Abstract Book

ISSN: 2588- 5545

37TH

سی و هفتمین کنگره رادیولوژی ایران

37th Iranian Congress of Radiology

19th Iranian Congress of Radiographic Sciences Association

نوزدهمین کنگره علوم پرتونگاری ایران

19-22 July, 2022

۲۸ تا ۳۱ تیر ماه ۱۴۰۱

Milad Tower Convention Center

مرکز همایش‌های بین‌المللی برج میلاد تهران

IR 2022

Radiology & AI: The Horizon on Approach افقی نو در رادیولوژی با هوش مصنوعی

مسئولیت محتوای خلاصه مقالات بر عهدهٔ نویسندهٔ مسئول مقاله می‌باشد.

Table of Contents

GENERAL INFORMATION

Venue.
International Conference Center of Tehran Milad Tower, Tehran, Iran
Organizer:
37th Iranian Congress of Radiology (ICR 2022) is organized by the Iranian Society of Radiology.
Date:
July 19-22, 2022
Language
The language of the congress is English and Persian
Secretariat Registration
Registration fee includes: • Admission to scientific sessions and commercial exhibition
Scientific Program Secretarial
Assistance and information regarding the scientific program will be provided by secretariat at conference center lobby.
Speaker Ready Room
The slide preview room is located in the "Main Hall "at Conference Center on the ground floor and will operate from 8:00 to 18:00. Lecturers are requested to submit their presentations 30 minutes before their session. The presentation should be in PowerPoint 2003 format. The files should be in portable media format supplied in flash-disk or CD.
VIP Room
The VIP room (Molavi Hall) is available for all ICR2022 speakers on -1/B1 floor at Conference Center
Electronic Posters
This year we only accept posters in electronic format. All posters should be prepared in PowerPoint 2003 format .Posters will be displayed in the lobby
Badges
Participants are requested to always wear their badges. The badges contain a bar-code which will be used for registering your entrance into the halls and also restaurants.
Workshop Registration
Workshops need separate registration. workshop schedule will be available at www.37.icrad.ir.
Meals
Coffee break will be available daily at 10:30- 11:00, 16:00-16:30 and lunch at 13:00- 14:00. All participants are advised to acquire the voucher for meals in advance at the time of their registration, otherwise they ought to get the voucher from registration desk.
Technical Exhibition
A technical exhibition will take place at the Conference Center, sufficient time during intermissions is reserved for visiting the booths of leading sponsors (Medical Engineering Companies), which present their latest achievements and give you ample expert information. Please refferte the Exhibit guide in your Congress bag.
Society Booth
The Iranian Society of Radiology booth is located on the lobby of conventional Center. Application forms and general information for membership are available. It provides membership services, information and an opportunity to pay annual dues for the society.
Only the Author is Liable for the Content and Wording of Abstracts. مسئولیت محتوا و نگارش بر عهده نویسنده مسئول مقاله می باشد.

INVITED SPEAKER ABSTRACTS LIST OF ICR2022

SCIENTIFIC ORAL ACCEPTED ABSTRACT LIST ICR2022

POSTER ACCEPTED ABSTRACT LIST OF ICR2022

EDUCATIONAL POSTER ACCEPTED ABSTRACTS LIST OF ICR2022

INVITED SPEAKER ABSTRACTS LIST (19TH IRSA)

SCIENTIFIIC ORAL ACCEPTED ABSTRACTS LIST (19TH IRSA)

SCIENTIFIIC POSTER ACCEPTED ABSTRACTS LIST (19TH IRSA)

List of Top 10 Scientific Abstracts of ICR2022

- **Comparison of predictive value of Helsinki Computerized Tomography scoring system,rotterdam and Stockholm in long-term outcome prediction in patient with traumatic brain injury**
  Author: Reyhane Faghihi

- **Fast-Unet++: A novel deep learning based approach for kidney dimension measurement using ultrasound images**
  Author: Mostafa Ghelich Oghli

- **Automatic diagnosis of liver steatosis by calculation hepato-renal index in ultrasound images using deep learning**
  Author: Mostafa Ghelich Oghl

- **A novel approach to breast tumor classification in ultrasound images based on the improved Inception-V3 model**
  Author: Mostafa Ghelich Oghli

- **An Artificial Intelligence-based Algorithm for Segmentation and 3D Visualization of Pancreatic Ductal Adenocarcinoma and Surrounding Vessels in CT images**
  Author: Tahereh Mahmoudi

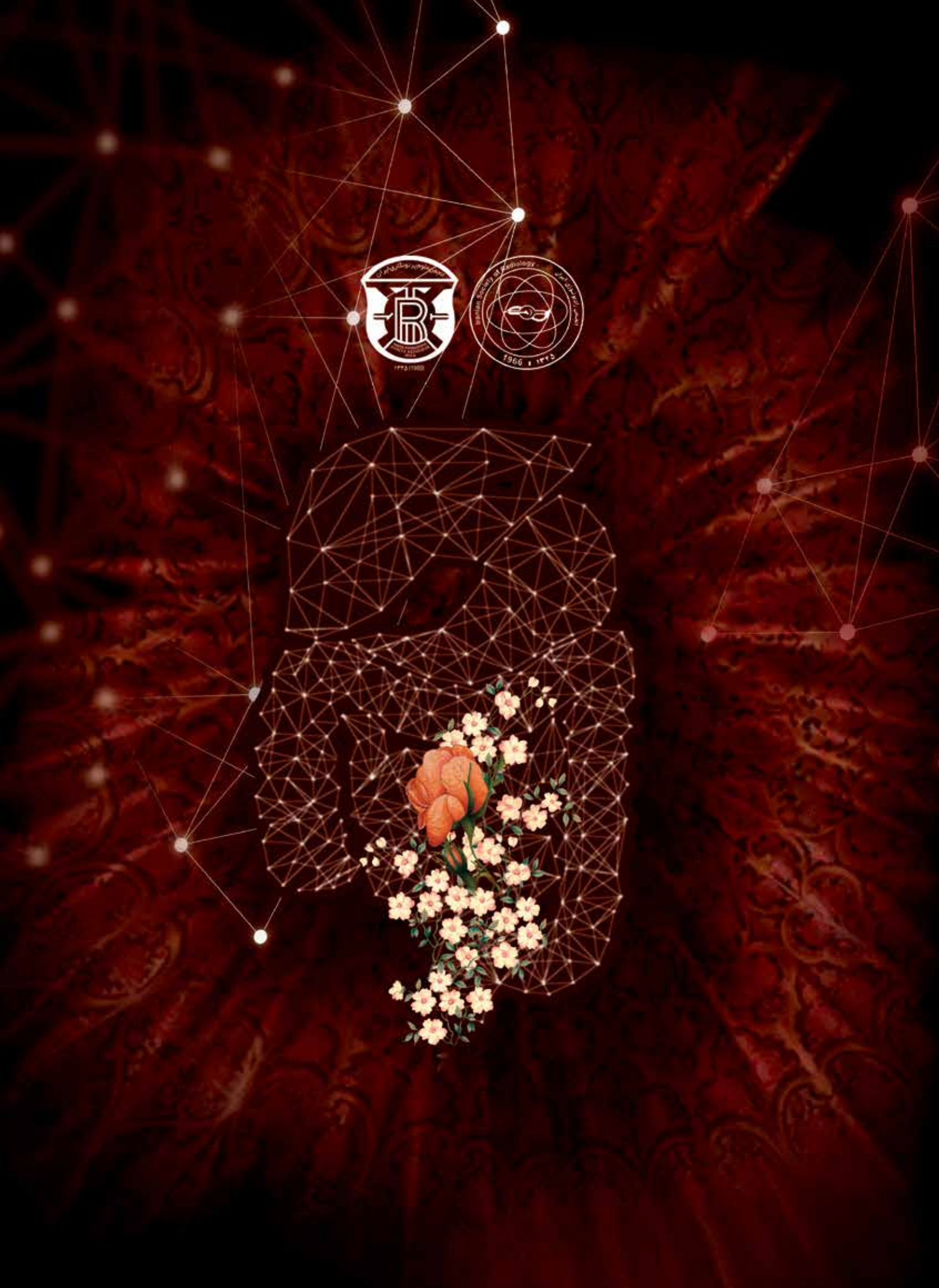
- **Comparative study of liver fibrosis staging and grading by MRI(DWI) and biopsy**
  Author: Saeed Naghibi

- **Cascade-Net: A deep learning-based framework for auto-segmentation of prostate and organs at risk in ultrasound images for high-dose rate brachytherapy**
  Author: Eman Showkatian

- **Correlation of Chest CT and MRI in Staging Pulmonary Morphological Changes in Cystic Fibrosis Patients**
  Author: Neda Pak

- **MRI Evaluation of the Symmetry of the Levator Veli Palatini Muscle Among a Noncleft Palate Population**
  Author: Neda Tahmasebifard

- **Using deep learning networks for classification of lung cancer nodules in CT images**
  Author: Mohamad Ali Javadzade



ADVANCED FETAL CNS EXAMINATION (SECOND TRIMESTER NEUROSONOGRAPHY)

Sara Parviz, MD
Tehran University of Medical Sciences (TUMS), Imam Khomeini Hospital Complex, Advanced Diagnostic and Interventional Radiology Research Center (ADIR)

Abstract:

Neurological abnormalities are among the most common fetal anomalies detected during screening modalities.
Ultrasound screening for CNS malformations is carried at the mid-trimester anomaly scan.
Visualization of three axial planes, (Trans ventricular, Trans thalamic and Trans cerebellar planes) is a part of baseline screening for CNS anomalies.
Basic evaluation of the fetal spine is also part of this screening procedure.
According to the ISUG guideline update (2020) in cases with any suspicious of CNS abnormalities (based on the screening ultrasound, background family history, or any other risk factor) a targeted fetal neurosonography must be done as a diagnostic examination.
The neurosonogram is a dedicated multi-planar ultrasound approach which is preferably done with trans-vaginal probe. When TVS is not technically feasible (e.g. breech presentation; twin pregnancy), the examination is performed trans- abdominally with the use of high-resolution linear or micro convex transducers.
Using sutures and fontanels as the acoustic window for brain evaluation, four coronal planes (including trans frontal, trans caudate, trans thalami and trans cerebellar planes) are obtained.
In the sagittal orientation mid sagittal view (anterior and posterior) and parasagittal planes are used for evaluation of the brain structures.
In each planes different brain structural anatomy must be evaluated according to the expected normal for the gestational age. The target structures include cavum septum pellucidi, ventricles, cortical sulci and posterior fossa structures.
Midline anatomy, including the corpus callosum and the cerebellar vermis are best seen in the midline sagittal view anteriorly and posteriorly respectively.
The fetal spine is evaluated in three axial, coronal and sagittal planes and the position of the conus medularis must be determined.
The use of a 3D ultrasound approach is recommended in targeted neurosonography, particularly when a good two-dimensional image is difficult to obtain.

Keywords:

Fetal Neurosonogram, Second Trimester, Congenital CNS Anomaly

WHAT ARE IMPORTANT FOR A NEUROSURGEON IN SPINAL REPORTS?

Shams Amiri.R, MD
Assistant Professor of Neurological Surgery, GOUMS

In this presentation we discuss issues which are important for neurosurgeons in different diagnostic radiologic tools by various field of concerns such as pathologic diagnosis, anatomic evaluations by radiographic measurements and indices and stability of spinal column. Medico-legal issues for reporting or not reporting of these measurements and also post-operative findings are another topics of challenge, which need more illumination and discussion.

ALARM FEATURES IN ROUTINE SPINE IMAGES; CONCURRENT INFECTION OR TUMOR, CASE PRESENTATION

Soheila Borji, MD
Zanjan University of Medical Sciences

Vertebral column is the most common organ involved with metastasis. Cancers that most prevalently metastasize to vertebra are breast, prostate and lung.

The most important symptom in cervical or lumbar region is local pain. X-ray images do not provide enough findings to detect metastasis. Up to 40% of vertebral metastasis are not diagnosed with X-ray images. Osteolytic lesions are common and most common findings include pedicle resorption and compression fractures.CT can detect metastasis earlier in comparison to X-ray. Furthermore, MRI is the most sensitive imaging method in detecting metastasis.

Osteolytic lesions have low signal in T1 weighted and high signal in T2 weighted and STIR with mild enhancement in post contrast images. Blastic lesions has low signal in both T1 and T2 weighted images. TB spondylodiscitis is the other important vertebral pathology, which involves two, or three levels especially in lumbar levels. Epidural soft tissue can also be involved.Soft tissue with low signal in T1 and high in T2 with enhancement in post contrast images is the main MRI finding in this disorder.

Other vertebral pathologies such as brucellosis, lymphoma, aneurismal bone cyst, osteoblastoma and multiple myeloma is also described in this case review.

IMPORTANT FEATURES OF SPINAL MECHANICAL INSTABILITY AND FACET DEGENERATION

Reza Bakhshandehpour, MD, IBR
Parseh Medical Imaging Center, Tehran, Iran
Amir Bakhshandehpour

Learning Objectives:

Upon completion of this presentation, participants will be able to: 1) Recognize classic definition(s) and methods of evaluation of the spinal instability 2) Review important Imaging features of spinal Instability and Facet joint Degeneration Presentation.

summary:

Low back pain is a socioeconomic problem encountered all over the world. About 80% of people experience it at some point during their lifetime, and it is reported annually in 36% of patients. Fortunately, 90% of low back pain cases are nonspecific and have no specific etiology. The main cause of low back pain is Mechanical Spinal Instability (MSI). MSI is defined as the abnormal movement in the motion segment beyond normal limits. Also, from a radiological point of view, MSI is usually divided into two main subgroups: Microinstability (without radiologic presentation) and Macroinstability (with radiologic presentation). The main etiologies of MSI are degenerative, traumatic, and neoplastic causes. In this presentation, we will only focus on the degenerative etiology. To diagnose MSI, the gold standard imaging technique used is taking dynamic radiographs of the spine in the flexion-extension position. In this technique, abnormal movements in Sagittal Translation (>4 mm) or Segmental Angulation (>15°) are investigated. In the second half of this presentation, Facet Joint Degeneration, which results from abnormal movements associated with disk degeneration, will be discussed. Facet joints have been reported to be responsible for 15%-45% of the cases of low back pain, and for 40%-55% of the cases of chronic neck pain without disk herniation. Therefore, the awareness of both clinicians and radiologists regarding imaging presentations in MSI and Facet Joint Degeneration plays a vital role in further providing better medical and surgical interventions.

Keywords:

Mechanical Spinal Instability, Facet Joint Degeneration, Dynamic Lateral Flexion and Extension, Magnetic Resonance Imaging

FOCUS ON SPINAL CANAL STENOSIS

Farnaz Godazandeh, MD
Assistant Professor of Radiology
Department of Radiology, faculty of Medicine, Mazandaran University of Medical Sciences, Sari, Iran

Spinal canal stenosis refers to the diverse conditions that decrease the total area of the spinal canal. It is generally divided into developmental or congenital and acquired types.

Four factors are associated with the degenerative changes of the spine that cause spinal canal stenosis:

disc herniation, hypertrophic facet joint, osteoarthritis, ligamentum flavum hypertrophy and spondylolisthesis.
As the population ages and average life expectancy increases, the number of patients with symptomatic spinal canal stenosis has increased. In order to select the most efficacious therapy, patient's clinical course, severity of symptoms, and radiological features are usually considered. MRI plays a key role in the diagnosis of spinal canal stenosis, and there have been reports of a statistical association between MRI grading and the patient's disability or neurological impairment.
There are various classification systems for evaluation, although quantitative measurements appear impractical. qualitative assessment of the relationships between the anatomical structures plays a major role in establishing the presence of spinal canal stenosis. Therefore, grading systems for classifying central spinal canal, lateral recess, and neural foraminal stenosis will be discussed.

IMAGING WORK UP OF STROKE

Nematollah Nematollahy, MD
Assistant Professor, Department of Radiology, Golestan University, Gorgan, Iran

Stroke is a serious health problem and is responsible for more than 5% of total deaths.It is also the leading cause of morbidity.
CT and MRI techniques as well as lumen imaging such as CT angiography and MR angiography are the main traditional methods for evaluation of acute ischemic stroke. Newer imaging modalities, including vessel wall MRI, transcranial Doppler ultrasonography, and 4D CTA and MRA, are developed to complement conventional CT and MRI techniques. Endovascular treatment is now proved to be an efficacious potent treatment option for patients with acute ischemic stroke with large-vessel occlusion involving the anterior circulation.Eligibility for this treatment is mostly determined by imaging, demonstrating ischemic core and penumbra. Having said that, CT and MRI are not able to precisely determine whether and to what extent brain tissue is infarcted (core) or still viable. Furthermore, there are often discrepancies between core volume and clinical outcome. This is due to the fact that imaging is a single-time measurement, but progression from severe ischemia to infarction is dynamic process and depends on many other factors beyond visible ischemic core on imaging.
Ultra-high magnetic field, ≥7 Tesla, scanners can produce a high spatial resolution images and scan faster than conventional low-magnetic field MR scans. Their invention was a breakthrough in neuroimaging. Non stenotic culprit intracranial plaques could be identified and high risk plaques could be diagnosed for appropriate treatment.
Plaque composition and characteristics like lipid content, neovascularization and intraplaque hemorrhage could be as important as stenotic effect of plaque in determining stroke risk. Vessel wall MRI is an state of the art protocol for stroke workup, especially in intracranial atherosclerosis. This change of insight into causes of ischemic stroke has led to a trend toward imaging the intracranial vasculature. In this presentation these issues will be discussed and relevant images will also be demonstrated.

Keywords:
Stroke, MRI, Ischemic Core

NOVEL APPLICATIONS OF PERFUSION IMAGING IN NEURORADIOLOGY

Mohammad Hadi Gharib, MD
Assistant Professor of Radiology
Golestan University of Medical Sciences (GOUMS), Gorgan, Iran

Until recently, most efforts in radiology were focused on the improvement of visualization and resolution of 2D characteristics of tissues and lesions.However, In the last few years, there have been robust advances in MR protocols focused on the evaluation of functional tissue characteristics, esp. perfusion or metabolism of tissues.
Application of these functional imaging techniques has enhanced our knowledge of tissue and tumor physiology and improved interpretation of CNS disease and evaluated the therapeutic managements of patients esp in the field of neuroradiology.
Moreover, we are now more confident to also assess treatment-related changes in follow-up imagings.

In this context, perfusion is one of the most important physiologic and pathophysiologic imaging protocols introduced and more developed esp. ln the last decade. Today, several techniques are available to perform perfusion studies and then calculate different perfusion parameters.
In addition, these investigations can be done using not only widely administered exogenous gadolinium-based contrast agents but also applying endogenous contrast dynamic methods (e.g. arterial spin labeling). Lack of awareness of perfusion MRI application in referring physicians, knowledge and experience deficit of Perfusion MRI in the performing radiologist and also significant complexity of Perfusion MRI protocols are strong existing drawbacks in this field. In addition, lack of simple and standardized post processing softwares and also guidelines on how to Interpret these results are other emerging problem issues?
Anyway, nowadays strong datasets are being accumulated to better demonstrate the impact of perfusion imaging on clinical practice these days. So, it is necessary for us to be more familiar with the pivotal role of these types of studies esp. in the field of stroke and tumor mapping.

THE ROLE OF VWI IN ACUTE STROKE, CRYPTOGENIC STROKE AND VASCULOPATHY DIFFERENTIATION AND EVALUATION OF ANEURYSMS: ITS INTEGRATION INTO WORKFLOW

Maryam Haghighi-Morad, MD
Assistant Professor of Radiology, Loghman Hakim Hospital, Shahid Beheshti University of Medical Sciences

Intracranial vessel wall imaging is a supplementary technique for conventional angiographic imaging with MRA, CTA and DSA. It is used in keeping with conventional methods for direct visualization of the vessel wall.
Differentiation of symptomatic narrowing of intracranial vessels due to atherosclerosis, vasculitis, RCVS and dissection is difficult with conventional methods but VWI is more accurate and reliable in this era.
On the other hand, it is an adjunct of conventional imaging in some situations include:
determination of the location of atherosclerotic plaque relative to branch ostium, detection of stroke etiology and risk assessment for angiography.
Furthermore, it is a new method for assessment of atherosclerotic plaque or vasculitis activity.
VWI is useful for biopsy of intracranial vessels in CNS vasculitis to select a target.
It is a new way of imaging to detect the ruptured aneurysm in patients with SAH and multiple aneurysms, but it's role in predicting future behavior of intracranial aneurysms is in the field of ongoing research

TECHNICAL POINTS AND INTERPRETATION OF MRU IN PEDIATRIC URINARY SYSTEM ANOMALIES

Fatemeh Zamani, MD
Assistant Professor of Radiology, Children Medical Center of Excellence, Tehran University of Medical Sciences (TUMS), Tehran, Iran

Magnetic Resonance Urography (MRU) is a comprehensive imaging modality for evaluating multiple pediatric urologic conditions combining excellent anatomic detail with functional information. MRU has better contrast resolution than CT urography without exposure to ionizing radiation and does not require IV contrast administration, making it more suitable for examination of pediatric and pregnant patients, patients with renal impairment and for patients with congenital abnormalities. MRU can be used to evaluate the renal parenchyma, the pelvicaliceal system, and the rest of the urinary tract in a single imaging study as in CT urography but without radiation exposure and IV contrast administration. MRU is limited by longer examination times than for CT urography, decreased spatial resolution, and an inability to reliably depict calcifications and calculi. MRU can be performed without contrast administration with static-fluid T2-weighted sequences and after IV contrast administration with excretory T1-weighted sequences (excretory MRU). Imaging usually is performed in the axial and coronal planes, the excretory images being acquired approximately 5

minutes after contrast administration. To avoid the risk of nephrogenic systemic fibrosis, static-fluid MRU is preferable to excretory MRU in the imaging of patients with impaired renal function, pregnant patients, and patients with ureteral obstruction.
Urinary tract dilatation (UTD), detected pre- or post-natally, is one of the most common reasons to image the urinary tract. Common indications for pediatric MRU include evaluation of complex renal and upper urinary tract anatomy, suspected urinary tract obstruction, operative planning, post-operative complications, and functional assessment. Additionally, MRU can visualize the entire course of the ureter and identify ectopic insertions as well as sites and potential causes of narrowing or obstruction, including identification of crossing vessels as a cause of ureteropelvic junction obstruction. In planning for surgery or evaluating post-surgical changes, MRU can provide detailed anatomic assessment for the surgeon with the ability to make 3D reconstructions of the entire renal and upper urinary tract.

Keywords:

MRU, Pediatric, Kidneys, Urinary Tract

TECHNICAL POINTS AND INTERPRETATION OF MRCP AND ULTRASOUND IN PEDIATRIC BILIARY DISORDERS

Neda Pak, MD

Associate Professor of Radiology, Radiology Department, Children Medical Center of Excellence, Tehran University of Medical Sciences, Iran

The pathologies of biliary tree in the pediatrics varies depending on the age of presentation including congenital and acquired diseases such as: Biliary atresia, Choledochal cyst, Bile leak, Alagille syndrome, cholelithiasis, Primary sclerosing cholangitis, infectious diseases. patients usually present with cholestasis and direct hyperbilirubinemia. Multimodality imaging assessment of the pediatric biliary system is required for appropriate management plan and awareness of the imaging features of the various biliary pathologies is mandatory. Real-time ultrasound is an important tool for differentiation of obstructive and non-obstructive causes of jaundice in pediatrics and Magnetic resonance cholangiopancreatography (MRCP) may be used as advanced techniques in special clinical conditions. Knowing the normal diameter of common bile duct (CBD) based on age is necessary to avoid underestimation the pathologic condition. The diameter of the common bile duct should be less than 1.6 mm in children younger than 1 year and less than 3.3 mm during childhood and early adolescence. The normal pediatric gallbladder is approximately 1.9 cm in length in neonates and 3.4 cm in length in infants and less than 1 cm in width. The average length of the gallbladder in a 16-year-old is 8 cm, with an average width of less than 3.5 cm and gallbladder wall thickness should be less than 3mm.In this session, we will illustrate the embryology and anatomy of the pediatric biliary system. Then, we will provide an overview of the imaging modalities and techniques used to assess the biliary system and imaging findings in various pathologies.

Keywords:

Pediatrics, Biliary disorder, Ultrasound, MRCP, Atresia, Choledocal Cyst

IMAGING APPROACH IN PEDIATRIC ABDOMINOPELVIC MASSES

Mitra Khalili, MD

Assistant Professor of Radiology, Shahid Beheshti University of Medical Sciences, Tehran, Iran
m.khalili76@yahoo.com

Pediatric abdominal masses are commonly encountered in the pediatric population, with a broad differential diagnosis including congenital and acquired lesions that may be benign and malignant. The primary role of abdominal imaging is to establish presence of mass and secondly identifying the differential diagnosis based on salient imaging features. In the setting of tumoral lesion, imaging modalities play an important role for diagnosis of the nature of tumor, extent of disease, and assist in presurgical planning. there are ACR imaging guidelines for abdominal masses in adults, however,

there is no ACR guidelines for pediatric abdominal masses and there is evidence-based practical imaging algorithm for pediatric abdominal masses.
Abdominal ultrasound is the preferred initial imaging modality in children with a suspected abdominal mass. Ultrasound can determine the anatomic origin as well as characterize the cystic or solid component and vascularity to narrow differential diagnosis. Local and distant abdominal metastasis in the abdomen can be assessed by ultrasound as well.
Abdominal X-ray should be requested as the initial imaging when there is concomitant abdominal pain and when there is suspicion for GI pathology based on clinical history and physical examination.
Cross sectional imaging such as CT of the abdomen and pelvis with contrast or MRI is recommended for further characterization of mass if ultrasound is inconclusive and also for better evaluation of disease extension for staging. suspected diagnosis dictates the exact CT and MRI protocol. Advantages of CT include its wide availability and rapid acquisition with disadvantage of radiation. MRI has the best contrast resolution than other imaging modalities in accurate diagnosis of an abdominal mass, However, has the risks of anesthesia in infants and children.
Nuclear medicine is a helpful adjunct imaging modality in selected cases in the pediatric population.

WHAT IS IMPORTANT IN IMAGING OF PEDIATRIC PRECOCIOUS PUBERTY

Elham Zarei, MD
Assistant Professor of Radiology, Ali Asghar Children Hospital, School of Medicine, Iran University of Medical Sciences, Tehran, Iran

Precocious puberty (PP) is a development of secondary sex characteristics before the age of 8 in girls and before the age of 9 in boys.
Development of secondary sex characteristics may result from inappropriate activation of the hypothalamic-pituitary axis with release of gonadotropin, or from gonadotropin-independent secretion of sex steroids by the adrenal glands or gonads. A variety of lesions can manifest with precocious puberty, including various CNS lesions, adrenal lesions, and sex cord–stromal tumors of the testis or ovary. CNS lesions causing precocious puberty are much more common in boys than in girls and are well evaluated with brain magnetic resonance imaging.
Early diagnosis and treatment of PP is essential due to emotional consequences and effects on health (early termination of growing, decreased fertility in adulthood). The diagnostic algorithms of PP encompass hormonal, genetic and imaging examinations.
The GnRH stimulation test was considered the gold standard for the laboratory confirmation of Central PP. However, GnRH stimulation test had several drawbacks such as the discomfort to patients, a time-consuming procedure with multiple samples, relatively high costs and a low sensitivity despite high specificity. The pelvic ultrasound is a useful method to evaluate pelvic organs, breast and scrotum. It is noninvasive, relatively less time-consuming and relative inexpensive A standard imaging examination which extends the physical one is breast and abdominal ultrasound scan in girls and scrotal imaging in boys.
The aim of this presentation is to visualize underlying changes that may be a cause (e.g. ovarian and adrenal tumor) and consequence (accelerated development of the reproductive organs – uterine and ovaries) of precocious puberty.

SCROTAL DISORDERS IN CHILDREN

Amirreza Jahanshahi, MD
Assistant Professor of Radiology, Tabriz University of Medical Sciences
dj_amirreza@yahoo.com

Testicular volume is approximately 1–2 cm^3 before the age of 12 years and reaches 4 cm^3 in pubertal males. In the peripubertal period a difference of 3 mm in anteroposterior diameter is significant. Testicular size determination specially important at suspicious to varicocele, testicular atrophy and acute scrotum.
Processus Vaginalis is outpouching of the parietal peritoneum, through which the testis descends from the abdomen to the scrotum between the 7th and 9th months of fetal life. Failure of the testis to descend and patency or anomalous closure of the

processus vaginalis result in the following conditions: cryptorchidism, inguinoscrotal hernia, and hydrocele. Hydrocele is an abnormal collection of fluid between the visceral and parietal layers of the tunica vaginalis and/or along the spermatic cord. In the normal scrotum, 1–2 mL of serous fluid may be observed in the potential tunica vaginalis cavity and should not be mistaken for hydrocele.

Virtually all hydroceles are congenital in neonates and infants and associated with a patent processus vaginalis, which allows peritoneal fluid to enter the scrotal sac.

In older children and adolescents, hydroceles are usually acquired and are the result of an inflammatory process, testicular torsion, trauma, or a tumor.

Acute Scrotum refers to a clinical picture of sudden-onset scrotal pain, redness, and swelling and most frequently caused by :acute epididymo-orchitis, testicular torsion and or torsion of the testicular appendages.

Testicular torsion occurs when an abnormally mobile testis twists on the spermatic cord, obstructing its blood supply (first venous and later arterial flow obstruction) and the ischemia can lead to testicular necrosis if not corrected within 5-6 hours of the onset of pain. The testis is usually elevated as a result of the torsion and the shortening of the cord itself and may be in a transverse lie.

Testicular Microlithiasis is usually an incidental finding and at this condition, calcifications are seen as bright, nonshadowing hyperechoic foci (five or more on any single view) within testis parenchyma that tend to be uniform in size in each patient and are distributed in a diffuse pattern or in peripheral clusters.

SHOULDER INSTABILITY IMAGING IN THE YOUNG ATHLETES

Seyed Hassan Mostafavi, MD
Ex-assistant Professor of Radiology, Iran University of Medical Sciences, Tehran, Iran

Shoulder instabilities in young athletes can be divided into traumatic, atraumatic, and microtraumatic glenohumeral instabilities, which can lead to secondary impingement syndromes. Magnetic resonance (MR) arthrography is superior to conventional MR imaging in the diagnosis of labroligamentous injuries, intrinsic impingement, and SLAP (superior labral anteroposterior) lesions, and thus represents the most informative imaging modality in the overall assessment of glenohumeral instability. This article reviews the imaging criteria for the detection and classification of instability-related injuries in young athletes.

Keywords:

Shoulder MRI, Dislocation, Instability, MR Arthrography, Young Athletes Shoulder

IMAGING IN MENISCAL TEAR ACCORDING TO ISAKOS CLASSIFICATION

Behzad Aminzadeh, MD
Assistant Professor of Radiology, Department of Radiology, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran

Hamidreza Yazdi, MD

Abstract:

Meniscal tear is one of the most common injuries following trauma and sports injuries. considering the significant role of meniscus in joint stability and load distribution in the knee, several new treatments are suggested in the literature depending on the type and extent of meniscal tear. it is necessary to know the exact type of meniscal tear in the mentioned studies to use different suggested treatments in routine practice. as a result, in addition to accurate diagnosis of type and extent of meniscal tear, having the same terminology to describe the meniscal injury is important for choosing the best treatment option by the orthopedic surgeon.

Accordingly, International Society of Arthroscopy, Knee Surgery and Orthopedic Sports Medicine (ISAKOS) recommends a standard and reliable system to describe and document meniscal injuries in arthroscopy.

According to the ISAKOS, the following categories should be specified in describing meniscal damage:

1. Tear depth (Partial or complete)
2. Location/rim width (Zone 1, 2, 3)

3. Radial location (Anterior, middle, posterior)
4. Central to popliteus hiatus? (Yes or no)
5. Tear pattern (Horizontal, radial, longitudinal, flap, complex)
6. Quality of meniscus tissue (Degenerative, nondegenerative, undetermined)
7. Tear length (In millimeters)

According to a pilot study, this classification has a good interobserver reliability for pooling data from international clinical trials to evaluate the treatment outcomes of meniscal tears.
MRI is the method of choice for non-invasive meniscal imaging and diagnosis of meniscal tears. MRI reporting according to ISAKOS standards can significantly help standardize reports and increase multi-disciplinary communication in this respect. However, this classification is not well known and practical among radiologists.
In this conference, we will discuss the MR imaging appearances of meniscal tears based on ISAKOS classification, and the importance of each category will be assessed clinically.

Keywords:

Meniscal Tear, ISAKOS, MRI

DIXON IMAGING IN BONE MARROW LESION

Sara Parviz, MD
Tehran University of Medical Sciences (TUMS), Imam Khomeini Hospital Complex, Advanced Diagnostic and Interventional Radiology Research Center (ADIR)

Abstract:

Dixon method is a fast technique based on the chemical shift. The images are produced according to the differences in the water and fat resonance frequency in the voxels.
In a single acquisition, fat only, water only, in-phase and opposed-phase images are obtained.
In the in-phase images the fat and water signals are added. In the opposed-phase the fat signal is subtracted from the water signal. The fat only images are in-phase minus opposed-phase and the water only are in-phase plus opposed-phase.
The water only images have the similar appearance as fat sat sequences.
This method has become popular regarding its advantages over the other fat suppression methods. It is a fast method could be performed with gradient and spin echo and the gradient echo make it even faster.
Both 3D and 2D images can be obtained.
In contrast to the chemical shift selective (CHESS) techniques, the fat suppression is uniform and not influenced by the field inhomogeneity. This advantage is more significant in the body parts with curvature. (eg. distal extremities)
The technique also has a good signal to noise ratio comparing to the inversion type fat suppressed images. (STIR)
Considering the potency of the Dixon method, it is a feasible technique for large field of views. (eg. whole spine)
There are some studies presenting whole body Dixon imaging for metastasis work op.
It is also a potent tool for solving the problem cases of bone marrow lesion. It can easily identify the gross and intracellular fat and differentiate infiltrative lesions (such as multiple myeloma and metastasis) from the benign ones (atypical hemangioma or stress fracture)
Another indication of the Dixon method is the post contrast images regarding its uniform fat suppression.
Regarding the advantages and potency of the Dixon technique it gains popularity especially for bone marrow evaluation and gradually replace the conventional fat suppressed methods.

Keywords:

Bone Marrow Pathology, Chemical Shift Imaging, Dixon, MRI

EVALUATION OF BONE TUMORS (BENIGN & MALIGNANT TYPES) IN THE AXIAL AND EXTREMITIES BY MRI

Ali Radmehr, MD
Professor of Radiology

Plain Film X-ray is a primary approach for evaluation and characterization of osseous lesions.
Bone isotope scan ,CT scan and MR images as imaging

modalities all play a significant role for diagnosis and staging of the bone tumors and classification of bone tumors as benign and malignant and determining invasive or locally invasive or noninvasive.
Through this communication we would like to discuss some common and uncommon bone tumors by MRI with common and uncommon interesting presentations.

INTERACTIVE AND CHALLENGING CASE PRESENTATION OF SHOULDER PATHOLOGIES

Leila Aghaghazvini, MD
Associate Professor of Radiology, Tehran University of Medical Sciences
Seyed Hassan Mostafavi, MD
Leila Zanjani
Nima Bagheri
Mohadesseh Azadvari

The gleno-humeral joint is relatively shallow, with the large humeral head compared with the glenoid fossa so the labrum as a fibro-cartilaginous structure increases the depth of the glenoid. Four muscles (supraspinatus, infraspinatus, teres minor, subscapularis) with their tendons, form the rotator cuff that contain cable in distal portion. Tendinopathy and tearing of rotator cuff have different appearance in MRI. The large deltoid muscle has a broad origin on the distal clavicle and acromion to insert into the deltoid tubercle of the proximal humeral diaphysis. There are several ligaments in shoulder too. The instability of shoulder as one of the important complains of patients and labral tearing and classifications and also primary or secondary impingement and causing factors have direct and indirect signs in MRI and MRarthrography. Adhesive capsulitis can be evaluated according to some criteria in imaging. In this case presentation we will review different pathologies and imaging criteria with focus on radiologist interpretation and orthopedic point of view.

OVERUSE SYNDROMES AND INJURIES INVOLVING THE ELBOW: MR IMAGING FINDINGS

Sepehr Haghighi, MD
Consultant Radiologist, Children's Medical Center, Tehran University of Medical Sciences, Tehran–Iran

Background:

Most elbow injuries result not from acute trauma but from repetitive microtrauma and chronic stress overload of the joint. Such "overuse" injuries may be difficult to diagnose clinically. In patients with elbow pain of uncertain origin, MR imaging may improve diagnostic specificity and accuracy.

Methods:

In this essay, characteristic MR imaging findings in common traumatic and overuse syndromes of the elbow are illustrated.

Results:

Diseases that can be observed include bone fractures and joint dislocation, osteochondroses, osteochondritis dissecans, ligament lesions, tendon abnormalities, neuropathies, and bursal conditions. Understanding its anatomy and biomechanics is the first step towards accurate evaluation and diagnosis of common pathologies using MRI.

Conclusions:

Athletes and children are particularly at-risk populations for chronic overuse syndromes and traumatic injuries. Finally, knowing the mechanisms of the most common elbow injuries and how they can affect joint function will facilitate communication between the radiologist and referring physician.

Keywords:

Elbow, Overuse Injury, Magnetic Resonance Imaging

MR IMAGING OF SHOULDER IN ATHLETES; EMPHASIZED ON ROTATOR CUFF INJURY

Reza Nafisi Moghadam, MD
Associate Professor of Radiology, Radiology Department, Shahid Sadoughi University of Medical Sciences, Yazd, IRAN

Abstract:

Shoulder is the most mobile joint and support by soft tissue such as the rotator cuff, capsule, glenohumeral ligaments, labrum, and the long head of the biceps tendon. This structures are susceptible for sports injury. Diagnosis of these injuries is important to quality of life.

This lecture discusses shoulder injury related to athletes emphasized to rotator cuff.

Static and dynamic stabilizers support glenohumeral joint. The rotator cuff tendons and the long head of biceps tendon are dynamic stabilizers. External and internal rotation of shoulder and humeral head centering are result of contracture balance between rotator cuff muscles. Shoulder impingement and rotator cuff tendinopathy are most common injury in throwing sports. Rotator cuff including the supraspinatus, infraspinatus, teres minor, and subscapularis, that is similar to unique structure. Therefore, injury of one of them may be involved other rotator cuff tendons. Each tendon has two surfaces; bursal surface in superficial side and articular surface in deep side of tendone.Degeneration and tearing of tendons is the most common complication of shoulder overuse such as overhead thletes.

Tendon thickening and signal change such as intermediate signal intensity in T2 images on MRI are imaging findings of tendon degeneration. we show fluid in tendon by ultrasonography. Tendon tear in MRI or US is showed by fluid in tendon, Which may extend to articular or bursal surfaces. Tendon tears extension to articular surface are twice as common as bursal surface.

As increased collagen of bursal side, as an important factor to prevent of tendon tear in this side.

CAROTID CT ANGIOGRAPHY FOCUSED ON PLAQUE CHARACTERIZATION

Ali Mohammadzadeh, MD
Associate Professor of Radiology, Rajaie Cardiovascular Center, IUMS

Abstract:

Stroke is the second most common cause of death worldwide and a significant proportion of all ischemic strokes are due to carotid atherosclerotic disease.

The evolution of computed tomography (CT) imaging techniques has allowed for the routine characterization of carotid plaque features.

The traditional concept of using the degree of luminal stenosis as the sole imaging marker for the selection of the optimal therapeutic approach is challenged by a rapidly growing body of literature demonstrating that plaques causing only mild stenosis may still lead to stroke (30 % of crypotogenic stroke).

Nowadays the imaging of vulnerable plaques and their characterization plays a key role towards the improvement of risk stratification and therapy selection in patients with both high- and low-degree carotid artery stenosis.

Compensatory remodeling of the artery may mask early stenosis,as the vessel dilate in the beginning of the stenosis.

The target of plaque imaging is to look beyond the lumen using advanced wall identifying the vulnerable symptomatic plaque:

- Intra-Plaque Hemorrhage (IPH)
- Thin or Ruptured Fibrous Cap (FC)
- Size of the lipid-rich-necrotic-core (LRNC)
- Active plaque inflammation.

Advantages of Multi-Energy CT compared with conventional CT include the ability to differentiate calcified plaque from iodinated contrast, while also facilitating bone subtraction, used to evaluate calcified plaques.

Multi-energy CT scanners because of their potential to perform spectral analysis and distinguish between the different subtypes of calcifications: Hydroxyapatite (in unstable plaque) and calcium oxalate (stable plaque).

Implicatins for prevention and treatment of cerebrovascular events. European Society of Cardiology (ESC) in March 2018, it is recommended that for asymptomatic patients with a life expectancy

>5 years and 60-99% carotid artery stenosis and imaging features associated with increased risk of ipsilateral stroke (IPH or LRNC), carotid artery revascularization should be considered.
MRI is the gold standard for plaque imaging. MRI can be used to distinguish between LRNC and IPH.
CTA is used to determine calcification, Low density area, luminar surface and degree of stenosis MDCTA images illustrating the classification of carotid plaques based on their surface morphology as smooth, irregular, and ulcerated

Keywords:
CT Angiography, Carotid, Plaque Characterization

KEY IMAGING FINDING AND REPORTING POINTS IN ORAL CAVITY PATHOLOGIES WITH EMPHASIS ON ORAL TONGUE, SUBLINGUAL SPACE AND ALVEOLAR RIDGE SUBDIVISIONS

Fahimeh Azizinik, MD
Assistant Professor, Department of Radiology, Advanced Diagnostic and International Radiology Research Center, Division of Head-Neck and OB-GYN Imaging, Amiralam and Yas Hospital, Tehran University of Medical Sciences, Iran
Email: Azizinikfahimeh@gmail.com

Abstract:
In this session firstly all cross sectional anatomy of the oral tongue ,floor of mouth,sublingual Space and alveolar ridge sub-site of oral cavity will be reviewed, followed by various pathologies of the mentioned sites including congenital, infectious/inflammatory, benign and malignant neoplastic process, vascular abnormalities and their imaging characteristics in computed tomography, magnetic resonance imaging or ultrasonography and differential diagnosis will be discussed.
Most common spread routs of SCC (the vast majority malignancy of oral cavity) from the above mentioned anatomic sites of origin will be presented with an emphasis on Key imaging features for standard and structural reporting, that affect staging and treatment planning,
Familiarity with the radiologic imaging appearances of the oral cavity and recognition of anatomic landmarks such as the mylohyoid and extininsic muscles are especially useful for localizing disease within this region.
Finally, Variouse interesting cases will also be presented for residents and radiologists.

APPROACH TO THYROID NODULES

Leila Aghaghazvini, MD
Associate Professor of Radiology, Tehran University of Medical Sciences
Mohammad Davudi
Sheida Javadi

There are different guidelines in differentiation of thyroid nodules according to gray scale ultrasound features. American TIRADs2017, ATA system2015, European TIRADS2017, Korean TIRADS and other guidelines are known mostly according to gray scale features regardless of color Doppler.
American TIRADS 2017 is a scoring system and categorizes nodules to benign, mildly, moderately, highly suspicious regarding to gray scale ultrasound. Ultrasound (US) elastography as a non-invasive technique for evaluating thyroid nodules has recently been introduced and appreciated in articles and some texts. There are different methods including strain elastography and shear-wave elastography with valuable results in evaluation of different pathologies especially in breast lesions.
In this workshop we will discuss about two major practical guidelines ATA2015 and TIRADS2017 and challenges and pitfalls and differences. We also aim to assess the usefulness of US elastography for thyroid nodules as added value to the gray scale features with focus on shear wave elastography.

IMAGING HIGH LIGHTS OF NASOPHARYNX AND OROPHARYNX

Maryam Mohammadzadeh, MD
Associate Professor, Department of Radiology, Division of Neuroradiology and Head & Neck Imaging, Amiralam Hospital, Tehran University of Medical Sciences
Email: m-mohammadzadeh@sina.tums.ac.ir

Abstract

In this session first of all cross sectional anatomy of nasopharynx and oropharynx will be reviewed, followed by various diagnostic modalities such as computed assisted tomography (CAT) scan, magnetic resonance imaging (MRI) and positron emission tomography (PET) CT.

Then various pathologies of nasopharynx and oropharynx including infectious, benign and malignant neoplastic process, inflammatory and granulomatous diseases such as Wegner and IGG4 diseases, their imaging characteristics and differential diagnosis will be discussed in detail.

There will be special attention to perineural spread of nasopharyngeal cancer in this session and various interesting and challenging cases will be presented to highlight importance of perineural spread diagnosis for residents and radiologists.

NON-MASS FINDINGS AT BREAST US, ARE THEY HAVE DIAGNOSTIC VALUE IN OUR PRACTICE?

Dr Maryam Farghadani, MD
Associate Professor of Department of Radiology, Isfahan University of Medical Sciences, Isfahan, Iran

Background:

A non-mass finding at US has been described as a discrete identifiable area of altered echotexture compared with that of the surrounding breast tissue that does not conform to a mass shape. Recognizing non-mass findings is important because breast cancer can manifest as such lesions, and US correlate findings for mammographic and breast MRI abnormalities may manifest as non-mass findings. The term non-mass finding is not part of the current Breast Imaging Reporting and Data System US terminology, and no standardized approach to classify and evaluate non-mass findings at US currently exists, despite the various classification systems proposed in the literature. Radiologists can improve detection and interpretative accuracy, as well as correlation of mammographic and MRI breast lesions, by increasing their recognition and understanding of non-mass findings at US.

Objectives:

- To Recognize the sonographic features of Non-mass findings at breast US
- To Describe the correlation between US features and MRI features for non-mass findings.
- To Identify the benign and malignant causes of non-mass findings at US.

Conclusion:

Suspicion should be raised, especially if non-mass findings are detected on US images in the expected location of a suspicious mammographic or MRI finding. The current published literature of non-mass enhancement provides varied definitions and classification systems. In this presentation, we suggest evaluating non-mass findings on US images by assessing internal echotexture, distribution, and associated findings.

Keywords:

Non-mass finding, Ultrasonography (US)

ROLE OF RADIOLOGIST IN TREATMENT PLANNING OF BREAST CANCER: UPDATES AND CURRENT CHALLENGES

Arvin Arian, MD
Associate Professor of Radiology, Tehran University of Medical Sciences, Cancer Institute, Advanced Diagnostic and Interventional Radiology (ADIR)

Breast cancer is the second cause of cancer related death in women worldwide. Stage of breast cancer at time of diagnosis is the main determinate of 5-year survival rate. The Radiologist have a vital role in the correct staging of breast cancer providing the

clinicians information that may change the disease stage, prognosis, or treatment plan.
They includes tumor size; total tumoral involvement including invasive and in-situ components , multi-focal or multi-centeric disease; nodal status (axillary levels I–III, supraclavicular and internal mammary chain); invasion to skin or nipple areolar complex, chest wall invasion (pectoralis, serratus anterior or intercostal muscle or ribs) as well as distant metastases.
In this article we describe the Role of different imaging modalities including mammography, ultrasound and MRI in pre-operative staging and treatment planning of breast cancer.

Key Words:

Breast Cancer, Cancer Staging, Mammography, Sonography, MRI

IDIOPATHIC GRANULOMATOUS MASTITIS: MANIFESTATIONS AT MULTIMODALITY IMAGING

Elham Neshan, MD
Assistant Professor, Department of Radiology, Faculty of Medicine, Tehran Medical Sciences, Islamic Azad University, Tehran, Iran

Idiopathic granulomatous mastitis (IGM) also known as granulomatous lobular mastitis is a non-infective granulomatous inflammation of breast typically in parous women characterized by lobulocentric noncaseating granulomas. IGM usually occurs in parous premenopausal women with a history of lactation and frequently is associated with hyper prolactinemia.
The clinical presentation is usually with a tender palpable mass of variable size.(1_20cm) ,Skin redness & warmth, pus discharging from skin sinuses & nipple are of other clinical signs.
Inflammatory breast carcinoma, bacterial and other infective mastitis, tuberculosis, systemic granulomatous conditions and breast fibrosis are top differential diagnoses.
IGM imaging recommendation depends on patient age, clinical marifestation and risk factors. One of the most useful protocol advises. Is mammography and ultrasound initially with us _ guided core biopsy and stains /culture for micro organisms. MRM may be helpful for mapping extent and monitoring response to treatment.
Patients with IGM have an excellent prognosis when they are appropriately treated with oral steroids or second line immunosuppressive and prolactin lowering medications. Imagining surveillance can be offered to patients with incidentally encountered IGM or mild symptoms.
The aim of this lecture is to review the imaging manifestations of IGM in a multimodality case _ based format and to describe relevant clinical and imagining based differential diagnoses.

Keywords:

IGM, Multimodality, Granulomas

BREAST IMAGING DURING PREGNANCY AND LACTATION

Behnaz Moradi, MD
Associate Professor of Radiology, Department of Radiology, Yas Complex Hospital, Tehran University of Medical Sciences (TUMS), Tehran, Iran.

Abstract:

The breast tissue undergoes significant physiological change during pregnancy and more notable in lactation. Involution of the breast occurs over a period of about 3 months after lactation ceases. These changes pose difficulties in clinical as well as radiological assessment of symptoms during this period. Most breast lesions detected during pregnancy and lactation are benign; however, the possibility of pregnancy-associated breast cancer (PABC) must be considered to avoid a delayed diagnosis. Tumors or disorders affecting the breasts in pregnant or lactating women are usually the same as those observed in nonpregnant women. However, some breast disorders are unique to pregnancy and lactation. There is limited evidence to support breast cancer screening in pregnant or lactating women based on ACR guideline. However, screening mammography is not contraindicated during pregnancy, particularly in women at intermediate to high risk for breast cancer. Ultrasound constitutes the most appropriate radiologic method for evaluating breast disorders in

women during pregnancy and lactation. MR imaging should be avoided during pregnancy but it is safe in lactation.

BREAST MRI ACR LEXICON

Khadijeh Bakhtavar, MD
Associate Professor of Radiology, Sina Hospital, Tehran University of Medical Sciences

Abstract:

MRI is currently the most sensitive imaging modality for identifying breast cancer and detects malignancy that is occult to clinical examination, mammography and ultrasound.

The ACR breast MRI lexicon provides a common framework for reporting imaging findings and directing next steps in patient care. While the basis of breast MRI consists of T1-weighted contrast-enhanced imaging, T2-weighted, ultrafast, and diffusion-weighted imaging may be used to improve lesion characterization. Such multiparametric assessment of breast lesions allows for excellent discrimination between benign and malignant breast lesions.

Indications for breast MRI are expanding. Its main indications are; staging of known cancer, screening for breast cancer in women at increased risk and evaluation of response to neoadjuvant chemotherapy. Other Indications for Breast MRI are carcinoma of unknown primary origin and proved axillary carcinoma (MRI depicts the primary cancer in the breast in up to 60% of cases), problem solving in findings that are not certainly benign but cannot be sampled for biopsy by using conventional imaging guidance such as mammographic asymmetries where a negative MRI effectively rules out the presence of cancer and in nipple discharge where MRI outperforms galactography, with a sensitivity for causative lesions of 92% versus 69%.

Lesions that are found by MRI are categorized as: Foci (<5 mm of enhancement and by definition too small to characterize but standing out from the surroundings), Masses (space-occupying lesions which are further characterized on the basis of their shape, margins and internal enhancement pattern) and Non-mass enhancement (NME) that includes areas of enhancement without a clear space-occupying lesion pattern. Areas of NME are further described according to distribution and internal enhancement pattern.

For all lesion types, initial and delayed phase enhancement as kinetic of enhancement are described to improve the differential diagnosis.

The breast MRI report should include a clinical data and indication for MRI, breast composition and background enhancement pattern, description of the important findings and final impression describing the radiologist's assessment of all imaging and clinical data. As taken from the BIRADS MRI lexicon, following the impressions, a final assessment category must be reported.

BREAST CANCER SUBTYPES, WHAT THE RADIOLOGIST NEEDS TO KNOW

Sepideh Sefidbakht, MD
Shiraz University of Medical Sciences, Medical Imaging Research Center

Objective:

To review the basic subtypes of breast cancer, their clinical and imaging differences

Material & Method:

Using multimodality IHC-proven cases, we will review the clinical implications of knowing the four major molecular subtypes of breast cancer. We will review typical imaging appearance of Luminal A and B, also HER2 and triple negative cancers. Using real cases, we will discuss how this knowledge affects the day-to-day decision making by breast imagers in initial diagnosis and follow-up of patients and survivors of breast cancer.

Results:

Breast Cancer is in fact not one single disease, but multiple subtypes that have varying prognosis and clinical behavior, thus varying prognosis and imaging appearance. Knowing the differences is necessary for the breast imagers who need to make more refined and informed decisions.

Conclusion:

The four major subtypes of breast cancer behave differently clinically and in imaging. A basic knowledge of this difference is necessary for breast imagers.

CONTRAST ENHANCED MAMMOGRAPHY, AN OVERVIEW AND CASE PRESENTATION

Parisa Aminzadeh, MD
Fellow of College of Radiologists Australia and New Zealand (FRANZCR)
Consultant Radiologist ST Vincent Hospital, Director of Training ST Vincent Breast Screen, Melbourne, Australia

Contrast enhanced mammography (CEM), utilizes IV contrast to detect tumour neovascularity.
This functional imaging modality, enables detection of enhancing lesions in the breast, with dual energy digital mammography, including a pair of images for each view. A low energy image which is a standard mammogram and a high energy image for detection of contrast uptake. Then these two images are combined, and glandular tissue subtracted, highlighting contrast uptake, improving cancer detection comparing with mammography and ultrasound.
CEM, has also demonstrated to have comparable sensitivity, but higher positive predictive value in cancer detection in comparison with MRI.
Therefore, it could be used in staging of patients with breast cancer, response to treatment post neoadjuvant treatment and screening women at increased risk of breast cancer.
CEM is more cost effective and efficient test comparing with MRI, but involves injection of iodinated contrast, more radiation than mammography, which is still within acceptable limits.
During this talk we will review techniques, clinical applications, pitfalls and future direction of CEM and review few cases.

NEOADJUVANT TREATMENT FOR BREAST CANCER, IMAGING ASSESSMENT OF RESPONSE TO TREATMENT

Parisa Aminzadeh, MD
Fellow of College of Radiologists, Australia and New Zealand (FRANZCR), Consultant Radiologist ST Vincent Hospital, Director of Training ST Vincent Breast Screen, Melbourne, Australia

Neoadjuvant (NAC) treatment is chemotherapy or endocrine therapy used before surgery for breast cancer.
There is no difference in overall survival and disease-free survival between patients treated with neoadjuvant and adjuvant therapy if chosen in a correct setting.Potential benefits for Neoadjuvant therapy are decreasing tumor size, assessing in vivo response to therapy and providing prognostic information for the patient.Early-stage triple-negative, Human epidermal growth factor 2–overexpressing breast cancers, locally advanced and inflammatory breast cancers are some indications of NAC.MRI is the most accurate modality to assess response to treatment.In this talk we will discuss when and how to assess response to NAC, pitfalls (over or underestimation) of assessment in different types of breasts cancer and will review few cases of assessment of response with MRI.

MAMMOGRAPHY ACR LEXICON

Fahimeh Zeinalkhani, MD
Assistant Professor of Department of Radiology, Cancer Institute, Imam Khomeini Hospital, Tehran University of Medical Sciences, Tehran, Iran

Abstract:

BIRADS, now more than ever, is intended to be a dynamic and evolving document that will adapt to changes in the practice of breast imaging and be of practical use to radiologists.
All the lexicons within the BIRADS Atlas stress the importance of clear description of findings and BIRADS assessment categories and management. In this lecture clear description of Mammography findings will be explained. These findings are Breast composition, masses, calcifications, architectural

distortion, asymmetries, intramammary lymph node, skin lesion, solitary dilated duct, associated features and location of lesion.

Keywords:

ACR lexicon, Mammography, BIRADS

A CASE REVIEW OF TOMOSYNTHESIS

Nasrin Ahmadinejad, MD

Advanced Diagnostic Interventional Radiology Research Center (ADIR) Tehran University of Medical Sciences

n_ahmadinejad@yahoo.com

Background:

Tomosynthesis or 3D mammographic imaging was first approved by FDA in February 2021, which provides mammographic images with 1-mm sections and allows a volumetric reconstruction of the whole breast from a number of low dose 2-dimensional projections obtained by different X-ray tube angles. This modality improves the sensitivity specially in dense breasts in comparison with digital mammography and allows the detection of greater number of expansive lesions and a better morphological analysis of mass margin and architectural distortion. The separating layers of breast tissue could suggest a possible reduction of false negative and false positive due to overlapping and increase specificity due to reduction of misleading summation artifacts.

Objectives:

To review some cases of tomosynthesis

Conclusion:

The higher sensitivity of DBT for architectural distortion allows increased diagnosis of invasive cancers overall and particularly improves the visibility of invasive lobular cancers.
Although improvements in cancer detection and recall rates are seen for patients in a large spectrum of age groups and breast density categories, these benefits are minimal in women with extremely dense breast tissue.

NEW INDICATIONS FOR BREAST MRI

Nahid Sadighi, MD

Associate Professor of Radiology, Tehran University of Medical Sciences; 1) Medical Imaging Center, 2) Cancer Institute, 3) ADIR. Tehran, Iran

Background:

Mammography is the primary modality used for imaging the breast. However, it has known limitations. Dynamic contrast-enhanced breast magnetic resonance imaging (MRI) provides superior sensitivity to detect breast cancer and, when used in the appropriate clinical setting, it has become a useful adjunct to mammography. Overlap in the MRI appearance of some benign and malignant diseases limits the specificity of breast MRI. The false-positive findings, which then result prompt additional imaging and/or biopsies for benign disease. This, combined with the higher cost and limited availability of breast MRI vs. conventional imaging, requires appropriate use of the imaging modality.

Keywords:

Breast, MRI, Indications

Inappropriate uses of breast MRI:

- MRI should not supplant careful problem-solving mammographic views or ultrasound in the diagnostic setting. Because MRI will miss some cancers that mammography will detect, it should not be used as a substitute for screening mammogram.
- MRI should not be used in lieu of biopsy of a mammographically, clinically, and / or sonographically suspicious finding.

BREAST MRI INDICATIONS:

The following clinical scenarios, for which breast MRI is indicated, will be reviewed: Preoperative evaluation of patients with newly diagnosed breast cancer, evaluation of breast cancer patients treated with neo adjuvant chemotherapy, evaluation of breast cancer patients with positive surgical margins following breast conservation therapy, evaluation of patients with metastatic axillary lymphadenopathy and an unknown primary malignancy, determination of silicone breast implant integrity, breast cancer

screening in high risk women, the use of breast MRI as a problem-solving tool for equivocal mammographic findings. For nipple discharge, MRI outperforms galactography, with a sensitivity for causative lesions of 92% versus 69%. In these patients, cancers are detected with an equally high sensitivity and a high specificity of 97%.

Summary

- In the hands of experienced teams, MRI allows for improvement of surgical practice, reducing re-excisions while preventing unnecessary mastectomies.
- Likewise, MRI enable patient selection to neo adjuvant chemotherapy and is the modality of choice for modification of therapeutic agents'
- MRI is beneficial for pre surgical assessment of residual tumor size to determine breast conserving surgery candidacy, and for prediction of pathologic complete response to triage patients to clinical trials omitting surgery.

This lecture and abstract are provided to emphasize the importance of performing breast MRI with appropriate indication.

MISSED BREAST CANCERS IN MAMMOGRAPHY

Simin Alerasool, MD
Radiologist, Tehran

ICR 2022 Mammography is the standard of reference for the detection of breast carcinoma, yet 10%–30% of breast cancers may be missed at mammography. Missed breast cancers are breast malignancies that are detectable at retrospective review of a previously obtained mammogram that was prospectively reported as showing negative, benign, or probably benign findings. Medical errors are a substantial cause of morbidity and mortality and the third leading cause of death in the United States. Errors resulting in missed breast cancer are the most common reason for medical malpractice lawsuits against all physicians Possible causes for missed breast cancers include dense parenchyma obscuring a lesion, poor positioning or technique, incorrect interpretation of a suspect finding, subtle features of malignancy.

The most commonly missed and misinterpreted lesions are stable lesions, benignappearing masses, one-view findings, developing asymmetries, subtle calcifications, and architectural distortion.

The various cognitive processes can lead to unconscious bias in breast imaging that result in missed breast cancers, such as satisfaction of search, inattention blindness, premature closing, and satisfaction of reporting. In this presentation it is tried to show some examples of either above mammographic features based on the RSNA July august 2020 and RSNA 2003 and also some of our real cases in private practice in order to have some minimization strategies in each of the commonly missed and /or misinterpreted breast lesions, as well as, reducing the more common cognitive biases in breast Imaging.

CARDIAC INDICATIONS AND APPLICATION OF CARDIAC MRI

Sanaz Asadian, MD
Radiologist, Assistant Professor of Radiology, Rajaie Cardiovascular Medical and Research Center, Tehran, Iran

In line with outstanding development in imaging technology with the undeniable aid of mathematics and physics, their application in routine radiology practice alters. Moreover, the clinical approach and management strategies for different disease processes change according to the available imaging modalities.

Although it has entered everyday cardiology practice for about three decades, cardiac MRI had a limited role in the past. It was primarily due to the dynamic nature of the heart and the influence of respiratory motion, which necessitated complex physics and mathematical calculations to have acceptable imaging quality. In the recent decade, cardiac MRI technology development accelerated with more utility in medical practice. Therefore, I think that all new generation radiologists have to be familiar with clinical settings in which cardiac MRI can be beneficial. Furthermore, they should know the essential sequences and the information they provide.

This section aimed to describe a few clinical settings, including viability assessment and myocarditis, in which cardiac MRI has a crucial role in patient

management strategies. Moreover, the MRI protocol for these entities will be explained illustratively. I hope this brief introduction to updated cardiac MRI application motivates young radiologists to study and research the cardiac imaging era.

Keywords:

Cardiac MRI, Cardiomyopathy, Myocarditis, Myocardial viability assessment

CHEST CT IMAGING FEATURES OF COVID-19-RELATED PULMONARY FIBROSIS: WHAT THE RADIOLOGIST SHOULD KNOW

Ramezan Jafari, MD

Associate Professor, Radiology Department, Faculty of Medicine and Chemical Injuries Research Center, Baqiyatallah University of Medical Sciences, Tehran, Iran

Chest CT scan abnormality and pulmonary fibrotic changes have been reported frequently after previous viral pneumonia outbreaks.

Also in Covid-19 pneumonia, where the severity of lung involvement is very high and common, and a large number of patients present with respiratory symptoms after the acute phase of the disease and discharge from the hospital, in a few articles, Chest CT scan abnormality and pulmonary fibrotic changes is reported, although more studies are still needs to be done in this regard so that we can know the exact extent and severity of Chest CT scan abnormality and pulmonary fibrotic changes as well as their causes and predisposing factors.

The most common chest CT abnormalities are GGO, parenchymal bands, reticular abnormality, traction bronchiectasis, and mosaic attenuation. GGO, Reticular abnormality and interlobular septal thickening, the subpleural band: may represent inflammatory abnormality or immature fibrosis that may either resolve or develop progressive lung fibrosis with time, so further follow-up should be recommended. The term fibrosis should be reserved for more specific signs such as traction bronchiectasis or bronchiolectasis, honeycombing, or architectural distortion, Volume loss, Loss of the smooth air-to-interstitium interfaces.

Keywords:

COVID-19, parenchymal bands, reticular abnormality, traction bronchiectasis, fibrosis

CARDIAC MRI STRAIN ROLE AS A SENSITIVE IMAGING BIOMARKER IN THE MYOCARDIAL DISEASE

Motevalli .M, MD

Rajaie Cardiovascular Medical and Research Center, Iran University of Medical Sciences, Tehran, Iran

motevalli_m@rhc.ac.ir

motevalli_m@yahoo.com

Introduction:

Cardiovascular MRI (CMR) is increasingly performed to measures myocardial deformation. The feature tracking technique is the most common post processing. The different components of myocardial motion include longitudinal strain, circumferential strain, radial strain, strain rate, torsion and torsion rate are evaluated with this technique.

Method:

CMR strain utility for different cardiac disease including cardiomyopathy, congenital heart disease ,infiltrative myocardial disease, LV dyssynchrony, arrhythmogenic right ventricular dysplsia (ARVD), pulmonary hypertension, ischemic heart disease ,cardio-oncology and so on.

Conclusion:

Myocardial strain imaging is now increasingly performed with feature tracking technique. CMR strain is used for several cardiac diseases for early diagnosis, risk stratification, prognostication of different heart disease, early detection of anticancer toxicity, choosing the cases for resynchronization therapy.

Keywords:

Cardiovascular MRI (CMR), Strain, Feature Tracking

APPROACH TO SOLITARY PULMONARY NODULES DETECTED ON CT SCAN

Taraneh Faghihi Langroudi, MD*
Associate Professor of Radiology, Radiology Department, Shahid Modarres Hospital, Shahid Beheshti University of Medical Sciences, Tehran, Iran
E-mail: faghihit@yahoo.com

One of the frequent challenges for radiologists who interpret thoracic CT scans is how to approach the pulmonary nodules especially the incidentally found solitary pulmonary nodules in a patient without history of underlying cancer or immune deficiency. There is a recommended guideline from Fleischner Society about the decision-making in the setting of incidentally found nodules. To use this guideline in daily practice the radiologist should take in mind a few factors including the patient's risk factors (age, gender, race, family history of lung cancer, smoking history) and also the patient's preference for choosing the follow-up methods and the follow up intervals.
On CT scan the radiologist should pay attention to the number of nodules in order to categorize them in Multiple or solitary nodule groups, to the characteristics of each nodule in order to categorize them in solid, sub-solid or ground glass groups and to the size of nodules in order to categorize them in three groups of <6mm, 6-8mm or >8mm. According to these mentioned factors the appropriate way of approach can be chosen for each patient.
One of the most important points in detecting and follow-up of these nodules is the protocol of thoracic CT scan which must be standard and consistent in all of the chest CT scans. These CT scans should be performed in spiral thin section (1-1.5mm) manner and they must be reconstructed in axial, coronal and sagittal planes. Comparing with previous CT scans, if available, is always necessary and helpful.

Key words:
Solitary Pulmonary Nodule, CT Scan

DIAGNOSTIC APPROACH TO MEDIASTINAL MASSES

Fariba Alikhani, MD
Department of Radiology, Isfahan University of Medical Sciences, Isfahan, Iran

Abstract:

Different types of mediastinal lesions can be identified in imaging modalities in symptomatic or asymptomatic patients. CT scan is more accurate than chest X- ray to distinguish these lesions location and composition and make the differential diagnosis narrow. Based on location, mediastinal masses are divided to three groups: anterior mediastinal lesions, middle mediastinal lesions and posterior mediastinal lesions. A new category, based on cross sectional imaging, is developed in recent years and divided the mediastinal pathology in pre vascular, visceral, and paravertebral compartments based on boundaries delineated by specific anatomic structures at multi detector CT. This new definition plays an important role in making diagnosis of mediastinal abnormalities. In the other way, a diagnosis may be suggested by combining radiologic features with specific clinical information. In this session, we present the multi detector CT–based classification of mediastinal compartments and discuss each compartment lesions imaging characteristics and composition and a structured approach to imaging evaluation of mediastinal abnormalities.

Conclusion:

Identify the location and imaging features of mediastinal masses in cross sectional imaging facilitates accurate diagnosis.

Keywords:

Mediastinum, Multidetector Computed Tomography, Mediastinal Mass

SPECTRAL CT: FROM BASIC TO CLINICAL APPLICATIONS IN THORACIC IMAGING

Mehrzad Lotfi, MD
Professor of Radiology, Medical Imaging Research Center, Department of Radiology, Namazee Hospital, Shiraz University of Medical Sciences, Shiraz, Iran
e-mail: lotfimz@yahoo.com

While conventional CT scanners provides anatomical and morphological evaluation of organs and tissues, spectral CT allows for material-specific analysis in addition to anatomical images of conventional CT.
All CT scan machines with capability of this technique, can be classified into two main categories: source-based and detector-based. Source-based scanners use X-ray beams with different energy spectra for imaging, either by two X-ray tubes with each tube operating at a different tube potential or a single X-ray tube working with each of four mechanism; 1-rapid switching between low and high tube potentials several time within the each rotation time; 2-two consecutive scans acquired at different tube potentials; 3-single-source with two-material filter splits the x-ray beam into high-energy and low-energy spectra; 4- sequential x-ray tube rotation performing at high- and low- tube potential. The detector-based scanners rely on the energy-resolving power of the X-ray detector to separate the signals that correspond with low-energy X-ray photons from those associated with high-energy photons. This separation can be achieved by using a photon-counting detector or a dual-layer energy-integrating detector with a different X-ray stopping power in each layer.
The most commonly used spectral applications are 1) virtual monoenergetic or monochromatic imaging (VMI), 2) virtual non-contrast or unenhanced imaging (VNC), 3) iodine concentration (IC) measurement, and 4) effective atomic number (Zeff map).
Spectral data can be used to accentuate enhancement, reduce metal artifacts, decrease the number of scans in multiphasic imaging and characterize lesions.
The clinical applications of this method in thoracic imaging include: detection of pulmonary thromboembolism (PTE); detection of Parenchymal perfusion defects due to central lung cancers or PTE; differentiation between malignant and benign lesion including solitary pulmonary nodules and lymph nodes; evaluation of intratumoral hemorrhage; Virtual non-calcium reconstruction for diagnosing vertebral metastasis; Treatment response evaluation; and Artifact and noise reduction.

Keywords:
CT Scan, Spectral, Thoracic Imaging

ROLE OF IMAGING IN CARDIAC MANIFESTATION OF CORONAVIRUS (COVID -19)

Hamidreza Pouraliakbar, MD
Associate Professor of Radiology
Rajaie Cardiovascular Medical and Research Center, Iran University of Medical Sciences, Tehran, Iran

Objectives:

This study is about the role of cardiac magnetic resonance (CMR) and cardiac computed tomography (CT) in evaluating cardiac involvement in patients infected by coronavirus disease-2019 (COVID-19) and suspicious of myocarditis or coronary artery disease.
Severe acute respiratory syndrome coronavirus 2, is an emerging disease and a major public health issue. COVID-19 was initially regarded as a disease of the lungs, which manifests as an acute respiratory illness and pneumonia, although more recently cardiac complications have been well-characterized.
Myocardial injury is a common complication of the COVID-19 illness and is associated with a worsened prognosis.
Previous reports about COVID-19 showed a significant increase in cardiac lesion biomarkers, including Cardiac troponin I (cTnI), Creatine Kinase (CK), α-hydroxybutyrate dehydrogenase (HBDB), Lactate Dehydrogenase (LDH), and NTproBNP.
Cardiac MRI (CMR) has evolved to become the preferred imaging modality for noninvasive evaluation in acute myocarditis as pathognomonic features of myocardial inflammation can be identified with improved sensitivity and specificity. Cine functional imaging, T2-weighted imaging, late gadolinium enhancement (LGE), and quantitative parametric mapping of T1 and T2 relaxation times to improve diagnostic accuracy and identify both acute

and chronic changes of myocardial inflammation. In a COVID-19-induced myocardial injury, CMR can assess the extent, chronicity, and severity thereof.
Coronary CT angiography is a well-established clinical modality, for acute chest pain in the emergency department and stable angina in patients with the covid-19 ambulatory setting. While other testing modalities are also indicated, in the COVID clinical environment we believe that coronary CT angiography offers superior clinical advantages. It is highly accurate, with a very high negative predictive value, and most importantly, it can be performed more rapidly and with far less personal contact with care providers than traditional stress testing.

CORONARY ANOMALIES: WHAT THE RADIOLOGIST SHOULD KNOW

Taraneh Faghihi Langroudi, MD*
Associate Professor of Radiology, Radiology Department, Shahid Modarres Hospital, Shahid Beheshti University of Medical Sciences, Tehran, Iran
E-mail: faghihit@yahoo.com

There is a wide range of congenital coronary anomalies which can be categorized to anomalies of origin, course and termination. The most important key for detection of these anomalies is familiarity with normal anatomy of coronary arteries on cross sectional imaging.
These anomalies can be divided to hemodynamically significant and hemodynamically non- significant groups.
The hemodynamically significant anomalies can cause cardiovascular symptoms such as myocardial ischemia and in rare cases may cause sudden cardiac death. Therefore this group of anomalies may need surgical or interventional correction. Coronary atresia, origination of coronary artery from pulmonary arteries (ALCAPA, ARCAPA), interarterial course of coronary artery (malignant course of coronary artery) and termination of coronary arteries to a low pressure cardiac chamber or vascular structure resulting in fistula formation are in hemodynamically significant group.
Duplication of coronary artery, high origin of left main coronary artery or right coronary artery, prepulmonic or transseptal or retroaortic course of coronary artery and systemic termination of coronary artery are in hemodynamically non-significant group which usually does not need any surgical correction but detection of their presence is important especially when the patient is going on a cardiac surgery or cardiovascular intervention.

ATYPICAL MANIFESTATIONS OF COVID-19 LUNG CT SCAN AND IMAGING CHALLENGES

Reza Gerami, MD
Ramezan Jafari
Amin Saburi*
Chemical Injuries Research Center, Systems Biology and Poisonings Institute, Baqiyatallah University of Medical Sciences, Tehran, Iran.
Electronic address: aminsaburi@yahoo.com

Abstract:

Since 2019 which first case of Coronavirus disease 2019 has been reported from Wuhan, China, some usual imaging presentations of this viral pneumonia were reported and all radiologists who worked in critical care units of COVID-19 have experienced these symptoms, and as a result, these findings are often used to diagnose the disease in lung CT scan. Lower lobes multifocal ground glass opacities (GGO), patchy consolidations, crazy paving, sub segmental vessel enlargement (>3 mm), reverse halo sign and interlobular septal thickening mentioned as usual findings of COVID-19.
Moreover, lung cavitations, discrete pulmonary nodules, pleural effusions, and lymphadenopathy, tree in bud and etc reported as less common findings of the disease. While, there are some rare atypical presentations and features of COVID-19 in chest CT scan which should be considered by radiologists and clinicians.
These features include the parallel pleural sign, fishing net on trees sign, Rings of Saturn appearance, Pulmonary Target sign and paving stone sign, which have recently been introduced as rare imaging features of COVID-19.
Familiarity with these findings and how to deal with them clinically on CT scan of the lungs can

help differentiate other lesions and lung diseases from COVID-19 and make a faster diagnosis. On the other hand, unfamiliarity with this finding can lead to impose additional diagnostic costs to the health systems.
The aim of this presentation is to discuss about atypical manifestations of COVID-19 in lung CT scan and declare their characteristics and imaging challenges. This discussion would be based on newest pathophysiology researches and matching these findings with the mentioned atypical imaging findings.

Keywords:
COVID-19, Lung, CT scan, Imaging

IMAGING OF LUNG CANCER: IMPLICATION ON STAGING AND MANAGEMENT (UPDATES IN TNM STAGING)

Alireza Dehghan, MD
Assistant Professor, Radiology Department, Shiraz University of Medical Sciences, Shiraz, Iran

Abstract:

Lung cancer is the leading cause of cancer-related deaths for both men and women worldwide. Though majority of patients present at an advanced stage, those with early-stage lung cancer can be treated with a potentially curative intent. It is necessary that a radiologist understands the principles of staging and the implications of radiological findings on the various staging descriptors and eventual treatment decisions. Computed Tomography (CT) scan of the chest is the cornerstone of lung cancer imaging based on which further management is decided. The primary tumor shows a wide spectrum of imaging appearances. There are three components that describe the anatomic extent of the tumor: T for the extent of the primary tumor, N for lymph node involvement, and M for metastatic disease. T-classification is performed using CT, the N- and M-classification using CT and PET-CT. In this presentation, we will talk about different imaging patterns of lung cancer. Standard-of-care lung cancer staging based on the 8th edition of the IASLC (International Association for the Study of Lung Cancer) lung cancer staging system will also be discussed.

Keywords:
Lung Cancer, TNM Staging, CT Scan

SARCOIDOSIS FROM HEAD TO TOE: WHAT THE RADIOLOGIST NEEDS TO KNOW

Marzieh Aalinezhad, MD
Assistant Professor, Department of Radiology, Medical School, Isfahan University of Medical Sciences, Isfahan, Iran

Abstract:

Sarcoidosis is an immune-mediated systemic disease of unknown origin, characterized by non-caseating epitheliod granulomas. Ninety percent of patients show granulomas located in the lungs or in the related lymph nodes. However, lesions can affect any organ. Typical imaging features of liver and spleen sarcoidosis include visceromegaly, with multiple nodules hypodense on CT images and hypointense on T2-weighted MRI acquisitions. Main clinical and radiological manifestations of renal sarcoidosis are nephrolithiasis, nephrocalcinosis, and acute interstitial nephritis. Brain sarcoidosis shows multiple or solitary parenchymal nodules on MRI that enhance with a ring-like appearance after gadolinium. In spinal cord localization, MRI demonstrates enlargement and hyperintensity of spinal cord, with hypointense lesions on T2-weighted images. Skeletal involvement is mostly located in small bone, showing many lytic lesions; less frequently, bone lesions have a sclerotic appearance. Ocular involvement includes uveitis, conjunctivitis, optical nerve disease, chorioretinis. Erythema nodosum and lupus pernio represent the most common cutaneous manifestations encountered. Sarcoidosis in various organs can be very insidious for radiologists, showing different imaging features, often non-specific. Awareness of these imaging features helps radiologists to obtain the correct diagnosis.

Keywords:
Sarcoidosis, Chest Radiography, Computed Tomography, Diagnosis

ADNEXAL MASSES, WHAT IS BENIGN, WHAT IS MALIGNANT

Fariba Aikhani, MD
Department of Radiology, Isfahan University of Medical Sciences, Isfahan, Iran

Abstract:

Adnexal cysts and masses are one of the frequent pathologies that are identified in female pelvic ultrasonography. Most of these lesions are benign and can be recognized based on characteristic US features. About 90% of adnexal masses can be adequately characterized with US alone. The discrimination between benign and malignant adnexal lesions is very important for correct management and for this point, US is the first modality and modality of choice for adequate assessment and no other methods have proven superior. In some cases, for more evaluation of adnexal lesions, pelvic MRI should be done. Many classification systems are designed to standardization of adnexal masses. The recent one is the Ovarian Adnexal Reporting and Data System (O-RADS), which is designed in 2018 to standardize definitions of characteristics by ultrasound. In this session we review the imaging evaluation of adnexal lesions to make the diagnosis easy.

Conclusion:

Identify the adnexal masses and characterized them in to benign and malignant group by US is very important for adequate management.

Keywords:

Ovarian Adnexal Reporting and Data System (O-RADS), Ovarian Cyst, Ovarian Cancer, Adnexal Mass

FETAL CORPUS CALLOSUM ABNORMALITIES: MRI AND ULTRASOUND ROLE

Behnaz Moradi, MD
Associate Professor of Radiology, Department of Radiology, Yas Complex Hospital, Tehran University of Medical Sciences (TUMS), Tehran, Iran.

Abstract:

The corpus callosum (CC) is the major interhemispheric commissure. It develops between the 10th and 20th weeks of gestation and transmits cognitive, sensory and motor information between the two hemispheres. The prevalence of CC abnormalities varies between different studies, ranging from 0.3 to 0.7% in the general population and 2 to 3% in developmentally disabled patients. Its abnormalities include agenesis, hypoplasia, hyperplasia and dysgenesis. Anomalies of the corpus callosum are commonly associated with other central nervous system (CNS) or extra-CNS malformations. Antenatal diagnosis of complete CC agenesis is easy after mid-trimester by ultrasound even in axial plane. Non-visualization of cavum septum pellucidum and colpocephaly are important signs in the axial view. More subtle findings (hypoplasia and partial agenesis) may also be recognized antenatally; however, their detection is difficult because a sagittal view is usually needed for their detection and obtaining a true sagittal view requires a more experienced sonographer. When pathology of the CC is suspected, fetal MRI is informative in regards to the definitive diagnosis of CC abnormalities, associated anomalies and cortical malformations.

UTERINE SARCOMA VS LEIOMYOMA: IMAGING ROLE

Behnaz Moradi, MD
Associate Professor of Radiology, Department of Radiology, Yas Complex Hospital, Tehran University of Medical Sciences (TUMS), Tehran, Iran.

Abstract:

Incidence of uterine sarcomas is 1.7 in 100,000 women, in postmenopausal women. The challenge of differentiating a leiomyoma from a uterine sarcoma is one part of the diagnostic process for all women with a uterine mass. Accurate preoperative imaging diagnosis of sarcoma plays a crucial role in selecting patient for non-surgical treatment. Preoperative and intraoperative findings are of limited value in estimating the likelihood that a mass is a uterine sarcoma. Magnetic resonance imaging (MRI) and endometrial sampling are the most potentially useful techniques. Endometrial sampling is challenging due to

the intramuscular location of most sarcomas. Confident prospective identification of usual leiomyoma and florid or frankly malignant sarcomas usually does not pose a diagnostic dilemma. The challenge is related to overlap in the imaging features of degenerating leiomyomas leiomyoma histologic subtypes, and sarcomas. There is no pelvic imaging modality that can reliably differentiate between benign leiomyomas and uterine sarcomas. Pelvic ultrasound followed by MRI is the most useful imaging strategy.

ABDOMINAL WALL HERNIAS

Atoosa Adibi, MD
Professor of Radiology, Isfahan University of Medical Sciences, Isfahan, IRAN

Abdominal wall hernias are among common diseases, Groin hernias are the most common, followed by femoral and umbilical hernia.
Diagnosis is usually made with physical examination, which may be difficult, especially in patients with obesity, pain or abdominal wall scarring.
In these cases,abdominal imaging is required for the correct diagnosis and to confirm suspected cases.
Abdominal wall hernias are categorized as following:

1. ventral: anterior and lateral abdominal hernias
2. dorsal
3. groin: most common

In all these types, the presence of a difficult clinical examination of the hernia can be documented by barium studies, ultrasonography or CT to give the accurate diagnosis.
The most appropriate test is ultrasonography.
MDCT has demonstrated to be very useful for such purpose and can even identify the contents of hernias.
In this review, application of these imaging modalities will be discussed.

BILIARY STRICTURE, BENIGN OR MALIGNANT?

Maryam Farghadani, MD
Associate Professor of Department of Radiology, Isfahan University of Medical Sciences, Isfahan, Iran

Background:

Bile duct strictures in adults are secondary to a wide spectrum of benign and malignant pathologic conditions. Benign causes of bile duct strictures include iatrogenic causes, acute or chronic pancreatitis, choledocholithiasis, primary sclerosing cholangitis, IgG4-related sclerosing cholangitis, liver transplantation, recurrent pyogenic cholangitis, Mirizzi syndrome, acquired immunodeficiency syndrome cholangiopathy, and sphincter of Oddi dysfunction.
Malignant causes include cholangiocarcinoma, pancreatic adenocarcinoma, and periampullary carcinomas. Rare causes include biliary inflammatory pseudotumor, gallbladder carcinoma, hepatocellular carcinoma, metastases to bile ducts, and extrinsic bile duct compression secondary to periportal or peripancreatic lymphadenopathy.

Objectives:

- To describe the wide spectrum of benign and malignant causes of bile duct stric¬tures in adults.
- To list salient MR imaging findings of adult bile duct strictures.
- To discuss the MR imaging features of the narrowed segment that may help differentiate malignant from benign bile duct strictures.

Conclusion:

Contrast-enhanced MR imaging with MR cholangiopancreatography is very useful in the evaluation of the bile ducts in patients with obstructive jaundice. Although biopsy is neces-sary for distinguishing malignant from benign stric¬tures, certain MR imaging findings of the narrowed segment may favor a malignant cause.

Keywords:

Biliary Stricture, MR Cholangiopancreatography (MRCP)

IMAGING OF CROHN'S DISEASE

Arvin Arian, MD
Associate Professor of Radiology, Tehran University of Medical Sciences, Cancer Institute, Advanced Diagnostic and Interventional Radiology (ADIR)

MR Enterogra¬phy has become the superior imaging modalities in the evaluation of Crohn's disease with high soft tissue resolution, fast acquisition time, lack of need for bowel preparation, lack of ionizing radiation and ability to show the extra intestinal complications of Crohn's disease.
MR Enterography using fast T1W, T2W, pre and post contrast dynamic series provides an excellent demonstration of bowel loops and allows the use of diffusion-weighted imaging to accentuate discrimination of inflammatory versus fibrotic segments that is vital to a gastroenterologist for decision making and treatment planning.
We will discuss the different patterns of Crohn's disease in MR Enterography such as Active inflammatory, fibrostenosing, deep penetrating and repgenerative/reparative phases and describe the detailed criteria's for estimation of disease severity, as well as intra and extra luminal complications of Crohn's disease.

KeyWord:

MR Enterography, Crohn's Disease, Inflammatory Bowel Disease

LIVER IMAGING REPORTING AND DATA SYSTEM (LI-RADS) - CASE BASED DISCUSSION

Arvin Arian, MD
Associate Professor of Radiology, Tehran University of Medical Sciences, Cancer Institute, Advanced Diagnostic and Interventional Radiology (ADIR)

The Liver Imaging Reporting and Data System (LI-RADS) is a system of standardized terminology and criteria invented by American college of Radiology to interpret and report imaging of liver by a Radiologists with expertise in hepatobiliary imaging.
The Aim of LIRADS guideline is to predict probability of Hepatocellular carcinoma or other malignancies, and provides a standardized language among Multidisplinary management team of liver cancer consists of hepatologists, hepatobiliary surgeons, Radiologists, interventionist and pathologists.
The main aim of LI-RADS is to facilitate decision making and treatment planning.
In this article we will clarify terminologies such as the non-rim arterial hyper enhancement, wash out, capsule and threshold growth and describes the advantages of structured reporting, applicability of LI-RADS in liver MRI and CT scan and describe the elements of reporting with case presentation.

Keywords:

LI-RADS, Liver Imaging, CT scan, MRI, Oncology, Cancer Imaging, and Structured Report

DOPPLER IN PORTAL HYPERTENSION

Mohammad Kazem Tarzamani, MD
Professor of Radiology, Tabriz University of Medical Sciences, Tabriz, Iran
Elham Goli, MD

Portal hypertension is defined as an increase in the pressure gradient between the portal vein and IVC or hepatic veins of 10 to 12 mm Hg or greater.
Portal hypertension is divided into intrahepatic, extrahepatic, and hyperdynamic categories.
The combination of gray-scale sonography, Doppler, laboratory markers, and advanced sonographic techniques such as contrast-enhanced ultrasound and elastography are valuable means of investigating suspected portal hypertension. Familiarity with the diagnostic implications and limitations of a variety of morphologic and hemodynamic alterations seen on gray-scale and Doppler findings are important in optimizing the sonographic analysis of these patients the upper limit of normal for portal vein diameter is 16 mm.
Portal vein cross-sectional area typically increases, and portal vein velocity typically decreases in the setting of portal hypertension.
With cirrhosis, the hepatic artery becomes enlarged and tortuous on color flow examination and shows substantially increased blood flow velocity on Doppler interrogation.
The most reliable approach for the diagnosis of portal hypertension is the evaluation of portal systemic collaterals.
The diagnosis of portal hypertension can be made when hepatofugal flow is identified in the main portal veins or branch vessels.

Enlargement or recanalization of the umbilical vein or reversal of flow in the coronary vein provide high sensitivity in diagnosing portal hypertension.
Reversal of flow in the portal vein or its branches indicates severe portal hypertension.

Keywords:

Portal Hypertension, Sonography, Doppler

O-RADS US AND MRI RISK STRATIFICATION OF ADNEXAL MASSES: AN EDUCATIONAL

Fariba Zarei, MD

Medical Imaging Research Center, Shiraz University of Medical Sciences, Shiraz, Iran, Department of Radiology, Shiraz University of Medical Sciences, Shiraz, Iran

Objectives:

The purpose of this article is to review the US and MRI o'rads risk stratification and recent guidelines in radiology for evaluation of adnexal masses.

Background:

The frequency of malignancy in premenopausal and postmenopausal women after adnexal mass resection is less than 10% and 15% respectively. Thus preoperative evaluation and preventing unnecessary surgery are the important roles of radiologists. About 25% of ovarian lesions are indeterminate with ultrasonography and after MRI is nearly 5% to 7%.

Methods:

Necessary pulse sequences of adnexal lesion MRI are T2WI, In-phase / out-of-phase or fat-saturated sequences, DWI and dynamic contrast-enhanced (DCE). In DEC, any enhancement in ovarian masses is important. For better evaluation of enhancement, especially in a mass with high T1W signal, subtracted image is most favorable. The presence of any soft tissue enhancement can be evaluated on DCE well. DCE's Low-risk adnexal masses show slow gradual enhancement, Intermediate risk ovarian masses enhancement more slowly than myometrium and High-risk ovarian masses enhance rapidly.

Results:

O-RADS Categories consist of O-RADS 0
(an incomplete evaluation)
O-RADS 1
(the physiologic category normal premenopausal ovary)
O-RADS 2
(almost certainly benign lesions, <1% risk of malignancy)
O-RADS 3
(lesions with low risk of malignancy, 1% to <10%)
O-RADS 4
(lesions with intermediate risk of malignancy, 10% to <50%)
O-RADS 5
(lesions with high risk of malignancy, ≥50%).

Conclusions:

The use of US and MRI o'rads classification and recent guidelines in radiology of adnexal masses help radiologists to decrease uncertainty in radiology reports, follow-up recommendations and make better connection between radiologists and referring physicians. Finally, radiologists can contribute to women's health outcomes.

IMAGING OF ESOPHAGEAL NON-MALIGNANT PATHOLOGIES

Nahid Sadighi, MD

Associate Professor of Radiology, Tehran University of Medical Sciences; 1) Medical Imaging Center, 2) Cancer Institute, 3) ADIR

Non-malignant esophageal diseases are critical to recognize, but can be easily overlooked or misdiagnosed radiologically. This lecture will cover the salient clinical features and imaging findings of non-malignant pathology of the esophagus. Many non-malignant diseases of the esophagus will be organized into two major categories: luminal disorders and wall disorders. Luminal disorders include dilatation/narrowing (e.g. achalasia, scleroderma, and stricture) and foreign body impaction. Wall disorders include wall thickening (e.g. esophagitis, benign neoplasms, esophageal varices, and intramural hematoma), wall thinning/outpouching (e.g. epiphrenic diverticulum, Zenker diverticulum, and Killian-Jamieson diverticulum), wall rupture

(e.g. iatrogenic perforation, Boerhaave Syndrome, and Mallory-Weiss Syndrome), and fistula formation (e.g. pericardioesophageal fistula, tracheoesophageal fistula, and aorto-esophageal fistula). It is the role of the radiologist to recognize the classic imaging patterns of these esophageal diseases to facilitate the delivery of appropriate and prompt medical treatment.
Although they are often eclipsed by esophageal cancer, it is important to think about the many non-malignant esophageal conditions which may be seen on imaging.

Overview of esophageal imaging

Multiple imaging modalities are used in the evaluation of esophageal pathology, including computed tomography (CT), barium esophagography, endoscopic ultrasound (EUS), and 18-Fluoro-deoxyglucose positron emission tomography (FDG-PET). Barium esophagography is a useful initial imaging modality for the diagnosis of patients with dysphagia, reflux, motility disorders, or perforation. If esophageal pathology is confirmed or highly suspected, endoscopic ultrasound is often utilized to evaluate a specific region of interest as it offers detailed visualization of the layers of the esophageal wall. In addition, this imaging modality can perform direct biopsy of suspicious lesions, including adjacent lymphadenopathy, if present.

Summary:

Imaging modalities for diagnosis of nonmalignant disease will be discussed after an overview of anatomy and physiology.

Keywords:

Esophagus, Non-malignant, Stricture, Dilatation, Rupture

STAGING OF RECTAL CANCER

Alireza Dehghan, MD
Assistant Professor, Radiology Department, Shiraz University of Medical Sciences, Shiraz, Iran

Abstract:

Rectal cancer has the eighth highest cancer incidence worldwide and is prone to local recurrence and systemic metastasis. Staging of rectal cancer strongly predicts the success of and rate of local recurrence following rectal cancer resection. MRI is the modality of choice for the staging of rectal cancer and to guide surgical and non-surgical management options. By the improvements in TNM staging, including a more widespread use of rectal MRI and increased radiologist awareness of the key rectal cancer TNM staging features, the mortality rate of rectal cancer has been declining over the past few decades in adults over 50 years of age. In this presentation, we will discuss different imaging characteristics of rectal cancer; identify the anatomic landmarks relevant for local staging of rectal cancer at MRI, list the key points to include in the radiologic report for primary staging and talk about the main pitfalls when reading and reporting MRI of rectal cancer.

Keywords:

Rectal Cancer, TNM Staging, MRI

MALABSORPTION IMAGING

Nematollah Nematollahy, MD
Assistant Professor, Department of Radiology, Golestan University, Gorgan, Iran

In this talk, a classified description of imaging findings in diseases of the small intestine that result in malabsorption is presented. Small bowel disorders cause malabsorption through a wide variety of mechanisms involving the small bowel lumen or wall or even the small bowel mesentery. Any disease that causes small bowel stasis can lead to bacterial overgrowth and subsequent malabsorption. Stasis may be caused by chronic small bowel obstruction from conditions such as Crohn's disease and adhesions or bysmall bowel hypomotility from conditions such as diabetes, scleroderma, and jejunal diverticulosis. Mucosal diseases causing malabsorption, include celiac disease, tropical sprue, Whipple"s disease, and osinophilic enteritis. In Lymphangiectasis ineffective lymphatic flow causes malabsorption in post mucosal level.

Keywords:

Malabsorption, small bowel disease, Celiac, small bowel follow through Anatomic classification of malabsorption etiology includes diseases of liver and biliary tree, pancreas or small intestine.

ILLUSTRATIVE EXHIBITION OF HYPOPHARYNX AND ESOPHAGEAL DISEASES

Jahanbakhsh Hashemi, MD
Professor of Radiology Imamreza Hospital Mashhad Iran (mums)

In this lecture we discussed about illustrative exhibition of hypopharyngeal and esophaggeal diseases.
First of all i mentioned that barium study and fluoroscopy is one of the best and diagnostic method to show motility and structural hypopharynx and esophagus diseases.
All these cases which are exhibited had performed in our radiology department or clinic.
All of them were studied by barium swallow.
These cases consist of many common, uncommon, rare and extremely rare cases which have teaching and diagnostic points.

IMAGING FEATURES OF BENIGN HEPATOCELLULAR NEOPLASMS

Faeze Salahshour, MD
TUMS, Imam Khomeini Hospital Complex, Tehran,IRAN

Benign hepatocellular neoplasms include focal nodular hyperplasia and hepatocellular adenoma, representing hypervascular masses mostly in young women. The former needs no additional therapeutic consideration, but the latter has a risk of rupture or malignant transformation. The FNH is a lobulated mass almost iso-dens/ signal to the liver on non-contrast images that show intense arterial hyperenhancement and become iso in the delayed images. It has a central scar with low T1, high T2 signal that shows delayed enhancement. The adenomas have several genetic-phenotypic subtypes, including the inflammatory, the HNF1 mutated, the beta-catenin activated, the sonic hedgehog, and unclassified subtypes. Among them, inflammatory and HNF 1 inactivated subtypes have characteristic imaging features. The inflammatory subtypes, the most common type that harbors a high risk of bleeding, show high T2 signal, avid arterial hyperenhancement, and delayed contrast retention. It may contain patchy steatosis. The Atoll sign is a characteristic finding in the inflammatory adenoma. The HNF1 inactivated adenoma is characterized by diffuse steatosis and signal loss on opposed phase images. It shows mild T2 hyperintensity and modest arterial hype enhancement. On delayed phase images, it did not retain contrast and may exhibit subtle washout or become iso signal with the background liver. The other types have no characteristic imaging features

MANAGEMENT AND FOLLOW-UP OF GALLBLADDER POLYPS

Farhad Naleini, MD
Associate Professor of Radiology Department, Clinical Research Development Center, Imam Reza Hospital, Kermanshah University of Medical Sciences, Kermanshah, Iran
farhadnaleini@yahoo.com

Polypoid lesions of gall bladder, defined as any elevated lesion of the mucosal surface of the wall estimated to occur in approximately 4–12% of the population. They are increasingly detected incidentally with the widespread use of ultrasonography.
Most of these lesions are not neoplastic. Cholesterol polyps are by far the most common one (60%–70% of the lesions) followed by adenomyomatosis and inflammatory polyps .The most common neoplastic polyps are adenoma and adenocarcinoma (5-10 % of the polyps) adenocarcinoma is relatively rare. The risk of carcinoma development from polypoid lesions in the literature is reported as 0–27%.
Gall bladder carcinoma most commonly presents as a mass that occupies gall bladder bed but in 15-20% of the cases appears as a polyp. Surgery at early stages is curative, but advanced adenocarcinoma has a poor prognosis. Preoperative differentiation between neoplastic and nonneoplastic gallbladder polyps, and indication for cholecystectomy remains a clinical dilemma.To resolving this, a guideline was created by the European Society of Gastrointestinal and Abdominal Radiology (ESGAR) and three other societies.
In this guideline, polyps are managed according to their size(10 mm as surgical threshold), growth rate (2 mm or more) and also carcinoma risk factors including age over 50 years, primary sclerosing cholangitis, sessile polyp and Indian ethnicity.
Several studies have criticized or modified this guideline. for example Sarah Z. Wennmacker et al

(2021) suggested MRI characteristics in addition to sonographic findings. Andrew J. Walsh et al (2022) concluded that 2-mm size change as the basis for cholecystectomy is likely too conservative. Sarah Z. Wennmacker et al (2018) concluded that The 10mm threshold is insufficient to indicate surgery.
Thus, although the joint European follow chart in routine work is practical, we must know that the problem of gall bladder polyp management is continuous.

Keywords:

Gall Bladder, Gall Bladder Polyp, Gall Bladder Carcinoma, Gall Bladder Polyp Management

GU

USE OF ARTIFICIAL INTELLIGENCE FOR PROSTATE CANCER DETECTION BASED ON PI-RADS CLASSIFICATION

Mohammad Hadi Gharib, MD
Assistant Professor of Radiology, Golestan University of Medical Sciences (GOUMS), Gorgan, Iran

Prostate adenocarcinoma is one of the most prevalent cancers worldwide. Multiparametric magnetic resonance imaging (mpMRI) of prostate gland is a non-invasive method that has improved detection of clinically significant prostate cancers, and enhanced underlying tumor volume quantification and its regional characterization. Machine learning (ML), a subset of artificial intelligence, is potentially able to analyze prostate mpMRI image series faster and more accurately. It is also believed that ML would be capable of better standardization of application of diagnostic criteria(PIRADS) and is more consistent in identifying clinically significant prostate cancers and hence better control false positive and false negative rates of this overwhelming study.
This lecture would try to summarize ML applications in prostate mpMRI and focus on recent updates of this field in prostate organ segmentation, lesion detection and segmentation, and most importantly lesion characterization.
A thorough literature review is accomplished to provide a brief of the most important studies that have focused on application of ML methods in prostate mpMRI image analysis.

IMAGING OF RENAL TRAUMA

Behzad Aminzadeh, MD*
Assistant Professor of Radiology, Department of Radiology, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran

Abstract:

Damage to kidney is observed in nearly 10% of patients with blunt or penetrating trauma. Most cases are seen in association with blunt trauma, and damage to other organs is also common, especially in high-grade injuries. Imaging plays an important role in diagnosing and grading kidney damage. Contrast enhanced CT scan is the modality of choice to assess kidney damage; it has a higher sensitivity and specificity relative to other methods and can show the type and location of injury, severity of involvement, the presence of urinary extravasation and vascular damage.
The American Association for the Surgery of Trauma (AAST), which was recently updated in 2018, divided kidney injuries into five groups.
Grade 1 renal injury include Subcapsular hematoma and/or parenchymal contusion without laceration.
Grade 2 renal injury include Perirenal hematoma confined to Gerota fascia and Renal parenchymal laceration less than 1 cm depth without urinary extravasation.
Mild kidney injuries, including Grade 1 and 2 damages, are the most common kidney injuries, often require non-surgical treatment and are managed conservatively.
Grade 3 renal injury include Renal parenchymal laceration more than 1 cm depth without collecting system rupture or urinary extravasation and Any injury in the presence of a kidney vascular injury or active bleeding contained within Gerota fascia.
Grade 3 injuries also often treated by non-surgical and conservative management under close observation.
Grade 4 renal injury include Parenchymal laceration extending into urinary collecting system with urinary extravasation, Renal pelvis laceration and/or complete ureteropelvic disruption, Segmental renal

vein or artery injury, Active bleeding beyond Gerota fascia into the retroperitoneum or peritoneum and Segmental or complete kidney infarction(s) due to vessel thrombosis without active bleeding; Grade 5 renal injury include Main renal artery or vein laceration or avulsion of hilum, Devascularized kidney with active bleeding and Shattered kidney with loss of identifiable parenchymal renal anatomy.
Severe kidney damage, including Grade 4 and 5 damages, often requires surgical treatment.
In this lecture, different grades of kidney damage will be discussed using CT scan images of patients.

Keyword:
Kidney, Trauma, Laceration

LAST UPDATE IN BOSNIAK CLASSIFICATION OF CYSTIC RENAL MASSES

Alireza Abrishami, MD, MBA
Assistant Professor of Radiology, Department of Radiology, Shahid Labbafinejad Hospital, Shahid Beheshti University of Medical Sciences, Tehran, Iran.

Diagnosis and treatment of suspected lesions of cystic renal cell carcinoma (RCC) is currently higher than the actual rate. Attempts to diagnose RCC in the treatable phase have resulted in surgery for many lesions without obvious benefit to the patient. This is especially true for cystic masses, which compared with solid masses are more likely to be benign and, when malignant, less aggressive. The Bosniak system has long been used to stratify the risk of malignancy in cystic renal masses. Although it is widely used and still effective, the classification does not formally incorporate masses identified at MRI or US or masses that are incompletely characterized but are highly likely to be benign, and it is affected by interreader variability and variable reported malignancy rates. The Bosniak classification does not distinguish invasive lesions from insignificant lesions. This proposed update to the Bosniak classification addresses some of these shortcomings. Early modifications include MRI, creating definitions for ambiguous imaging terms, and enabling a larger proportion of the masses to enter low-risk classes. Although this update requires validation, it aims to increase the number of cystic masses for which Bosniak classification can be applied, while improving its accuracy and precision for the risk of cancer in each class.

PRACTICAL POINTS IN THE PROSTATE BIOPSY

Mohammad Kazem Tarzamani, MD
Professor, Department of Radiology, Tabriz University of Medical Sciences, Tabriz, Iran
Sina Abdkarimi

Organizations such as the AUA recommend shared decision making for men 55 to 69 years of age considering PSA-based screening .Outside this age range, the AUA recommends that PSA-based screening as a routine could not be recommended based on the available evidence.
This process can be explained in three parts:

- Preparing Patients for Biopsy including: 1- Taking patient's history(Drug history=>anticoagulants and anti platelets) 2- Laboratory tests 3- Consultation with infectious disease specialist(In case of antibiotics hypersensitivity or history of underlying infectious disease) 4-Consultation with cardiologist(In case of uncontrolled HTN, CHF or ...) 5- Prophylactic antibiotics 6- Diet 7- Enema
- DURING the procedure: 1- Explanation the procedure to the patient 2- Sterilization 3- Analgesia 4- Patient positioning 5- Biopsy techniques
- After the procedure: 1. Explanation of complications to the patient 2. Drinking plenty of fluid for the next three days. 3. Activity limitations 4. Inform the patient about warning symptoms 5. Visit the patient one week after the prostate biopsy to discuss the results and possible treatment plan

Keywords:
Prostate, Biopsy, Prophylactic Antibitics, Sterilization

IMAGING OF THE INGUINOFEMORAL REGION

Hoda Asefi, MD
Assistant Professor of Radiology, Department of Radiology, Sina Hospital, Tehran University of Medical Sciences, Tehran, Iran.

The groin region is consisted of two anatomic areas: the inguinal canal and the femoral triangle. Good understanding of embryology, anatomy and imaging characteristics of this region is necessary and allows thorough diagnosis and characterization of pathologic conditions. These conditions include hernias, cystic lesions, undescended testis and retractile testes, vascular conditions such as varicoceles and pseudoaneurysms, infectious and inflammatory processes, lymphadenopathies and neoplasms. Ultrasound is usually the initial modality for evaluation of inguinofemoral region. CT scan and MRI are also helpful diagnostic tools.

There are three major types of Inguinofemoral hernias: direct inguinal hernias, indirect inguinal hernias and femoral hernias. Their differentiation by clinical examination is usually difficult and their imaging diagnosis is mainly performed on the basis of anatomic land marks. Direct inguinal hernias are located anteromedial and inferior to the inferior epigastric vessels, whereas indirect inguinal hernias are posterolateral and superior to the course of these vessels. Femoral hernias are located medial to the common femoral vein and inferior to the course of the inferior epigastric vessels and may compress the femoral vein. Most common cystic lesions include communicating and non-communicating hydroceles. Color doppler ultrasound plays and important role in evaluation of varicoceles and pseudoaneurysms.

Hematomas may appear hyper attenuating on CT scan. metastatic lymph nodes are usually large, round or have irregular borders. they may be heterogeneous or hypoechoic, with variable vascularity.

In this session we will briefly review embryology and anatomy of inguinofemoral region, and then we will discuss practical imaging techniques and findings. Detection of hernias, their types and post operative complications will be discussed with more details, and other above-mentioned conditions are also reviewed briefly.

ULTRASOUND IMAGING OF FETAL BRAIN ABNORMALITIES

Mahyar Mohammadifard, MD
Professor of Radiology, Department of Radiology, Birjand University of Medical Sciences, Birjand, Iran

Introduction:

Neurosonography is an important tool in the diagnosis of Central nervous system (CNS) malformations of fetus.

Methodes:

Transabdominal sonography is the technique of choice to investigate the fetal CNS during late first, second and third trimesters of gestation. The examination should include the evaluation of the fetal head and spine.

Results:

Central nervous system (CNS) malformations are is one of the most common congenital abnormalities. Neural tube defects are the most frequent CNS malformations. Ultrasound has been used as main modality to help diagnose fetal CNS malformations. The aim of this presentation is to review, describe and update the screening evaluation of CNS anomalies. Targeted fetal neurosonography', is a dedicated examination of the fetal brain and spine that needs specific expertise. Transabdominal sonography is the technique of choice for the screening examination of the fetal CNS during the midtrimester scan. This examination includes evaluation of the fetal head and spine. In neurosonographic studies, the examination is mostly performed with gray-scale and Color and power Doppler used to identify cerebral vessels. Required structures for examination are: cerebellum, cisterna magna, lateral cerebral ventricles, choroid plexus, midline falx, and cavum septum pellucidum. All these structures can be reviwed in threel planes of imaging that include cistern magna/cerebellum, cavum septum pellucidum, and ventricular atria. A systematic approach achieved by instituting a protocol. Imaging the fetal brain is limited primarily by the position of the fetal head and technical factors such as maternal body habitus and lack of adequate amniotic fluid. Diagnosis of brain anomalies in the fetus therefore must depend upon constant landmarks that could be documented in normal fetuses.

Conclusion:

Fetal CNS anomalities are an important leading cause of in utero mortality and postnatal morbidity, and accurate prenatal diagnosis is essential for appropriate management

Keywords:
Abnormalities, Brain, Fetal, Imaging, Ultrasound

ECTOPIC PREGNANCY: DIAGNOSIS AND INTERVENTIONS

Zeinab Safarpour Lima, MD
Assistant Professor of Radiology, Shahid Akbarabadi Clinical Research Development Unit (ShACRDU), Iran University of Medical Sciences, Tehran, Iran

Ectopic pregnancy (EP) is defined as a pregnancy that occurs outside of the uterine cavity. EP is a significant cause of morbidity and death in women of child-bearing years, especially in countries or areas with poor prenatal care. The most common predisposing risk factor for EP is tubal abnormality. However, up to 50% of patients with EP have no known risk factors. Approximately 95% of EPs are located within the fallopian tube. Other types of ectopic pregnancy include interstitial, cornual, ovarian, cervical, scar, intraabdominal, and heterotopic pregnancy.
Ectopic pregnancy should be considered in any patient presenting early in pregnancy with vaginal bleeding or lower abdominal pain in whom intrauterine pregnancy has not yet been established.
The clinical diagnosis of ectopic pregnancy is based on a combination of serum quantitative levels β-hCG and transvaginal ultrasound findings.
Currently over 90% of ectopic pregnancies can be visualized on TVS. This means that early ectopic pregnancies can often be detected in asymptomatic women.
Intrauterine pregnancy visualized on transvaginal ultrasonography essentially rules out ectopic pregnancy except in the exceedingly rare case of heterotopic pregnancy. The definitive diagnosis of ectopic pregnancy can be made with ultrasonography when a yolk sac and/or embryo is seen in the adnexa; More often, the patient history is combined with serial quantitative β-hCG levels, sequential ultrasonography, and, at times, uterine aspiration to arrive at a final diagnosis of ectopic pregnancy.
Systemic administration of methotrexate (MTX) is the most commonly used first-line therapy in clinical practice. High levels of serum β-hCG, large conceptus size, and the presence of fetal cardiac activity are regarded as relative contraindications of systemic MTX treatment. Transvaginal ultrasound-guided local injection of MTX or potassium chloride (KCl) in tubal, cornual, cervical and ovarian ectopic pregnancies has been reported as a possible alternative to surgery and systemic medical treatment.
In this presentation we explain the diagnostic clues and interventional treatment of ectopic pregnancy.

Keywords:
Ectopic Pregnancy, Ultrasonography, Diagnosis, Interventions

FIRST TRIMESTER NEUROSONOGRAPHY

Leila Bayani, MD
Diagnostic Radiologist, Head of Department in Arash Hospital, Tehran University of Medical Sciences (TUMS).
First and Corresponding Author

Abstract:
Intracranial anomalies are among the most common congenital birth defects. They range from severe and lethal malformations, which are often amenable to prenatal diagnosis during the first to early second trimesters of pregnancy, to more subtle anomalies that may only be detected during the second to third trimesters of pregnancy.
Most brain abnormalities are present in the first trimester, but only a few are detected so early in gestation.
According to current recommendations for first-trimester ultrasound, the fetal head structures that should be visualized are limited to the cranial bones, the midline falx and the choroid-plexus-filled ventricles. Using this basic approach, almost all cases of acrania, alobar holoprosencephaly and cephalocele are detected. However, the majority of other fetal brain abnormalities remain undiagnosed until the mid-trimester. Such anomalies would be potentially detectable if the sonographic study were to be extended to include additional anatomic details not currently included in existing guidelines.
The aim of this lecture "first trimester neurosonogram" is to describe how best to assess the normal fetal brain by first-trimester expert neurosonography and to demonstrate the early sonographic findings that

characterize some major fetal brain abnormalities.
The main focus of lecture is early detection of open spina bifda which spinal column is split (bifid) as a result of failed closure of the embryonic neural tube as it is relatively common "the prevalence of spina bifida in the USA and many European countries is estimated at 0.5–0.8/1000 births whereas prevalence in some regions of China has been reported to be more than 20 times higher".
New findings for cystic abnormality of posterior fossa are also included in this lecture in addition of more sever anomaly like acrania, holoprosencephaly and etc.

THE DIAGNOSTIC FEATURES OF SPINA BIFIDA: ROLE OF ULTRASOUND

Narges Afzali, MD
Department of Radiology, Faculty of Medicine, Mashhad Medical Sciences, Islamic Azad University, Mashhad, Iran

Abstract

The human neural tube develops in third and fourth week after conception and is completed by 28 days post-conception. Neural tube defects occur when the complete closure process fails. Spinal dysraphism involves a spectrum of congenital anomalies resulting in a defective neural arch through which meninges or neural elements are herniated. They are divided into aperta (visible lesion) and occulta (with no external lesion). The aperta type is usually associated with skin defect and risk of CSF leak, whereas the occult forms have normal skin cover.
Prenatal diagnosis of spina bifida (SB) is an important issue in fetal screening ultrasound exams. Spina bifida must be first checked at the routine first-trimester ultrasound by observing the posterior fossa for intracranial translucency (obliteration of the fourth ventricle). The second screening for SB is performed at the second-trimester anomaly scan. Ventriculomegaly, scalloping of the frontal bones ("lemon" sign), elongation and downward displacement of the cerebellum with obliteration of the cisterna magna ("banana" sign) are ultrasound features of SB in second trimester. In closed SB and SB occulta, the cranial and posterior fossa findings are not present because they are not associated with leaking of spinal fluid and posterior fossa herniation, so the spine should be examined thoroughly in multiple planes during the second-trimester scan. Two-dimensional and three-dimensional ultrasound exam allows an accurate detection of the site, type, and level of the spinal defect. Associated anomalies should also be searched precisely. Magnetic resonance imaging gives specific information of the defect and associated anomalies and is important in ruling out differential diagnosis. MRI is suggested to candidates for intrauterine surgery.

Keywords:

Fetal Ultrasound, Myelomeningocele, Open Neural Tube Defects, Spina Bifida, Three-dimensional Ultrasound, Fetal Anomalies.

FETAL INTRACARDIAC SHUNT MALFORMATIONS (ASD, VSD, AVSD)

Amirhossein Hashemi Attar, MD
Department of Radiology, Faculty of Medicine, Mashhad Medical Sciences, Islamic Azad University, Mashhad, Iran

Fetal intracardiac shunt malformations cover a wide spectrum of cardiac diseases including ASD, VSD and AVSD. Not only are they concerned as cardiac shunt and hemodynamic changes but they are also of high importance because of association with other cardiac, non-cardiac and chromosomal abnormalities.
ASDs are classified into 1) septum secundum (type 2) 2) septum primum (type 1 or partial AVSD) 3) sinus venosus and 4) coronary sinus types.
VSDs are subdivided into 1) inlet 2) outlet 3) perimembranous and 4) muscular forms.
AVSDs are classified as partial vs. complete and also balanced vs. unbalanced.
The goal of the presentation is to review the findings of these defects in fetal echocardiography to become familiar with their classifications and differential diagnosis.

RESISTANCE CHANGES IN MATERNAL OPHTHALMIC ARTERIES IN PREGNANT WOMEN WITH PREECLAMPSIA

Mohammad Kazem Tarzamni, MD*
Professor of Radiology, Tabriz University of Medical Sciences
Mahnaz Ranjkesh

Background:

Preeclampsia is a serious condition that affects both maternal and fetal health. The ophthalmic artery is the first branch of the internal carotid artery and is an easily accessible vessel for Doppler assessment that provides information on less accessible cranial circulation. Early diagnosis and proper management of preeclampsia can improve maternal and neonatal outcomes. Given the prevalence of preeclampsia, the importance of proper management to improve health indicators is clear.
The aim of this study was to evaluate the changes in maternal ophthalmic artery resistance in pregnant women with preeclampsia.

Methods:

In this cross-sectional study, 75 pregnant women between 20 and 38 weeks of gestation were included. Preeclampsia was defined according to the ISSHP criteria based on the development of new hypertension after 20 weeks of gestation and the presence of at least one of following signs: proteinuria, organ disorders or placental-uterine disorders. Doppler of maternal ophthalmic arteries, umbilical arteries and fetal MCA were performed and Doppler criteria including EDV, PSV, RI, PI and S/D Ratio were determined.

Results:

The mean age of the pregnant women was 29.84±7.39 years and the mean gestational age was 31.84±4.23 weeks. Evaluation of color Doppler findings of the maternal ophthalmic artery showed that there was a direct correlation between RI, EDV and S/D ratio between the maternal ophthalmic artery and the umbilical artery; however, no correlation was observed between maternal ophthalmic artery color Doppler indices and fetal MCA.

Conclusion:

It can be concluded that there is a direct and strong correlation between Doppler indices of the maternal ophthalmic artery (RI, EDV and S/D Ratio) with the umbilical artery. It is easy to do and can be used as a factor to assess the status of preeclampsia in nulliparous pregnant women.

Keywords:

Preeclampsia, Color Doppler, Ophthalmic Artery

IMAGING OF FETAL GASTROINTESTINAL ABNORMALITIES

Violet Adib, MD
Shiraz Medical University
Fellowship of Fetal Medicine King's College of London

Abstract:

Evaluation of fetal gastrointestinal abnormalities by sono showing many pitfalls and overlaps,or pathologies maybe detected late in pregnancy, MRI of fetal GI tract showing much more accuracy than sonography, specially in malformations, and better localization of level of obstruction, micro colon, meconium,extension of masses.

DIAGNOSIS, MONITORING AND MANAGEMENT OF FGR

Ayda Roostaee, MD
Department of Radiology, School of Medicine, Shahid Akbar-Abadi Hospital, Iran University of Medical Sciences, Tehran, Iran
ayda152001@yahoo.com

Intrauterine growth restriction (IUGR) and small for gestational age are common diagnosis in obstetrics and as IUGR carries an increased risk of perinatal mortality and morbidity; the differentiation between these two entities is important.
A fetus who is small for gestational age is frequently defined as one with an estimated fetal weight of <10th percentile but Intrauterine growth restriction (IUGR) is an abnormal fetal growth pattern that occurs in

approximately 8% to 10% of pregnancies and is associated with neonatal morbidity and mortality. IUGR refers to an impoverished fetal growth with fetal, maternal, or placental causes (ie, congenital or chromosomal anomalies, infections, and vascular disorders) of a detrimental cascade in which oxygen reduction (up to hypoxemia) and nutritional deficiencies lead to cardiovascular deterioration, extreme blood flow resistance, and decreased fetal growth rate.

Clinical studies have shown that the gestational age at diagnosis can be used to subclassify suspected fetal growth restriction into early and late, depending on whether the condition is diagnosed before or after 32 weeks of gestation.

Antenatal Doppler ultrasound (uterine artery, umbilical artery, middle cerebral artery; ductus venosus, aortic isthmus) not only helps in prediction, diagnosis, management and time of delivery in fetuses with Intrauterine growth restriction (IUGR); but also in many studies determined that abnormal Doppler findings in fetuses with Intrauterine growth restriction (IUGR) is related to poor long term neurodevelopment.

A large number of studies have confirmed the value of Doppler measurements in the management of IUGR, enabling doctors to ensure the healthy prolongation of a pregnancy which, without Doppler monitoring, could result in a preterm birth, a stillbirth or even a baby that can suffer lifelong effects.

APPROACH TO PRENATAL DIAGNOSIS OF SKELETAL DYSPLASIA

Ensi Khalili Pouya, MD
Assistant Professor of Radiology, Mahdiyeh Hospital, Shahid Beheshti University of Medical Sciences, Tehran, Iran
n30.khalili@gmail.com

Skeletal dysplasias (also known as osteochondrodysplasia) are a heterogeneous group of conditions associated with various abnormalities such as disturbance of bone growth which begins during the early stages of fetal development and evolves throughout life. These entities are not uncommon and radiologists are likely to encounter suspected cases of dysplasia in his practice. Despite recent advances in imaging, fetal skeletal dysplasias are difficult to diagnose in utero due to some reasons; including the large number of skeletal dysplasias and their variable phenotypes with overlapping features; at least 32 groups with more than 350 distinct entities have been described; lack of precise molecular diagnosis, lack of systematic approach and variability in the time at which findings manifest in some skeletal displasias. However, the correct and early diagnosis is important for management of complications and for genetic counselling. Hence, it is important for radiologists to be familiar with radiological features of common dysplasias. Ultrasonography (US) of suspected skeletal dysplasia involves systematic imaging of long bones, thorax, hands and feet, skull, spine and pelvis. Nowadays, using three-dimensional US has been shown to improve diagnostic accuracy.

In this article, we discuss a radiologic approach to skeletal dysplasia; describe the differentiating features of common lethal and non-lethal types of dysplasia. In conclusion, we propose algorithms to either definitively diagnose a particular dysplasia or suggest the most likely differential diagnoses to referring clinician and thus direct further work-up.

Keywords:
Skeletal Dysplasia, Phenotype, Ultrasonography

ULTRASOUND IMAGING OF FETAL BRAIN ABNORMALITIES

Mahyar Mohammadifard, MD
Professor of Radiology, Department of Radiology, Birjand University of Medical Sciences, Birjand, Iran

Introduction:

Neurosonography is an important tool in the diagnosis of Central nervous system (CNS) malformations of fetus.

Methods:

Transabdominal sonography is the technique of choice to investigate the fetal CNS during late first, second and third trimesters of gestation. The examination should include the evaluation of the fetal head and spine.

Results:

Central nervous system (CNS) malformations are is one of the most common congenital abnormalities. Neural tube defects are the most frequent CNS malformations. Ultrasound has been used as main modality to help diagnose fetal CNS malformations. The aim of this presentation is to review, describe and update the screening evaluation of CNS anomalies. Targeted fetal neurosonography', is a dedicated examination of the fetal brain and spine that needs specific expertise. Transabdominal sonography is the technique of choice for the screening examination of the fetal CNS during the midtrimester scan. This examination includes evaluation of the fetal head and spine. In neurosonographic studies, the examination is mostly performed with gray-scale and Color and power Doppler used to identify cerebral vessels. Required structures for examination are: cerebellum, cisterna magna, lateral cerebral ventricles, choroid plexus, midline falx, and cavum septum pellucidum. All these structures can be reviewed in three planes of imaging that include cistern magna/cerebellum, cavum septum pellucidum, and ventricular atria. A systematic approach achieved by instituting a protocol. Imaging the fetal brain is limited primarily by the position of the fetal head and technical factors such as maternal body habitus and lack of adequate amniotic fluid. Diagnosis of brain anomalies in the fetus therefore must depend upon constant landmarks that could be documented in normal fetuses.

Conclusion:

Fetal CNS anomalies are an important leading cause of in utero mortality and postnatal morbidity, and accurate prenatal diagnosis is essential for appropriate management

Keywords:

Abnormalities, Brain, Fetal, Imaging, Ultrasound

ACQUIRED UTERINE ENHANCED MYOMETRIAL VASCULARITY/ARTERIOVENOUS MALFORMATION DIAGNOSIS AND TREATMENT

Amin Abolhasani Foroughi, MD

Associate Professor of Radiology and Interventional Radiology Fellowship

Medical Imaging Research Center, Shiraz University of Medical Sciences, Shiraz, Iran

Nowadays increase in incidence of EMV/AVM is seen after abortion, D&C, endometrial or cervical cancer, cesarean section, and gestational trophoblastic disease. The best way to diagnosis the disease is to do trans vaginal ultrasound and color Doppler sonography which reveals abnormal tortuous vessels in myometrium with or without extension to endometrium with or without retained products of conception.

In color Doppler ultrasound the abnormal tortuous vessels have PSV more than 20 cm/s with a blush of color signal in abnormal vessels.

The treatment options rely on mainly PSV. If the PSV was between 20 to 40 cm/s then the management is expectant. If the PSV was between 40 to60 cm/s then using medical treatment with Methylergonovine Maleate, Tranexamic acid, Danazol, combined oral contraceptive pills, gonadotrophin-releasing hormone agonists in addition to Curettage followed by color Doppler ultrasound to assess treatment response is the treatment of choice.

If the PSV is more than 60 to 70 cm/s then angioembolization is the best way to treat. Gelfoam is a good agent but it is a temporary agent and rebleeding and reintervention may be needed. The other option is to use PVA, that is a permanent agent with good results. Care should be taken to rescue the ovarian feeders; however, infertility should always be explained for the patients and her family as a potential complication with different incidence rate from 10 to 50 percent depending to patients age and previous fertility condition.

Some interventionist used Glue and Onyx for treatment but they seem to be not good options because of more damage to uterine artery possibly more interfere to infertility.

Keywords:

EMV, AVM, AUEMV, Angioembolization

EMBOLIZATION OF HEAD AND NECK TUMORS

Mohammad Reza Sasani, MD*
Assistant Professor, Medical Imaging Research Center, Department of Radiology, Shiraz University of Medical Sciences, Shiraz, Iran.

Abstract:

We aim to evaluate the role of endovascular treatment by interventional radiologist in head and neck tumors. One of options in the treatment of benign and malignant neoplasms in head and neck region is endovascular embolization in conjunction with surgical resection. Preoperative embolization result in reduce intraoperative blood loss, decrease surgery time, decrease manipulation of surrounding structures during surgery. Other advantage of preoperative embolization is reduced neurological morbidity and morbidity in the tumor management of surgical resection. Paragangliomas and juvenile nasopharyngeal angiofibromas are common tumors of head and neck that refer for embolization. In addition, malignant lesions that involving carotid artery may be selected to preoperative embolization. In summary, preoperative embolization is a useful method in conjunction to surgery in management of head and neck tumors.

Keywords:

Head and Neck Neoplasms, Therapeutic Embolization, Endovascular Procedures, Interventional Radiology.

COMPLICATION RATE AFTER PERCUTANEOUS LIVER BIOPSY USING A REAL-TIME ULTRASOUND APPROACH: INTRODUCING A UNIFORM METHODOLOGY

Mohammad Reza Sasani, MD*
Assistant Professor, Medical Imaging Research Center, Department of Radiology, Shiraz University of Medical Sciences, Shiraz, Iran, Corresponding Author

Alireza Rasekhi, MD

Background:

After first attempts of liver biopsy, several techniques for this procedure have been developed with a wide variety of methods and materials. Many studies have been conducted on evaluation of post liver biopsy complications, but their main limitation is considerable variation in patient populations and methods, which could be the cause of diverse results. Therefore, there is a need for a homogeneous approach to perform percutaneous liver biopsy leading to comparable results worldwide.

Objectives:

This study was conducted to obtain a precise complication rate after percutaneous liver biopsy using a uniform approach in all subjects with omission of the factors that have led to varying results in the literature. The secondary aim was to introduce a uniform methodology for percutaneous liver biopsy that produces comparable results.

Methods:

In this retrospective study, 116 patients were enrolled for percutaneous liver biopsy. A uniform approach was employed to perform biopsy for all participants. There was an attempt to eliminate factors might influence complication rate using same type and size needle, single needle pass, a subcostal approach, breath holding in deep inspiration, identical pre- and post-biopsy preparation, real-time ultrasonography guidance, one operator, and no sedation or general anesthesia. Finally, the frequency of complications was recorded.

Results:

The overall complication rate was 19.8%, of which 18.9% were pain and minor bleeding and one patient (0.9%) had hematoma requiring hospitalization. The total percentage of patients who experienced pain was 13.8%. No other complications were observed. Conclusions: The findings of this study may indicate precise estimation of post liver biopsy complication rate. Furthermore, our uniform methodology could be an advantageous choice in clinical practice because of a lower complication rate compared to most reports. Other positive aspects are absence of life-threatening complications and the need for a homogeneous approach to perform liver biopsy leading to comparable outcomes.

Keywords:

Methodology, Planning, Imaging Guided Biopsy, Ultrasound, Core Needle Biopsy, Liver Dis, Complications.

ENDOVASCULAR TREATMENT OF DURAL ARTERIOVENOUS FISTULA

Mohammad Gharib Salehi, MD

Associate Professor of Radiology Department, Clinical Research Development Center, Imam Reza Hospital, Kermanshah University of Medical Sciences

kumssalehi@yahoo.com

Farhad Naleini, MD

Background and Purpose:

Intracranial dural arteriovenous fistulas (DAVFs) are abnormal shunts between dural arteries and dural venous sinus or cortical veins. We report our experience with endovascular therapy of primary complex DAVFs using modern embolic agents.

Methods:

This is a retrospective analysis of patients with DAVFs treated between 2017 and 2020. Patient demographics and technical aspects including the use of embolic agent, access to the fistula, number of treatments, occlusion rates, and complications were addressed. Angiographic treatment success was defined as complete occlusion (CO) of the DAVF.

Results:

seventeen patients were treated endovascularly. Median age was 43 years and 53% were men. The most common symptom was pulsatile tinnitus in 8 patients (34%). The most frequent location of the DAVF was the transverse-sigmoid sinus (38%). Non-adhesive and adhesive liquid agents were used in 92% as a single material or in combination. CO was achieved in 14 patients (87%). Non-adhesive liquid agents were exclusively used in 14 patients with CO attained in every case. For CO of tentorial DAVFs, multiple sessions were more often required than at the other locations (55 vs. 14%, p = 0.0051). Among 26 procedures, the overall complication rate was 7%. The procedure-related mortality rate was 0%. Conclusion: Endovascular treatment of intracranial DAVFs is feasible, safe, and effective with high rates of CO. In more than half of the patients, the DAVF was completely occluded after a single procedure. However, in tentorial DAVFs, multiple sessions were more often required.

DIFFERENT TECHNIQUES OF THROMBECTOMY IN ISCHEMIC STROKE

Mohammad Gharib Salehi, MD

Associate Professor of Radiology Department, Clinical Research Development Center, Imam Reza Hospital, Kermanshah University of Medical Sciences

Leila Afshar Hazarkhani, MD

Background & Objectives:

Several studies confirmed that early recanalization of intracranial arteries during ischemic strokes result in better recovery of these patients after three months of treatment.

Materials & Methods:

Recanalization of cerebral arteries is performed using intravenous tPA or mechanical thrombectomy.

Timely restoration of cerebral blood flow using reperfusion therapy is the most effective maneuver for salvaging ischemic brain tissue that is not already infarcted. There is a narrow window during which this can be accomplished, since the benefit of reperfusion decreases over time

Results:

Intravenous tPA injection within 4.30 hours of ischemic stroke is associated with better outcome in three months' follow-up.

Intravenous tPA has less effect on large cerebral arteries, like internal carotid arteries. Recent studies showed that mechanical thrombectomy of large cerebral arteries within 6 hours of stroke onset is associated with better outcome three months after operation. Since 2015, mechanical thrombectomy has been entered in first-line of acute phase of ischemic stroke in several guidelines and countries. Mechanical thrombectomy included several different endovascular techniques, as thrombaspiration and stent retrieval for clot removal.

Conclusion:

Understanding several these different techniques, their benefits, and their safety could help better selection of suitable method for endovascular treatment of stroke patients.

INTERVENTIONAL RADIOLOGY FOR GI BLEEDING

Amin Abolhasani Foroughi, MD
Associate Professor of Radiology and Interventional Radiology Fellowship, Medical Imaging Research Center, Shiraz University of Medical Sciences, Shiraz, Iran

GI bleeding is characterized by anatomic location of the source. That is before or after ligament of Treitz known as upper or lower GI bleeding.
For upper GI bleeding, we should do consultation with GI man for endoscopy, If the source is revealed, then it can be treated by clip, sclerotherapy, and epinephrine infusion.
If it failed, then CTA is the modality of choice for finding the cause of bleeding. It should be done in noncontract, arterial, and port venous phases. When the source of bleeding is depicted, then it can be treated by angioembolization, using coils, glue, PVA, or if they failed by vasopressin infusion.
If the patients suspected to have lower GI bleeding, then RBC scan can be done to detect the site of bleeding. Again, angioembolization can be done for bleeding.
For finding the source of bleeding, first celiac trunk, and its branches, left gastric a. and gastroduodenal a. should be interrogated, then SMA for finding small bowl source and then IMA for either upper or lower GI bleeding source and at last internal iliac arteries should be searched for cause of bleeding. For gastroduodenal artery always care should be take to embolize pancreaticoduodenal branch that is mainly feed from SMA.
For embolizing the source of bleeding coils is a good option, in addition PVA and gelfoam can be used or they can be injected alone. The other option is Glue and Onyx injection. Care should be taken to embolize the back door to prevent rebleeding.

Keywords:

GI Bleeding, Angioembolization, Diagnosis, Treatment

TRANSJUGULAR INTRAHEPATIC PORTOSYSTEMIC SHUNT

Alireza Rasekhi, MD
Associate Professor of Radiology, Shiraz University of Medical Sciences

Introduction:

Transjugular intrahepatic portosystemic shunt (TIPS) is a well-established percutaneous modality for decreasing portal hypertension. The major clinical indications for transjugular intrahepatic portosystemic shunts include refractory variceal hemorrhage and refractory ascites.

Materials and methods:

Among the patients with cirrhosis in transplant list and intractable complications 31 patients underwent TIPS procedure. The shunt itself was created by placing a stent between the portal vein and the hepatic vein. The patients with child C or B with varicial bleeding or intractable ascites were enrolled in this study.
After preparing the patient a calopinto needle passed from jugular vein to the right or mid hepatic vein and the right or left portal vein punctured and the bare stent were deployed.Pressure gradient were measured and the aim was reacing less than 10 mmhg portosystemic gradient.

Resault:

The resultant shunting of portal venous flow to the systemic circulation reduced the porto systemic gradient and alleviate bleeding and ascites without changing the extra hepatic anatomy. Patency was good. The patients recovered from complications and again entered the list of transplantation. Intra procedural mortality was 0%. Shunt thrombosis were 5 patients (16%) in follow up and 8 (26%) were not effective.

Conclusion:

TIPS is a safe and effective procedure to reduce portal hypertension and complications.

Keywords:

Portosystemic Shunt Transjugular Interventional Radiology

RESPONSE TO TREATMENT OF OSTEOID OSTEOMA AFTER RFA AND A COMPARISON BETWEEN DRILLING AND CURETTAGE TECHNIQUES BEFORE RFA

Alireza Rasekhi, MD
Associate Professor of Radiology, Shiraz University of Medical Sciences

Objective:

Osteoid osteoma (OO) is known as painful benign osteoblastic lesions, occurring mostly in the long bones. The present study aims to evaluate OO& imaging features before/after radiofrequency ablation (RFA) with/without curettage and during the follow-upperiod.

Materials and methods:

In this retrospective study, we reviewed several OO patients with RFA who were assessed via drilling with/without curettage.

Results:

RFA with drilling was used in some patients and for the rest of the patients ,RFA with curettage and drilling was performed as a treatment procedure. The overall clinical success rate was 92.6% , with a low complication rate (7.4%). Sixteen patients belonging to the inter-cortical tumor location in the bone. The mean diameter of nidus in pre/post-treatment was 3.46 ± 2.02 and 2.22 ± 1.75 mm. Significant differences between pre/post-treatment follow up examinations in nidus size (P value < .001), nidus diameter (P value < .001), bone marrow edema (P value = .01), and calcification size (P value < .001) was detected. Additionally, it depicts that mean values decreased after treatment in tumor size and cortical thickening. Conclusion: There is no significant difference between RFA and curettage in the treatment of OO. Moreover, it is concluded that clinical response to treatment is more valuable and efficient than post-RFA imaging, which can be more beneficial in mitigating risks of radiation dose and moderating healthcare expenses.

Keywords:

Osteoid Osteoma Radiofrequency Ablation

INTERVENTIONAL RADIOLOGY IN URETERAL INJURIES

Alireza Rasekhi, MD
Associate Professor of Radiology, Shiraz University of Medical Sciences

Ureteral injuries might happen due to several causes. Surgical or minimally invasive treatments might be chosen. The minimally invasive treatments are best because they are more practical and do not need hospitalization. This study introduces a new percutaneous technique called double-loop+needle technique, which can be an effective substitute for surgical treatment of ureteral injuries. Four patients are introduced, including two patients with disrupted ureters from the bladder (one transplanted and the other had post-rectal cancer surgery) who underwent percutaneous reconstruction ureteroneocystostomy. This technique showed fewer complications and hospitalization duration than surgical intervention. Double-loop+needle technique is safe and practical for performing ureteroplasty and minimally invasive ureteroneocystostomy. However, it needs more experience to use it as a routine technique for managing patients with ureteric disruption and complete occlusion, the cases that might be challenging in surgery.

Keywords:

Ureteral disruption interventional radiology ureteral injury

RENAL ABLATION

Masoud Pezeshki-Rad, MD
Interventional Radiologist, Associate Professor of Radiology, Mashhad University of Medical Sciences

Background:

The incidence of kidney cancer is increasing steadily in the last three decades. Image-guided ablative techniques, mainly radiofrequency ablation (RFA) and cryoablation are being used with increased frequency and excellent results in the management of small renal tumors.

Diagnostic Evaluation:

Imaging plays a cardinal role in the detection of renal masses. Enhancing lesions on CT have a 75–80% potential for malignancy.

Indications

- Small tumors < 4 cm. Cryoablation could be used for T1b tumors.
- Poor surgical candidates
- tumor in a solitary kidney
- Bilateral tumors
- Renal insufficiency
- Von-Hipple Lindau disease
- Hereditary form of renal cancer
- Patient's preference for ablative management
- Palliation of hematuria

Contraindication

- Irreversible coagulopathy
- Poor life expectancy
- Extensive metastatic disease
- Sepsis
- Pacemaker presence is a relative contraindication for RFA

Technical tips

- Prone, semi-prone or lateral decubitus position
- Hydrodissection with 5% dextrose (not saline) when performing RFA
- Retrograde pyeloperfusion with cold dextrose in lesions abutting the collecting system and ureter

Endpoint

- The aim of the treatment is the creation of an ablation zone that involves the renal mass and extends at least 0.5 cm around the lesion.
- When using cryoablation a double freeze-thaw cycle is required to achieve cell death in the treatment area

THORACIC ABLATION

Bita Abbasi, MD
Interventional Radiologist
Associate Professor of Radiology, Mashhad University of Medical Sciences

Background:

Lung tumors are common accounting for nearly a third of all cancer deaths in the USA. Lungs are also the second common site for metastasis. Here we discuss the practical aspects of lung nodule ablation.

Diagnostic evaluation

In theory, microwave and cryotherapy offer a number of advantages over radiofrequency in the setting of a solid lesion in the aerated lung parenchyma.
Remember that aspirin or Clopidogrel should be discontinued 7–15 days prior to the procedure unless absolutely necessary.
In addition to the full blood count and INR, a respiratory function test should normally be done prior to the lung ablation.
A staging CT scan should be done to assess the size, number, location, proximity of important structures, and amount of plural or fissural contact of the lesion.
A PET is usually performed prior to RFA mainly to assess for nodal or extrathoracic uncontrollable disease.

Indications

Curative setting

- Primary non-small cell lung tumor T1N0M0 or small T2N0M0 in patients unfit for surgery or who do not want surgery
- Best for tumors less than 3 cm
- Non-curative for tumors more than 5 cm
- Lung metastasis from selected slow-growing primaries usually up to three per lung, and each less than 4 cm

Contraindication

- Pneumonectomy
- FEV < 0.8
- Within 1cm of large bronchus, blood vessel, or the heart.
- Pacemaker

Technical tips

- For lesions close to the pleural surface or on the diaphragm use Hydrodissection
- Use thick sections or a bone window to view 14 G electrodes
- Hypervascular chest wall lesions and certain parenchymal metastasis can be pre-embolized.

Endpoint

A ground-glass halo around the tumor measuring at least 5 mm indicates a satisfactory endpoint of treatment. Larger margins are desirable for adenocarcinoma.

INTRACRANIAL STENTS

Rambod Salouti, MD

Are decided to Laser Cut stents and braided stents, Laser Cut stents is divided to Open Cells and Closed cells In Open Cells Some wires connected-some not and Allows each segment to move independently
At present, 6 types of stents dedicated for intracranial use are available in the worldwide market:

- 5 stents (Neuroform, Solitaire, Enterprise, and Leo plus, LVIS) for assisting coiling
- Open cell: Neuroform
- Close-cell: Solitaire, Enterprise, and Leo plus, LVIS
- and 1 stent (Wingspan) for the treatment of intracranial atherosclerotic disease.

advantages of Open-cell Designs for Self-Expandable Stent:

- Open-cell design stents better cover the aneurysm neck when compared to close-cell stents, and induce less straightening of the vessel.
- The open-cell stents have, however, less struts apposing well to the vessel wall compared to close-cell stents
- Open-cell stents conform better to vascular tortuosities.

Disadvantages of Open-cell Designs for Self-Expandable Stent:

- open-cell stents may show increased opening of cells and outward prolapse of struts into an aneurysm neck when situated at the convexity of the curvature, whereas at the concavity, struts, or stent segments may protrude inward.
- An open-cell stent, once partially delivered, cannot be resheathed and repositioned owing to its design consisting in independent stent segments soldered by connectors.

advantages Close-cell Designs for Self-Expandable Stent:

- The major advantage of a close- cell stent is ability to be deployed in the vessel lumen and resheathed in its delivery microcatheter, allowing the operator to optimize the position of the stent regarding the aneurysm neck.

disadvantages Close-cell Designs for Self-Expandable Stent:

- When a closed-cell stent is bent, it has less flexibility to conform to a curved or irregular anatomy.
- The close-cell unsegmented design does not allow the stent to lengthen at the outer curve or to shorten at the inner curve.
- This limitation in adapting to a vessel curvature will cause flattening of the stent or kinking resulting in incomplete stent apposition.
- Incomplete stent apposition has recently been found to be a critical factor associated with higher thromboembolic complication rates in SACT embolization of intracranial aneurysms.

BENIGN BILIARY STRICTURES INTERVENTION

Arash Khameneh Bagheri, MD
Assistant Professor of SBUM

Benign biliary strictures can be attributable to a large variety of causes, but are commonly iatrogenic after direct or vascular injury during laparoscopic cholecystectomy and other biliary procedures. An increasing number of patients present with strictures of bilioenteric anastomoses after liver transplantation and radical surgery for hepatopancreaticobiliary cancer. Endoscopic access to the biliary tree may be difficult or impossible following pancreaticoduodenectomy, and in this context strictures are best approached percutaneously.
In most of the cases a new surgical intervention is not possible and the percutaneous trans-hepatic approach is of paramount importance in the diagnosis and treatment of the problem. In the case of stenosis, dilation of the narrow tract is the usually the first approach.
Therefore, the percutaneous trans-hepatic approach is of extreme importance in the diagnosis and treatment of the problem especially in complex cases

BIEMBOLIZATION (COMBINED HEPATIC AND PORTAL VEIN EMBOLIZATION)

Alireza Sattar, MD
Radiologist, Fellowship of Interventional Radiology, shiraz, Iran

Liver failure after major liver resection remains the main cause of postoperative mortality. This is usually due to a small remnant liver volume.
liver transection in the context of an Associating Liver Partition and Portal Vein Ligation for Staged Hepatectomy (ALPPS) procedure is an option; however, this technique is associated with a significant rate of postoperative morbidity and mortality.
Portal vein embolization (PVE) of the liver to be resected has been developed to induce hypertrophy of the future remnant liver (FRL).
Despite the high rates of technical success and effectiveness of PVE, some of patients remain unresectable due to insufficient or even absent hypertrophy of the FRL.
So additional strategy is developed as HPVE, (also called liver venous deprivation or biembolization) to induce more and faster hypertrophy of the FRL volume and that is PVE in combination with simultaneous hepatic vein embolization (HVE).
The goal is to interrupt the portal and venous circulation in the territory to be resected and thus initiate compensatory hypertrophy of the FRL.
So, in cases of complex liver resection requiring total vascular exclusion with increased risks of postoperative liver failure related to ischemia-reperfusion injury, HPVE may be considered routinely to achieve the maximum increase in the FRL volume possible before complex hepatic resection.

IMAGING OF HEMATURIA

Adeleh Dadkhah, MD*
Assistant Professor of Radiology, Department of Radiology, Iran University of Medical Sciences, Tehran, Iran

Abstract:

Hematuria is one of the most common presentations of patients with urinary tract diseases; therefore, it is a common reason for urinary tract imaging. Many causes of microscopic hematuria (three or more red blood cells per high-power field from two of three properly collected urinalysis specimens) do not require a full diagnostic workup, including vigorous exercise, infection or viral illness, menstruation, exposure to trauma, urologic procedures (e.g., catheterization).
Many different radiological imaging modalities can be done to assessment of hematuria but CT Urography is the method of choice to find out the cause of hematuria. In the CT urogram, all patients receive water, primarily. Next, a non-contrast helical abdominopelvic CT scan is obtained to evaluate calculi. This is followed by the injection of iodinated contrast media with the acquisition of a high-resolution (1- to 2-mm sections) nephrographic phase and a high-resolution delayed phase (5 to 10 minutes).
Radiologist should look for calculi, infection, mass (bladder, kidney, prostate, urothelial), obstruction, chronic renal disease, congenital vascular malformations and aneurysms, nutcracker syndrome, BPH, renal cystic diseases, urethral stricture disease, parenchymal disease, traumatic indications, blood clot, retroperitoneal and periureteric disease, bladder endometriosis and papillary necrosis.
In patients with low risk of malignancy, renal insufficiency, radiation sensitivity (children and pregnant women) or contrast media allergy, alternative imaging options include renal ultrasonography and magnetic resonance urography (MRU) are used. Radiologic evaluation will almost always be accompanied by cystoscopy because no imaging technique is completely satisfactory for ruling out disease at bladder and lower urinary tract.
If appropriate workup does not reveal nephrologic or urologic disease, then annual urinalysis should be performed for at least two years after initial referral. If these two urinalyses do not show persistent hematuria, the risk of malignancy is less than 1%, and the patient may be released from care. However, if asymptomatic microscopic hematuria persists, a full repeat evaluation should be considered within three to five years of the initial evaluation.

Keywords:

Hematuria, CT Urography, Radiology

NEURO-ONCOLOGY MRI PROTOCOLS (MULTI-PARAMETRIC IMAGING OF BRAIN TUMORS)

Sharifkashani Shervin, MD
MD, Radiologist

MRI has an essential role in the evaluation of intracranial lesions such as Brain tumors. The conventional MRI of the tumors has some limitations in primary diagnosis, early detection, grading of the tumor, and differentiation of the tumors for instance differentiation of the primary central nervous system lymphoma (PCNSL) from the Glioblastoma multiform. Adding the Multiparametric MRI (mpMRI) values can overcome some of these limitations and facilitates a more accurate diagnosis. Multiparametric MR imaging is a kind of combination of morphological, structural, and functional imaging modalities including diffuse-weighted (DWI) MRI, diffusion tensor imaging (DTI), perfusion-weighted (PWI) MRI which itself includes: Dynamic susceptibility-contrast (DSC,) and Dynamic contrast-enhanced (DCE) and finally magnetic resonance spectroscopy (MRS). Each functional imaging modality has its own advantages and must be performed along with the conventional imaging as complementary imaging but the major drawback can be increased time and cost. The Multiparametric MRI of the brain tumors can also be used for management planning, follow-up, treatment response, and post-treatment changes versus residual and/ or recurrence of the tumor. In this presentation, the most practical Multiparametric MR imaging modalities for better diagnosis, evaluation, and differentiation of Brain tumors are discussed.

HOW TO OBTAIN THE BEST IMAGE OF FOUR CHAMBER VIEW , OUTFLOW TRACTS AND 3 VESSEL TRACHEAL VIEW & THYMUS GLAND

Mohammad Ali Karimi, M.D
OB committee of ISR

Congenital heart disease (CHD) is a leading cause of infant morbidity and mortality from birth defects. Radiologists can play an invaluable role in accurate prenatal diagnosis of CHD.
This presentation is intended to provide the radiologists with some technical points for the performance of high-quality ultrasound fetal heart examinations.
After some recommendations about system settings adjustment, we will discuss how to obtain high quality standard images of basic fetal echocardiography views: 4-chamber view, outflow tracts and three-vessel view.
Finally, recommendations for the assessment of thymus gland will be provided.
Key words: fetal echocardiography, 4-chamber view, LVOT, RVOT, three-vessel view.

DIFFERENTIATION OF TUMORAL AND NONTUMORAL LESIONS IN CERVICAL CORD AND BRAINSTEM BY TRACTOGRAPHY

Aidin Taghiloo*
Arad Hospital, Ztaghiloo@yahoo.com

Diagnosis of Spinal Cord And Brainstem Lesions By Structural MRI Has Always Been Questionable And Challenging. Both Tumoral And Nontumoral Lesions Such As Demyelinating And Inflammatory Disease Have Common Structural Characters. Neither IV Contrast Injection Nor DWI Or SWI Sequences Can Help In This Issue And Biopsy From Lesion Is The Next Step For Definite Diagnosis. Due To These Problem And Importance Of Differentiation Of These Entities We Decided To Use Tractography To Facilitate This Purpose. We Considered 27 Patients With Intramedullary Lesion In Cord And Brainstem With Uncertain Diagnosis Based On Structural Imaging, Physical Exam Or Laboratory Findings. By Tractography We Evaluated Fiber Tracts Closely And The Behavior of Fibers And Correlated The Results With Pathology Report Or Lesion Progression Or Regression Over Time.
Sometimes They Displace Around The Lesion And Sometimes They Pass Through That And Physically Speaking We Can Estimate The Nature And Character of Pathology.

IMAGING IN TRAUMATIC NERVE INJURY

Reza Alizadeh
Iran University of Medical Sciences
Reza_13154@yahoo.com

Due to the extensive and large neural network and the limited time to present information related to traumatic lesions, this article deals with the imaging of common and important neural lesions.
First, a schematic view of the anatomy of the natural nerve and its various layers, including the; 1. fascicle which contain: Axon, Endoneurium, Perineurium, and then the accumulation of a number of fascicles along with the Epineurium, which forms the nerve.
Second, the image of the natural nerve will be discussed in imaging modalities,especially ultrasound and MRI in the axial, sagittal and coronal sections.
Third schematic types of neurological traumas including; Neuropraxia (grade I), Axonotmesis (Grade II) and Neurotmesis including (Grade III-V) and traumatic
lesions (Grade VI)(combination of lesions 1-5) and then will be discuss about their appearance in different visual modalities. Such as radiology, plain CT and CT myelography, ultrasound and MRI, which include direct symptoms such as change in size and shape and extension and echo or signal, as well as indirect symptoms including muscle denervation change, perineural fibrosis and neuroma formation in the proximal part of nerve damage.
Following the conference important nerve lesions such as Brachial plexus injury including anatomy and pathology (Roots, trunks, Divisions cords and Branches) in various imaging modalities, especially ultrasound and MRI will be discuss [including techniques and sequences used to diagnose nerve damage such as T1 (NON FATSAT) and 3D SPACE STIR sequences, T2 SPACE, STIR and DWI
sequence with low B VALUE.
In the next stage, important nerves of the upper limbs including median, ulnar,radial, axillary and supra scapularis nerves , and important nerves of the lower limbs including femoral, sciatic plexus, obturator and tibialis and proneal sacs will be presented.

FEATURE TRACKING TECHNIQUE AND QUANTIFYING BIVENTRICULAR STRAIN PATTERN IN EBSTEIN'S ANOMALY; A CASE-CONTROL STUDY IN IRAN

Mohammad Ali Mohammadi Vajari*
Department of Radiology, Iran University of Medical Sciences
Malimv71@yahoo.com
Marzie Motevalli
Ali Allameh
Ghazale Tefagh
Hamidreza Pooraliakbar
Parham Rabiei
Sanaz Asadian
Kasra Kiani Amin
Golnaz Houshmand

Ebstein's Anomaly (EA) is a congenital heart anomaly. Its main feature is abnormal function of tricuspid valve. It remains a relatively ignored abnormality. Hence, new approaches should be developed for determining degree of the lesion. There are several ways to study nature of tissues using Magnetic Resonance Imaging (MRI). One of the most accurate methods is strain calculation using Feature Tracking Technique. Since this method is novel in cardiac MRI (CMR), the aim of this study is determining and evaluating Feature Tracking technique in EA.

Methods:

18 EA patients and 15 healthy controls were enrolled in this case-control study conducted in Shahid Rajaei hospital, Tehran, Iran in 2018-2019. Radial, longitudinal, and circumferential strain of left and right ventricules were determined using CMR 1.5 Tesla Siemens Systems. Strains of patients and control were determined by semi-automatic commercially available software of Circle cardiovascular imaging (CVi42). data were analyzed with SPSS, 22.

Results:

The results showed a significantly lower Radial LV strain of EA patients compared with control group (P =0.002). Also, global longitudinal strain of RV in EA patients was significantly lower than controls (P = 0.001). There were no significant differences between other strain components of RV and LV between patients and controls.

Conclusion:

Among different ways for detecting cardiac function in EA, CMR with different strain patterns of ventricles could be a promising method. Most implicated strain markers in our study were radial LV strain and longitudinal RV strain which may be the best variants for early diagnosis of heart function.

THE VALUE OF ULTRASOUND-GUIDED CORE NEEDLE BIOPSY IN DIFFERENTIATING BENIGN FROM MALIGNANT SALIVARY GLAND LESIONS

Mohammad Ali Kazemi
Farzaneh Amini
Bita Kargar
Maryam Lotfi
Keyvan Aghazadeh
Hashem Sharifian
Behnaz Moradi
Javid Azadbakht*
Kashan University of Medical Sciences
Javidazadbakht2@gmail.com

Purpose:

In recent years, core needle biopsy (CNB) technique has received much attention, being used as alternative method of tissue sampling for surgical biopsy of salivary gland tumors (SGTs). The present study aimed to evaluate the value of CNB in differentiating benign from malignant SGTs. Hereby, we also present two rare cases of parotid gland metastasis.

Methods:

Patients with suspected benign or malignant SGTs in imaging were enrolled in this study. All core needle biopsies were performed under ultrasound guidance, i.e ultrasound-guided Core Needle Biopsy (USCNB). Histological examination of the specimen after surgical excision was regarded as gold standard test and set as reference standard to assess USCNB

accuracy for discriminating between ultrasound-visible benign and malignant SGTs.

Results:

Based on USCNB results, from 36 participants (14 women and 22 men) with SGTs, 44.4% of detected tumors were benign and 55.5% were malignant. Twenty-two patients underwent surgery and postoperative specimen histological examination showed that 59% of excised lesions were benign and 41% were malignant. USCNB and surgical biopsy (SB) findings were completely compatible for 21 patients. Sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy of USCNB were 100% in differentiating malignant from benign lesions.

Conclusions:

USCNB is a valuable and accurate method of diagnosis with high sensitivity and specificity in distinguishing benign from malignant ultrasound-visible SGTs.

LUNG CONTUSION, A COVID 19 PNEUMONIA MIMICKER

Behzad Aminzadeh*
Mashhad University of Medical Sciences
Aminzadehb@mums.ac.ir
Mona Maftouh
Ahmadreza Tavassoli

Background:

COVID-19 pneumonia has a variety of chest computed tomography (CT) manifestations, and its diagnosis can be challenging, especially in a trauma center. Here, we assessed the diagnostic dilemma of COVID-19 with a pulmonary contusion in Imam Reza (general hospital) and Kamyab hospitals (trauma center) in Mashhad, Iran.

Methods:

using available data from the pre-covid19 pandemic period, we reviewed 610 CT scans performed in March, 2019 (a year before the first COVID-19 reports) in a general and a trauma center hospital to evaluate the typical and indeterminate findings of COVID-19 (according to the Radiological Society of North America).

Results:

We found similar findings of COVID-19 infection (false positive) in 10% and 20% of CT scans performed in Imam Reza (general) hospital and Kamyab (trauma center) hospital, respectively. The percentage of the typical findings for COVID-19 (false positive cases) in our trauma center was twice that of the general hospital before the COVID-19 pandemic

Conclusion:

Our results showed that although chest CT scan is highly sensitive for COVID-19 diagnosis, it is not specific, and its specificity in a trauma center might be even less than that in general hospital. Due to overlapping characteristics of the pulmonary contusion and COVID-19 pneumonitis in chest CT scan, other associated findings in each condition and also temporal evolution of CT findings might be useful in differentiating COVID-19 from lung contusion.

ULTRASOUND FINDINGS IN TETHERED CORD PATIENTS BEFORE AND AFTER SURGERY

Behzad Aminzadeh*
Mashhad University of Medical Sciences
Aminzadehb@mums.ac.ir
Ehsan Keykhosravi
Elham Faravani
Ali Alamdaran
Maryam Emadzadeh
Soroush Dehghani

Background:

Early recognition of tethered cord syndrome (TCS) with accessible diagnostic methods can effectively reduce the incidence of complications. There is also a substantial need for new techniques that can quantify the postoperative changes in TCS patients. In this study, we examined the findings of spinal cord ultrasonography in patients with TCS in comparison

with normal children. We also examined these ultrasound findings in a number of patients after corrective surgery.

Methods:

In this prospective cross-sectional study, 30 patients with TCS and 34 normal children of the same age were assessed. In all participants, the maximum distance of the spinal cord from the posterior canal wall was measured using ultrasonography. The location of conus medullaris was also recorded. Thirteen patients with TCS were accessible for post-operative evaluation and the effects of corrective surgery was also assessed on the studied variables in these patients.

Results:

In normal children, conus medullaris was located from L1 to L2 vertebrae, with L1 level and L1-L2 interspace being the most common (each 41.2%). In TCS patients, the most common location for conus medullaris was at L4 level (53.3%). The maximum distance of the spinal cord from the posterior wall of the spinal canal was significantly lower in TCS patients compared with normal children (2.79±0.76 vs. 1.75±0.62 mm, P<0.001). We obtained significant improvement in maximum distance of the spinal cord from the posterior wall of the canal in patients who underwent ultrasonography after the corrective surgery (1.57±0.54 mm to 2.95±0.49 mm, respectively, P=0.001).

Conclusion:

According to the results, it can be stated that the spinal cord is much closer to the posterior canal wall in TCS patients compared with normal children. However, these outcomes were improved in patients after corrective surgery.

EVALUATION OF DISEASE ACTIVITY IN RHEUMATOID ARTHRITIS PATIENTS BASED ON ULTRASOUND FINDINGS

Behzad Aminzadeh*
Mashhad University of Medical Sciences
Aminzadehb@mums.ac.ir
Sahar Ebadati
Maryam Sahebari
Zahra Rastegar
Maryam Emadzadeh
Hedieh Ragati Haghi
Ramesh Giti

Background:

The attentive management of rheumatoid arthritis (RA) has attracted particular attention. US-7 is the first scoring system that combines bone erosions and soft tissue lesions in a single composite scoring system. This study aimed to assess the correlation between US-7 and disease activity score (DAS-28) in clinically active RA patients. We also compared the efficacy of a novel ultrasound score-based system, including nine involved joints (joints assessed with US-7 plus knees) with the standard US-7 score.

Methods:

In this cross-sectional study, all the RA patients referred to the outpatient rheumatology clinic of Qaem Hospital, Mashhad, Iran, from 2019 to 2020 were included. In addition to demographic and socioeconomic information, 28 joints were clinically examined in order to calculate DAS-28. We assessed nine joints comprising the German US-7 and the knees using Grayscale ultrasonography (GSUS) and power Doppler US (PDUS).

Results:

This study composed of thirty-five RA patients (female/male: 33/2) with a mean age of 49.1±12.0 years. The duration of disease and treatment ranged from 0-30 years and 0-20 years. GSUS and PDUS synovitis scores (US-7) were significantly correlated with DAS-28 (P<0.05). GSUS and PDUS synovitis scores (US-7) plus knees (US-9) were also significantly correlated with DAS-28 (r= 0.49 and

r=0.45, respectively, P<0.01). The synovitis score measured by GSUS was significantly correlated with GSUS knee synovial score (r=0.42, P=0.01).

Conclusion:

Both US-7 and US-9 synovitis scores were correlated with DAS-28, and the results of US-7 and US-9 were similar. It can be proposed that adding more involved joints into the radiologic assessment does not necessarily lead to better diagnostic value. This point is critical in daily radiologic practice.

COMPARISON OF PREDICTIVE VALUE OF HELSINKI COMPUTERIZED TOMOGRAPHY SCORING SYSTEM,ROTTERDAM AND STOCKHOLM IN LONG-TERM OUTCOME PREDICTION IN PATIENT WITH TRAUMATIC BRAIN INJURY

Reyhane Faghihi*
Kashan University of Medical Sciences
Faghihireyhane68@gmail.com
Hamidreza Talari
Masoumeh Abedzadeh
Seyed Mohammad Hossein Tabatabaei
Noushin Moussavi

Introduction:

Despite advances in modern medicine, traumatic brain injury is still a major medical problem. Early diagnosis of brain trauma is crucial for clinical decision making and prognosis. The aim of this study was to compare the predictive value of Helsinki, Rotterdam and Stockholm CT scans in predicting late outcomes in patients with brain trauma.

Material and Methods:

In this predictive value study, 171 people with an age range of 24 to 64 years with traumatic brain injury (TBI) who are referred to the surgical emergency department of Shahid Beheshti Hospital in Kashan from the beginning of 2019 to the end of 2020 were studied. Demographic information and CT scan of patients were extracted from the recorded patient information and PACS system. Helsinki, Rotterdam and Stockholm CT scores were determined simultaneously according to available guidelines. Information related to patients' 6-month outcome was assessed by the extended Glasgow Outcome Scale (GOSE).

Results:

The results of this study showed that the mean of Helsinki, Rotterdam and Stockholm CT scores and GOSE in terms of GCS status of brain trauma patients showed a statistically significant difference (P<0.001). This result is significant as higher scores were observed in Helsinki, Rotterdam and Stockholm scores in lower GCSs and higher scores in GOSE scores in higher GCSs. Also, there was a statistically significant difference between the mean of these CT scores and GOSE in terms of mortality and vegetative status of TBI patients (P<0.001). This significance was such that by considering the CT scores in the condition of death and vegetation, higher scores were shown, but in the GOSE, the score was lower. Analysis of Cohen's Kappa coefficient showed a statistically significant difference between each pair of scores and Stockholm and Helsinki scores had the highest kappa coefficient in predicting patients' outcomes. In the prediction of mortality outcomes of TBI patients, the Rotterdam CT score showed the highest sensitivity (0.9) among other scores and Helsinki score showed the highest sensitivity (0.898) in predicting 6-month unfavorable outcome.

Conclusion:

In the present study, we found that among the three CT scores evaluated, the Rotterdam CT score in predicting mortality of patients with brain trauma was more sensitive and the Helsinki CT score was more specific than other scores. At 6 months outcome, the Helsinki CT score were more sensitive than other scores and the Stockholm CT score was more specific.

Keywords:

Traumatic brain injury (TBI), Rotterdam CT score, Helsinki CT score, Stockholm CT score, CT scan, extended Glasgow Outcome Scale (GOSE)

ONE-TO-MANY U-NET MODEL FOR MEDICAL IMAGE SEGMENTATION

Vahid Ashkani Chenarlogh
Mostafa Ghelich Oghli*
Research and Development Department, Med Fanavarn Plus Co., Karaj, Iran
Ali Shabanzadeh
Nasim Sirjani
Ardavan Akhavan

Background:

Accurate automated medical image segmentation plays vital role in clinics to help clinicians for accurate diagnosis as well as measurement. Accurate medical image segmentation systems suffer from some problems including, different object size, noisy data, and different types of medical image. Thus, the base line image segmentation methods are not sufficient for such complex segmentation tasks in the various medical image types. To overcome the issues, a novel One-to-Many U-Net based model introduced in this paper.

Method:

In the proposed U-Net based model, the first block of the encoder path consists of three layers with different level of feature maps. Each of these layers extended to three sub blocks that each of these sub-blocks itself comprised of three layers. Encoder blocks constructed of 2D-convolution, Leaky ReLU and batch-normalization layers. The same extension strategy has been used in decoder path of the proposed model. The decoder path includes the transposed-2D convolution, Leaky ReLU, dropout, and batch-normalization layers in a consecutive manner. Each layer of the encoder path concatenated with the decoder modules using skip connections strategy. Finally, the output of the model has achieved by concatenation of last three layers of the decoder path.

Results:

To evaluate our architecture, we investigated two distinct data-sets including CVC-ClinicDB dataset for polyp segmentation, and HC18 Grand challenge ultrasound dataset for fetal head segmentation purpose. The proposed algorithm achieved Dice and Jaccard coefficients of 97.26%, and 94.73%, respectively for fetal head segmentation in HC18 dataset. Moreover, the proposed model outperformed the state-of-the-art U-Net based models on the CVC-ClinicDB dataset with Dice and Jaccard coefficients of 83.95%, 75.35%, respectively.

Conclusion:

The proposed One-to-Many U-Net model has demonstrated promising results in various medical images segmentation (polyp and fetal head segmentation) tasks and outperformed state-of-the-art approaches.

FAST-UNET++: A NOVEL DEEP LEARNING BASED APPROACH FOR KIDNEY DIMENSION MEASUREMENT USING ULTRASOUND IMAGES

Mostafa Ghelich Oghli*
Research and Development Department, Med Fanavarn Plus Co., Karaj, Iran, M.G31_Mesu@yahoo.com
Seyed Morteza Bagheri
Ali Shabanzadeh
Mohammad Zare Mehrjardi
Ardavan Akhavan
Vahid Ashkani Chenarlogh
Nasim Sirjani

Background:

The aim of this study was to segment the kidney in ultrasound images at the sagittal and axial planes automatically. Then, predict kidney dimensions containing length, thickness, width, and volume of the kidney, parenchyma length, cortex length, and parenchyma volume.

Method:

We proposed a fast and accurate convolutional neural network, name Fast-Unet, to segment kidney and sinus in sagittal and axial planes of ultrasound images. Then, kidney length and thickness were measured from the resulting mask of sagittal frame and kidney width was measured from axial frame's

mask. Using these three dimensions, kidney volume was calculated. The exact procedure was performed for calculation of sinus volume. By subtracting renal volume and sinus volume the parenchyma volume was calculated.

Results:

The train-test dataset contained 1350 ultrasound images in sagittal and axial planes. The Dice and Jaccard coefficients were used to evaluate the segmentation step, and 98.3% and 94.8% for the sagittal frame and 93.2% and 90.8% for the axial frame were achieved respectively. The predicted values of renal measurement were also validated with radiologist's report using root-mean-square-error (RMSE) metric and 0.09 cm, 0.08 cm, 0.08 cm, 0.04 cm, 0.01 cm, 1.3 cm3, 0.98 cm3, were achieved for kidney length, thickness, width, parenchyma length, the volume of kidney, and the volume of parenchyma respectively.

Conclusion:

To the best of our knowledge, this study was the first attempt to predict seven renal measurements using ultrasound images automatically. This can reduce the unnecessary referral to CT imaging and increase the precision of renal measurement using sonography.

AUTOMATIC DIAGNOSIS OF LIVER STEATOSIS BY CALCULATION HEPATO-RENAL INDEX IN ULTRASOUND IMAGES USING DEEP LEARNING

Mostafa Ghelich Oghli*
Research and Development Department, Med Fanavarn Plus Co., Karaj, Iran
Seyed Morteza Bagheri
Ali Shabanzadeh
Mohammad Zare Mehrjardi
Ardavan Akhavan
Vahid Ashkani Chenarlogh
Nasim Sirjani

Background:

In this study, we have proposed and validated a fully automatic approach for quantification of fatty liver disease using ultrasound images based on hepato-renal-index (HRI) calculation. The procedure includes segmentation of kidney and liver, detection of an ROI in the renal parenchyma region and liver at the same depth, and HRI calculation.

Methods:

We proposed a highly accurate and fast convolutional neutral network, named Fast-Unet, for segmentation of kidney and liver. The main superiority of Fast-Unet model is low response time, which is appropriate in ultrasound image analysis that needs on-site measurement by radiologist. We used superpixel algorithm to find lowest variance region in parenchyma as the renal ROI. At the next step, all pixels with the same depth as renal ROI centrum were found using the intersection of two borders of convex probe sector. This step is conducted because if the renal and liver ROIs were not in the same depth the resulted HRI is not accurate due to ultrasound depth attenuation effect. Finally, an ROI in the liver with the same depth was found and HRI was calculated.

Results:

The train-test dataset contained 752 ultrasound images. The Dice and Jaccard coefficients were used to evaluate the segmentation step, and 94% and 89% for the kidney and 97% and 91% for the liver were achieved respectively. The predicted HRI values were also validated with radiologist's report using root-mean-square-error (RMSE) metric and 0.04 was achieved.

Conclusion:

Automation of HRI calculation speeds up the fatty liver diagnosis and helps the novice radiologists to interpret ultrasound images more accurately.

A NOVEL APPROACH TO BREAST TUMOR CLASSIFICATION IN ULTRASOUND IMAGES BASED ON THE IMPROVED INCEPTION-V3 MODEL

Nasim Sirjani
Mostafa Ghelich Oghli*
Research and Development Department, Med Fanavarn Plus Co., Karaj, Iran
Masoumeh Gity
Tarzamni Mohammad Kazem
Ali Shabanzadeh
Vahid Ashkani
Eman Showkatian
Ardavan Akhavan

One of the most significant reasons for women's decease is breast cancer. So, swift diagnosis and proper remedy have conspicuous roles in breast cancer control and its rate reduction among women. Reliable and precise detection is highly critical to specialists. As mammography and ultrasound (US) imaging are two prevalent screening modalities for breast anomalies detection, the mass of physicians use them. However, the procedure of mammography is time-consuming and painful, contrary to ultrasound imaging. But it's more authentic. In this study, by intending to assist doctors, we have utilized the improved InceptionV3 structure to classify ultrasound breast lesions into two classes: malignant and benign.

AN EFFICIENT STRATEGY FOR THE BREAST TUMOR SEGMENTATION IN ULTRASOUND IMAGES BASED ON IMPROVED MASK R-CNN MODEL

Nasim Sirjani
Mostafa Ghelich Oghli*
Research and Development Department, Med Fanavarn Plus Co., Karaj, Iran
Masoumeh Gity
Mohammad Kazem Tarzamni
Ardavan Akhavan
Vahid Ashkani
Ali Shabanzadeh
Eman Showkatian

Breast cancer is the second leading cause of cancer death in women. Early detection and therapy are essential for the decline in breast cancer mortality rate. Mammography and ultrasound (US) are two conventional imaging modalities for breast cancer diagnoses. However, they might lead to unnecessary biopsy operations. The precise delineation of breast lesions' borders is significant since determining the malignancy of a lesion is critically reliant on the lesion's morphological features (e.g., shape, smoothness of boundary, etc.). Therefore, accurate detection of the lesion boundaries can assist in automated breast tumors' classification. This study has utilized the Mask R-CNN model as a practical approach to segment breast lesions.

DESIGN AND FABRICATION OF ZNO-BI2O3-P2O3 PHOSPHATE RADIO PROTECTIVE GLASS

Fatemeh Moradi*
Iran University of Medical Sciences
Younes Younesifar
Motahareh Samizadeh
Pouya Azarbar
Reza Malekzadeh*

Background:

Computed tomography (CT) and CT angiography methods are used as a pre-test to evaluate patients with coronary artery disease. Due to the high dose of patients and staffs in this imaging method, dose reduction methods that deliver the lowest dose to patients while maintaining image quality are studied and researched. The purpose of this study was to evaluate the effectiveness of new phosphate ZnO-Bi2O3-P2O3 glasses to reduce the amount of received dose in coronary angiography.

Methods:

In this study, Monte Carlo software code MCNPX6 was used. Single energy photon source from 100

to 700 keV with distances of 50 keV was defined which is the energy used in all diagnostic procedure. Then Bi2O3-particle dimensions of 50 nm and 50 micrometers were considered in the simulation. The ZnO- Bi2O3-P2O3 glasses were simulated at six different concentrations and percentages. Then the linear and mass attenuation coefficients of each of these samples were calculated.

Results:

The results showed that phosphate glass filled with Bi2O3 nanoparticles were more efficient than conventional phosphate glass or filled with Bi2O3 micro-particles. Also at low photon energies both shields had better radio-protection performance. Also due to the filler concentration and photons energy, a dose reduction of 16-27% was found.

Conclusion:

The results showed that the use of bismuth oxide nanoparticles as filler in glasses, leads to an acceptable decrease in organ received dose.

Keywords:

Dose Reduction, Coronary Angiography, Radio- Protected Glasses, Nanoparticles.

IRON OXIDE-BASED TARGETED CORE/SHELL NANO-CONTRAST AGENT FOR MAGNETIC RESONANCE IMAGING

Motahareh Samizadeh*

Department of Medical Physics, School Of Medicine, Tehran University of Medical Sciences, Tehran, Iran

Motahare.Samizadeh@gmail.com

Younes Younesifar

Pouya Azarbar

Fatemeh Moradi

Reza Malekzadeh

Behnaz Babaie Abdollahi

Background:

Magnetic resonance imaging (MRI), accounts for one of the best accessible approaches in molecular soft tissue and cancer diagnostic imaging. Yet, the low sensitivity of MRI, as the main disadvantage, leads to low detectability and poor contrast between normal and cancer tissues. To enhance tumor contrast in the MRI, a unique targeted contrast agent based on polyethylene glycol (PEG) bounded on Fe3O4@Au nanoparticles (NPs) was developed.

Methods:

The prepared system was fully characterized and related parameters including relaxivity, cytotoxicity, colloidal stability, cell targeting ability as well as MR contrast enhancement were evaluated.

Results:

The mean size of Fe3O4@Au-PEG NPs was determined about 70 nm. The cytotoxicity assay indicated that NPs had perfect cyto-compatibility after 24 h and 48 h on both SKBr-3 and MCF 10A cell lines. In vitro, MR imaging experiments were induced negative signals in cells affirming that the NPs enable targeted contrast T2-weighted MR imaging of SKBr-3 as over-expressing HER-2 receptor cells. Besides, MRI images of the treated tumor-bearing BALB/c mice indicated high tumor uptake and the ability of NPs to create a better negative contrast effect. The NPs showed excellent stability and blood compatibility (zeta potentials of −19 mV), proper relaxivity (r2 = 54.96 mM-1s-1), negligible in vitro cytotoxicity (82.1% cell viability), and obvious in vivo MR signal enhancement effect (the T2 MR signal intensity for NPs in SKBr-3 cells was around 3-fold higher than of MCF 10A cells).

Conclusion:

The developed Fe3O4@Au-PEG NPs could be suggested as an encouraging candidate as a contrast agent for early detection of cancer due to its low toxicity, proper blood, and higher MRI relaxivity

Keywords:

Contrast Media, Nanoparticles, Magnetic Resonance Imaging, Relaxivity.

PREGNANCY RATE IN INTRAUTERINE INSEMINATION, IS UTERINE BIOPHYSICAL PROFILE OF PREDICTIVE VALUE? A PROSPECTIVE STUDY

Nazanin Farshchian
Kermanshah University of Medical Sciences
N_Farshchian2000@Yahoo.com
Taravat Fakheri
Parisa Bahrami Kamangar
Hassan Lorestani
Javid Azadbakht*

Purpose:

Although the health services for the treatment of infertility have progressed over the years, the prevalence remains almost the same. One of the oldest treatments for infertility is intrauterine insemination (IUI).

Objective:

This study aimed to evaluate the value of uterine biophysical profile (UBP) scoring to predict the pregnancy rate after IUI.

Methods:

This prospective study was carried out on 85 women who were referred to our tertiary teaching center with infertility of male factor or unknown etiology infertility in 2018. To measure the uterine biophysical criteria, transvaginal ultrasonography (TVS) was performed on the day of beta-human chorionic gonadotropin (B-hCG) injection, and the results were evaluated based on positive B-hCG.

Results:

85 patients were included with a mean age of 30 years; of those 12 (14.1%) were able to conceive. Neither UBP (P= 0.151) nor it's parameters (including endometrial thickness, number of endometrial layers, myometrial echogenicity, uterine artery pulsatility index, myometrial blood flow internal to arcuate vessels, endometrial blood flow in the third zone of endometrium, myometrial contraction frequency, and ovarian follicle (OF) size [p = 0.05, 0.89, 0.59, 0.79, 1, 1, 0.59, and 0.77, respectively]) were not significantly associated with pregnancy rate. 91.7% of the cases with positive pregnancy test results, had a UBP score of >13; however, UBP score was not meaningfully associated with IUI treatment success rate (p = 0.15).

Conclusion:

UBP scoring system seems to need more data for external validation, or it might require modifications before implementation, as it may cause false reassurance.

COMPARING CAROTID ARTERY INTIMA-MEDIA THICKNESS BETWEEN PREECLAMPTIC, HEALTHY PREGNANT AND NON-PREGNANT WOMEN

Nazanin Farshchian
Kermanshah University of Medical Sciences
Faezeh Soraya
Parisa Bahrami Kamangar
Javid Azadbakht*

Purpose:

Preeclampsia is a multisystem condition with unknown cause, with extensive endothelial malfunction and vasospasm, that develops during pregnancy. Published studies have reported contradictory results on if carotid artery intimal media thickness (C-IMT) increases in preeclamptic pregnant women. As an attempt to identify this condition timelier and monitor the therapeutic measures, the C-IMT in preeclamptic women was compared with that of pregnant and non-pregnant healthy control subgroups.

Methods:

A cross-sectional analytical study was conducted on 21 preeclamptic pregnant, 21 healthy pregnant, and 21 non-pregnant women with normal blood pressure. Participants' age between subgroups were statistically matched. The C-IMT of the subjects was measured implementing a 7-12 MHz surface probe, turning the tissue 'harmonic imaging function' on,

putting the focal point on the near wall of common carotid artery, and averaging the measurements in 3 standardized regions along the common carotid artery on both sides. The findings compared between subgroups employing Kruskal-Wallis test.

Results:

The minimum, maximum and mean C-IMT in preeclamptic pregnant women, healthy pregnant and non-pregnant women were respectively (0.4, 0.8, 0.600), (0.3, 0.4, 0.300), and (0.2, 0.5, 0.300), with significantly thicker C-IMT in preeclamptic patients (P <0.001). C-IMT was not meaningfully different between healthy pregnant and non-pregnant participants.

Conclusion:

C-IMT was significantly different between the three subgroups, with thickest intima-media thickness in preeclamptic participants. Thus, measuring C-IMT in the early stages of pregnancy and closely monitoring its size during management course may greatly help in quantify the progression/regression of the condition as pregnancy advances and post-delivery.

AN ARTIFICIAL INTELLIGENCE-BASED ALGORITHM FOR SEGMENTATION AND 3D VISUALIZATION OF PANCREATIC DUCTAL ADENOCARCINOMA AND SURROUNDING VESSELS IN CT IMAGES

Tahereh Mahmoudi*
Tehran University of Medical Scienses
Amir Reza Radmard
Hossein Arabalibeik
Alireza Ahmadian
Aneseh Salehnia
Amirhossein Davarpanah*

Background:

Fully automated and volumetric segmentation of critical tumors may play a crucial role in diagnosis and surgical planning. One of the most challenging tumor segmentation tasks is localization of Pancreatic Ductal Adenocarcinoma (PDAC). Exclusive application of conventional methods does not appear promising. Deep learning approaches have achieved great success in the computer aided diagnosis, especially in biomedical image segmentation.

Methods:

In this retrospective study, multi slice CT scans of 157 cases with pathologically proven adenocarcinoma of pancreas were enrolled. CT scans were acquired prior to obtaining tissue sample by percutaneous core needle biopsy or fine needle aspiration using endosonography. We introduced a framework based on convolutional neural network (CNN) for segmentation of PDAC mass and surrounding vessels in CT images by incorporating powerful classic features, as well. Segmentation of PDAC mass in the obtained slices was subsequently performed using 2D attention U-Net and Texture Attention U-Net (TAU-Net). TAU-Net was introduced by fusion of dense Scale-Invariant Feature Transform (SIFT) and LBP descriptors into the attention U-Net. Then, an ensemble model was used to cumulate the advantages of both networks using a 3D-CNN. Due to insufficient sample size for vessel segmentation, we used the above-mentioned pre-trained networks and fin-tuned them.

Results:

Experimental results show that the proposed method improves the Dice score for PDAC mass segmentation in portal-venous phase by 7.52%. This algorithm showed a significant different (p = 0.007) compared to state-of-the-art methods. Fully automated segmentation of surrounding vessels around the PDAC are carried out using small dataset. The results are shown that pertained networks on PDAC segmentation can be effective in vessel segmentation.

Conclusion:

Three dimensional visualization of the tumor and surrounding vessels can facilitate decision making, treatment response assessment and surgical planning in PDAC.
Combination of imaging and treatment strategies in one nanosystem has received a great attention for cancer detection and treatment. The aim of this

study was to design a nanosystem consisting of dual modality computed tomography / magnetic resonance imaging (CT / MRI) with the ability to load the 5-fluorouracil (5FU) as an anticancer drug.
In this study, a new nanosystem (AMP / 5FU) based on gold nanoparticles (Au) and manganese oxide (MnO) coated with polyethylene glycol (PEG) for imaging and 5FU delivery was prepared in the Faculty of Chemistry, University of Tabriz. Size and shape of nanoparticles using TEM, hydrodynamic size with DLS device, magnetic property using VSM device, cell and blood compatibility with hemolysis test, drug loading and release feature, X-ray attenuation using CT scan and r1 relaxivity of nanoparticles were examined by MRI.
Spherical nanoparticles had paramagnetic properties, an average size of 20 nm and a hydrodynamic size of 78 nm. 5FU non-loaded nanoparticles showed high compatibility for A549 cells for all concentrations, while drug-loaded nanoparticles showed up to 89% toxicity for cancer cells. The results of hemolysis test showed that the nanoparticles have blood compatibility. The drug loading rate of 5FU was 90% and its release rate showed a pH dependence of about 73%. AMP / 5FU nanoparticles showed a considerable X-ray attenuation for CT scan as well as appropriate r1 relaxivity of MRI (r1=4.36 mM−1s−1). AMP/5FU NPs can be considered as a high potential candidate for bimodal CT/MRI and 5FU anticancer drug delivery.

Keywords:

Manganese Oxide, Gold Nanoparticles, 5-Fluorouracil, Computed Tomography, Magnetic Resonance Imaging, Loading/Release

POLYETHYLENE GLYCOL COATED MANGANESE OXIDE/ GOLD NANOCOMPOSITE FOR DUAL MODAL MRI/CT AND INVESTIGATION OF LOADING CAPACITY OF 5-FLUOROURACIL

Mahdi Khalilneghad

Tohid Mortezazadeh*

Tehran University of Medical Sciences

Purpose:

Polycystic ovary disease (PCOD) is one of the most common female endocrine conditions associated with anovulation, oligo-amenorrhea, and infertility in women of childbearing age. PCOD has been suggested as one of the potential metabolic syndrome facets, and carotid intima media thickness (C-IMT) could serve as a predictive/monitoring marker in assessing or following the risk of heart disease in these patients.
Methods: A observational single-center investigation was performed on total of 48 female patients (24 with PCOD and 24 age-matched healthy participants). Employing an 8-12 MHz surface ultrasound transducer, and averaging the measurements from three standard areas of both common carotid arteries, the mean value of the C-IMT participants were compared between the two subgroups. Focal point was set at the center of the artery lumen, and near-field arterial wall was evaluated for C-IMT while 'tissue harmonic imaging' was turned-on.

Results:

Twenty-four cases of PCOD (with mean age of 33.17 ± 3.91), and 24 age-matched healthy females (with mean age of 33.12± 3.81) were included. Mean C-IMT value was measured at 0.57± 0.09 and 0.71 ± 0.17 for case and control subgroups, respectively (P = 0.019).

Conclusion:

The mean C-IMT in PCOD patients is significantly higher than that of the healthy females of same age. Thus, C-IMT could serve as a metabolic syndrome index in PCOD patients and might be of help in monitoring patients for the efficiency of treatment measures taken to decrease the probability of subsequent cardiovascular diseases.

COMPARING CAROTID ARTERY INTIMA-MEDIA THICKNESS IN WOMEN WITH POLYCYSTIC OVARY DISEASE WITH THAT OF AGE-MATCHED HEALTHY WOMEN

Nazanin Farshchian*
Kermanshah University of Medical Sciences
Mohammad Reza Ghasempour
Parisa Bahrami Kamangar
Javid Azadbakht

Introduction:

Iodinated Contrast agents are used in Computed Tomography (CT) to increase the contrast between lesions and surrounding tissues with similar chemical characteristics. Contrast agent has the disadvantage that it produces kidney damage. Patients under chemo and radiotherapy are susceptible to kidney failure. Therefore, CT enhancement protocols must have certain restrictions. The aim of this study is to evaluate the performance of low kVp, CT protocols with reduced iodine usage in patients under chemo and radiotherapy.

Materials and methods:

The patients, under chemo and radiotherapy in a university hospital, agreed to sign the consent form, were selected for this study. They were scanned by 16-MDCT GE system with routine (120 kVp and 1mlI/kg) and reduced kVp (80 kVp) with reduced contrast agent protocols respectively. CT protocols included neck and chest enhanced CT images. Renal function before and after CT scanning was used to evaluate the effect of contrast agent reduction on kidney function. Two expert radiologists with more than 5 years' experience evaluated the CT images, qualitatively.

Results:

The results of this study, on 20 patients, showed that the quality of neck and chest CT images with 65% contrast agent reduction taken at 80 kVp were comparable to the similar CT images taken by routine protocol. The results of blood test showed that the reduced iodinated contrast protocol did not have impaired kidney function.

Conclusion:

The results of the present study support our hypothesis that low kVp CT protocol with iodine load reduction has the acceptable image quality and the kidney function is not altered due to this protocol. Key words: x-ray Computed Tomography, kidney failure, contrast agent

EVALUATION OF THE PERFORMANCE OF IODINE LOAD REDUCTION AT LOW KVP CT PROTOCOL

Rezvan Ravanfar Haghighi*
Medical Imaging Research Center, Shiraz University of Medical Sciences, Sravanfarr@gmail.com
Sabyasachi Chatterjee
Hamid Nasrolahi
Pooya Iranpour
Fariba Zarei
Sedigheh Hosseinipanah
Vani Vardhan Chatterjee

Background:

Fetal lung maturity is one of the most important criteria which is studied during preterm delivery, because its immaturity can cause many postpartum complications such as respiratory distress syndrome. Thalamus echogenicity is a new ultrasound criterion which increases during pregnancy as the fetus grows.

Purpose:

This study was designed to investigate the Relationship Between Fetal Thalamus Echogenicity by Ultrasound and Neonatal Lung Maturity Methods: This cross-sectional study was performed on 57 pregnant women referred to the hospitals of Mashhad Azad University. All mothers underwent ultrasound sonography to measure thalamus echogenicity, interstitial diameter, placental changes, abdominal circumference, femoral bone length, and head circumference. Apgar score of one and five minutes, hospitalization in NICU and the opinion of a pediatrician were used to assess lung maturity.

Results:

The mean age of mothers participating in the study was 34/26 years. 63/2% of infants had mature lungs. There was a significant relationship between maternal age,fetal age, thalamic echogenicity, presence of vernix in amniotic fluid, hospitalization in NICU and Apgar score with fetal lung maturity (P<0/05).

Conclusion:

According to the results of this study thalamus echogenicity can be used as a non-invasive measure to assess fetal lung maturity.

Keywords:

Infant Lung Maturation, Thalamus Echogenicity, Sonography.

EVALUATION OF RELATIONSHIP BETWEEN FETAL THALAMUS ECHOGENICITY BY ULTRASOUND AND NEONATAL LUNG MATURITY

Saeed Naghibi*
Azad University, Naghibisaeed@yahoo.com

Background:

Liver fibrosis is known as a life threatening disease due to its side effects such as portal hypertension and liver dysfunction. The disease is curable at early stages which makes the diagnostics of Fibrosis a crucial matter. The golden standard for Liver Fibrosis evaluation is the liver biopsy. However, this method is considered to be invasive and is followed by side effects. Thus, there is a growing demand for non-invasive methods to diagnose Liver Fibrosis and the stage of the disease. One of the non-aggressive approaches is Diffusion-Weighted Imaging (DWI).

Purpose:

Comparison of Biopsy and DW MRI as diagnostic approaches for staging liver fibrosis.

Methods:

This study covers a group of patients suffering from chronic liver disease who are referred to an Imaging Centre located in Mashhad city in 1395-96. The experienced radiologists in the field of intervention performed the biopsy procedure and the tissue samples were tested in the pathology laboratory to determine the stage and severity of the Fibrosis. Furthermore, the patients were scanned by MRI (MRI 1.5 Tesla siemens symphony) with all the required sequences (T1,T2, ADC,...) and b values 500 ,1000 s/mm2. The results were collected by the radiologist and analysed by SPSS software.

Results:

It is found that a negative correlation exists between Apparent Diffusion Coefficient (ADC) value and the Liver Fibrosis severity level. At lower ADC values the Fibrosis is more severe. Additionally, the ADC value was evaluated versus the Fibrosis stage. The results show a statistical difference between Stage 1,4, Stage 2,3, Stage 2,4 and no obvious statistical difference between F1,F2 and F3,F4.

Conclusion:

Based on the experimental results in the current study, DWI is a useful method to observe and diagnose at the middle and final stages of Fibrosis. However, DWI cannot used as a valid approach to differentiate between early stages of the disease.

Keywords:

ADC, Liver Fibrosis, Non-invasive Methods

COMPARATIVE STUDY OF LIVER FIBROSIS STAGING AND GRADING BY MRI(DWI) AND BIOPSY

Saeed Naghibi*
Azad University

Purpose:

distinguishing perforated from non-perforated appendicitis is of high importance, as treatment and management dramatically differs. This study aimed at investigating the relationship between ultrasound features of appendix and risk of subsequent perforated appendicitis in patients with acute appendicitis.

Methods:

This descriptive-analytical study was conducted on 43 patients with final surgical diagnosis of acute appendicitis. All patients underwent ultrasound exam on admission, utilizing both linear (7-8 MHz) and curved (4-5 MHz) transducers. Two radiologists blinded to patients historical and clinical data, performed ultrasound exam on all participants following a systematic approach. Cases of mismatch were resolved in consensus. Tissue harmonic imaging function was turned on for all cases.

Results:

According to our results, submoucosal layer visibility in case with final surgical diagnosis of perforated appendicitis was significantly lower than that of patients with non-perforated appendicitis (P <0.001). Prevalence of appendicolith, and peri-appendiceal fluid collection was not significantly different between the two subgroups (P< 0.05). Incidence of peri-appendiceal abscess was far more common in case of perforated appendicitis, comparing to the other subgroup (p> 0.05)

Conclusion:

Lack of visibility of appendiceal submucosal layer and visualizing peri-appendiceal abscess in ultrasound are highly associated with subsequent appendicitis perforation.

ULTRASOUND VISIBILITY OF APPENDIX SUBMUCOSAL LAYER AND ITS CORRELATION WITH APPENDICITIS COMPLICATIONS IN PATIENTS WITH ACUTE APPENDICITIS

Nazanin Farshchian*
Kermanshah University of Medical Sciences
N_Farshchian2000@yahoo.com
Parisa Bahrami Kamangar
Shirin Javidi Helan
Javid Azadbakht

Introduction:

Accurate delineation of prostate and organs at risk (OARs) in ultrasound images plays an important role in HDR brachytherapy treatment planning but due to the low soft contrast tissue, it is very time-consuming and challenging task and prone to inter and intra-observer variations. In this work, we propose a two-stage deep learning-based approach for fast, reliable, and reproducible auto-segmentation of prostate and OARs in HDR brachytherapy.

Methods:

In this work, we developed a Cascade-Net which is consists of two states of art neural networks for the prostate, urethra, and rectum segmentation in ultrasound images. In our segmentation framework, the first stage is the organ localizer module, which generates a candidate segmentation region of interest (ROIs) for each organ. The second stage produces a more robust and accurate contour from the previous coarse segmentation mask. A U-Net with an attention mechanism on skip connections and a deep supervision concept will generate ROIs by eliminating irrelevant background information. This network will identify the probability of the presence of each organ. The extracted regions will be fed to the attention deeplab3 to generate a fine segmentation. Ultrasound Images of 109 patients with prostate cancer were utilized in this study. The performance of the proposed framework was evaluated through well-established quantitative metrics such as Dice similarity coefficient (DSC), and Hausdorff distance (HD).

Results:

The Cascade-Net framework achieved the segmentation results with a DSC of 96 ± 3%, 94 ± 1%, 92 ± 2 for prostate, Urethra, and rectum, respectively. The HD values (mm) were 0.04 ± 0.01, 0.03 ± 0.02, 0.04 ± 0.03 for prostate, Urethra, rectum, respectively. There was no statistically significant difference between manual segmentation and the Cascade-Net framework (P-value > 0.05).

Conclusions:

The results of our study demonstrate that our auto-contouring segmentation framework can be used for fast, reliable, and reproducible segmentation of the prostate and OARs to facilitate the brachytherapy workflow.

CASCADE-NET: A DEEP LEARNING-BASED FRAMEWORK FOR AUTO-SEGMENTATION OF PROSTATE AND ORGANS AT RISK IN ULTRASOUND IMAGES FOR HIGH-DOSE RATE BRACHYTHERAPY

Eman Showkatian*
Research and Development Department, Med Fanavarn Plus Co.
Eman.Showkatian@gmail.com
Mostafa Ghelich Oghli
Nasim Sirjani
Vahid Ashkani
Ardavan Akhavan

Introduction:

Accurate delineation of prostate and organs at risk (Oars) in ultrasound images plays an important role In HDR brachytherapy treatment planning but due to the low soft contrast tissue, It is very time-consuming and challenging task and prone to inter and intra-observer variations. In this work, We propose a two-stage deep learning-based approach for fast, reliable, and reproducible auto-segmentation of prostate and oars In HDR brachytherapy.

Methods:

In this work, we developed a cascade-net which is consists of two states of art neural networks for The prostate, urethra, and rectum segmentation in ultrasound images. In our segmentation framework, the first stage is the organ localizer module, which generates a candidate segmentation region of interest (Rois) for each organ. The second stage produces a more robust and accurate contour from the previous coarse segmentation mask. A U-Net with an attention mechanism on skip connections and a deep supervision concept will generate rois by eliminating irrelevant background information. This network will identify the probability of the presence of each organ. The extracted regions will be fed to the attention deeplab3 to generate a fine segmentation. Ultrasound images of 109 patients with prostate cancer were utilized in this study. The performance of the proposed framework was evaluated through Well-Established quantitative metrics such as dice similarity coefficient (DSC), and hausdorff distance (HD).

Results:

The cascade-Net framework achieved the segmentation results with a DSC of 96 ± 3%, 94 ± 1%, 92 ± 2 for prostate, urethra, and rectum, respectively. The HD values (Mm) were 0.04 ± 0.01, 0.03 ± 0.02, 0.04 ± 0.03 for prostate, urethra, rectum, respectively. There was no statistically significant difference between manual segmentation and the cascade-net framework (P-Value > 0.05).

Conclusions:

The results of our study demonstrate that our auto-contouring segmentation framework can be used for fast, reliable, and reproducible segmentation of the prostate and oars to facilitate the brachytherapy workflow.

A COMPARATIVE SURVEY OF THE DOPPLER INDICES OF UTERINE ARTERY IN PREGNANT WOMEN WITH AND WITHOUT HISTORY OF PREVIOUS ABORTION(S)

Nazanin Farshchian*
Kermanshah University of Medical Sciences
N_Farshchian2000@Yahoo.Com
Maryam Khoshbakht
Parisa Bahrami Kamangar
Javid Azadbakht

Purpose:

The goal of this study is to determine the typical range of asymmetry between the length and thickness of the levator veli palatini muscle and to explore the impact of the observed asymmetry on velopharyngeal closure. A second objective is to report normative length and thickness of the levator veli palatini muscle among adults with typical velopharyngeal anatomy.

Method:

Magnetic resonance imaging (MRI) data and Amira 5.5 Visualization software were used to evaluate the

levator veli palatini muscle among 89 participants with typical velopharyngeal anatomy. Flexible nasopharyngoscopy was used to determine the function of velopharyngeal closure among 39 of the 89 participants with typical velopharyngeal anatomy to examine the functional impact of observed asymmetry.

Results:

Matched paired t tests demonstrated a nonsignificant difference between the length and thickness of the right and left levator muscle. The mean difference between the right and left length of the levator muscle was 2.28 mm but ranged from 0.09 mm to 10.37 mm. In all cases where individuals displayed asymmetry in the levator muscle through MRI, there was no observed impact on the symmetry of velopharyngeal closure.

Discussion:

This study suggests that differences in the right and left levator veli palatini muscle are not significant among individuals without cleft palate. However, among individual cases where asymmetry was sizeable, there was no direct impact on the closure pattern. This may suggest there are multiple factors that contribute to asymmetrical velopharyngeal closure that are beyond the level of the levator veli palatini muscle.

TO DETERMINE THE DIAGNOSTIC VALUE OF FIRST TRIMESTER UTERINE ARTERY PI FOR PREDICTION OF ABORTION OR IUFD

Fatemeh Yarmahmoodi*
Radiology Department, Medical School, Shiraz University of Medical Siences, Shiraz, Iran, Yarmahmoodif@gmail.com
Razieh Naseri
Seyyed Mostajab Razavinejad

Background:

Doppler technique is a non-invasive method to study uterine perfusion. Inadequate uterine artery flow can disrupt the fetal replacement process. Inadequate uterine perfusion, regardless of etiological factors, is another important factor in spontaneous abortion in women. Uterine blood flow resistance is higher in the mid-luteal phase of patients with recurrent miscarriage than in normal individuals. Doppler studies in patients at risk of miscarriage have shown different results. The aim of this study was to evaluate the diagnostic value of PI index in the first trimester of pregnancy in predicting pregnancy outcomes.

Materials and Methods:

The present study is a cross-sectional study. In this study, 191 pregnant women in the 11th-13th week of pregnancy referred to the teaching hospitals of Shiraz University of Medical Sciences were selected and examined. Data were collected using a checklist. This checklist had two parts. The first part was the data related to ultrasound findings in week 11-13 and follow-up ultrasound and in the second part the findings related to pregnancy outcome including abortion, gestational hypertension, gestational glucose, stillbirth and IURG were recorded and used by SPSS software. And independent t-test, chi-square were analyzed.

Results:

143 patients (74.9%) had no history of abortion and 48 patients (25.1%) had history of abortion. 16 patients (8.4%) had high blood pressure, 9 patients (4.7%) had blood sugar, 6 patients (3.1%) had pregnancy poisoning, 15 patients (7.9%) had intrauterine growth restriction and 4 patients (1 / 2%) had fetal death. The mean PI in mothers with fetal death and mothers with intrauterine growth restriction was significantly higher than mothers who did not have a history of fetal death and intrauterine growth restriction ($P < 0.05$). The results of the table also showed that the difference between the mean PI in mothers with and without abortion, blood pressure, blood sugar, pregnancy poisoning was not statistically significant ($P > 0.05$). Per unit increase in PI, the risk of IUGR in pregnant women was significantly 2.3 times (OR = 2.32) and the risk of fetal death in pregnant mothers was 5 times (OR = 5.06).

Conclusion:

In general, the results of the study showed that the mean PI in mothers with fetal death and mothers with intrauterine growth restriction was significantly

higher than mothers who did not have a history of fetal death and intrauterine growth restriction. Improvement in PI index (arterial resistance Uterine) improves uterine blood flow and improves the outcome of pregnancy, especially reducing the risk of miscarriage.

Keywords:

Pregnancy, Fetal Death, Abortion, Preeclampsia, IUGR

CORRELATION OF CHEST CT AND MRI IN STAGING PULMONARY MORPHOLOGICAL CHANGES IN CYSTIC FIBROSIS PATIENTS

Neda Pak*
Iranian Society of Radiology, Pakneda@Yahoo.com
Javid Azadbakht
Mohammad Reza Modaresi
Alireza Aboli

Objective:

To evaluate whether magnetic resonance imaging (MRI) is as effective as Computed Tomography (CT) for determining functional pulmonary changes in patients with cystic fibrosis (CF) during follow-up exams.

Methods:

Twenty-three patients (12 Males) aging between 1-20 years, CF disease of whom were confirmed by sweat test, were investigated. Patients were evaluated using lung CT scan, and One-week later underwent chest MRI, without contrast injection for either of modalities. Eventually, CT and MRI scores were compared based on individual features incorporated into bhalla scoring system, as well as based on the total calculated score.

Results:

There was a strong correlation between Bhalla chest CT and MRI scores (R = 0.97, P<0.0001), with a mean and median difference of 0.61 and 1 points, respectively. The chest CT and MRI showed a high level of agreement to detect all studied variables, including the severity and extent of bronchiectasis (ICC: 98.8% And 97.6%; R = 0.988 And 0.977, Respectively), peribronchial thickening (ICC: 81.4%; R = 0.815), sacculations, generalities of the bronchial division involved, and number of bubbles (ICC: 100%; R = 1), emphysema (ICC: 67.3%; R = 1) and collapse/ consolidation (ICC: 89.1%; R = 0.890).

Conclusion:

These results showed that none of the relevant findings were missed by MRI, and more interestingly, and MRI can adequately address morphological changes in follow-up imaging of CF patients.

MRI EVALUATION OF THE SYMMETRY OF THE LEVATOR VELI PALATINI MUSCLE AMONG A NONCLEFT PALATE POPULATION

Neda Tahmasebifard*
East Carolina University, Tahmasebifardn18@Students.Ecu.Edu
Charles Ellis
Kathrin Rothermich
Xiangming Fang
Jamie Perry

Purpose:

The goal of this study is to determine the typical range of asymmetry between the length and thickness of the levator veli palatini muscle and to explore the impact of the observed asymmetry on velopharyngeal closure. A second objective is to report normative length and thickness of the levator veli palatini muscle among adults with typical velopharyngeal anatomy.

Method:

Magnetic resonance imaging (MRI) data and amira 5.5 visualization software were used to evaluate the levator veli palatini muscle among 89 participants with typical velopharyngeal anatomy. Flexible nasopharyngoscopy was used to determine the function of velopharyngeal closure among 39 of the 89 participants with typical velopharyngeal

anatomy to examine the functional impact of observed asymmetry.

Results:

Matched paired T tests demonstrated a nonsignificant difference between the length and thickness of the right and left levator muscle. The mean difference between the right and left length of the levator muscle was 2.28 Mm but ranged from 0.09 Mm to 10.37 Mm. In all cases where individuals displayed asymmetry in the levator muscle through MRI, there was no observed impact on the symmetry of velopharyngeal closure.

Discussion:

This study suggests that differences in the right and left levator veli palatini muscle are not significant among individuals without cleft palate. However, among individual cases where asymmetry was sizeable, there was no direct impact on the closure pattern. This may suggest there are multiple factors that contribute to asymmetrical velopharyngeal closure that are beyond the level of the levator veli palatini muscle.

DECREASED PULMONARY ARTERY BIFURCATION ANGLE: A NOVEL IMAGING CRITERION FOR THE DIAGNOSIS OF CHRONIC PULMONARY THROMBOEMBOLISM

Bita Abbasi*
Mashhad University of Medical Sciiences, Abbasib@mums.ac.ir
Afrouz Darvish
Reza Akhavan
Donya Farrokh
Masoud Pezeshki-Rad
Behrooz Zandi
Jahanbakhsh Hashemi
Ali Feyzi Laein

Background:

Chronic pulmonary thromboembolism (CTEPH) is an unusual complication of acute pulmonary embolism (PE), which is now considered treatable. In modern multi-detector scanners, a detailed evaluation of pulmonary artery geometry is currently possible. This study aimed to evaluate Pulmonary Artery Bifurcation Angle (PABA) changes in the follow-up computed tomography angiography (CTA) of patients with acute PE.

Methods:

In this cross-sectional study, the records of two tertiary-level academic hospitals were gathered from 2012 to 2019. Pulmonary Artery (PA) bifurcation angle and diameter were measured. Chi-Square test, independent samples T-test, Mann-Whitney, and pearson's tests were employed to compare data. We utilized receiver operating characteristic analysis to evaluate the cut-off point (ROC) curve. Pulmonary artery bifurcation angle changes' accuracy, sensitivity, and specificity were calculated. A P value <0.05 was considered to be significant.

Results:

Forty-Six patients were included in the study. No significant differences were found between patients with and without CTEPH and PABA in the dimeters of PA trunk, right PA, and left PA in the first CTA images (P Values Of 0.151, 0.142, 0.891, and 0.483, respectively). At the same time, In the secondary CTA, the mean PABA was significantly smaller in patients with CTEPH (P=0.011). In the receiver operating characteristic (ROC) analysis, delta angle revealed an area under the curve Of 0.745 and an optimal cutoff of 0, leading to a sensitivity of 64%, specificity of 87%, and accuracy of 76% for diagnosing CTEPH.

Conclusion:

We showed s significant decrease in PABA in patients developing CTEPH. this parameter can be easily measured in lung CTA.

CEREBRAL VENOUS SINUS STENTING FOR RESISTANT IDIOPATHIC INTRACRANIAL HYPERTENSION (IIH), AN EXPERIENCE ON 15 PATIENTS

Mohammad Karimi*
Milad Hospital
Mohammadali Arami
Farhad Manteghi
Behnam Mansouri
Puya Zandi
Mobina Javadi
Negar Fazeli

Objectives:

Transverse sinus stenosis is common in patients with Idiopathic Intracranial Hypertension (IIH). While the role of transverse sinus stenosis in the pathogenesis of IIH remains controversial, some studies have shown that placement of a stent in a narrow transverse sinus can reduce intravenous pressure and improve symptoms. In this study, we aim to further clarify the hypothesis that the signs and symptoms of IIH can be relieved or improved by placing a stent in the transverse sinus stenosis.

Methods:

Fifteen patients with IIH (All Female) who had not responded to conventional treatments were selected. Cerebral venous sinus stenting (CVSS), which involves accessing the stenotic area by applying the sheath and guidewire and placing the stent was performed. Our investigation focused on the important and determining factors in the diagnosis and pathogenesis of this disease including: Intracranial and intravenous sinus pressure, optic disc edema, visual field defects and headaches both before and after the placement of the stent in the transverse sinus of the patients. Patients were followed up for approximately 21 months post-procedure.

Results:

Four (26.7%) patients showed continued headaches. The visual disturbance was completely resolved in 13 (86.7%) patients as well as complete resolution of papilledema in 13 (86.7%), and partially in 2 (13.3%) patients. The intracranial pressure decreased in all patients and 2 (13.3%) patients continued to have auditory bruit, but no new tinnitus was reported.

Conclusion:

Our findings support the effectiveness of stent placement in the transverse sinus of selected patients with IIH and can be used in certain situations. Our results can prove the safety of this method.

EVALUATION THE ABILITY OF EMOTIONAL INHIBITION IN PATIENTS WITH FRONTAL LOBE LESIONS USING FMRI BEFORE AND AFTER OPERATION

Zahra Farshidfar*
Shahid Beheshti University, Farshidfar@sums.ac.ir
Mohamad-Ali Oghabian
Mehdi Tehrani-Doost
Amir-Hoseyn Javadi

Introduction:

Emotional inhibition is one of the cognitive ability, which is important in social behavior and has critical role in quality of life. Brain lesions located in frontal lobe, especially in prefrontal area can change emotional inhibition.
The aim of this study was evaluating the role of surgery, and the effect of the existence of tumor in frontal lobe on the ability of emotional inhibition.

Method:

Sixteen patients afflicted by frontal brain lesions underwent fmri with emotional face Go/No-Go task before and three months after surgery. In addition, IVA test done to assess the response control and attention of patients in these eras.
Emotional Go/No-Go task contain two runs. Each run has four blocks with 256 emotional face images (Happy And Angry). For evaluating the emotional inhibition, ask the patients to select the specific emotion, which was showing as the instruction images at the beginning of each block for 3 seconds. The Fmri data collected and analyzed with FSL sSoftware.

Results:

The Fmri data demonstrated the larger activity in respected regions of the brain, which are responsible for emotional inhibition after surgery. Moreover, accuracy and reaction time improved in this state.

Conclusion:

According to this study, the emotional inhibition improved after surgery; So we can expect the better quality of life in these patients. The change in accuracy and reaction time was remarkably seen in happy emotion rather than angry; And seen in Low-grade gliomas.

ROLE OF ARTERIAL SPIN LABELING IN ALZHEIMER'S DISEASE

Vahid Shahmaei*
Shahid Beheshti University of Medical Sciences
Vahidshahmaei.Sbmu@gmail.com

Alzheimer's disease (AD) is the most common cause of dementia and the fifth leading cause of death in people aged 65 years and older.
Arterial spin labeling (ASL) is the Non-invasive method that uses arterial blood water as an endogenous tracer to measure cerebral blood flow (CBF).
Arterial spin labeling (ASL) MR imaging is a Non-invasive, rapid and increasingly widely available method for quantifying cerebral blood flow; ASL represents a potential alternative modality for measuring brain perfusion as compared with positron emission tomography (PET).
Quantitative imaging of cerebral blood flow, using standard magnetic resonance imaging (MRI) equipment because it requires no contrast injection, ASL can add resting functional information to MRI studies measuring atrophy and signs of ischemic injury. Key features of ASL technology that may affect studies in Alzheimer's Disease are described. ASL is proving to be an increasingly promising tool for exploring pathogenetic mechanisms, early detection, monitoring disease progression and pharmacological response and differential diagnosis of AD.
The most consistent finding across the studies of AD is decreased precuneus and/or posterior cingulate blood flow and lower posterior CBF at the time of diagnosis show a more rapid cognitive decline. Some of the regions with the slowest arrival are those that also show flow decreases in AD, such as parietal and frontal association cortex.
Since MRI scanners are more widely available than PET scanners (and also less expensive), ASL might become an alternative for FDG-PET.
ASL blood flow MRI is a promising marker of early disease in AD and other dementias. ASL currently lags some other imaging methods in the maturity of the technology and the evaluation in AD. With widespread distribution of the technique in progress, we anticipate these challenges will shortly be overcome and ASL will become an essential tool in AD treatment and prevention research.

Keywords:

Arterial Spin Labeling, Magnetic Resonance Imaging, Cerebral Blood Flow, Alzheimer's Disease

USING DEEP LEARNING NETWORKS FOR CLASSIFICATION OF LUNG CANCER NODULES IN CT IMAGES

Mohammad Ali Javadzadeh Barzaki*
Department of Radiology, Faculty of Medicine, Ardabil University of Medical Sciences, Ardabil, Iran. Email: Javadzade@Yahoo.Com
Mohammad Negaresh
Jafar Abdollahi
Mohsen Mohammadi
Hassan Ghobadi
Bahman Mohammadzadeh
Firouz Amani

Purpose:

One of the foremost common cancers around the world is lung cancer (LC) which evaluation of its incidence very important for more robust planning. Computerized tomography (CT) is important for the diagnosis of lung nodules in carcinoma. Recently, algorithms like deep learning have been considered as a promising method within all medical field, therefore, we try to using various deep learning

networks for classification of lung cancer nodules in CT images.

Methods:

In this paper, open-source datasets, and multicenter datasets are used. Three CNN architectures (VGG16, VGG19, and Inceptionv3) were designed to detection lung nodules and classified them into two malignant or benign groups based on their pathologically and laboratory results.

Results:

The accuracy of these three CNN architectures in 10-fold training model were found to be 98.3%, 99.6%, and 99.5%, respectively. There was no difference in term of sensitivity and specificity between larger and smaller nodules. The model validation was checked by manually assessments of CT by doctors and compared with three-dimensional CNN results. The performance of the CNN model was better and accurate than manual assessment.

Conclusion:

Results showed that, of the CNN architectures, The VGG19 with an accuracy of 99.6% has the best performance among the three networks.

Keywords:

Deep Learning, Lung Cancer, Early Diagnosis, Computed Tomography

CLINICAL SIGNIFICANCE OF THE BILIARY FINDINGS IN MR ENTEROGRAPHY OF PATIENTS WITH INFLAMMATORY BOWEL DISEASE

Sara Momtazmanesh*
Tehran University of Medical Sciences
Smomtazmanesh@gmail.com
Mehran Gholami
Neda Pak
Ali Reza Sima
Seyed Ali Montazeri
Shadi Kolahdoozan
Homayoun Vahedi
Amir Reza Radmard

Background:

Given the strong association of inflammatory bowel disease (IBD) and primary sclerosing cholangitis (PSC), we aimed to investigate the clinical relevance of abnormal hepatobiliary findings on magnetic resonance enterography (MRE) of IBD patients considering the risk of over-or underestimation of PSC at MRE.

Methods:

Using the MRE dataset of patients referring to a Tertiary hospital and the national registry of Crohn's and colitis, 69 Mres, including 23 IBD-PSC, 23 IBD without PSC, and 23 healthy controls, were retrospectively reviewed by two experienced radiologists blinded to the clinical data to evaluate hepatobiliary abnormalities. Sensitivity, specificity, and likelihood ratios were calculated.

Results:

Bile Duct irregularities were the most common finding in the IBD-PSC group, with a frequency of 91%. intra- and extrahepatic Bile Duct (IHBD And EHBD) irregularities were observed in 87% and 78% of PSC patients, respectively. Higher frequency of IHBD and EHBD wall thickening, Bile Duct dilation, EHBD stricture, and periportal edema were observed in the IBD-PSC group. Peribiliary T2-Weighted hyperintensities and contrast-enhancement were significantly more common in the IBD-PSC than

IBD and HC groups (48% And 35%, Respectively) (P-Value<0.001). Detection of Biliary irregularities on MRE had a specificity of 94% (95% CI= 82% To 99%), a sensitivity of 91% (72% To 99%), and a positive likelihood ratio of 14.0 (95%CI= 4.7 To 42.1) for the PSC diagnosis.

Conclusions:

This study emphasizes the importance of assessing and reporting hepatobiliary abnormalities visible in MRE of patients with IBD to avoid a delayed diagnosis of PSC.

COAGULOPATHY IN COVID-19 PATIENTS AND ENDOVASCULAR TREATMENT, REPORTS OF 4 PATIENTS

Mohammad Ali Mohammadi Vajari*
Department of Radiology, Iran University of Medical Sciences
Mohammad-Reza Babaee
Erfan Mohammadi-Vajari

Background:

COVID-19 pandemic due to the respiratory infection of SARS-Cov-2 has now become a global threat. The thrombotic complications are common in COVID-19 patients which have been extensively addressed in various studies. The hemorrhagic complications, however, have received less attention. In this article, 4 cases of COVID-19 patients with hemorrhagic complications are presented.

Case Presentation:

All 4 patients were hospitalized in ICU and received routine COVID-19 treatments such as heparin prophylaxis. During hospitalization, all four patients had rectus sheath hematoma and retroperitoneal hemorrhage. They underwent embolization to control hemorrhage. Embolization of the inferior epigastric artery and the anterior trunk of internal iliac artery was carried out under fluoroscopy-guided angiography. The active hemorrhage of the patients was controlled. Three patients recovered after the treatment and were discharged while one patient, unfortunately, died due to the severity of the pulmonary involvement, old age, and hemorrhage. First, the hemorrhage of these patients was assigned to the hemorrhagic complications due to the use of heparin. But the hemorrhage volume was not justifiable with the symptoms and complications of prophylaxis dosage of heparin. The attention was gradually drawn to the coagulopathy of the COVID-19 patients.

Discussion:

There is increasing awareness of coagulation disorders in Covid-19 infection. Thrombotic complications seem to be common among this patient population, which may necessitate preparing appropriate guidelines for its management. However hemorrhagic complications and their proper treatment should also be taken into consideration in Covid-19 infection.

EXTRA MEDULLARY HEMATOPOIESIS PRESENTING AS PROGRESSIVE HEADACHE, A CASE REPORT AND REVIEW OF LITERATURE

Mohammad Ali Mohammadi Vajari*
Department of Radiology, Iran University of Medical Sciences
Iman Mohseni
Mohammad-Reza Babaee
Ghazale Tefagh
Nima Rakhshankhah
Marzie Motevalli

Background:

Hematopoiesis is defined as formation of blood cells from hematopoietic stem cells which reside in the bone marrow. Extramedullary hematopoiesis (EMH) is defined as production of blood cells in other organs in addition to bone marrow. Usual sites of EMH are known to be the spleen and liver, other less common sites of EMH have been reported to be the para spinal region, abdominal viscera, thymus, pleura, and also intracranial structures. Intracranial EMH is a rare condition.

Case Presentation:

In this article we present a case of intracranial EMH presenting as progressive headache.
Our patient was a 33-year old man with thalassemia presenting with acute progressive flaccid quadriplegia, severe progressive headache and decreased level of consciousness. He had not received his transfusions regularly due to poor compliance. His imaging studies showed evidence of intracranial

and pre sacral EMH. Multiple mass-like lesions with a solid and partially dense appearance were seen on both sides of the interhemispheric falx in an extra axial and dural-based position alongside with similar lesions adjacent to the convexity of the right frontal lobe.

Discussion:

Although mostly asymptomatic, intracranial EMH can present as a variety of symptoms including progressive headache. The necessary steps in successful diagnosis of intracranial EMH are considering the patient's underlying disease, symptoms, and imaging findings. Intracranial EMH has been mostly seen in patients with a history of thalassemia major and intermedia and myelofibrosis. The differential diagnosis should be kept in mind when evaluating a patient with relevant underlying medical condition. Different imaging modalities are used in diagnosis of EMH. The CT appearance of EMH is a heterogeneous lobulated soft tissue density mass. MRI is the modality of choice in the diagnosis of intracranial EMH.

THE DIAGNOSTIC ACCURACY OF TVS FOR DEEPLY INFILTRATING ENDOMETRIOSIS AND POUCH OF DOUGLAS OBLITERATION IN THE PRESENCE OR ABSENCE OF OVARIAN ENDOMETRIOMA, A PROSPECTIVE STUDY

Behnaz Moradi
Nahid Sadighi
Masoumeh Gity
Behnaz Boroujerdirad
Fatemeh Davari-Tanha
Reza Daneshvar
Javid Azadbakht*
Kashan University of Medical Sciences
Javidazadbakht2@gmail.com

Purpose:

Endometriosis is one of the most common women's diseases, which as a multiorgan condition and often painful disorder, Has drawn much attention to it. Hereby, we aim to test TVS accuracy for the diagnosis of deeply infiltrating endometriosis (DIE) in respect To the presence of ovarian endometrioma (OE).

Methods:

This was a prospective study with all enrolled patients undergoing transvaginal sonography (TVS) before undertaking gynecologic laparoscopy. Setting pathological confirmation as the standard reference, the accuracy of TVS for the diagnosis of DIE and pouch of douglas (POD) obliteration was compared with that of laparoscopy in anterior and posterior pelvic compartments, and with regard to the presence or absence of OE. The degree of agreement between TVS and laparoscopy was measured in each case and for each site of involvement, using cohen's kappa statistic.

Results:

One hundred and ten patients were recruited with a mean age of 37.20 ±7.16 years. The accuracy, sensitivity, and negative predictive value of TVS to diagnose DIE and POD obliteration were calculated as 89.5%, 58.3%, and 88.9% in anterior pelvic compartment (APC), and 93.3%, 92%, and 70.6% in posterior pelvic compartment (PPC), respectively. Nevertheless, TVS had a lower sensitivity for detecting pelvic adhesion and peritoneal cyst comparing to laparoscopy. OE presence did not significantly increased TVS accuracy for the diagnosis of DIE or POD obliteration (P> 0.05).

Conclusions:

Current study has shown that TVS is an accurate and non-invasive tool for the detection and mapping of DIE and POD obliteration, regardless of the presence of OE. TVS May waive the need for exploratory laparoscopy in DIE, or at least it can offer a precise pre-procedural DIE mapping.

THE EFFECTS OF VITAMIN B12 SUPPLEMENTATION ON SERUM HOMOCYSTEINE LEVEL AND HEPATIC STEATOSIS AND FIBROSIS IN NON-ALCOHOLIC FATTY LIVER DISEASE: A RANDOMIZED CONTROLLED TRIAL

Hamidreza Talari*
Kashan University of Medical Sciences
Talari2008hr@yahoo.com
Nasrin Sharifi
Seyed Mohammadhosein Tabatabaii
Milad Mokfi
Mohammadreza Mola Ghanbari

Background And Aims:

Previous studies have reported evidence of an association between serum vitamin B12 levels and non-alcoholic fatty liver disease (NAFLD). The present study aimed to evaluate.
The effects of vitamin B12 supplementation on serum liver enzymes, homocysteine, grade of hepatic steatosis, and metabolic profiles in patients with NAFLD.

Methods:

Forty patients with NAFLD were enrolled in a parallel, double-blind placebo-controlled trial. They were randomly allocated to receive either one oral tablet of vitamin B12 (1000µg cyanocobalamin) or a placebo per day for 12 weeks. Serum levels of homocysteine, aminotransferases, fasting blood glucose (FBG), lipids, and malondialdehyde (MDA), as well as homeostasis model assessment of insulin resistance (HOMA-IR) were assessed. The grade of liver steatosis and fibrosis was measured by real-time 2-dimensional U/S shear wave elastography.

Results:

Vitamin B12 supplementation significantly decreased serum levels of homocysteine compared with placebo (-2.74 Vs. -0.54 µmol/L; P=0.038). Although serum alanine transaminase (ALT) in the vitamin B12 group decreased significantly, this change did not reach a significant level compared to the placebo group (-10.30 Vs. -7.30 IU/L; P>0.05). Despite the significant within-group decrease in FBG, MDA, and grade of liver steatosis and fibrosis on ultrasonography in the vitamin B12 group, between-group comparisons did not reveal any significant difference.

Conclusion:

Supplementation with vitamin B12 might decrease serum levels of homocysteine in patients with NAFLD; Therefore, it may protect against the adverse outcomes of hyper-homocysteinemia, such as the increased risk of inflammation and oxidative stress in the liver.

Keywords:

Non-Alcoholic Fatty Liver Disease; Vitamin B12; Ultrasound; Homocysteine

ADRENAL METASTASIS FROM ENDOMETRIAL CANCER AND PRIMARY COLON CANCER, A CONSTELLATION OF MULTIPLE PRIMARY AND AN EXTREMELY RARE SECONDARY MALIGNANCIES IN LYNCH SYNDROME

Javid Azadbakht*
Kashan University of Medical Sciences
Javidazadbakht2@Gmail.Com
Maryam Mary Azadbakht
Amir Hassan Matini
Reza Manouchehri

Background:

Adrenal metastasis of primary endometrial cancer is extremely rare (12 Cases Reported Thus Far), and is usually asymptomatic and adrenal hormonal profile is normal. Prognosis is dismal, especially in case of bilateral adrenal metastasis. Hereby, a case of primary endometrial and colon cancer with adrenal metastasis from endometrial cancer is presented, a constellation of malignancies which has not yet been reported in literature.

Case Discussion:

The patient was a 51-year-old postmenopausal woman presented with abnormal uterine bleeding and vaginal discharge from 6 months prior to admission. Her family history was positive for colon cancer in her brother (At the age of 40). Ultrasound exam revealed bulky necrotic endometrial thickening with myometrial and advanced parametrial invasion, regional and retroperitoneal lymphadenopathies, along with right adrenal heteroechoic mass. Same findings were confirmed in MRI, as well as a mass like heteroenhancing focal thickening in sigmoid colon wall. Patient underwent total hysterectomy with debulking of parametrial lesions, marginal excision of the sigmoid wall mass, and enucleation of encapsulated right sided adrenal mass. Histopathological and immunohistochemistry (IHC) analysis on specimen revealed high grade locally invasive endometroid cancer with adrenal metastasis and primary colon cancer in sigmoid wall. Lynch syndrome was also suggested according to IHC results. Patient developed with uremic encephalopathy 31 days post-surgery, and deceased on the same day.

Discussion:

This patient is the first-ever reported case of adrenal metastasis from endometrial cancer, along with primary colorectal cancer in a suspected context of lynch syndrome. Adrenocortical carcinoma has been reported in 3.2% of patients with lynch syndrome, but adrenal metastasis (As in this case) is another rare possibility which needs to be ruled out, as it profoundly affects the therapeutic approach. the prognosis of adrenal metastasis from endometrial cancer is poor, and other synchronous primary metastases in lynch syndrome may worsen the outcome.

DELAYED ASYMPTOMATIC HERNIATED RECTUS GYRUS INTO THE SELLA THREE YEARS AFTER SURGICAL TREATMENT

Mersad Mehrnahad*
Shahid Beheshti University of Medical Sciences
Mersad.Mehr@gmail.com
Mohammad Eslamian

Endoscopic endonasal transspenoidal surgery is commonly used to treat pituitary tumors. Complication rates for the aforementioned technique are relatively low, and the majority of them appear early in the postoperative period. Among them, hormonal abnormalities are the most frequent, while anatomical complications were less observed. we report a rare case of delayed asymptomatic herniation of anterior mesial floor of the frontal lobe (Gyrus Rectus) into the sella.

THE FREQUENCY OF COEXISTED CONGENITAL BILATERAL ABSENCE OF VAS DEFERENS AND UNILATERAL KIDNEY AGENESIS IN INFERTILE MEN REFERRED TO ROYAN INSTITUTE

Fattaneh Pahlavan
Royan Institute, Vosough@Royaninstitute.org
Ahmad Vosough*

Background:

Congenital bilateral absence of the vas deferens (CBAVD) leads to azoospermia and infertility. It might be seen with unilateral kidney agenesis. There is no study about the prevalence of coexistence of unilateral kidney agenesis and the vas deferens anomaly of iranian. The aim of this study was to assess the frequency of coexisted CBAVD and unilateral kidney agenesis in infertile men, referred to royan institute between 2016 and 2019.

Methods:

A cross_ sectional study was done on eligible patients.

The study was approved by the institutional ethics committee. Infertile men who had been examined by an urologist and were suspected for CBAVD, referred to ultrasound ward. Using abdominal ultrasound examination, kidney anomalies were ruled out. Data was entered into spss software 21. A value less than 0.05% was considered significant.

Results:

Participants aged 33.05±6.35. A total of 110 patients were eligible. In 66 patients CBAVD was detected. 23 patients had left side VD, and 21 patients had right side VD. 12 (11%) men met both CAVD and unilateral kidney agenesis. The percentage of coexisted CBAVD and unilateral kidney agenesis was 9.1%, and coexisted congenital unilateral absence of the vas deferens (CUAVD) and unilateral kidney agenesis was 1.8%. However, here was no significant difference (P=0.07).

Conclusion:

Kidney agenesis cannot be detected by routine laboratory tests or transrectal ultrasound examination. Hence, it should be ruled out in CAVD patients, using abdominal ultrasound examination after transrectal examination.

Keywords:

Azoospermia, Ultrasound Examination, Congenital Absence Of The Vas Deferens, Kidney Anomalies

PREDICTING MORTALITY RATE IN ICU-ADMITTED COVID-19 PATIENTS IMPLEMENTING VISUAL SEMI-QUANTITATIVE CT SEVERITY SCORING SYSTEM

Javid Azadbakht*
Kashan University of Medical Sciences
Javidazadbakht2@gmail.com

Purpose:

To evaluate the relationship between CT scan findings and mortality in COVID-19 pneumonia by comparing deceased patients with normal patients.

Methods:

In this retrospective case-control study, 290 ICU admitted patients with RT-PCR confirmed COVID-19 pneumonia were investigated. Totally, 145 deceased patients with confirmed COVID-19 related death (In-hospital mortality subgroup, case), and 145 patients who survived the admission course (surviving subgroup, control) were randomly selected among all ICU admitted COVID-19 patients referring to the affiliated tertiary center between 20 Aug, 2021 and 21 Sep, 2021. Participants' laboratory and clinical information, and their on-admission computed tomography (CT) images were reviewed. Mortality-related risk factors were compared between case and control subgroups.

Results:

The mean age of deceased patients (68.20±16.07) was significantly higher than that of the surviving patients (54.72± 19.50) (P <0.001). Diabetes, hypertension, and chronic kidney disease (CKD) were significantly related with higher mortality rates (62.2%, 58.7%, and 80.4% mortality in diabetic, hypertensive, and CKD patients versus 41.7%, 42.1%, and 35.9% in non-diabetics, normotensives, and patients without CKD). Additionally, the Mean on-admission air-room SPO2 level in deceased patients (90%) was significantly lower than that of the survivors (93%) (P = 0.001). Neutrophil to lymphocyte ratio (NLR), lymphocyte count, c-reactive protein (CRP), erythrocyte sedimentation rate (ESR), lactate dehydrogenase (LDH), creatinine (Cr), blood urea nitrogen (BUN), and fasting blood sugar (BS), mean CT severity score (CT-Ss), and O2 supportive therapy requirement were significantly higher in the mortality subgroup (P <0.05). Pleural effusion showed no significant correlation with short-term mortality. CT-Ss of >11, in isolation or in combination with the above-mentioned prognosticators, was 64% or 81.4% sensitive, and 60% or of 78.6% specific, to predict mortality.

Conclusions:

This study found semiquantitative CT severity score easy-to-calculate and efficient to diagnose and risk-stratify high-risk COVID-19 patients, and it was meaningfully predictive of mortality in COVID-19 pneumonia.

PREDICTING ICU LENGTH OF STAY IN COVID-19 PATIENTS USING A MULTIVARIABLE MODEL INCORPORATING CLINICAL, LABORATORY, AND IMAGING FEATURES

Javid Azadbakht*
Kashan University of Medical Sciences
Javidazadbakht2@gmail.com
Zahra Sadat Lajevardi
Elaheh Zahed

Purpose:

To predict ICU length of stay (LOS) using a multivariable model incorporating clinical, and laboratory, and imaging features in hospitalized COVID-19 patients, thereby stratifying patients and allocating resources accordingly.

Methods:

In this retrospective cohort study, 139 hospitalized patients (Aged Between 3 To 99) with Rrt-PCR confirmed COVID-19 pneumonia requiring intensive care, who had been discharged or deceased, were enrolled. Demographic, clinical, and laboratory findings of eligible patients were all extracted from electronic medical records and, if needed, through phone calls. Semi-quantitative CT severity score (CTSS) was calculated and assigned to each encoded patient independently and blindly. We used the cox regression model to investigate the prognostic role of Semi-quantitative CTSS, clinical and laboratory features to anticipate ICU-LOS.

Results:

139 patients with Rrt-PCR confirmed COVID-19 pneumonia (including 60 females and 79 males) with a mean age of 58.52 ± 20.58 (ranging from 3 to 99) were included. CTSS was not predictive of ICU-LOS. Additionally, CTSS of more than 11 was predictor of mortality (sensitivity, 60.3%; specificity, 58%; AUC, 0.605; 95% confidence interval, 0.508-0.702; P-Value, 0.034), and CTSS of above 10 was predictor of oxygen therapy dependency (sensitivity, 70.2%; specificity, 68%; AUC, 699 / 0; 95% confidence interval, 0.580-0.818; P-Value, 0.002). CTSS was not significantly associated with respiratory rate and on-admission dyspnea, while it was inversely related to air-room Spo2 on the first day of admission (P <0.0001, R = -0.341).

Conclusion:

CTSS is capable of anticipating mortality rate and the chance of undergoing supportive oxygen therapy during ICU hospitalization, while it does not predict ICU-LOS, rate of mechanical ventilation, or corticosteroid therapy.

CHEST CT SEVERITY SCORE, CURB-65 SCORE, AND THEIR RELATIONSHIP WITH IN-HOSPITAL MORTALITY IN COVID-19 PATIENTS

Javid Azadbakht*
Kashan University of Medical Sciences
Javidazadbakht2@gmail.com
Zahra Sadat Lajevardi
Elaheh Zahed

Background:

With every new strain of the SARS-Cov-2 spreading at a fast pace across the borders, an easy-to-calculate and reliable scoring system seems invaluable to identify high-risk patients.

Objectives:

This study aims to investigate the relationship between CT severity score (CTSS) and CURB-65 score with mortality in COVID-19 patients.

Methods:

This study was conducted on RT-PCR confirmed COVID-19 patients admitted to a tertiary teaching center during the fifth national wave of disease in one of the early disease epicenters in the country. All enrolled patients underwent chest CT Scan within the first day of admission. CTSS and CURB-65 scores were calculated and assigned to patients, while radiologist was blinded to clinical and laboratory findings, and they were evaluated for their correlation with in-hospital mortality, additively and separately.

Results:

Total number of 216 patients (140 Males) with a mean age of 56.02 ± 17.34 years (ranging from 4 to 95) were enrolled. We found no significant relationship between CURB-65 score and CTSS (correlation coefficient: 0.065; P: 0.338). CURB-65 score above 1 was predictive of in-hospital mortality with a sensitivity of 56.4% and specificity of 81.9% (P: 0), those for CTSS above 11 were 79.5% and 4 51.5%, respectively (P: 0.001). CURB-65 score >1 and CTSS >11 predicted in-hospital mortality with sensitivity and specificity of 61.5% and 79.7% (P: 0.000). CURB-65 score and CTSS had a higher sensitivity and specificity to predict mortality compared to each of those separately, but these enhanced statistics were not significant.

Conclusion:

CURB-65 score is meaningfully stronger than CTSS to prognosticate in-hospital mortality in patients with COVID-19, and it is not significantly correlated with CTSS.

COEXISTING ENDOMETRIAL POLYP AND FIBROMA

Fattaneh Pahlavan

Maryam Niknejadi*

Department of Reproductive Imaging, Reproductive Biomedicine Research Center, Royan Institute For Reproductive Biomedicine, ACECR, Tehran, Iran

Mniknezhady1390@Gmail.Com

Background:

Endometrial abnormalities such as polyps and fibroma are responsible for infertility in women. The prevalence of endometrial polyps and fibroma is 10-40% and 20%, respectively. Recent studies have shown that the prevalence of coexisting endometrial polyp and fibroma is about 20.1%. Due to the high prevalence of coexisting polyp and fibroma, accurate and precise assessment of endometrium should be considered if fibroma or polyp is detected in the uterus. In case that sub mucosal or intramural fibroma results in endometrial distortion, more attention should be considered. Polyp is seen next to the fibromas or on the opposite side of the endometrium.

Imaging Findings:

Figure 1 demonstrates the transverse section of the uterus. A 30 Mm intramural fibroma is seen in the left side of the uterus and a 10 Mm polyp is located on the endometrium, just beside the fibroma.

Figure 2 shows the sagittal view of the uterus. an intramural fibroma which has distorted endometrium is seen. A 6 Mm polyp is on the opposite side of fibroma.

Figure 3 a depicts a transvers section of the uterus and a 44 Mm intramural fibroma; and a 11 Mm polyp in the sagittal view of the uterus is seen in figure 3B.

The diagram shows the different sites of abnormalities in the endometrium. The mechanical effect of fibroma leads to distortion of the uterus and it may result in formation of polyps. The main hormone related to the both anomalies is estrogen hormone. Hormones and their receptors in the specific sites would account for coexisting endometrial polyp and fibroma.

Conclusion:

Transvaginal sonography, saline infusion sonohysterography, and hysteroscopy are the beast modalities for diagnosis of these anomalies. Hysteroscopic resection should be considered for treatment of polyps; However, hysterectomy is the definitive solution.

Keywords:

Sonography, Coexisting, Polyps, Fibroma

EVALUATING THE EFFECTIVENESS OF ARTIFICIAL INTELLIGENCE FOR ORGAN SEGMENTATION IN IMAGE-GUIDED RADIOTHERAPY: A SYSTEMATIC REVIEW

Amin Banaei

Samaneh Hassanpour*

Department of Medical Physics, Faculty of Medical Sciences, Tarbiat Modares University, Tehran, Iran

Samaneh.Hr.1996@Gmail.com

Ali Vafadar

Background:

Image-guided radiotherapy (IGRT) provides high accurate treatment for cancer patients, and better contouring and preservation of organs at risk (Oars) by tracking tumors motions and deformations using CT and MRI images obtained during treatment(1). Manual contouring of OAR and target volumes are complicated and time-consuming (2). Nowadays, artificial intelligence (AI) is considered a help, which can be used to segment the structures in CT and MRI images for treatment planning, patient setup verification, and evaluating tumor deformations (3). This study aims to express and conclude the effectiveness of AI in IGRT.

Methods:

The literature search was conducted in pubmed, sciencedirect, and google scholar using terms “MRI”, “Radiotherapy”, ” IGRT”, “Artificial Intelligence”, “Machine Learning” and “Auto-Segmentation”. The most relevant articles were selected and reviewed to evaluate the effectiveness of AI in IGRT.

Results:

Several studies showed that the use of AI in IGRT can resulted to significant time reduction compared to manual contouring in head and neck (4, 5), prostate (6), lung (7) and rectal(8) cancers. Furthermore, several studies reported high delineation accuracy for AI on CT images (9-11). However, some studies indicated that the accuracy of the structures delineation using AI, especially for CT images with insufficient clarity and contrast, resulted in the wrong delineation and subsequently over or under-dosage of patients (12, 13). It is suggested that MRI images with superior soft-tissue contrast can help to obtain better structure delineation (14). However, commercial CT scanners combined with radiotherapy machines are more accessible than MRI systems in the clinic.

Conclusion:

As manual organ delineation takes significant time and effort, there will be an increase in using AI for organ delineation in the future. MRI images for AI organ delineation can result in higher accuracy contouring than CT images; however, output contoured organs must be reviewed and modified with humans before any radiation dose calculations.

DOPPLER EXAM OF ANTRAL FOLLICLE; DOES IT EFFICIENTLY PREDICT THE DUE TIME OF OVULATION

Nazanin Farshchian*
Kermanshah University of Medical Sciences
N_Farshchian2000@yahoo.com
Reza Favaedi
Parisa Bahrami Kamangar
Javid Azadbakht

Purpose:

Predicting the exact time of ovulation is highly important for planning to conceive or prevent pregnancy. This study aims at assessing the accuracy of doppler ultrasound in determining the ovulation time.

Methods:

The present descriptive cross-sectional study was conducted on 158 women, who intended to conceive. All participants underwent transvaginal doppler sonography of the ovaries between 9th-14th day of menstrual cycle, using A 7-10 Mhz transducer while tissue harmonic imaging function was on. Antral follicles were spotted and their morphological features along with doppler indices in vessels surrounding follicular wall were evaluated (namely peak systolic velocity (PSV), pulsatility index (PI), and resistive index (RI)). Pulse repetition frequency (PRF), and color gain were set as respectively highest and lowest values which give an artifact-free color image.

Results:

Approaching toward the 14th day of menstural cycle follicle became larger, more round in shape with a slight increase in their internal echo and occasionally appearance of a surrounding hypoechoic halo. Overtime, perifollicular vessels attained a more uniform configuration and all doppler indices showed significant alteration from ninth to fourteenth day as follow: PSV increased from 18.25±5.811 cm/second on 9th day to 22.37±6.880 on 14th day, PI slightly increased from 2.35±1.327 in 9th day to 2.40±1.347 in 14th day, and RI decreased roughly to the half (from

1.51±6.199 in 9th day to 0.83±0.207 in 14th day). All changes were statistically significant (P<0.05).

Conclusion:

With ovulation time approaching, antral follicle shows morphological and vascular changes in ultrasound exam. From 9th To 14th day of menstural cycle, follicular RI decreases, PI gently increases, and PSV increases. These findings reflect higher blood flow velocity and lower vascular resistance around ovulating antral follicle, which is readily identifiable in doppler study and is of great accuracy in estimating the due time of ovulation.

APPLICATION OF ULTRASOUND ELASTOGRAPHY FOR BREAST CANCER-RELATED LYMPHEDEMA DIAGNOSIS AND STAGING: A SYSTEMATIC REVIEW

Seyyed Mohammad Hosseini*
Medical Students Research Committee, Shahed University, Tehran, Iran
Seyyedmh1998@Gmail.Com
Amir Hossein Bahanesteh
Hossein Yarmohammadi
Seyed Fattah Mahdavi Anari

Background:

Breast cancer-related lymphedema (BCRL) affects negatively the quality of life and imposes a significant burden on breast cancer survivors. Despite the importance, diagnosis of lymphedema still is based on clinical findings and recent research has studied ultrasound application for more accurate diagnosis and staging.

Methods:

An electronic search was performed on pubmed and scopus on 20/11/2021. Original studies investigating BCRL diagnosis or staging with ultrasound were considered eligible. Other types of lymphedema or articles in other languages than english were excluded. Data regarding participants, method, and findings were extracted from included articles after screening.

Results:

Among 16 included articles, four had used ultrasound for both diagnosis and staging. Two studies had compared affected limbs with healthy controls, while the other had compared with unaffected limbs. Strain and shear wave velocity imaging was reported in 14 and one studies, respectively; while one study had used both imaging. Circumference measurement and bioimpedance analysis were used as other assessment tools in four and three articles, respectively. Different findings were reported in included articles. In 13 articles, the thickness of cutis and subcutis of the affected limb was significantly higher. Also, reduction incompressibility of skin was reported in two studies. Correlation with findings of other assessment tools was also investigated; as a significant correlation of ultrasonography findings with circumference, and bioimpedance analysis was reported in four and three articles, respectively. Moreover, four included articles reported a significant correlation between ultrasonography findings and higher stages of lymphedema.

Conclusion:

Current evidence supports the usefulness of ultrasonography in BCRL diagnosis and staging. Future researches are needed to focus on the early application of ultrasonography for latent BCRL after the surgery.

Keywords:

Lymphedema, Ultrasounds, Elastography, Diagnosis

COMPARING INTIMA-MEDIA THICKNESS OF THE UTERINE ARTERY IN PREECLAMPTIC PREGNANT WOMEN WITH THAT OF HEALTHY PREGNANT AND NON-PREGNANT WOMEN

Nazanin Farshchian*
Kermanshah University of Medical Sciences
N_Farshchian2000@yahoo.com
Mahnosh Najafi
Mansour Rezaei
Parisa Bahrami Kamangar
Javid Azadbakht

Purpose:

Preeclampsia is a pregnancy related endothelial malfunction with rapid raise in blood pressure and proteinuria which develops during pregnancy (typically begins after 20 weeks of pregnancy). This study aims at investigating the predictive power of the intima-media thickness of the uterine artery (UA-IMT) in prognosticating preeclampsia.

Methods:

This observational single-center investigation was conducted on 60 female participant in three subgroups of 20 (preeclamptic, healthy pregnant, and non-pregnant women with normal blood pressure). The average value of the UA-IMT, measured in 3 standard predefined areas of the uterine artery on both sides, were assessed implementing a 3-5 Mhz curved probe. The mean UA-IMT was then compared between the three study subgroups. Mechanical and thermal indices were kept below standard values, and tissue harmonic function was turned-on during all exams. Ultrasound beam focus was set immediately superficial to the uterine artery near wall.

Results:

The mean UA-IMT in preeclamptic, healthy pregnant and non-pregnant women were measured at 237.75±19.83 µm (ranging from 210 To 290 µm), 231.50± 20.14 µm (ranging from 195 To 275 µm), And 244.50 ± 34.75 µm (ranging from 195 to 310 µm), respectively. Although the mean value was lower in healthy pregnant women, the difference was not significant (P = 0.290).

Conclusion:

UA-IMT was not significantly different between the study subgroups, thus it cannot predict or detect preeclampsia where suspicion raises clinically.

COMPARING DOPPLER INDICES OF RIGHT AND LEFT UMBILICAL ARTERIES IN NORMAL FETUSES

Nazanin Farshchian*
Kermanshah University of medical Sciences
N_Farshchian2000@yahoo.com
Faeze Yari
Parisa Bahrami Kamangar
Javid Azadbakht

Purpose:

Umbilical artery doppler indices are commonly assessed during The second and third trimester ultrasound Exams. As these are commonly investigated and reported in only one side, we compared doppler indices between right and left umblical arteries in normal fetuses to find if they are significantly different.

Methods:

This analytical single-center study was conducted on 326 healthy fetuses of healthy mothers in second or third trimester, implementing a 3-5 Mhz curved probe, assessing doppler indices (Namely RI And PI) in right and left umbilical arteries. Mechanical and thermal indices were kept below recommended values to ensure fetus safety. In all case, umblical arteries were assessed In transvrse plane as they pass by the urinary bladder wall in pelvis.

Results:

The mean value of RI was measured at a range of 0.30 to 1.20 for left umbilical artery, and 0.10 to 1.70 for right umbilical artery. The PI range for left and right umbilical arteries were 0.10 to 2.20, and 0.09 to 2.24, respectively. In general, the RI of the left umbilical artery was higher than, equal to, and lower than right umblical artery in 139, 22, and 165 cases, respectively (P = 0.013). The PI of the left umbilical artery was higher than, equal to, and lower than right umblical artery in 153, 23, and 150 cases,

respectively (P= 0.662). These findings show that RI differs significantly between right and left umblical arteries, but PI does not. Nonetheless, RI could be higher in left or right umblical artery with a relatively equal frequency.

Conclusion:

According to the findings of the present study, the mean RI of the umbilical arteries is better to be reported for both sides as the higher RI may changes the management strategy.

MECONIUM ILEUS TREATMENT WITH ULTRASOUND GUIDED CONTRAST ENEMA

Ali Alamdaran*
Mashhad University of Medical Sciences
Alamdarana@mums.ac.ir

The inspissated meconium pellets are a cause or effect of ileocolic obstructions. The present study aimed at explaining our experience of an ultrasound-based approach for differentiation and treatment of the inspissated meconium pellets. This study was conducted at Mashhad University of Medical Sciences, Mashhad, Iran, from 2017-2021. Thirty neonates (less than 8 days) with inspissated meconium pellets were examined using ultrasound. Moreover, in cases with non-complicated inspissated meconium pellets, ultrasound-guided contrast enema was performed for confirmation of the diagnosis or probable treatment. In ultrasound, the inspissated meconium pellets were observed as uniform hypo- to hyper-echoic tubular or beaded intra-luminal material in ileocolic loops or recto-sigmoid area. These pellets were in five states: simple meconium ileus, complicated meconium ileus, small bowel atresia, meconium plug syndrome, and hirschsprung's disease.
During contrast enema in non-complicated meconium ileus, moving and floating of inspissated meconium pellets was observed during ultrasound scanning, while this issue was not observed in small bowel atresia. The success rates of the ultrasound guided contrast enema in patients with simple meconium ileus were 80%. The inspissated meconium pellets have an ultrasound appearance. they are mainly observed in patients with simple and complicated meconium obstructions and bowel atresia. Except in complicated meconium obstructions, the ultrasound-guided contrast enema was performed for their differentiation and probable treatment.

MESENTERIC VESSEL ABNORMALITIES DETECTED WITH SONOGRAPHY: A POSSIBLE GATEWAY TO THE EARLY DIAGNOSIS OF VARIOUS GASTROINTESTINAL ANOMALIES

Masoud Mahdavi*
Mums,
Mahdavirm@mums.ac.ir

Background:

In pediatric sonography, mesenteric vessel abnormalities can be used as a sign of malrotation or volvulus. This study was aimed at evaluating the diseases associated with mesenteric vessel abnormalities in children, except for rotational anomalies.

Methods:

From 2017 to 2020, pediatric patients with abdominal complaints were referred for a full abdominal sonogram and were evaluated for mesenteric vascular abnormalities. During this period, 62 children (aged <12 years), with mesenteric vessel abnormalities, were discovered with sonography. They were also examined for associated anomalies and were followed until a final diagnosis was determined.

Results:

Mesenteric vessel displacement was reported in 37 patients (60%); in 24 cases, the vein was located to the left of superior mesenteric artery (SMA), and in others (13 Cases), in the anterior position. Abnormal pathways in mesenteric vessels were reported in 33 patients (53%); 18 cases showing a right side turn and 15 cases showing a left side turn. The whirlpool sign was seen in 16 patients (27%). These three patterns of vessel abnormality were associated with disorders such as diaphragmatic hernia, bowel obstruction, and space occupying lesions (masses). The location

of the mesenteric abnormality was in the proximal part of mesenteric vessels in 45 cases (72.5%) and in its distal part in 17 cases (27.5%). Malrotation (eight cases), obstruction, and volvulus were the most common causes of a distal abnormality.

Conclusions:

Mesenteric vessel abnormalities, noted with sonography, may not be exclusive to the diagnosis of malrotation and midgut volvulus. In this cohort, bowel obstruction, diaphragmatic hernia, and space occupying lesions were the other most common anomalies associated with mesenteric vessel abnormalities. In reviewing one-third of mesenteric vessels, abnormalities were only seen in the distal part of vessels; therefore, a thorough examination is warranted.

BREAST CANCER MOLECULAR SUBTYPE CORRELATION WITH SONOGRAPHY

Ahmad Soltani Shirazi*
Ahvaz Jundishapour Medical Sciences University
dr.a.soltanishirazi@gmail.com

Breast sonogram indication goes far not only for differentiation cystic or solid mass advanced solography of breast have ability to diagnosis malignant breast mass with high predictive value more than 95 %.
The multiple features of malignant masses such as speculation, angular margin, posterior acoustic shadow, branching, vascularity and shape could help us to diagnosis luminal A, luminal B, her2 and triple negative, the calcification help us to know out come of diseases and prognosis as well to choose better managing of treatment, the 36 patient with proved breast cancer biopsy and subtype molecular calcification correlated with breast mass malignant features in sonogram and find out, luminal A have angular border and echogenic halo, luminal B have angular shape with posterior shadow and hyper vascular pattern on doppler images HER2 have angular margin and posterior enhancement and triple negative have oval shape and microloublation with at least 85% accuracy.

how ever this calcification based on estrogen, progesterone and her 2 (epidermal growth factor) receptors, which have significant role on prognosis and endocrine therapy, chemotherapy, and type of surgery.

COMPARISON OF BRAIN CORTICAL THICKNESS IN MRI OF PATIENTS WITH EPILEPSY VERSUS CONTROL GROUP

Farnood Rajabzadeh*
Department of Radiology, Faculty of Medicine, Mashahd Medical Sciences, Islamic Azad University, Mashhad
Narges Sadeghpoor

Introduction:

Epilepsy is one of the most common neurological diseases in children and adults that often occurs as recurrent generalized tonic-clonic seizures. These seizures are associated with cardiovascular and respiratory complications that threaten survival; therefore, due to the importance of determining the rtiology of epilepsy and also to predict and prevent the occurrence of epilepsy, this study was performed to compare the thickness of the cerebral cortex in MRI of patients with epilepsy with the control group.

Methods:

This study was a case-control study with the participation of 31 patients with epilepsy (Case Group) and 31 non-epileptic patients referred to the radiology clinic of Imam Reza (AS) hospital in Mashhad in 1399. Initially, all patients with epilepsy between 15-59.
Years were included in the study and underwent MRI. Also, according to the number of people in the kurdish group, people without epilepsy underwent MRI as a control group. After data collection, T1-Weighted and T2-Weighted images. Prepared by 1,5 tesla siemens siemens symphony MRI MRI were examined, and the thickness of temporal, peritoneal, and frontal cortex in individuals was calculated. Finally, for data analysis, the data were entered into SPSS software version 26.

Results:

The mean age of the case group was 36,2 11 1, 11 years, and the control group was 32,8. 11,2 years. There was no significant difference between the age and sex of the case and control groups. The findings of this study also showed that the thickness of the frontal, peritoneal and temporal cortex (both sides) of patients with epilepsy was significantly less than the control group (P <1,15). Also, changes in cortical thickness were not related to age and sex (P <1,15).

Conclusion:

The results of our study show the relationship between the reduced thickness of frontal, peritoneal, and temporal cortices with epilepsy; therefore, these findings provide evidence of structural changes in images due to the pathogenesis of epilepsy.

Keywords:

MRI, Epilepsy, Brain, Cerebral Cortex Thickness

FREQUENCY, SHAPE, AND ESTIMATED VOLUME OF INTRACRANIAL PHYSIOLOGIC CALCIFICATION IN DIFFERENT AGE GROUPS INVESTIGATED BY BRAIN COMPUTED TOMOGRAPHY SCAN: A RETROSPECTIVE STUDY

Mehrdad Ghorbanlou*
Iran University of Medical Sciences
Mehrdad.Ghorbanlou@gmail.com
Fatemeh Moradi
Mehdi Mehdizadeh

Purpose:

Intracranial calcification is referred to calcification of parenchyma and vascular structures in brain which can be physiologic or pathologic. This study was conducted with the purpose of investigating the frequency, location, pattern, dimensions and estimated volume of intracranial physiologic calcification (IPC) by computer tomography in different age groups.

Methods:

In this cross-sectional retrospective study, brain computed tomography scans of 216 patients were analyzed in 9 age groups each containing 24 patients from 2 to 89 years old. Data were analyzed by SPSS software using one way analysis of variance (ANOVA, Post Hoc Tukey), Chi square, and linear regression tests (P≤0.05 was considered significant).

Results:

Rate of calcification in different areas were as follows: Pineal gland (75.0%), Habenula (36.4%), Pineohabenula (15.0%), Right Lateral Ventricle Choroid Plexus (RCP) (67.7%), Left Lateral Ventricle Choroid Plexus (LCP) (62.7%), Falx Cerebri (26.8%), Petroclinoid Ligament (13.2%), Tentorium Cerebelli (6.8%), Third Ventricle Choroid Plexus (0.9%), Fourth Ventricle Choroid Plexus (2.7%), Basal Ganglia (0.9%). A significant correlation exists between the presence of calcification in pineal, habenula, RCP, and LCP (P≤0.001). Nodular shape of calcification was dominant (47.9%). Estimated volume of pineal calcification showed increased levels in group 8 (70–79 years old) compared to group 2 (10–19 years old) (P≤0.05).

Conclusion:

Since the accurate description of radiologic appearance of Ipcs (location, shape, and size) accompanied with age and clinical manifestation is of great importance in diagnosis and distinguishing from pathologic calcification—for example in patients with melatonin dysregulation or schizophrenic patients—this study was required.

THE ROLE OF CT ANGIOGRAPHY TO PREDICT THE SHAMBLIN GROUP IN CAROTID BODY TUMORS

Somayeh Hajiahmadi*
University of Esfahan, Sohajiahmadi@gmail.com
Morteza Shahbandari
Mahas Sadat Arefinejad

Aim:

Carotid body tumors (Cbts) are uncommon benign head and neck neoplasms. Surgical resection is the treatment of choice for Cbts. However, the anatomical structures adjacent to the tumor tissue may encounter serious injuries during the surgery. Shamblin grading system is a surgical intra-operative scoring system to determine the risks associated with the surgery. Therefore, we aimed to evaluate the correlation of pre-surgical imaging parameters with shamblin grades and intra-operative complications.

Method:

In This Cross Sectional Study, We Enrolled 36 Patients With Cbts. Preoperative cervical CT angiography was acquired in each participant and following parameters were reported in each case: Tumor volume, tumor distance to the base of the skull (TDBS), tumor contact with the internal carotid artery (ICA), and external carotid artery (ECA) and tumor density. Finally, we assessed the relation of pre-surgical imaging parameters with shamblin grades, and intra-operative complications.

Results:

Only tumor volume was significantly correlated with shamblin grades ($P < 0.05$). The tumor contact with ECA was marginally correlated with shamblin grades ($P=0.103$); However, other imaging parameters were not significantly correlating with shambling grades. There was a statically significant correlation between ICA contact and tumor volume with ECA injury. In addition, the tumor density significantly correlated with cranial nerves injury. The results of STATA analysis were indicative for 69.44% accordance between radiologic typing and shamblin grading system.

Conclusion:

We found that tumor volume, tumor ICA contact, and tumor density correlate significantly with the shamblin grading system and intra-operative complications.

Keywords:

Carotid Body Tumor, Shamblin Grading System, Internal Carotid Artery, External Carotid Artery, Surgery

EVALUATING THE IMAGE QUALITY OF LOW-DOSE CHEST COMPUTED TOMOGRAPHY IN COVID-19 OUTBREAK

Bita Abbasi*

Mashhad University of Medical Sciences

Abbasib@mums.ac.ir

Jahanbakhsh Hashemi

Donya Farrokh

Behrooz Zandi

Masoud Pezeshki-Rad

Ali Feyzi Laein

Parvaneh Layegh

Background:

Since December 2019, COVID-19 infection has been reported from wuhan, China. Although chest radiograph is the first imaging of choice in many cases, lung CT is suggested as the subsequent study in some situations, and the CT scanners in many hospitals are busy 24/7 taking images of patients with respiratory syndromes. This has alarmed the radiologists about high doses of radiation. This study compared the image quality of low-dose chest CT examinations with routine chest CT images.

Methods:

All subsequent patients referred for chest CT in 4 weeks were enrolled in this study. Chest CT scans performed within the first two weeks of study were taken using the routine standard-dose protocol. The scans were performed in the next two weeks using the low dose protocol. Subjective image quality and objective parameters of the CT images were evaluated.

Results:

A total of 196 patients were evaluated. Ninety-six patients were scanned using NDCT, and 100 patients were examined using LDCT. The patient's dose was significantly reduced in the LDCT group (P: 0.000). both radiologists reported most images as having no artifacts or with mild artifacts. There was no significant difference in the subjective quality of images between the two protocols. There was no significant difference between the CNR and SNR in the two protocols.

Conclusion:

Low dose chest CT applied in patients with acute respiratory syndrome significantly reduced radiation dose while providing acceptable image quality and diagnostic certainty.

EVALUATING ANEMIA ON NON-CONTRAST THORACIC COMPUTED TOMOGRAPHY ABSTRACT

Bita Abbasi*
Mashhad University of Medical Sciiences, Abbasib@mums.ac.ir
Maliheh Seyed Hosseini
Maryam Emadzadeh
Reza Akhavan
Masoud Pezeshki-Rad
Behrooz Zandi
Jahanbakhsh Hashemi
Donya Farrokh
Ali Feyzi Laein
Parvaneh Layegh

Background:

Anemia is a major global disease burden factor linked to an adverse impact on overall prognosis and negatively affects the quality of life. Some suggested findings for anemia on non-contrast chest CT, like relatively dense interventricular septum (septal sign) or fairly dense aortic wall (aortic ring sign). The measured attenuation value is a reproducible physical density measurement, readily obtainable from a standard CT examination. There is no reliable cut-off for blood attenuation to suggest anemia on the non-contrast chest CT. The current study evaluated subjective and objective criteria' diagnostic accuracy for diagnosing anemia on unenhanced thoracic CT.

Methods:

Patients admitted to our academic hospital between June 2019 to March 2020 were candidates to be enrolled in this retrospective study. For the subjective assessment, the radiologists were asked to record the presence or absence of the "Aortic Ring Sign" and "Interventricular Septum Sign." For the objective evaluations, blood density was measured at various anatomic locations.

Results:

A total of 325 patients were included in this study. There was a significant correlation between blood attenuation in all measured segments and Hb level. subjective analysis revealed that the aortic ring sign was more sensitive than the interventricular septum sign in detecting anemia, whereas the latter character was more specific

Conclusion:

The results suggest that it is possible to detect anemia from an unenhanced chest CT scan. Both objective and subjective criteria show promising sensitivity and specificity.

PREDICTIVE POWER OF THE MODIFIED BRIXIA CHEST X-RAY SCORING SYSTEM IN PROGNOSTICATING IN-HOSPITAL MORTALITY IN ICU-ADMITTED COVID-19 PATIENTS

Javid Azadbakht*
Kashan University of Medical Sciences
Javidazadbakht2@gmail.com
Maryam Mary Azadbakht

Purpose:

Given the emergence of new strains (some of concern) of SARS-COV-2 every now and then, and considering the fast viral transmittion (especially in newer strains), implementing a dependable diagnostic/staging method is of great importance in risk-stratifying and allocating resources accordingly. The aim of this study was to determine the prognostic value of the modified Brixia CXR scoring system for predicting final in-hospital outcome in ICU-Admitted COVID-19 patients.

Methods:

In this cross-sectional, observational, single-center study, 108 ICU-admitted, RT-PCR confirmed cases

of COVID-19 who underwent on-admission plain chest radiograph were enrolled. Relevant available clinical, laboratory and historical data were extracted from patients' paper and electronic records, and via phone contact in cases of missing data. Plain chest radiographs were inspected by two radiologists, and cases of mismatch were resolved by consensus. Finally, the predictive power of modified Brixia chest X-Ray scoring system to prognosticate the ICU length of stay and mortality in studied participants was investigated.

Results:

The CXR score was meaningfully predictive of mortality, with a cut-off point of 5.5 and an area under the curve of 0.925. Diabetes (P = 0.001), cardiovascular disease (P = 0.006), central pulmonary involvement (P < 0.001), bilateral pulmonary involvement (P < 0.001) and pleural effusion (P < 0.001) were significantly associated with higher CXR scores. Additionally, CXR score was significantly associated with a higher rate of subsequent tracheal intubation (P < 0.001); However, it was not significantly correlated with ICU length of stay (P = 0.05).

Conclusion:

The present study showed that the modified Brixia CXR scoring system is a powerful predictor of mortality in ICU-Admitted COVID-19 patients, and might be of help to triage patients and determine high-risk cases for the purpose of resource allocation.

DESIGN AND IMPLEMENTATION OF A MACHINE LEARNING-BASED EDGE-COMPUTING SYSTEM FOR BREAST CANCER SCREENING

Mojtaba Aajami*
Wisdomx, Mojtaba.Aajami@gmail.com
Maryam Barzin

Computation systems have been witnessing a paradigm shift in which processing tasks are migrating from resource-rich cloud servers to the resource limited edge nodes residing at the point where data are generated and possessed. This paradigm called as the edge-computing has become as the first option in the applications that data-privacy is of paramount importance such as medical diagnosis systems. We present the results of the feasibility study of a machine learning-based mammography interpretation tool that has been implemented on a low price commercial off the shelf edge computing hardware. We evaluated the proposed system using the models that reach area under the receiver operating characteristics (AUROC) of 0.857 and 0.881 for single view and four views interpretation, respectively. The evaluation results substantiate this configuration is able to rffectively run the machine learning models that performs breast cancer prediction using a single mammogram. Furthermore, we observe that computation resource demanded by more complex models that utilize four mammograms for the task of interpretation can be satisfied by the considered edge computing hardware.

MECHANISMS REPROGRAMMING THAT MODULATE ADAPTIVE RESISTANCE INDUCED VIA EXCESSIVE BACKGROUND RADIATION LEVEL, RAMSAR, IRAN?

Hoda Talebian*
Babol University of Medical Sciences, Hodatbn@Ymail.Com
Ali Shabestani Monfared
Vahid Changizi

Purpose:

This survey compared the level of hypoxia-inducible factor (HIF1a) and the main regulator of transcription nuclear factor Kappa Beta (NF-KB) among two different Dwellers of Ramsar, Iran in terms of natural background radiation; residents of a high-stage (HBRA) and a normal-stage background radiation area (NBRA).

Methods:

60 individuals' blood samples were equally divided into two mentioned categories. While NBRA Dwellers were received to less than 1.5 Mgy Annually, The HBRA residents were exposed to more than 15 times around 15 Mgy per year. Limiting interfering factor

of socioeconomic differences we selected mentioned participants from two close neighbourhoods. NF-KB and HIF-1a expression levels were compared using quantitative real-time PCR (Qpcr).

Results:

Extra background radiation levels lead to reprogrammed mechanisms; both in oxygen homeostasis and inflammatory response. HBRA residences in compared to NBRA have shown a statical decrease in HIF1a regulator ($P < 0.0002$), as well as a significant increase in NF-KB level ($P < 0.0001$).

Conclusion:

It seems that radiation adaptive response induced in high background radiation areas residents are linked to changes in their molecular regulators. These alterations could indicate reprogrammed molecular mechanisms involved in radioresistance such as the warburg effect and activation of survival signalling pathway however greater studies are recommended.

OVERLOOKED CHRONIC MESENTERIC VENOUS THROMBOSIS: AS A MIMICKER

Mohammad Mehdi Mehrabi Nejad*
Tehran University of Medical Sciences
Faeezeh Salahshour
Nasim Batavani

Purpose:

Timely diagnosis and treatment of MVT is the main factor affecting the patients' outcome. Given its non-specific clinical and laboratory findings, radiologic modalities are highly suggested to minimize the diagnosis delay. Missed mesenteric venous thrombosis may be lethal, but some cases recovered with residual stenosis of the SMV or its branches, leading to chronic abdominal pain evaluated by CT scan. In this presentation, we review the most common types of chronic MVT CT findings that imitate other differential diagnoses with the relatively same presentations and consequently interrupt the timely diagnosis and treatment.

Imaging Findings:

Several secondary findings could mimic other disease processes still masquerade underlying remote thrombosis and causing misdiagnosis and mismanagement. Crohn's disease, bowel and mesenteric tumors, lymphoma, and mesenteric panniculitis may simulate by remote venous thrombosis on the CT scan. Obstruction, GI bleeding with unknown origin are other clinical presentations besides chronic abdominal pain.

Discussion:

To minimize the misdiagnosing, we recommend radiologists carefully follow all vessels' entire course to detect the focal narrowing as far as the distal branches. Besides, collateral vessels in chronic MVT originate from the venous system; However, comb signs in crohn's disease are prominent arteries. Although rare, we reviewed almost all different deceptive radiologic manifestations of chronic MVT, all of which could be ruled out through scrutinized following the collaterals and mesenteric vasculature. This point could minimize not only further invasive and costly investigations but also a presentation-to-treatment interval time, providing a more favorable outcome. Yet, our findings should be confirmed through further investigations on a larger sample size.

Conclusion:

Radiologists should be aware of similar conditions that chronic MVT could imitate their CT features. greater attention to mesenteric vasculature and collaterals in abdominal CT scans of patients with clinical suspicion for chronic MVT could minimize the misdiagnosis.

ACCURACY OF ARTIFICIAL INTELLIGENCE-AIDED CT QUANTIFICATION IN PREDICTING THE PROGNOSIS OF PATIENTS WITH COVID-19

Mohammad Mehdi Mehrabi Nejad*
Tehran University of Medical Sciences
2m.Mehrabi@gmail.com
Arvin Arian
Mostafa Zoorpaikar
Shahriar Kolahi
Navid Hasanzadeh
Masoumeh Gity
Saman Sotoudeh-Paima
Hamid Soltanian-Zadeh

Purpose:

To investigate the performance of an AI-Aided quantification model in predicting the clinical outcomes of hospitalized patients with COVID-19.

Methods:

A total of 90 patients with covid-19 (men, n=59 [65.6%]; age, 52.9±16.7 years) were recruited. quantification of the total and compromised lung parenchyma was performed by two expert radiologists using volumetric image analysis software and compared against an AI-assisted package consisting of a modified u-net model for segmenting covid-19 lesions and an off-the-shelf u-net model augmented with covid-19 data for segmenting lung volume. the fraction of compromised lung parenchyma (%cl) was calculated. the patients were divided into two groups according to the clinical outcomes: critical (n=45) and noncritical (n=45). all admission data were compared between the two groups.

Results:

There was an excellent agreement between the radiologist-obtained and AI-Assisted measurements (intraclass correlation coefficient=0.88, P<0.001). Both the AI-Assisted and radiologist-obtained %Cls were significantly higher in the critical patients (P=0.009 and 0.02, respectively) than in the non-critical patients. In the multivariate logistic regression analysis, an AI-Assisted %CL of ≥35% (odds ratio [OR]=17.0), the oxygen saturation level of <88% (OR=33.6), immunocompromised condition (OR=8.1), and other comorbidities (OR=15.2) independently remained as significant variables in the models. Our proposed model showed a sensitivity of 79.1%, a specificity of 88.6%, and an accuracy of 83.9% in predicting critical outcomes.

Conclusion:

AI-Assisted Measurements Are As Robust As Quantitative Radiologist-Obtained Measurements In Predicting Adverse Outcomes.

FACTORS PREDICTING TRANSMURAL NECROSIS IN PATIENTS WITH ACUTE MESENTERIC VENOUS THROMBOSIS

Elaheh Shaker*
Imam Khomeini Hospital
Aminreza Abkhoo
Faeezeh Salahshour
Farzane Shafiee
Niloofar Ayoobi Yazdi

Background:

To determine the clinical, laboratory, and computed tomography (CT) findings that indicate transmural necrosis in patients with acute mesenteric venous thrombosis (AMVT).

Methods:

We used the electronic records and CT scans of the patients hospitalized between 2014 and 2020 with the diagnosis of acute mesenteric ischemia due to AMVT. Various parameters were compared between The patients who had transmural necrosis on laparotomy and those without transmural necrosis who could be discharged from the hospital.

Results:

From 51 patients, 18 underwent laparotomy. Among them 13 had transmural necrosis whereas, 5 patients had normal or ischemic bowel. 33 completed conservative therapy.

Among the clinical findings, obstipation, and among the laboratory findings, the mean level of white blood cells, creatinine, urea, and lactate dehydrogenase were higher in the transmural necrosis group. Comparing the CT scan findings, the mean diameter of the abnormal loop, and diameter of the bowel loop proximal to the abnormal loop were higher in the patients with transmural necrosis. Also, these radiologic findings were more prevalent in the transmural necrosis group: Loculated fluid beside abnormal loop, bowel wall thickening, adjacent focal mesenteric haziness, foci with decreased enhancement, and pneumatosis intestinalis.
Among 32 patients with abnormal bowel wall thickening, the diameter of the abnormal loop, the diameter of the bowel loop proximal to the abnormal loop, and adjacent focal mesenteric haziness were higher in those with transmural necrosis.

Conclusion:

Clinical, Laboratory, And Radiologic Findings Could Be Used To Differentiate Transmural Necrosis From Non-Transmural Necrosis In Patients With AMVT.

COMPARING DOPPLER INDICES OF RIGHT AND LEFT UMBILICAL ARTERIES IN NORMAL FETUSES

Nazanin Farshchian*
Kermanshah University of Medical Sciences, N_Farshchian2000@Yahoo.Com
Faeze Yari
Parisa Bahrami Kamangar
Javid Azadbakht

Purpose:

Umbilical artery doppler indices are commonly assessed during the second and third trimester ultrasound exams. As these are commonly investigated and reported in only one side, we compared doppler indices between right and left umblical arteries in normal fetuses to find if they are significantly different.

Methods:

This analytical single-center study was conducted on 326 healthy fetuses of healthy mothers in second or third trimester, implementing a 3-5 Mhz curved probe, assessing doppler indices (namely RI and PI) in right and left umbilical arteries. Mechanical and thermal indices were kept below recommended values to ensure fetus safety. In all case, umblical arteries were assessed in transvrse plane as they pass by the urinary bladder wall in pelvis.

Results:

The mean value of RI was measured at a range of 0.30 to 1.20 for left umbilical artery, and 0.10 to 1.70 for right umbilical artery. The PI range for left and right umbilical arteries were 0.10 to 2.20, and 0.09 to 2.24, respectively. In general, the RI of the left umbilical artery was higher than, equal to, and lower than right umblical artery in 139, 22, and 165 cases, respectively (P = 0.013). The PI of the left umbilical artery was higher than, equal to, and lower than right umblical artery in 153, 23, and 150 cases, respectively (P= 0.662). These findings show that RI differs significantly between right and left umblical arteries, but PI does not. Nonetheless, RI could be higher in left or right umblical artery with a relatively equal frequency.

Conclusion:

According to the findings of the present study, the mean RI of the umbilical arteries is better to be reported for both sides as the higher RI may changes the management strategy.

PARKINSONISM

Amirreza Jahanshahi*
Assistant Professor of Radiology, Tabriz University of Medical Sciences, dj_amirreza@yahoo.com

Most patients (about 80–85%) diagnosed with Parkinson's disease have what is called primary parkinsonism or idiopathic Parkinson's disease (meaning that the disease has no known cause). This type tends to respond well to drugs that work by increasing or substituting dopamine molecules in the brain but at secondary parkinsonism type ,a key difference is that patients do not respond well to dopaminergic medications such as levodopa and second type Includes drug-induced parkinsonism, vascular parkinsonism, normal pressure hydrocephalus (NSA), corticobasal degeneration (CBD),progressive supranuclear palsy (PSP) and also multiple system atrophy (MSA).
Progressive supranuclear palsy (PSP) is more common forms of secondary parkinsonism. As with idiopathic Parkinson's disease, progressive supranuclear palsy has a late age of onset, but the symptoms tend to progress far more rapidly once they appear. However, dementia tends to have a later onset as the disease progresses.
Multiple system atrophy (MSA)results in symptoms that are similar to idiopathic Parkinson's disease, but with a much faster progression.
Corticobasal degeneration (CBD) is the least common of the atypical parkinsonisms and caused by a build-up of proteins called tau, which damage parts of the brain.
In most cases the diagnosis of probable PD can be made on clinical grounds, and no ancillary investigations are needed, however, in early PD the full triad of clinical symptoms and signs (bradykinesia, tremor at rest and rigidity) may not yet be manifested Substancia nigra is located at midbrain and composed from pars compacta and retinacula. Pars compacta is formed by dopaminergic neurons and located medial to pars reticulata (between this part and red nucleus) CT scans can show nonspecific atrophy with enlarged ventricles and sulci and Conventional MRI at 1.5 T with routine T2- and T1W imaging does not reveal disease-specific abnormalities in PD and, particularly in the early phases, the MRI appears normal and Its main role is to exclude 1.subcortical vascular pathology, 2.rare secondary causes of parkinsonism (e.g., Wilson's disease, NPH, or tumors, granulomas, or calcification of basal ganglia), and 3.in discriminating atypical parkinsonian syndromes.
T1 images may show mild hyperintensity of compact and reticular parts of the substantia nigra and red nuclei (due to iron accumulation) or may show loss of normal slight hyperintensity in substantia nigra due to loss of neuromelanin.
Loss of the normal swallow tail appearance of susceptibility signal pattern in the substantia nigra on axial imaging is perhaps the most promising diagnostic sign and swallow tail sign describes the normal axial imaging appearance of nigrosome-1 within the substantia nigra on high-resolution T2*/ SWI weighted MRI.

IMAGING OF THE PLACENTA ACCRETA SPECTRUM, A CONCEPTUAL REVIEW FEATURING INTERESTING CASES

Behnaz Moradi
Javid Azadbakht*
Kashan University of Medical Sciences
Javidazadbakht2@gmail.com
Soheila Sarmadi
Mahboobeh Shirazi
Masoumeh Gity
Maryam Rahmani
Elham Shirali
Maryam Mary Azadbakht

Purpose:

Placenta accreta spectrum (PAS) disorders are quite challenging for the purpose of diagnosis and treatment. Timely diagnosis is of great importance, as maternal and fetal mortality drastically increases if patients go through the third phase of delivery in not well-suited

facilities. Imaging evaluation is the mainstay to diagnose PAS disorders antenatally. Herewith, we review the recommended imaging approaches, as well as reported US and MRI features of PAS disorders. We also represent some interesting and challenging cases of PAS imaging in first and second trimester.

Imaging Findings:

Imaging in normal non-invasive placentation, ultrasound findings in PAS (including placenta previa, focal exophytic mass, multiple placental lacunae, loss of the retroplacental clear space, myometrial thinning, bladder wall abnormalities, and abnormal Doppler imaging patterns) will all be shortly and concisely discussed. Reported conventional and functional MRI, and DWI features of PAS (including abnormal uterine/placental bulge, placental heterogenicity, focal placental mass, bladder wall abnormalities, dark T2 band, irregular placental-myometrial interface, myometrial thinning, and abnormal uteroplacental vascularity) will be briefly reviewed as well. For each case, we touch on potential pitfalls in imaging and reported figures and stats of any feature for diagnosing PAS. Imaging role in diagnosing PAS in first trimester, along with cesarean section pregnancy will also be overviewed.

Discussion:

Neither pathology nor imaging (US or MRI) findings of PAS in isolation are not very strong, independent, and confident to predict PAS. Both pathology and radiology may bring about false negative or positive results, and none of them are capable of predicting the depth of abnormal placentation confidently.

Conclusion:

A multidisciplinary approach considering clinical risk factors, imaging features, and pathological findings should make the diagnosis. With all these being said, diagnosing PAS is challenging and postoperative complications are quite common, even in facilities with a high level of expertise in managing PAS disorders.

EVALUATION OF STEREOTACTIC BODY RADIATION THERAPY AND RADIOFREQUENCY ABLATION IN PATIENTS WITH LIVER NEOPLASMS: A SYSTEMATIC REVIEW

Hamid Reihani*
Shiraz University of Medical Sciences
hmid.reihani@gmail.com
Pouya Saraei

Background:

Today, liver cancer is the 4th most common cause of death. The most effective treatment for liver cancer is surgical resection and liver transplantation, but a significant number of patients do not meet the criteria for surgery, unfortunately. Radiofrequency Ablation (RFA) and Stereotactic Body Radiation Therapy (SBRT) are two of the most well-known alternative therapies. The aim of this review is to compare these two treatments in terms of local control (LC), overall survival (OS) and side effects to make better clinical decisions for treating liver cancer patients.

Methods:

This study is a systematic review based on articles, books and studies available in scientific databases such as MEDLINE, PubMed, Scopus, Google Scholar, Cochrane Library, Web of Science and EMBASE.

Results:

Ultimately, 17 studies with a total of 3760 participants (SBRT= 1366 and RFA= 2424, some patients were excluded from the studies) were included in our systematic review according to the eligibility criteria. The mean age of SBRT and RFA patients was 67.7 and 66.3 years respectively, and the follow-up of these patients was between 13 to 50.3 months. The mean LC across studies in SBRT and RFA was 93.7% and 81.86% for the first year. Also, the mean OS in SBRT and RFA was 80.3% and 81.2%, respectively.

Conclusion:

Based on the studies, there was no significant difference between SBRT and RFA in terms of LC and OS. Although in certain cases, such as deep tumors,

the proximity of the tumor to blood vessels or bile ducts, diameter more than 3 cm, tumors in the sub phrenic region or in older patients due to the inability to retain breath during RFA, SBRT is considered a better and smarter choice.

Keywords:

Stereotactic body radiotherapy, Radiosurgery, Radiofrequency Ablation, Liver Neoplasms, Hepatocellular carcinoma.

REVIEW OF INTERNAL HERNIA AS A DIAGNOSTIC CHALLENGE AND PROBLEM

Jahanbakhsh Hashemi*
Professor of Radiology, Mashhad University of Medical Sciences
jahanbakhshhashemi@gmail.com

Review of internal hernia as a diagnostic challenge and problem:

Internal hernias are not common pathologies, but it should be in differential diagnosis of any case presented with intestinal obstruction symptoms. We should always bear in mind that ischemia and strangulation of the affected loops could be arise. Imaging modality such as MDCT plays an important role in the diagnosis of internal hernias, particularly high resolution Multiplanar Reformatted images (MPR).

MDCT is usually the first line in imaging diagnostic techniques.

The main purpose of this paper is to describe the characteristics of anatomical location and CT findings of important types of abdominal and pelvic internal hernias such as paraduodenal, foramen Winslow, pericecal, sigmoid-mesocolon, and supravesical hernias.

In this article we review CT findings of 15 cases with different types of internal abdominal hernias and illustrate the imaging findings of internal hernias, focusing on CT imaging features.

We mentioned that it is very important for radiologists to be familiar with various types of internal hernias, to know their CT imaging features and accordingly prompt to make an accurate diagnosis.

ASSESSMENT OF INTESTINAL OBSTRUCTION USING VARIOUS IMAGING MODALITIES

Ali Vafadar*
Department of Medical Physics, Faculty of Medical Sciences, Tarbiat Modares University, Tehran, Iran
Samaneh Hassanpour
Mahdi Mansoori Kia
Farshid Seifzadeh
Hessam Nouralizad

Background:

Bowel obstruction (BO) happens when the lumen of the bowel is blocked leading to proximal dilatation and distal collapse. Causes either functional or mechanical are classified into complete and partial obstruction in small or large intestines [1]. Outstanding clinical features usually include pain, vomiting, constipation, and abdominal distention. High morbidity and mortality in uncontrolled cases indicate the importance of early diagnosis [2]. Abdominal imaging can help physicians to verify the diagnosis, and commence the treatment as soon as possible [3]. The purpose of the current study is to compare and evaluate the application of imaging modalities such as plain radiography, computed tomography (CT), and magnetic resonance imaging (MRI) in diagnosing BO.

Methods:

"PubMed", "ScienceDirect", and "Google Scholar" scientific databases were scanned to obtain valid and relevant articles to our subject, then the most relevant articles to the topic were selected and summarized.

Results:

Plain radiography is widely recognized as the least helpful imaging modality for the diagnosis of BO, and it is difficult to determine the exact location and cause of obstruction using it[4-6]. However, abdominal radiography serves as an initial imaging study in patients to evaluate BO[7]. CT is an accurate modality and particularly is capable of ascertaining the level and cause of obstruction [8, 9]. Based on the studies reviewed, fast MRI was the best and could be used to attain more information despite some restrictions such as high cost and limited accessibility.[10, 11].

Conclusion:

Imaging modalities were found to play a prominent role in diagnosing BO. Among the imaging methods evaluated, MRI and CT, respectively had the highest sensitivity, specificity, and accuracy. These findings suggest that CT or MRI should be applied when the results of plain radiography are insufficient.

Keywords:

Intestinal obstruction, Plain radiography, CT, MRI

NEW RADIOLOGIC SIGNS: SOME DIAGNOSTIC CLUES ON HYSTEROSALPINGOGRAPHY

Firoozeh Ahmadi*

Department of Reproductive Imaging, Reproductive Biomedicine Research Center, Royan Institute for Reproductive Biomedicine, ACECR, Tehran, Iran

Fereshteh Hoseini

Maryam Javam

Fattaneh Pahlavan

There are several well-known diagnostic signs in radiology such as scotty dog, dog ears, moon sign and etc. These signs are resulted from assuming a view of nature pattern; inferior perspectives; on radiography, sonography, CT scan and MRI images. Sometimes, the pathology or abnormality of an organ may present an appearance very similar to a natural pattern in medical images. Some of them are so common and can be considered as a sign of a specific pathology or abnormality, which is a great help for easier diagnosis. Fibroids are one of the most common pathologies that can produce similar and frequent appearances on hysterosalpingography (HSG). After investigating more than 5,000 HSG images collected by Dr. Shahrzad and the Royan Imaging Center, we found some new diagnostic signs which were commonly repeated in hysterograms of infertile women. We try to introduce theses signs in this lecture.

SONOGRAPHIC FEATURES OF INVASIVE FUNGAL DISEASE OF LUNG

Ali Alamdaran*

Mashhad University of Medical Sciences

alamdarana@mums.ac.ir

Background:

The early diagnosis of invasive fungal diseases is important because the therapeutic outcome depends on the prompt initiation of appropriate interventions. In this study, we present the feature of ultrasound of pulmonary fungal infection in six children with leukemia.

Method and Patients:

Between 2020-2021, this cross-sectional study was conducted in the radiology department at Dr. Sheikh Children's Hospital, Mashhad, Iran. During this period, we reviewed imaging findings of fungal lung infections in 12 immunocompromised patients who were referred for chest ultrasound and CT scan. High-resolution computed tomography (HRCT) of patients showed multiple nodular lesions with/without ground-glass opacity (halo sign or reverse halo sign), and wedge-shape consolidations. In some patients, there were thick wall cavitary lesions with intra-cavitary fungus ball and the air-crescent sign. Ultrasound findings of the lung included the target lesion, the cavitary lesion, wedge-shaped consolidation, and extra-pulmonary invasion to the chest wall or sub-diaphragm. The galactomannan test, debridement of para-nasal sinuses and core needle biopsy confirmed fungal infections; Aspergillosis or Mucormycosis.

Conclusion:

The target appearance and invasion to the chest wall are two characteristic features of pulmonary invasive fungal disease on ultrasound.

FEMALE ACUTE PELVIC PAIN IMAGING OF OVARIAN TORSION

Ahmad Soltanishirazi*
Ahvaz Jundishapour Medical Sciences University
dr.a.soltanishirazi@gmail.com

Among the etiology of acute pelvic pain, ovarian torsion due golden time for treatment the early and accurate diagnosis is very important.
TVS with color Doppler is first step of imaging with some specific character of ovaries such as enlargement of size with peripheral location of follicles which have echogenic border and free fluid of culde sac and high end diastolic flow pattern are suggestive of torsion of ovaries.
sometime the torsion is not complete and findings are not straight forward pelvic MRI is the best chose as complimentary imaging for accurate diagnosis of torsion.
within last 2 years we have few cases which are approved with surgery and pathology of ovarian torsion we find some MRI and sonogram specific finding of ovarian images which help up for accurate diagnosis.

ANOMALY SCAN OF FETAL URINARY SYSTEM

Ahmad Soltanishirazi*
Ahvaz Jundishapour Medical Sciences University
dr.a.soltanishirazi@gmail.com

Genitourinary tract malformation is the most common fetal malformation which is identified with anomaly scan of second trimester with incidence of 4 in 1000 pregnancy.
obstructive uropathy is the most and need treatment before delivery and follow up after on for prevention of disease.
prenatal diagnosis improves outcome of affected child with preventing of renal damage and renal failure.
renal number, size, echo level of cortex and AP diameter of renal pelvic evaluated. echogenic enlarged kidneys with normal amniotic fluid or oligohydramnios have multiple etiology with different prognosis and outcome. sonography algorithm of fetal sonogram of urinary system and association of other system anomaly guided the radiologist to diagnosis of disorder and appropriate medical plan.
we introduce modern ultrasound screening program for detecting genitourinary tract abnormality in first, second and third trimester anomaly scan.

ABDOMINAL X RAY INTERPRETATION

Maryam Tavakoli*
North Khorasan University of Medical Sciences
Emad Khoshdel

It is a simple algorithm for interpretation of abdominal X-RAY Magnetic Resonance Elastography of Liver lesion: review Technique and Clinical Applications Many pathological processes cause marked changes in the mechanical properties of tissue.
Magnetic Resonance Elastography (MRE) is a non-invasive MRI based technique for quantitatively assessing the mechanical properties of tissues in vivo. MRE is performed by using a vibration source to generate low frequency mechanical waves in tissue, imaging the propagating waves using a phase contrast MRI technique, and then processing the wave information to generate quantitative images showing mechanical properties such as tissue stiffness. Since its first description in 1995, published studies have explored many potential clinical applications including brain, thyroid, lung, heart, breast, and skeletal muscle imaging. However, the best-documented application to emerge has been the use of MRE to assess liver disease.
Multiple studies have described many potential applications of MRE, from characterizing tumors to detecting diffuse disease processes. Studies have shown that MRE can be successfully implemented to assess abdominal organs.
studies have demonstrated that there is a strong correlation between MRE-measured hepatic stiffness and the stage of fibrosis at histology. The emerging literature indicates that MRE can serve as a safer, less expensive, and potentially more accurate alternative to invasive liver biopsy which is currently the gold standard for diagnosis and staging of liver fibrosis.

The technique essentially involves three steps:

1. generating shear waves in the tissue,
2. acquiring MR images depicting the propagation of the induced shear waves and
3. processing the images of the shear waves to generate quantitative maps of tissue stiffness, called elastograms

This review describes the basic principles, technique of performing a liver MRE, analysis and calculation of stiffness, clinical applications, limitations, and potential future applications.

BREAST MRI: WHAT THE TECHNOLOGIST NEEDS TO KNOW

Maryam Jafari, MD
Shahrzad Dadgari, MD
Effat Sheydaian, BSc
Ghasideh Ravan Bakhsh, BSc

Magnetic resonance imaging (MRI) of the breast is a valuable and sensitive tool for the early detection of breast cancer, breast cancer screening, and problem-solving modality in special cases, along with the assessment of silicone implant integrity. The high sensitivity of MRI for breast cancer detection leads to the increasing use of breast MRI for pre-operative and pre-neo adjuvant chemotherapy assessment and post-treatment evaluation and breast cancer screening in high-risk patients and dense breast tissue. In this topic, we will review the breast MRI technique and the new protocols for abbreviated breast MRI.

The standard MRI protocol includes T2 and T1 sequences (anatomy and signal analysis), post-contrast-enhanced dynamic images as well as 3D sequences are mainly useful for the localization of the lesions.

Common artifacts usually seen at breast MRI are including motion artifacts, suboptimal fat suppression, chemical shift, metallic susceptibility, phase wrap and radiofrequency noise. Proper positioning of the breast coils is necessary to limit a number of artifacts. Correct breast positioning is important and is obtained by using foam wedges for small-sized breasts, assuring there is no folding and the right position of both nipples. These aspects restrict motion artifacts that change the subtraction sequences.

The patient should be comfortable and her arms could be positioned above the head to restrict aliasing and phase encoding artifacts.

PATIENT DOSE MANAGEMENT IN COMPUTED TOMOGRAPHY PRACTICAL APPROACH*

Masoud Sadrnia
Hossein Farahnak
hossein.farahnak@gmail.com

Computed Tomography (CT) examinations have rapidly increased in number over the last few years due to recent advances such as the spiral, MDCT, CT fluoroscopy , Coronary CTA and spectral CT. Due to the potential of ionizing radiation and its long-term effects, managing and reducing the dose of patients is very important.And this is especially important in children and procedures that are increasing, as well as coronary CTA because of by the use of modern CT scaner can greatly reduce patient exposure.

The purpose of this article is to

1- describe the importance of educating radiology personnel, patients, and referring clinicians about the concerns over CT radiation
2- describe commonly used CT parameters and radiation units
3- Comparison and expression of dose reduction methods in different CT machin
4- describe specific CT techniques to minimize radiation while providing diagnostic examinations.
5- Describe how to reduce the dose in children and coronary CTA

Keywords:
Computed Tomography, Dose Reduction, Radiation Dose, Iterative Reconstruction

LOW DOSE OCCUPATIONAL EXPOSURE AND THE RISK OF TRANS-GENERATIONAL RADIATION INDUCED GENOME INSTABILITY

Hossein Mozdarani, Ph.D
Department of Medical Genetics, Faculty of Medical Sciences, Tarbiat Modares University, Tehran, Iran.
mozdarah@modares.ac.ir

Abstract:

Ionizing radiation has been considered as a potent mutagen after Muller's' Drosophila experiments and verification of his findings by Russell and Russell on mammalian system with mega- mouse project.
These experiments and related findings led to reduction of maximum permissible dose set for radiation workers and general population. Nowadays we know that ionizing radiation damage DNA directly or indirectly. The consequences of DNA damage might be cell death, carcinogenesis, ill health, genetic disease and even infertility. Although the nature of all cellular damages is genetic, no matter the exposed cell is somatic or germ cell, but we consider genetic effect of radiation only when the germ cells and reproductive system is exposed to radiation. The aim of this study was to show that genetic damages induced in germ cells might be transmitted to the next generation, but there is apossibility to prevent the extent of transgenerational genome instability. To do this various groups of male and female mice were exposed to gamma radiation in the presence of vitamins as antioxidants.
Male and female mice were mated in weekly intervals and three days after conception and verification of conception, oviducts of mice were excised and 4-8 cell preimplantation embryos were retrieved for chromosomal or micronucleus study. Pre-embryos were fixed on slides and the frequency of chromosomal aberrations and micronuclei was scored for each group under light microscope. Results indicated a high frequency of either chromosomal abnormality or micronuclei in embryos retrieved from irradiated female mice. Pretreatment of female mice with vitamins C and E led to reduction of chromosomal abnormalities or micronuclei in preimplantation embryos. Irradiation of male mice led to increased frequency of abnormal pre-embryos in all spermatogenic cycles. Presence of vitamins led to reduced frequency of transgenerational genetic damage. In conclusion, this study has clearly shown that genetic damages induced in male or female reproductive system might pass to the next generation and using antioxidants might help to reduce the possibility of radiation induced transgenerational genetic damage to the next generation. Moreover, it is important to keep the genetically significant dose (GSD) of general population as low as possible to prevent consequences of radiation induced genetic damages in next generation.

Keywords:

Low Dose Ionizing Radiation, Genetic Effects, Transgenerational Genetic Damages, Pre-embryos, Chromosomal Abnormality, Micronuclei, Antioxidants

WHAT WE NEED FOR BREAST IMAGING IN RADIATION ONCOLOGY

Ali Shabestani Monfared
Professor of Medical Physics Radiotherapy Physicist
Babol University of Medical Sciences

Breast cancer is the most common cancer between women in the world. Almost all breast cancer cases need radiation therapy alone or in combination with other types of treatment modalities. Computed tomography is almost unique imaging modality for treatment planning in radiation therapy. This article shows What We Need for Breast
CT in Radiation Oncology which is different from what we do in practice of non-cancer cases imaging for thorax CT. It is important to know that, because it prevents repeat/ retake imaging and/or reducing treatment planning efficacy/accuracy for breast cancer patients.

ASSESSMENT OF HEMORRHAGE IN BRAIN MRI

Navid Sarmast Alizadeh, M.Sc.
M.Sc. of Medical Imaging, MRI High-Tech Department, Pars Hospital, Thran, Iran, Imam Khomeini Hospital's Medical Imaging Center, Tehran University of Medical Sciences
alizadeh4949@gmail.com

Hemorrhage on MRI has highly variable imaging characteristics that depend on both the age of the blood, the type of hemoglobin present (oxy- deoxy- or met-), on whether or not the red blood cell walls are intact and the specifics of the MRI sequence. The factors that affect the appearance of hemorrhage on MRI vary according to the sequence. The oxygenation state of hemoglobin and the location of either contained within red blood cells or diffused in the extracellular space have a tremendous effect on the imaging effects of blood. The three hemoglobin states to be considered are oxyhemoglobin, deoxyhemoglobin and methemoglobin. Oxyhemoglobin, accounting for 95% of hemoglobin in arterial blood and 70% in venous blood, is only weakly diamagnetic, having little T2* and only mildly shortening T1 relaxation time. This is the result of heme iron is in ferrous form (Fe^{2+}) and has no unpaired electrons. Deoxyhemoglobin, in contrast, is strongly paramagnetic and results in substantial signal loss on T2* weighted sequences, such as susceptibility weighted imaging, and blooming artefact.

Methemoglobin results from oxidative denaturation of the heme molecule to the ferric (Fe^{3+}) form, strongly paramagnetic .Oxyhemoglobin and deoxyhemoglobin produce little effect on T1 signal. The presence of blood proteins results in intermediate T1 signal in hyperacute and acute hemorrhages. T2* weighted sequences, such as susceptibility weighted imaging and gradient echo are primarily affected by the hemoglobin oxygenation state and whether or not cell lysis has occurred.

While contained within red blood cells, resulting in uneven distribution of paramagnetic effects, both deoxyhemoglobin and methemoglobin result in signal loss. Once the cells lyse and methemoglobin is distributed evenly throughout the clot, the local magnetic field distortion is also lost and T2 signal loss fades.

Eventually, hemosiderin and ferritin (both paramagnetic) are then ingested by monocytes and macrophages and results once more in unevenly distributed paramagnetic effects and signal loss. In general, five stages of hematoma evolution are recognized: hyperacute (<1 day), acute (1 to 3 days), early subacute (3 to 7 days), late subacute (7 to 14-28 days), chronic (>14-28 days).Remembering these may be facilitated by this aging blood on MRI mnemonic.

TIME-RESOLVED, CONTRAST-ENHANCED MR ANGIOGRAPHY- A REVIEW ON PRINCIPLES AND CLINICAL APPLICATIONS

Fariborz Faeghi
Associate Prof. of Medical Physics,Clinical MRI Physicist, School of Allied Medical Sciences, Shahid Beheshti University of Medical Sciences, Tehran, Iran
Email: f_faeghi@sbmu.ac.ir
Faranak Faeghi

Abstract:

Improvements in gradient performance and novel image acquisition techniques have greatly accelerated MR image acquisition. Until recently, these improvements have been used mainly for increasing the spatial resolution of MR angiography techniques and procedures. High spatial resolution is often necessary for the confident visualization of smaller vessels, grading of arterial stenoses and proper identification of more subtle vascular pathologies such as penetrating ulcers.

Early on, there also was interest in the development of time-resolved techniques to allow visualization of the temporal passage of the contrast bolus through a targeted vascular system.

Until recently, time resolved imaging has primarily been available using two- dimensional (2D) pulse sequences for limited planar or "projectional" viewing. However, with the advent of ultrafast gradients (slew rates of faster than 100 T/m/s for "sub-second" 3D CE MRA) and alternative k space schemes (e.g. Time Resolved Imaging with Contrast Kinetics or TRICKS), time-resolved imaging can now be achieved using three-dimensional (3D) MRA, for "4D" or time-resolved volumetric dynamic evaluations. Here we will explore some of the available techniques for time-resolved MRA and will highlight clinical scenarios in which high temporal resolution imaging can improve

the diagnostic value for an MRA exam. Time-resolved imaging is a particularly helpful tool for multi-station MRA exams, identification of flow patterns associated with certain vascular pathologies and arterial-venous segmentation of complex vascular malformations or arrangements.

Keywords:

CE MRA, Time Resolved, TRICKS

ADRENAL GLANDS CT IMAGING IMAGING TECHNIQUE AND CHARACTERIZATION OF ADRENAL LESIONS

Javad Ghasemi
BS,RT (R), Clinical Education & Application Specialist of CT Scan

Adrenal glands can be affected by a variety of lesions. Adrenal lesions can either be primary, of adrenal origin, or secondary to other pathologies.
Functioning adrenal lesions can also give clues to the histologic diagnosis and direct workup. Over the years, various imaging techniques have been developed that have increased diagnostic accuracy and helped in better characterization of adrenal lesions non-invasively. This article reviewing adrenal CT imaging techniques and others imaging procedures such MRI, US and NM, and characterization of Adrenal Lesions. Whether an adrenal mass is identified serendipitously or is being imaged for further characterization, there are several CT findings that contribute to the diagnosis, such as lesion size, level of enhancement at imaging phase (NECT, Portal, and delay) percentage washout on delayed images, histogram analysis. Washout values would help to further distinguish adenomas from malignant lesions. Enhancement washout percentages for these masses are calculated. The absolute percentage enhancement washout can be calculated by measuring the enhanced attenuation, the delayed enhanced, and the unenhanced values. AEW (Absolute enhancement washout), REW (Relative enhancement washout) are two index for better diagnosis and characterization of Adrenal lesion.

Keywords:

Adrenal Glands, CT Imaging, Adrenal Lesions, Enhancement Washout, AEW, REW.

ORTHOPEDIC MEASUREMENTS IN COMPUTED TOMOGRAPHY

Mohamadhosein Asemanrafat
BSc of Radiology Technology, MSc of Medical Imaging Technology
Shiraz University of Medical Sciences

Computed Tomography is One of the most advanced medical imaging modalities that is extensively used for orthopedic procedures evaluations.
Many capabilities like MPR, MIP and VR make CT a versatile device to both physicians and technologists to widely make use of these features to evaluate bony structures and perform any measurements based of digital essence of CT. Skeletal disorders is one of the greatest concerns for orthopedic surgeons in view of both diagnosis and planning for treatment. CT regarding its fast workflow, accuracy and precision is highly applicable in these cases. Many of most common skeletal disorders like Femoral Anteversion, Tibial Torsion, TTTG, Patellar Tilt, Glenoid Version, Limb Length Discrepancy and Cobb Angle are accurately measured in CT.

SY MRI

Mohsen Shojae Moghadam, Msc
Shojae.mohsen@gmail.com

SyntheticMR's unique technology measures the absolute properties of the brain and delivers synthetic contrast weighted images, tissue segmentations and parametric maps of the patient.
Using this data, SyMRI synthetically recreates 8 different contrast weighted images, which are fully adjustable for any combination of TE, TR and TI. This gives the radiologist increased flexibility to choose the contrast weighting of their choice, while reducing the risk of recall for the patient.
SyMRI also delivers automatic tissue segmentation and volumetric measurements of the patient. The

additional information allow clinicians to make a diagnosis, follow disease progression and track therapy efficacy with greater confidence.

Keywords:

Synthetic MRI, Parametric Maps, Tissue Segmentation

NEW ADVANCED QUANTITATIVE METHODS IN ABDOMINAL MAGNETIC RESONANCE IMAGING

Vahid Shahmaei

MRI Clinical physicist / Medical Imaging MSc

Shahid Behesthi University of Medical Sciences

Quantitative magnetic resonance (MR) imaging is a fundamentally different paradigm compared with other MR imaging techniques as they are typically employed in the clinic. quantitative MR imaging makes use of MR imaging parameters for evaluation anddetermination of fundamental biologic properties of tissue. Quantitative MR imaging has found numerous applications in abdominal imaging, including the potential for differentiating benign versus malignant focal lesions, quantifying depositional disease in the solid visceral organs noninvasively (such as iron in the case of hemochromatosis), evaluating diffuse liver disease such as fibrosis and cirrhosis, and others diseases. A brief review of pulse sequences is as follow:
DWI is a promising imaging technique to evaluate abdominal tumors. This technique can be used for pretreatment tumor detection, characterization including predicting tumor response to therapy, monitoring tumor response during therapy, and follow-up study after treatment to detect possible tumor recurrence. Quantitative tumor assessment is possible by calculating ADC after performing DW.
Liver MR Elastography (MRE) is a noninvasive method for diagnosing fibrosis that has been developed over the last decade in response to the limitations of liver biopsies, blood markers, and traditional imaging modalities. Parameters derived from MRE including Liver stiffness is typically assessed by quantitative analysis by drawing regions of interest (ROI's) in the elastograms.
Intracellular fat accumulation is common feature of liver disease. Intracellular fat (steatosis) is the histological hallmark of non-alcoholic fatty liver disease (NAFLD) but also may occur with alcohol abuse, viral hepatitis, HIV and genetic lipodystrophies, and chemotherapy. With current limitation of non-targeted biopsy in diffuse liver disease, quantitative non-invasive biomarkers of liver fat would be beneficial. A MRI-based iron quantification pulse sequences can be used to accurately quantify hepatic fat deposition.
Liver iron overload is the histological hallmark of hereditary hemochromatosis can also occur in chronic hepatopathies. MRI is widely recognized as the primary approach to non-invasively determine liver iron concentration (LIC). Relaxometry is the quantitative evaluation of the MRI signal loss due to the predominant shortening of the T2 and moreover the T2* relaxation times.
In area of chronic liver diseases, Chemical exchange saturation transfer (CEST) represents a novel MRI contrast mechanism. CEST MRI has the advantage of high specificity to certain low-concentration biochemistry components such as protein and glycogen and have benefits over conventional biopsy.
Dynamic contrast enhanced (DCE) MRI acquisitions is providing a new opportunity to explore the routine use of quantitative perfusion imaging for evaluation of a variety of abdominal diseases in clinical practic by providing quantitative and semiquantitative measurements of tissues blood flow. Most clinical applications of perfusion imaging in the abdomen to date have focused on the evaluation of the renal function and cancer.
This workshop focuses on the aforementioned fundamental quantitative MR imaging parameters and their physical principles, review common and advanced pulse sequences employed in their derivation, image processing and analysis and also review some of their current applications in abdominal imaging, will be discussed.

STRESS CMR EVALUATION AND DIFFERENTIATION BETWEEN ISCHEMIC, INFRACTED, HYPERNATE AND NORMAL MYOCARDIUM BY USING T1 MAPPING IN BOTH REST AND STRESS PHASE INDUCED BY ADENOSINE

Ali mohammadzadeh, MD
Iran: mralimohammadzadeh@yahoo.com
Golnaz Houshmand, MD
Hasan Fatehi

Abstract:

Stress T1 mapping is considered as a new novel method for evaluation of myocardial ischemic in stress phase with no need to use Gadolinium.
This method is based on any change in parameter of T1 mapping in stress phase in comparison to rest phase only.
In fact, T1 mapping is a new novel method which is usable in the myocardium to evaluate any under lying myocardial disorder including edema and interstitial fibrosis.
By using T1 mapping sequences in stress VS rest phase, we are able to measure T1 value of myocardial segments in normal, ischemic and infracted areas without use of Gadolinium.
In this study, our aim is to perform T1 reactivity in myocardial ischemic patients and to compare it to ischemic induced by adenosine, evaluation of myocardial scar in myocardial segments and to differentia to normal ischemic, infracted and hyber noted myocardium based on T1 reactivity.

Keywords:

Stress CMR, Adenosine. T1 Mapping.

CT DOSE MANAGEMENT AND RELATED CANCER RISK ESTIMATION DURING THE COVID 19 OUTBREAK

Mostafa Robatjazi
Department of Medical Physics and Radiological Sciences, Sabzevar University of Medical Sciences, Sabzevar, Iran.
Robatjazim@medsab.ac.ir
Mahdis Moayed

Abstract:

Over the last 2 Years , there has been a dramatic increase in using of chest CT scan examinations because of their ability to detect COVID- which led to an increase in radiation exposure in the population. This study aimed to evaluate the dosimetric values and estimate the incidence of lung and breast cancer risk for the patients who underwent CT scans in diagnosing COVID-19. About 500 patients who underwent chest CT examination in three referral COVID-19 centers were involved in this study. The CTDIvol and DLP were extracted from scanner reported values. The geometric Size-specific dose estimates (gSSDE), water equivalent wSSDE, and effective dose were calculated for each patient based on the reported conversion factors in task group report 204, and 96 of the American Association of Physicists in Medicine (AAPM). The SSDE which was considered as organ-specific dose was used for cancer risk estimation based on BEIR VII models. The excessive related risk (ERR), excessive absolute risk (EAR), and Life attributable risk (LAR) were calculated for each patient at attained ages of 5,10,20, and 30 Years after exposure age. The mean age of the conducted people in this study was about 47.5±18 years old. The mean value of the CTDIvol was about 8.73± 4.61 mGy and by considering the geometric and water equivalent effective diameters, the gSSDE was 12.60± 6.9 mGy and wSSDE was about 16.80± 10.76. The mean value of DLP was about 274.7± 126.8 mGy-cm and the mean effective dose was about 3.85± 1.77 mSv. Based on the results of cancer risk estimation the ERR values decreased with increasing the attained age, while by increasing the attained age the EAR value increased. The lung cancer LAR value was 16.7± 10 and the breast cancer LAR value for the females was about 12.8± 8 per 105 people. The results of our study showed that the CTDIvol should be converted

to SSDE by conversion factors to estimate the real dose of the patients, because of various patient body sizes. The lung and breast cancer risk incidence in females is more than in males. Despite the increasing of chest CT examinations due to COVID-19 diagnosis, the estimated EAR and ERR showed here would be no considerable increment in the cancer incidence. Nevertheless, optimization of CT scan protocols is mandatory to reach the ALARA goals.

Keywords:

Size Specific Dose Estimation, Cancer Incidence, CTDI, DLP, Effective Dose

CLINICAL APPLICATION OF ADVANCED MRI TECHNIQUES IN FEMALE PELVIC STUDY

Mahrooz Malek, MD
Tehran University of Medical Sciences
Maryam Farsi, BSc.

MRI of the female pelvic has become an important adjunct to transvaginal ultrasound and is even considered the gold standard imaging modality for benign and malignant gynecological disease. Given its excellent soft tissue contrast capability, MR imaging not only can define the anatomy and extent of local tumor invasion, but also can image entire pelvic for evaluation of broader extent of disease.
Developments in functional MRI such as diffusion_ weighted imaging (DWI), dynamic contrast enhanced (DCE) and other special techniques include susceptibility-weighted imaging (SWI), intravoxel incoherent motion (IVIM), diffusion kurtosis imaging(DKI),….have led to the incorporation of these advanced imaging sequences within a typical female pelvic MRI imaging protocol.
DWI allows for the qualitative analysis of diffusion of water molecules in tissue, reflecting tissue cellularity.
DCE MR imaging augments morphologic lesion characterization, discrimination of tumor recurrence from post-therapy changes, and evaluation of tumor response.
SWI detect the sequela of hemorrhage to diagnose endometriosis or adenomyosis
DKI is an advanced DWI technique which can potentially provide better microstructural characterization of tumor tissue.
IVIM provides simultaneous information on tissue or tumor cellularity and perfusion; with that it offers promising clinical applications in diagnosis, disease stratification, and treatment response assessment
An accurate patient diagnosis depends not only on high image resolution and radiologist expertise but also on the management of image.

SCREENING MAMMOGRAPHY WITH ADDITIONAL VIEWS

Nasrin Ahmadinejad, MD*
Advanced Diagnostic Interventional Radiology Research Center (ADIR), Tehran University of Medical Science, Tehran, Iran
n_ahmadinejad@yahoo.com
Soheila Koopaee, MS
Department of Medical Physics and Biomedical Engineering, School of Medicine, Tehran University of Medical Science, Tehran, Iran

Introduction:

Breast cancer is the most common type of cancer in world. Most women diagnosed with breast cancer are over the age of 50, but younger women can also get breast cancer. About 1 in 8 women are diagnosed with breast cancer during their lifetime. There is a good chance of recovery if it is detected at an early stage. So breast cancer screening is a promising way to achieve this goal. Breast cancer screening means checking woman's breasts for cancer before there are signs or symptoms of the disease. Screening mammography is a well-known tool of breast screening in women aged 40 and upper. The ability of mammography to demonstrate micro calcification smaller than 100 µm and reveal lesions before they become palpable make it a promising screening toll in most women.

Case presentations:

The routine mammography includes 2-view mammogram, craniocoudal (CC) and mediolateral oblique (MLO). With this 2-view the most part of breast tissue will be imaged. In some cases, according to the patient habitus some part of breast tissue will be missed in routine 2-view mammography or for more and better evaluation of suspicious findings which are seen in routine mammography, additional

views of mammography will be needed. Additional views of mammography varied based on the need of radiologists and the status of patients. As a technologist, the knowledge about the views and how to perform them in a correct wat are critical.

Conclusion:

The goal of this presentation is to introduce these additional views to technologists and teaching how to perform them in an optimum way. Optimum way means as low as absorbed dose in patients and imaging the most breast tissue.

Keywords:

Breast Cancer, Mammography, Screening

OPTIMIZATION OF MAMMOGRAPHY IMAGE IN CONVENTIONAL AND DIGITAL MAMMOGRAPHY DEVICE IN THE CONDITIONS USED BY THE DEVICE IN TABRIZ

Mahdi Khalilneghad*
Tabriz University of Medical Sciences
mahdi.radiology92@gmail.com

Purpose:

Many breast cancers can be diagnosed by physical examination (self-examination) and microscopic examination (biopsy and pathology tests). But other breast cancers are not easily identifiable and require specialized laboratory and imaging techniques to diagnose them. These tests may vary depending on the type and location of cancer, as well as its severity. Mammography is used to diagnose and screen breast cancer in the early stages of the disease, and early detection of this disease increases the life expectancy of patients. However, due to the risk of radiation, the widespread use of mammography for breast cancer screening is controversial. This study aimed to optimize mammography images in conventional and digital mammography devices in the conditions used by the devices in Tabriz, to evaluate the average and compare breast doses in 2020 on mammography centers in this city. Considering that the main concern in mammography imaging is the dose of patients and the quality of the image and determining the conditions for taking the image with the lowest dose and at the same time appropriate quality, the aim of this study is.

Material and Methods:

In this study, three mammographic devices were tested for quality control recommended by the protocols of the Atomic Energy Organization. After confirming the device in terms of quality control, data on 322 patients who were referred to four centers for mammography during four months were collected and analyzed. Then, the mean dose values of mammary glands for each mammography test were calculated in mGy and the mammographic image quality in the conditions used by the devices with ACR phantom and resolution phantom was examined and analyzed.

Results:

In 4 clinics, compressed tissue thickness in conventional mammography device, mean values for CC and MLO were 4.01 ± 0.92 and 4.49 ± 1.63 cm, respectively, and dose values were 1.53 ± 0.58 and 1.58 ± 0.59 mGy, respectively, in digital mammography device. The mean for CC and MLO was 5.8 ± 1.00 and 6.30 ± 1.01 cm, respectively, and the dose values were 2.07. 0.71 and 2.15 ± 0.69 mGy, respectively.

Conclusion:

According to the observed results, the average dose of glands of digital mammography devices is higher than conventional mammography devices. Instead, the quality of images obtained from digital mammography is better than conventional mammography. The difference in image quality with other countries can be attributed to the shorter life of the devices. Due to the absorption dose and image quality, regular quality control measures are recommended to reduce the absorption dose and increase the image quality.

Keywords:

Optimization, Mammography Images, Conventional Mammography, Digital Mammography, Breast Cancer.

LIFETIME ATTRIBUTABLE BREAST CANCER RISK RELATED TO LUNG CT SCAN IN WOMEN WITH COVID19

Atefeh Tahmasebzadeh*
Iran University of Medical Sciences
tahmasebzade@gmail.com

Reza Paydar

Purpose:

Evaluating effective and organ radiation doses and

also lifetime attributable risk (LAR) of breast cancer from lung CT scans for 235(20–50 years) female patients with Covid19 surveyed from a Corona center hospital in Tehran, Iran.

Materials and methods:

Patients' data and exposure information were extracted from dose report pages in picture archiving and communication systems. They were divided into six age groups 20-25; 25-30; 30-35; 35–40; 40-45 and 45–50years.Effective and breast radiation dose were calculated by NCICT dosimetric software, and LAR of cancer incidence has been evaluated by BEIR VII report.

Results:

The average dose of breast tissue was reported 2.97 mGy and also the average of effective dose was reported 6.2 mSv. Also, the risk of breast cancer in women increased with age and the increasing rate of lung CT scan orders during this period of time increased the risk of breast cancer significantly.

Conclusion:

Although CT scan is a useful instrument in the diagnosis and treatment of Corona disease, but it should be recommended with caution due to the increased risk of breast cancer, especially in younger women.

INVESTIGATION OF ABSORBED DOSE AND ESTIMATION THE RISK OF SECONDARY THYROID CANCER IN WHOLE BRAIN RADIOTHERAPY

Mahtab Ahmadi*
Isfahan University Medical Sciences
m.ahmadi_7511@yahoo.com

Background:

Introduction: After surgery, radiation therapy is the most important part of treating brain tumors. Thyroid cancer is the second most malignancy, as a result of radiation therapy of head and neck. Therefore in Whole-brain radiation therapy, determining the absorption dose of thyroid and the risk of secondary thyroid cancer is important. The aim of this study was to calculate the absorption dose of thyroid and the risk of secondary thyroid cancer, in whole-brain radiation therapy.

Methods:

The study included 50 patients undergoing radiation therapy to the entire brain, with an average age of under 30 years old, in Milad Hospital of Isfahan, using the ONCOR accelerator and 6MV photon. TLD was used to determine the dose received by the thyroid. Then to calculate the risk of secondary thyroid cancer, the method of calculating risk in BEIR VII report and the Suggested quantity of ICRP which means: Excessive relative risk of ERR, was used.

Findings:

The calculated average absorbed dose was 1.976 cGy±0.611 in women and 2.213 cGy±1.041 in men. The average risk of secondary cancer of the thyroid, in women 3, 5, 10, 15and 20 years after whole-brain radiation therapy, was respectively 4.601±1.614, 1.559±0.595,0.176±0.063,0.050±0.018,0.022±0.009. This risk was respectively 3.253±1.721, 1.150±0.516, 0.125±0.066, 0.035±0.019, 0.016±0.008 in men.

Conclusion:

The absorption dose of thyroid is not related to age (P=0/743), but the risk of secondary cancer of the thyroid is associated with sex and is 1.4 times higher in women than men. In addition, by increasing the age after radiation the average risk of induced cancer had a reducing behavior.

EARLY DETECTION OF COGNITIVE DISORDERS USING QSM TECHNIQUE: AT WHAT STAGE DOES IRON DEPOSITION BEGIN?

Farzaneh Nikparast*
Mashhad University of Medical Sciences
nikparastf@yahoo.com

Hoda Zare

Shabnam Niroomand

Background:

Iron deposition plays a vital role in damaging neurons and causing different cognitive disorders, which can be assessed using the QSM technique.

Objective:

This research aims to introduce biomarkers for the early detection of cognitive disorders.

Methods:

35 normal cognition participants and 46 patients with cognitive disorders were scanned by a 3T MRI scanner. QSM processing and statistical analysis were performed in these groups' MRI images.

Results:

in the EMCI group, The QSM value of the bilateral thalamus($P<0.05$) and left amygdala ($P=0.006$) nuclei were higher than the control group.
There was also a positive relationship between increased cognitive impairment and QSM values in the left putamen nucleus ($P<0.05$) in the LMCI group.

Conclusion:

The left amygdala and bilateral thalamic nuclei are the first areas exposed to iron deposition during cognitive impairment.
QSM values of the left putamen nucleus can monitor iron deposition changes in advanced stages of cognitive impairment.

INVESTIGATION OF THE MITIGATION EFFECT OF SPIRULINA AGAINST ON RAT'S HEART TISSUES

Mohammad Hootan Ahmadvand*
Tehran University of Medical Sciences
hootanahmadvand@yahoo.com
Safoora Nikzad
Fatemeh Mirzaei
Payam Hashemi

Background:

Breast cancer, Hodgkin's disease, and pediatric malignancies are all treated with radiation therapy, which exposes the heart to high local radiation doses, increasing the risk of cardiovascular disease in survivors' decades later. This study aimed was to examine the mitigation efficiency of Spirulina compared to the effect of Metformin.

Materials and Methods:

25 male Wistar rats were allotted into five groups: control, Spirulina, Radiation, Radiation plus Spirulina, Radiation plus Metformin. Irradiation (15 Gy to chest) was performed using a LINAC. Forty-eight hours after irradiation, drug solutions were administered to rats by gavage at a dose of 300 mg/kg and 100 mg/kg in 1 mL daily for a total of 30 days for Spirulina and Metformin, respectively. After 10 weeks, all of the rats were euthanized, and their heart tissues were collected for histological examination.

Results:

the qualitative evaluation of heart tissue indicated that Irradiation caused irregularities in the arrangement of myofibrils, and the most significant modifications included the proliferation and migration of mononuclear cells, vacuolation of the cytoplasm, congestion, and, to a lesser extent, rupture of muscle fascicles in the radiation group. The histopathology of the spirulina-receiving group was not significantly different from that of the control group, but a comparison of the two groups receiving radiation plus spirulina versus metformin plus radiation revealed that metformin was more effective, so the radiation-induced congestion in the spirulina plus radiation group was still severe.

Conclusion:

Spirulina had no effect on radiation-induced cardiac damage, while metformin did. Higher Spirulina doses given over a longer period of time will likely have a greater heart-mitigate effect.

FEASIBILITY EVALUATION OF SYNTHETIC DIFFUSION-WEIGHTED MRI IN PATIENTS WITH BRAIN TUMOR IN COMPARISON WITH CONVENTIONAL DIFFUSION-WEIGHTED MRI

Vahid Shahmaei*
Shahid Beheshti University of Medical Sciences
vahidshahmaei.sbmu@gmail.com
Forough Sodaei

Background:

Feasibility evaluation of Synthetic Diffusion-Weighted MRI in Patients with brain tumor in Comparison with Conventional Diffusion-Weighted MRI
Background In the past few years, the use of Diffusion-Weighted Imaging (DWI) for disease detection and characterization has increased substantially. DWI can probe tissue cellularity, microstructures, and microvasculature at a sub-voxel level, all of which are of great importance to brain tumors. Hence, developing various diffusion models become more critical. Although the image quality of DWI and Apparent Diffusion Coefficient (ADC) maps is affected by b-value selection, the optimal b-value in cancer imaging remains debatable. A large b-value (> 1000 s/mm2) reflects stronger diffusion-weighting, which suppresses normal tissue and enables better detection of lesions. However, the limitations of DWI using a high b-value include long acquisition time and low signal-to-noise ratios (SNRs) due to requirement of longer echo times (TEs) and artifacts such as eddy current-induced distortions. A new model synthetic DWI (sDWI) is mathematically derived from directly acquired DWI with at least two different b-values. This approach may overcome the limitations of conventional DWI (cDWI) by achieving background suppression of a very high b-value DWI without additional acquisition scan time. To date, few studies have focused on sDWI application in brain tumor imaging. Therefore, this study aimed to evaluate the clinical feasibility of sDWI at different b-values in patients with brain tumor by qualitative and quantitative assessment compared with cDWI.

Materials and methods:

Twenty patients with brain tumor were assessed using cDWI at b-values of 0 ,1000, and 2000 s/mm2 and sDWI at b-values of 2000 s/mm2. Qualitative analysis (overall image quality, and lesion conspicuity) was performed using a 4-point Likert-scale for all DWI sets. We also measured cancer-to-parenchyma contrast ratios for each DWI set in 20 patients with the tumor identified on any of the DWI sets. Statistical comparisons were performed using ANOVA.

Results:

All parameters of qualitative analysis and cancer-to-parenchyma contrast ratios increased with increasing b-values, regardless of the type of imaging method ($p < 0.001$). Additionally, sDWI2000 provided better lesion conspicuity than cDWI1000 (3.52 ± 0.92 vs. 3.39 ± 0.90, $p < 0.05$). Although cDWI2000 showed better normal tissue suppression and overall image quality than sDWI2000 (3.66 ± 0.78 and 3.73 ± 0.62 vs. 3.32 ± 0.90 and 3.35 ± 0.81, respectively; $p < 0.05$), there was no significant difference in their CDR (90.0%). Cancer-to-parenchyma contrast ratios were greater in sDWI2000 than in cDWI2000 (0.63 ± 0.17 vs. 0.55 ± 0.18, $p < 0.001$).

Conclusion:

sDWI2000 can be feasible for evaluating brain tumors in clinical practice. It provides higher tumor conspicuity, better cancer-to-parenchyma contrast ratio, and comparable CDR when compared with cDWI1500.

INTRODUCTION TO ELECTRICAL PROPERTIES TOMOGRAPHY: A NEW MR-BASED METHOD

Vahid Shahmaei*
Shahid Beheshti University of Medical Sciences
vahidshahmaei.sbmu@gmail.com
Forough Sodaei

Background:

The electrical properties (EPs; conductivity and permittivity) of tissue have the potential to be used as biomarkers in many clinical applications since they vary as a function of the relative intracellular and

extracellular fluid volumes and ionic concentrations, and the cellular membrane extent in the tissue, respectively. In EPs, generally attributing to the different water content in neoplastic tissue due to the variation of protein hydration and vascularization, as well as to the membrane permeability, amount of extracellular fluid, packing density and orientation of the malignant cells. At the same time, while in some cases it is impossible to discriminate the malignance from tumors with conventional Magnetic Resonance (MR) techniques, statistically significant EPs differences between cancerous and benign tissues were reported in ex vivo measurements.

These data suggest that development of an imaging modality for mapping electrical properties with a high spatial resolution and high specificity will have a significant impact on detection and diagnosis of cancer, and may thus improve substantially survival rate of cancer patients. In the other hand, real-time and subject-specific EPs imaging is highly desirable for SAR quantification and for the purpose of constraining tissue heating in pulse sequence design in HF-MRI applications. By employing Maxwell's Equations that govern electromagnetic fields, MR based Electrical Properties Tomography (EPT) utilizes measurable RF-coil-induced magnetic fields (B1 fields) in an MRI system to quantitatively reconstruct the local EPs of biological tissues.

The purpose of this study is to review the recent cutting-edge development of EPT, from its basic theories in electromagnetism to the most recent research outcomes and also Challenges for future research are also discussed.

THE EFFECT OF GEOMETRIC PARAMETERS OF LEAD GRID ON DOSIMETRIC CHARACTERISTICS OF EXTERNAL RADIOTHERAPY USING ELECTRON BEAM OF A MEDICAL LINEAR ACCELERATOR

Kamran Entezari*
kam.entezari@gmail.com

Background:

Introduction: Applying electron beam in radiotherapy has the advantage of low skin sparing effect. Increasing energy lead to significant increase in skin dose. Therefore, in electron beam radiotherapy of the tumors under the skin, different types of grids have been used when linac electron beams are used. But suitable grid needs to be designed in a way to enable us to decrease the skin dose while giving uniform high dose to the tumor treatment volume. The goal of this study was to design and examine various electron grids for radiotherapy with 6, 18 MeV electron beams. Dosimetric characteristics were analyzed for five different lead grids with different characteristics having various diameters and shield areas between their holes. The dose distribution of isodose curves were derived with MATLAB software using EDR–2 dosimetric films.

Grid with the 2 cm diameter cavities and 0.4 cm shield between cavities when exposed to 6 MeV electron beam was the most appropriate. Using this grid 100% PDD curves located at 1.25 cm in the open filed (without grid), increased to 1.87 cm. On the other hand using 18 MeV electron beam, the grid with the 2.5 cm diameter cavities 100% PDD isodose curve which was located at the depth of 4.5 cm in the open field increased to 5.4 cm.

In order to decrease the skin dose with electron beam radiotherapy of superficial tumors, which are located under the skin, suitable lead grid can be considered. For this purpose, diameter and area between the holes should be in a suitable range not causing an unsteady dose delivery to tumors and increase the dose delivered to tumors under the skin.

BRAIN MRI TECHNIQUES AND CLINICAL FINDINGS IN PATIENTS WITH COVID-19

Samad Hasani*
Department of Radiology, Faculty of Paramedicine, Tabriz University of Medical Sciences, Tabriz, Iran
samadhasaniagh988@gmail.com
Nahideh Gharehaghaji

Background:

Introduction

Coronavirus in COVID-19 not only involves the human respiratory system but can also spread

from the respiratory system to the central nervous system and causes brain damages and neurological manifestations. Several studies and case reports have reported the findings of the brain MRI in COVID-19 patients using different MRI techniques. This study aimed to review the brain MRI techniques and clinical findings in patients with COVID-19.

Methods:

Literatures search was carried out using scientific databases including; Scopus, PubMed, Web of Science, and Google Scholar. The articles describing brain MRI techniques and clinical findings in patients with COVID-19 were found and reviewed.

Results:

The most applied MRI pulse sequences and techniques for brain MRI in COVID-19 patients included; pre and post-contrast T1-weighted spin-echo, diffusion-weighted imaging (DWI), susceptibility-weighted imaging (SWI), T2-weighted gradient-echo, and post-contrast fluid-attenuated inversion recovery (FLAIR). Different findings of the brain MRI in COVID-19 patients were reported, such as; acute ischemic infarcts, intracranial hemorrhage, parenchymal abnormality attributed to posterior reversible encephalopathy syndrome, and leukoencephalopathy.

Conclusion:

Using appropriate MRI techniques better detects the brain damages caused by the coronavirus. MRI findings of the brain may help radiologists and neurologists to provide potential insight in the case of COVID-19 brain damages.

Keywords:

COVID-19, Brain, Magnetic resonance imaging, MRI techniques, Clinical findings

RADIATION DOSE REDUCTION OF BREAST USING LEAD APRON DURING THE HEAD SCANNING: A COMPUTED TOMOGRAPHY TECHNIQUE

Fatemeh Asghari*
fatemehasghari221@gmail.com

Background:

Computed tomography (CT), which is one of the main routine procedures for diagnosing medical issues produced ionizing radiation. The radiation can have toxicity effects on the organs; therefore, with that in mind, any techniques that cause to reduce the side effects,especially on the sensitive organs, would be considered. The current study aimed to assess the dose reduction effect of lead apron shielding on the breast regions during head CT scanning.

Materials and Methods:

The routine head CT scans were performed in 28 female patients (with a mean age of 51.37 ± 14.52 years). The common lead aprons were folded and positioned in the lung regions to protect the breasts. Breast region doses were measured using six thermoluminescent dosimeters (TLD-100) to assess each patient's lead apron's dose reduction.
Three TLDs were located above the apron and three dosimeters under the apron to calculate the dose reduction. Breast radiation-induced cancer incidence and mortality risks were estimated using BEIR-VII model based on the estimated breast doses with and without apron shielding for all agesof exposures. Finally, the cancer risks and measured doses (with and without the use of the apron) were compared using Paired sample t-Test in SPSS software.

Results:

The statistical analysis showed that the breast dose and radiation-induced cancer risks in the presence of the apron had been reduced significantly (P-value < 0.003). Mean ± standard deviation of the breast dose with the presence of apron and without apron were 0.18 ± 0.06 mGy and 0.49 ± 0.13 mGy, respectively. Althogh all the cancer risks for both groups (with and without apron) were very low, using lead apron can

decrease breast cancer incidence ([1.24±0.32]×10-3 % without apron vs. [0.46±0.15]×10-3 % with apron) and mortality ([0.30±0.08]×10-3 % without apron vs. [0.11±0.04]×10-3 % with apron) about 63% all patients.

Conclusion:

According to the results, wearing lead aprons in the lung region, which are easily accessible in every center, for patients undergoing head CT scans, could significantly reduce the breast doses, cosenquently breast cancer risks. Therefore, using of these shields would be recommended in the breast regions during routine head CT examinations.

Keywords:

Computed tomography, Dose reduction, Head scan, Breast, Lead apron, Thermo luminescence dosimeter

A NEW METHOD FOR ESTIMATING OF PATIENT EFFECTIVE DOSE IN COMPUTED TOMOGRAPHY ANGIOGRAPHY: BASED ON BODY MASS INDEX AND DOSE LENGTH PRODUCT

Mohammad Hossein Jamshidi*

Department of Radiologic Technology, Faculty of Paramedicine, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.

mh_jamshidi@yahoo.com

Background:

Cardiac computed tomography (CT) angiography (CCTA) has emerged as a useful diagnostic imaging modality in the assessment of coronary artery disease. Risks associated with radiation exposure are manifested as either deterministic or stochastic effects. Deterministic effects occur when the radiation dose reaches a threshold dose level. As a result, medical imaging community must ensure that the benefits of radiological examination for each patient are higher than related risks. The aim of this study was to investigate how the introduction of MDCT scanners and patient-size-dependent imaging protocols have affected patient doses.

Materials and Methods:

Demographic data of each patient were recorded as well as data from a CT scan of the CCTA of 49 patients include 28 male and 21 female were studied. The protocol of scan for adult CTA was: kvp=120, Ma= 250 and pitch= 0.5. For calculated organ and effective doses, we used ImPACT software version 1.0.4. The results are analyzed and regression was used in order to examine the relation between the results of the scan data in MATLAB environment.

Results:

The research findings showed that the received dose to most patients is the same as determined by the ICRP103. An average of the effective dose (8.2mSv) was less than the predicted amount by ICRP103. To estimate the effective dose of the body, according to the patient's BMI, an equation was obtained [Effective Dose (mSv) = 0.357 BMI - 0.441] for male and [Effective Dose (mSv) = 0.419 BMI - 0.298] for female. The results from this equation correspond to the calculated dose by Impact (R2>0.95). In addition, the method was proposed to predict the parameters of mAeff and DLP resulting from the related scan. [mAeff (mGy.cm) = 5.03 BMI -18.7 , DLP(mGy.cm) = 19.22 BMI -62.71].

Conclusion:

According to the results of this study, the authors proposed a good alternative to estimate the effective dose according to BMI instead of ImPACT calculations for scanners and scanning conditions as well as a method to predict the effective dose by using the parameters of the CT system and BMI without being irradiated on the patients.

Keywords:

Effective Dose, Computed Tomography Angiography, Body Mass Index.

COST-EffECTIVENESS AND LIMITATIONS OF ISCHEMIA DETECTION BY CARDIAC MAGNETIC RESONANCE IMAGING

Mohammad Hossein Jamshidi*
Department of Radiologic Technology, Faculty of Paramedicine, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran
mh_jamshidi@yahoo.com

Background:

In a subset of patients in the European Cardiac Magnetic Resonance (CMR) registry, who underwent ischemia testing by CMR, costs were calculated and compared with an invasive strategy to detect CAD. Of the 2,717 patients studied, 21% were positive for CAD (ischemia and/or infarct scar), 73% negative, and 6% were uncertain and underwent additional testing. Compared with an invasive approach, the CMR strategy led to cost-savings in the public sectors of the German, United Kingdom, and Swiss healthcare systems of 50%, 25%, and 23%, respectively. Another study assessed the cost-effectiveness of CMR in the emergency department and demonstrated cost-savings of approximately 35% over a 1-year follow-up when patients with suspected acute coronary syndrome (no ST elevations, normal initial troponin) were referred to CMR, compared with routine in-hospital work-up. Tis cost-saving was obtained without a difference in clinical outcome in the two patient groups and was explained mainly by the facts that (1) hospitalization could be avoided in approximately 80% of the CMR group and (2) after discharge, i.e. during the 1-year follow-up, costs continued to decrease in the CMR group. A major limitation of CMR today remains its restricted availability. Along with this goes a heterogeneous and sometimes inadequate situation in Europe with regard to reimbursement of CMR studies. Recent and future evidence on cost-effectiveness of CMR should help to improve these financial aspects in the near future. In addition to these health-economical obstacles, CMR has a number of important contraindications. These contraindications include many implantable devices. However, the first MR-compatible pacemaker obtained approval from the European Medicines Agency (EMEA) for marketing in December 2008. A recent multi-centre trial confirmed a high image quality of CMR studies in >95% of patients with implanted pacemakers. It is expected that an increasing number of MR-compatible electronic devices, including ICDs, will be available in the near future.

Keywords:

Ischemia, Cardiac Magnetic Resonance, Detection.

MACHINE LEARNING ALGORITHMS IN CLASSIFICATION AND STAGING OF GLIOMA TUMORS USING MAGNETIC RESONANCE IMAGING (MRI)

Zahra Papi*
Isfahan University of Medical Sciences
zahrapapi85@gmail.com
Iraj Abedi
Fatemeh Dalvand
Alireza Amouheidari

Background:

Glioma is the most common primary brain tumor in adults. Extensive machine learning capabilities using Magnetic Resonance Imaging can be converted as a practical instrument in accurate and early diagnosis of lesions to assist physicians in diverse diagnostic and therapeutic fields. The aim of this study is, segmentation and definition of glioma tumors grade automatically with variety of learning algorithms.

Methods:

This study is a fundamental-applied that performed using MRI multimodal images of 285 patients with glioma tumor from the BraTS 2018 challenge dataset. In order to classification glioma tumors as high grade and low grade, first segmentation was performed with U Net network, then segmentation results were used in the classification stage based on transfer learning to determine the exact grade of tumor.

Findings:

The mean of Dice Similarity Coefficient (DSC) came for designed segmentation for region of whole tumor, core tumor and enhancing 0/76, 0/70 and

0/71 respectively. The accuracy of the proposed classification based on VGG 16 network to determine the grade of tumor in both HGG and LGG groups was 99.01%.

Conclusion:

In glioma classification, learning methods without biopsy can determine the grade of tumor without taking time. With early determining of tumor grade can increase the survival patients rate and Improve quality of life.

Keywords:

Machine learning, Transfer learning, Segmentation, Classification, Glioma, Magnetic Resonance Imaging

REVIEW AND EVALUATION OF DIFFERENT SOFTWARE PACKAGES FOR PERFUSION (DCE) MRI ANALYSIS

Iman Azinkhah*
Milad Hospital
imanazinkhah@gmail.com

Background:

Analyzing MRI perfusion data is a complex process, while MRI perfusion is a rapidly expanding technique used in clinical settings, and on the other hand, various kinetic models have been proposed. Currently, there are various software environments for studying and analyzing perfusion information, and the software environments of MRI devices themselves do not provide sufficient resources to apply different methods. For a more comprehensive comparison of the performance of these software, we have examined different kinetic models in different software environments on different datasets.

Methods:

Clinical perfusion data of 10 patients and a simulated data set were performed by different software. Various parameters including Ktrans and the implementation method of different kinetic models were studied and compared.

Results:

The different values of Ktrans obtained in these software packages do not have a statistically significant difference, but in some kinetic models implemented, differences are observed according to the method of execution and fitting. Some software packages have limitations depending on the basic environment to run, the type of kinetic models applicable, the type of input data, the type of data fitting, and the type of license.

Conclusion:

It can be said that one of the most important issues after successful and accurate implementation of perfusion and dynamic technique in MRI is the accurate and successful analysis of information according to the type of selected kinetic model. Therefore, knowledge of the features and limitations of implementation in kinetic models in various software is critical in this regard.

REVIEW OF A QUALITY CONTROL PERIOD OF MRI 1.5T ALONG WITH DESIGNING A SOFTWARE FOR RECORDING AND REPORTING RESULTS

Iman Azinkhah*
Milad Hospital
imanazinkhah@gmail.com

Background:

Due to the widespread use of MRI imaging equipment, especially due to its high power in imaging soft tissue lesions, the importance of performance of this equipment has become more important than ever. Conventional quality control protocols have been developed and reported by some professional groups such as NEMA and AAPM. Of course, quality control for each imaging centre should be planned based on the available equipment and the necessary needs. QC tests are the most helpful function that can detect imaging defects before affecting the patient's diagnostic process and thus troubleshoot and eliminate the desired defect. Of course, this study only examined tests that could be performed by existing phantoms on the device itself. To more accurately

review and store QC information, a program was designed to record information and display and compare QC information.

Methods:

QC test were performed according to specific time intervals and recorded in the desired software. The most important tests performed are MFD, PIU, PSG, SNR, FWHM, Geometric Accuracy. One of the objectives of this study is to programing a software to help record quality control results so that it is easy to report results periodically in the shortest possible time. Also, to be User-Friendly, the software was programming in vb.net.

Results:

According to the tests performed, the Geometry test was obtained below the criteria, which after a periodic service by the relevant company, this test achieved the desired result.

Conclusion:

The results of tests performed on MRI devices will indicate the ability of each device to imaging patients. In general, the following results can be considered:

- Since to perform QC tests, it is generally necessary to implement SE and FSE protocols, the guidelines should include protocols for performing QC on some vital MRI protocols such as FAT sat and DWI.
- In order to ensure the correct operation of the devices, the manufacturer must determine the minimum requirements for quality control and include a plan for implementation in the system.

According to the comparison of the results, the importance of periodic services on the results of quality control has been well identified.

PREPARATION AND EVALUATION OF SHELL-CORE NANOPARTICLES OF BISMUTH OXIDE AND PEGYLATED IRON OXIDE TO IMPROVE IMAGING FOR MYOCARDIAL INFARCTION

Mohamadreza Kordani*
mmohamadreza1992@yahoo.com

Background:

Bismuth iron oxide-core shell magnetic nanoparticles (FeBi) are used in MRI and CT imaging for better diagnosis in medicine due to their improved X-ray absorption and magnetic properties. Nanoparticles are also used as a targeted system for drug delivery to Damaged tissues were examined. Therefore, nanoparticles used in the diagnosis of damaged tissue can also be considered as an improvement agent in treatment. In this study, the anti-inflammatory drug indomethacin was loaded on FeBi nanoparticles and examined.

Method:

Synthesis of bismuth oxide / iron oxide core-shell nanoparticles was performed by oxidative precipitation method. The core-shell nanoparticles were encapsulated with polyethylene glycol (PEG) to achieve stable dispersion. Indomethacin was used to reduce the initial inflammation. The drug was loaded on the PEG shell by a solvent. The amplification of MRI and CT signals in the phantom was evaluated. Cytotoxicity and reduction of inflammation were performed on H9C2 cells.

Results:

The nucleus-shell particle size and its morphology were investigated by TEM analysis and their size was about 20 nm. XRD analysis was used to investigate the crystal structure of the nanoparticles. FTIR analysis was used to investigate the chemical structure of nanoparticles before and after peping and drug loading. Magnetic sensing (VSM) has been used in this study. In MRI and CT, the signal increase of these nanoparticles is .... respectively.Drug loading was measured Drug release was examined after 4 days and about 40% was obtained.

Keywords:

Nano, Indomethacin, Iron Oxide, Bismuth Oxide

INVESTIGATION OF THE MITIGATION EFFECT OF SPIRULINA AGAINST ON RAT'S HEART TISSUES

Mohammad Hootan Ahmadvand*
Tehran University of medical science
< hootanahmadvand@yahoo.com>
Safoora Nikzad
Fatemeh Mirzaei
Payam Hashemi

Background:

Breast cancer, Hodgkin's disease, and pediatric malignancies are all treated with radiation therapy, which exposes the heart to high local radiation doses, increasing the risk of cardiovascular disease in survivors' decades later. This study aimed was to examine the mitigation efficiency of Spirulina compared to the effect of Metformin.

Materials and Methods:

25 male Wistar rats were allotted into five groups: control, Spirulina, Radiation, Radiation plus Spirulina, Radiation plus Metformin. Irradiation (15 Gy to chest) was performed using a LINAC. Forty-eight hours after irradiation, drug solutions were administered to rats by gavage at a dose of 300 mg/kg and 100 mg/kg in 1 mL daily for a total of 30 days for Spirulina and Metformin, respectively. After 10 weeks, all of the rats were euthanized, and their heart tissues were collected for histological examination.

Results:

The qualitative evaluation of heart tissue indicated that Irradiation caused irregularities in the arrangement of myofibrils, and the most significant modifications included the proliferation and migration of mononuclear cells, vacuolation of the cytoplasm, congestion, and, to a lesser extent, rupture of muscle fascicles in the radiation group.
The histopathology of the spirulina-receiving group was not significantly different from that of the control group, but a comparison of the two groups receiving radiation plus spirulina versus metformin plus radiation revealed that metformin was more effective, so the radiation-induced congestion in the spirulina plus radiation group was still severe.

Conclusion:

Spirulina had no effect on radiation-induced cardiac damage, while metformin did. Higher Spirulina doses given over a longer period of time will likely have a greater heart-mitigate effect.

VESSEL WALL IMAGING IN STROKE PATIENTS

Navid Sarmast Alizadeh*
MSc of Medical Imaging (MRI), HighTech Department Pars Hospital
alizadeh4949@gmail.com

Background:

Navid Sarmast Alizadeh MSc of Medical Imaging, Head of Hight Tech Department Pars Hospital
Stroke is one of the most common causes of death and disability in the world, which usually causes an abrupt onset of a neurological deficit. Intracranial artery stenosis has been considered a major cause of ischemic stroke. Traditionally, intracranial vascular diseases have been evaluated with invasive luminal imaging techniques, such as catheter angiography or non-invasive luminal imaging techniques (MR angiography or CT angiography). However, these techniques indirectly visualize vessel wall abnormalities, and many cerebral vasculopathies may have similar luminal narrowing. Advances in vessel wall imaging techniques now make it possible to directly visualize the intracranial vessel wall. VW-MRI has been applied as the only noninvasive technique to directly assess the intracranial vessel wall structure. It can provide derived vessel wall characteristics to help clinicians determine stroke etiology, estimate atherosclerotic plaque burden or vasculitis activity, as well as future cerebrovascular events.
The most important recommendation for intracranial VW-MRI in clinical practice is to assess and differentiate intracranial vasculopathies, such as intracranial atherosclerotic plaque, vasculitis, reversible cerebral vasoconstriction syndrome, arterial dissection, and other causes of intracranial arterial narrowing. Diagnosis of cerebrovascular disease has relied on luminal imaging. However, different vasculopathies usually have similar morphological features on luminal imaging. The advent of VW-MRI offers insights into the pathogenesis of cerebrovascular disease.
The technology of whole-brain VW-MRI has become a new method for stroke classification. The research presents a first step in designing focused trials on individualized treatment and prevention strategies of intracranial stenosis.

PATIENT SHIELDING IN X-RAY DIAGNOSTIC IMAGING

Mohammad Maskani*
Mashhad University of Medical Sciences
maskani_mohammad@yahoo.com

Background:

The use of shields for patients in diagnostic imaging has been used for more than 60 years. However, there are still controversies over whether or not to use shields for patients. This study aimed to respond to these controversies according to the literature.

Methods:

Searches were conducted to locate literature discussing the advantages and disadvantages of using shields in diagnostic imaging. The selection of articles was limited to those published within the past 10 years. The selected studies were examined using the following topics as guidelines: patient shielding in diagnostic imaging, patient gonadal and fetal shielding in diagnostic imaging, stop shielding your patients, risk to the fetus from diagnostic imaging.

Result:

After assessing studies, no study reported the effect of diagnostic radiation on fertility and hereditary diseases. Internal scattering accounts for almost 90% of patients' exposure to out of the field of view, with no shielding effect. The use of shields sometimes causes the loss of diagnostic information and sometimes in automated exposure control increases the patient's radiation and due to improvement in imaging devices and equipment, patients' diagnostic radiation dose has been reduced by more than 90% in the last 50 years.

Conclusion:

According to the researchers, the use of shields for patients in x-ray diagnostic exams should be stopped. Although it is difficult for radiologists, patients, and physicians to accept this change, the voice of science should be heard and the use of shields for patient care should be stopped.

Keywords:
shielding, radiation, patient-dose

CAN COMMON LEAD APRON IN TESTES REGION CAUSE RADIATION DOSE REDUCTION DURING CHEST CT SCAN? A PATIENT STUDY

Mohammad Kiapour*
mkiapour1985@gmail.com

Background:

Computed tomography (CT) is a routine procedure for diagnostic procedures , using ionization radiation in this modality has hazardous effects especially on sensitive organs.

Objective:

The aim of this study was to quantify the dose reduction effect of lead apron shielding on the testicular region during routine chest CT scans.

Material and Methods:

In this measurement study, the routine chest CT examinations were performed for 30 male patients with common lead aprons folded and positioned in testis regions. The patient's mean body mass index (BMI) was 26.2 ± 4.6 kg/m2
To calculate the doses at testis region, three thermoluminescent dosimeters (TLD-100) were attached at the top surface of the apron as an indicator of the doses without shielding, and three TLDs under the apron for doses with shielding. The TLD readouts were compared using SPSS software (Wilcoxon test) version 16.

Results:

The radiation dose in the testicular regions was reduced from 0.46 ± 0.04 to 0.20 ± 0.04 mGy in the presence of lead apron shielding ($p < 0.001$), the reduction was equal to 56%. Furthermore, the heritable risk probability was obtained at 2.0 ×10-5 % and 4.6 ×10-5 % for the patients using the lead apron shield versus without shield, respectively.

Conclusion:

Applying common lead aprons as shielding in the testis regions of male patients undergoing chest CT scans can reduce the radiation doses significantly. Therefore, this shield can be recommended for routine chest CT examinations.

Citation:

Kiapour M, Ebrahimnejad Gorji K, Mehraeen R, Ghaemian N, Niksirat Sustani F, Abedi-Firouzjah R, Shabestani Monfared A. Can Common Lead Apron in Testes Region Cause Radiation Dose Reduction during Chest CT Scan? A Patient Study. J Biomed Phys Eng. 2021;11(4):497-504. doi: 10.31661/jbpe.v0i0.2104-1307.

Keywords:

Computed Tomography, Radiation Protection, Chest CT Scan, Lead Apron, Testis, Thermoluminescent Dosimetry

VIRTUAL HYSTEROSALPANGOGRAPHY

Behjat Haghighiyan*
Medical Imaging Clinic of Karaj
b.haghighian@gmail.com

Background:

CT Virtual Hysterosalpingography (VHSG) is a novel imaging technique for the evaluation of the female reproductive organs. This imaging procedure provides a more complete, minimally invasive evaluation of the uterus with bidimensional,tridimensional and endoscopic views.
The purpose of this study is to show the role and imaging characteristics of CT VHSG in the evaluation of intrauterine adhesions.

THE APPLICATIONS OF ADVANCED MULTIPARAMETRIC MRI IN BRAIN TUMOR IMAGING

Vahid Shahmaei*
Shahid Beheshti University of Medical Sciences
vahidshahmaei.sbmu@gmail.com
Forough Sodaei

Background:

Intracranial tumors are a significant health problem. The annual incidence of primary and secondary central nervous system neoplasms ranges from 10 to 17 per 100,000 persons. Imaging plays a pivotal role in the clinical management of human brain tumors. The goals and requirements for brain tumor imaging are multiple and complex. They involve providing a diagnosis and differential diagnosis, as well as accurate grading of tumors. Also neuroimaging is an essential part of the decision-making process for therapy and precise planning of surgical intervention. Before neurosurgery intervention, neuroimaging can accurately define the location and delineation the lesion. Neuroimaging can also aid in radiotherapy planning by precisely defining the lesion margins. Additionally, it should be use to follow therapeutic intervention and possible side effect. Advanced MRI techniques offer physiologic, metabolic or functional information about tumor biology that goes beyond the diagnostic yield of standard MRI. Recent years new techniques are emerging such as: MR diffusion, MR perfusion, CEST Imaging, relaxometry, MR spectroscopy and functional MRI. So multiparametric MR imaging make it possible to define CNS neoplasms. Novel MRI techniques evaluate changes at the microvascular, hemodynamic and cellular levels of brain tumors. In addition to structural changes they also evaluate changes at the metabolic and biochemical levels. Incorporation of these techniques into the diagnostic protocol allows us to obtain detailed information about tumors. Each of these techniques provides distinct and complementary diagnostic information that can help better characterize brain tumors at various stages of clinical work-up, from initial diagnosis to post-treatment response assessment. However, it must be noted that the diagnostic efficacy, incremental benefit and cost-effectiveness of these advanced MRI techniques have yet to be established.

The purpose of this review article is to present and detect the importance and applications of multiparametric MR imaging in diagnosis and grading of neoplasms and also showing latest MR neuroimaging methods and the usefulness of these techniques in therapeutic monitoring.

NANOPARTICLES-ASSISTED PHOTOTHERMAL CANCER THERAPY UNDER MAGNETIC RESONANCE IMAGING GUIDANCE

Nahideh Gharehaghaji*
Radiology Department, Paramedical Faculty, Tabriz University of Medical Sciences
gharehaghaji@gmail.com
Samad Hasani

Introduction:

Nanoparticles-based image-guided therapy has shown great potential for cancer treatment in recent years. Photothermal therapy (PTT) is an emerging method that utilizes photothermal agents to absorb near-infrared (NIR) light and generate localized hyperthermia to destroy cancerous cells with minimal side effects. Magnetic resonance imaging (MRI) paves the way for effective and safe PTT via real-time imaging and monitoring of the therapeutic process. This study aimed to review the properties of the nanoparticles used in MRI-guided PTT of cancer.

Methods:

The keywords of nanoparticles, photothermal therapy (PTT), cancer, and magnetic resonance imaging (MRI) were entered in the scientific databases of Scopus, Google Scholar, and PubMed. Then the most relevant searched articles were reviewed.

Results:

Nanoparticles-assisted photothermal therapy (NPTT) under MRI guidance can be classified into three categories based on the application frequency: (i) Gold-based nanoparticles; which have a strong optical absorbance in the NIR region (700 – 1300 nm) due to their surface Plasmon resonance effects; (ii) Magnetic nanoparticles; such as iron oxide nanoparticles which

possess good photothermal properties and also can be employed as MRI nanoprobes; (iii) carbon-based nanoparticles; such as graphene derivatives which have a significant ability to convert absorbed light into heat. The nanoparticles expressed in all three categories showed good biocompatibility, low toxicity to normal tissues, and highly effective cancer cell ablation in vitro and in vivo.

Conclusion:

Using NPTT under MRI guidance provides the basis for the multifunctional probes combining high anticancer efficacy of PTT and MRI monitoring in a single nanoplatform.

Keywords:

Nanoparticles, Photothermal therapy (PTT), Cancer, Magnetic resonance imaging (MRI)

TNM BREAST CANCER STAGING USING MAMMOGRAPHIC IMAGES BASED-CONVOLUTION NEURAL NETWORK

Ali Achak*
Islamic Azad University Dezful Branch
ali.achak10@yahoo.com
Elaheh Tarighati
Mohammad Reza Hedyehzadeh
Rrosa Farhang Zadeh

Background:

Breast cancer has been one of the main reasons of women's death in the recent decade. For decreasing of resulting death estimation of this kind of cancer, premature recognized and treatment is a necessary point. After detection breast cancer treatment process is begin with determination extended scale of cancer in organs and choose the best measurment method and helping determination staging of the Tumor and Metastasis Sentinel lymph nodes by helping of common methods. Today, Offensive-biopsy method is used for determination staging of breast cancer that is risky, Time-consuming and Costly for a human. So this study is used to determine the staging of Tumor and Sentinel lymph nodes of breast cancer by using image Mammography from patients who are suffering by Convolution neural network. Used database in this study is 139 Mammography images of a woman suffered of breast cancer. In this research, at first Pre-processing method is done by deleting noise and development quality of Mammography of every patient by using Unsharp linear filter techniques and increased contrast of Histogram matching method. In Classification images of Tumor area in the form of manual method of the other parts of breast are separated by specialists. Afterward suggested networking Convolution layers is using of Tumor area try to determine the staging of cancer (Tumor measurement and Sentinel lymph Metastasis) in order to used the international descriptions Ajcc (American Joint Committee on Cancer) The outcome results are estimated by suggested networking function AUC 0.877. The results represents suitable function and high efficiency of this suggested pattern for determining staging of non-aggressive breast cancer is according to standard descriptions that will have an important role in premature treatment and increasing patient lifetime.

CARDIAC MAGNETIC RESONANCE IMAGING FOR THE INTERVENTIONAL CARDIOLOGIST: TECHNICAL CONSIDERATIONS FOR A STANDARD EXAMINATION

Mohammad Hossein Jamshidi*
Department of Radiologic Technology, Faculty of Paramedicine, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran
mh_jamshidi@yahoo.com

Background:

Cardiac magnetic resonance imaging is a noninvasive technique for assessing heart structure and function without the need for ionizing radiation. However, its application to the heart is still evolving rapidly because of complexities in studying a moving organ. Unique challenges of cardiac MRI (cardiac magnetic resonance [CMR]) relates to the need for specialized hardware ("coils") and complex software that is unique to the heart. Technology in the field is continuing to develop rapidly, allowing

CMR to improve diagnostic accuracy in our patients without the use of invasive or radiation-dependent tests. Furthermore, CMR has the advantage over echocardiography and radionuclide scintigraphy in that images can be obtained in any tomographic plane without limitations imposed by body habitus. For MRI, a powerful magnetic field (most commonly 1.5 or 3.0 T) is used to align the nuclear magnetization of hydrogen atoms (protons) present in the water and fat of the body. Radiofrequency electromagnetic fields are used to modify the alignment of magnetization in this large magnetic field. When the radiofrequency source is switched off, the magnetic vector returns to its resting state, emitting a radio wave signal that is received by coils placed around the body part of interest. Characteristics of this received signal are used to construct an image. Different tissues relax at different rates when the transmitted radiofrequency pulse is switched off a fact that is exploited to generate clinically important image contrast. The time taken for the magnetic vector to return to its equilibrium state is called T1 relaxation. Gadolinium hastens T1 relaxation, and thus causes a local signal increase in the area of increased gadolinium concentration when using appropriately T1-weighted sequences. T2 relaxation describes the loss of phase coherence of the magnetic vectors that form the signal. To allow for the creation of a CMR image, pulsed magnetic field gradients are applied in 3 dimensions before the acquisition of the signal. For 2 of these dimensions, this gradient is invariant with each pulse. However, with the third dimension, the gradient is a variable strength pulse allowing for spatial reconstruction via a process known as "phase encoding." Therefore, each MRI image must be acquired in several steps and, in the case of the heart, over several heartbeats. It is possible to acquire CMR data in "real-time" during single heartbeats using fast imaging techniques.

Keywords:

Cardiac Magnetic Resonance, Interventional Cardiology, Technical Considerations

CORONARY ARTERY DISEASE IN CHILDREN: IMAGING CONSIDERATION

Mohammad Hossein Jamshidi*

Department of Radiologic Technology, Faculty of Paramedicine, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

mh_jamshidi@yahoo.com

Background:

Coronary artery disease in children can be acquired, but the majority of anomalies are congenital. Transthoracic echocardiography (TTE) remains the first-line imaging tool for evaluating children with suspected coronary anomalies. In experienced hands, the coronary origins and proximal coronary courses are reliably imaged. When further anatomic detail of luminal dimensions, ostial morphology, or evaluation of more distal portions of the coronary anatomy is necessary, other imaging modalities are necessary. Catheter angiography is the reference standard for the determination of coronary luminal abnormalities, such as coronary stenosis. Additional techniques that further characterize the arterial wall and myocardial perfusion can be performed during catheterization, such as intravascular ultrasound (IVUS) and fractional flow reserve measurement. However given the invasive nature of catheter angiography, electrocardiographic (ECG)-gated coronary computed tomography angiography (CCTA) and cardiac magnetic resonance angiography (CMRA) are the main diagnostic modalities utilized. Both techniques yield three-dimensional images of the heart, with the coronary vessels shown in the context of adjacent cardiac structures. Visualization is facilitated by various post processing techniques, such as curved multiplanar reformatting and endoluminal views via virtual angioscopy. CCTA has excellent diagnostic accuracy in detecting coronary stenosis, and several studies show that it is now comparable to catheter angiography. These capabilities have made CCTA and CMRA the preferred method for the diagnosis and characterization of coronary anomalies. CCTA provides excellent visualization of coronary anatomy, including the distal coronary branches. Images synchronized to the cardiac cycle can be acquired with prospective or retrospective ECG synchronization. Prospective ECG-triggering yields a snapshot of the heart at a

predetermined portion of the cardiac cycle, whereas with retrospective ECG-gating, data is acquired throughout the cardiac cycle and can therefore be reconstructed at multiple time-points in the cardiac cycle and can be used to produce cine images of the heart. However, because data is acquired throughout the cardiac cycle, images obtained with retrospective ECG-gating generally incur a greater radiation dose compared with prospective ECG-triggering. With 64-slice scanners, the typical scan time in either mode is less than 10 seconds. Newer generation dual source and volumetric computed tomography (CT) scanners provide full anatomic coverage of a pediatric thorax in less than a second or in a single heartbeat, freezing respiratory and cardiac motion, and obviating the need for sedation in many cases.

Keywords:

Coronary Artery, Children, Imaging.

POSITRON EMISSION TOMOGRAPHY IN NUCLEAR CARDIOLOGY AND DETECTION OF CORONARY ARTERY DISEASE

Mohammad Hossein Jamshidi*

Department of Radiologic Technology, Faculty of Paramedicine, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

mh_jamshidi@yahoo.com

Background:

Experience with radionuclide assessments of myocardial perfusion can be measured over decades. Single-photon emission computed tomography (SPECT) myocardial perfusion scintigraphy (MPS) has been validated for the diagnosis and prognosis of cardiac disease and the technique is embedded in national and international guidelines. Positron emission tomography (PET) has been used to assess myocardial viability but it is now used increasingly to detect flow limiting coronary artery disease (CAD). Although previously used mainly to assess myocardial viability, PET is now more commonly used to assess myocardial perfusion and it is generally considered the non-invasive gold standard for this. Although cyclotron-produced radiotracers, such as N-ammonia or O-water, are regularly used, recent efforts have focused also on the use of rubidium-82. Tis tracer is produced by a generator, compares favorably with other PET tracers for measurements of myocardial perfusion and perfusion reserve, and is an attractive option for hospitals without easy access to a cyclotron. PET offers higher resolution images and provides quantification of perfusion in absolute terms (ml/g/min). PET may have better sensitivity and specificity than SPECT MPS for the detection of CAD, particularly where there is severe multi-vessel disease and in obese patients. Two meta-analyses with PET demonstrated 90–93% sensitivity and 81–88% specificity for CAD detection, superior to myocardial perfusion SPECT. Myocardial perfusion in absolute units measured by PET further improves diagnostic accuracy, especially in patients with multi-vessel disease, and can be used to monitor the effects of various therapies. The method has also significant prognostic value. Despite demonstration of cost-effectiveness in high-throughput centres, the clinical utility of PET is still constrained by high upfront cost and low availability compared with SPECT.

Keywords:

Nuclear Cardiology, Coronary Artery, Positron Emission Tomography

SIMULATION OF COMPUTED TOMOGRAPHY BY MONTE CARLO GATE\GEANT4 METHODS: WHY AND HOW?

Iman Azinkhah*

Milad Hospital

imanazinkhah@gmail.com

Background:

The use of CT scan equipment in detection is increasing rapidly and the demand for image quality, image accuracy and speed has increased accordingly. The role of computer systems and especially the simulation of imaging modalities is considered as the front line of these goals today. Due to the random nature of CT scans and other modalities, Monte Carlo methods are considered as a mandatory tool in simulating these systems. Each of these packages has its advantages and disadvantages, including Geant3, EGS4, MCNP, and

Geant4. A Monte Carlo code is able to implement the complex geometries of scanners and imaging systems in a user-friendly environment while maintaining complex collision physics and transactions.

Methods:

Using Monte Carlo code, Gate V9 program with Geant4 v8 program kernel simulated a 16-slice Siemens Emotion CT scan. This simulation is implemented using all device specific information. Macro file was used to run the program in Linux environment.

Results:

The images prepared from this simulation were reconstructed by another side program according to back-projection and examined at different thicknesses. The quality of the images is at the level of simulation and obtaining little information is desirable for other studies.

Conclusion:

Gate program can be used to improve spatial resolution, noise analysis, linearity and optimization of protocols. One of the most widely used and helpful cases is dose estimation at the level of the phantom and the patient's body to estimate and separate the scattered rays. Thus, Gate simulations based on Monte Carlo techniques will be a powerful tool in helping to further advance CT scan imaging systems.

EVALUATION THE AMOUNT OF SOCIAL RESPONSE IN RADIOLOGY RECNOLOGY

Omolbanin Delashoub*
Hormozgan University of Medical Sciences
odelashoub21@gmail.com
Reza Afzalipour

Introduction:

Social response of the syllabus is for directing the educational activities in order to train radiography experts who are able to afford the health needs of the target community. This study tries to evaluate the amount of the social response in the courses of radiology technology and provide them with suggestions and sulotions to raise their awareness.

Method:

This is a qualitative study. Participants in this study were 60 radiology students who entered the clinical arena and 20 professors of this field. The method of data collection was semi-structured online interview. After reviewing the answers, the themes were extracted. Then a list of them was prepared and the similarities in their meaning and concept were reviewed. Based on the centrality, the themes were placed in 2 subcategories, and then the related subunits were placed in the same category.

Results:

with analysing the interviews, 2 main themes were extracted, each had several sub-themes. The main themes included educational and clinical. According to people's opinions, the most important sub-theme in the main clinical theme was internships because in the universities 60% is dedicated to radiography, 20% is dedicated to CT scan and 20% is dedicated to MRI, while today's medical demand is exactly the opposite. And the most important sub-theme in the main theme of training is teaching the demode radiology techniques that medical society no longer needs them.

Conclusion:

In order to develop social responsiveness, there are several structural barriers in the field of radiological technology that need to be removed in order to increase social responsiveness. There are Numerous suggestions for reviewing the textbooks in this field, but most of them are individual experiences of researchers and its efficiency in different educational systems needs further studies and researches.

Keywords:

Radiology Technology, Social Responsibility, Education

EVALUATION OF BREAST CANCER SCREENING AND MAMMOGRAPHY FINDINGS IN WOMEN REFERRING TO MAMMOGRAPHY DEPARTMENT OF SHAHID MOHAMMADI BANDAR ABBAS HOSPITAL IN 1400

Omolbanin Delashoub*
Hormozgan University of Medical Sciences
odelashoub21@gmail.com
Reza Afzalipour

Introduction:

Breast is a common place for deadly malignancies in women. According to experts in Iran, the prevalence of breast cancer among Iranian women is about 30 to 35 cases in 100,000, and about eight tousand women get breast cancer every year,Using mammography in screening the women older than 40 years can reduce 33% deaths caused by breast cancers. Therefore, this study was conducted to find the patients with breast cancer among the women who reffers to mammography department of Shahid Mohammadi Hospital.

Methods:

This is a descriptive cross-sectional study and the sample of this study includes all referring women in 1400 for whom mammography was performed. Data were collected through a questionnaire which includes personal information and analyzed the mammography results by a radiologist.

Results:

The results of this study showed that among the 700 women for whom mammography was performed in 1400,most of them were between 30-65 years old. The most common complaint of patients was breast pain and a feeling of mass in this area. Most of them have had these symptoms for a long time and they see a doctor with a long delay . 64% of the patients were did mammography due to the follow-up for chemotherapy, and 10% of the patients did mammography without any symptoms and only for annual check-ups. Also,according to the examination of mammography results by radiologists, 64% of cases were Benign and 16% of lesions were not observed and 12% cases were malignant masses and 8% of cases were mastitis.

Conclusion:

The results of this study showed that with presence of covid-19, the number of patients referred to the mammography department has decreased by 50% and despite the fact that breast cancer can be treated if it is diagnosed in time , the knowledge of early detection of Breast cancer and risks signs and seeing a doctor for diagnosis the cancer in women in Bandar Abbas are very low. Therefore, educating women and implementing screening programs should be taken serious , because early detection of cancer masses is associated with improved cancer prescience.

Keywords:

Screening, Breast Cancer, Mammography, Bandar Abbas

EVALUATION THE EXECUTIVE STRATEGIES OF RADIOLOGISTS TO PREVENT THE CT SCAN TUBES FROM SHORTENING LIFE DURING THE CORONA PANDEMIC IN TWO SECTIONS OF CT SCAN IN PAYAMBAR AZAM EDUCATIONAL-MEDICAL COMPLEX OF BANDR ABBAS

Omolbanin Delashoub*
Hormozgan University of Medical Sciences
odelashoub21@gmail.com
Reza Afzalipour

Introduction:

Despite the corona pandemic and the importance of CT scans in the diagnosis of Covid-19 disease and with the increasing demand for CT scans, one of the concerns was the tube's life of the devices because the service life of consumable parts in CT scan devices is reduced per imaging time,despite the increase in lung requests and the use of HRCT protocol, which increases the pressure on the tubes, so the experts

of these two departments have some strategies to protect the tubes from wearing. The purpose of this study is to examine the executive solutions to prevent the reduction of the tube life of CT scan devices in Payambar Azam educational-medical complex by radiologists.

Methods:

CT scan personnel of the Payambar Azam educational-medical complex as the target population were examined by open interviews. These people were selected by purposive and non-random sampling. The interview was conducted in absentia, then the mentiond data was recorded and analyzed based on the analysis method.

Results:

The analysis of the manuscripts showed that although the HRCT protocol is used to improve the images of covid_19 patients or suspected of Covid-19 in Payambar Azam educational-medical complex, but this protocol inherently causes more tube wearing because of the small cuts and Ma that cause so much pressure on the device ;in the seimens devices The personnel's solution is to use a 8 mm slice thickness and a 1.5 mm reconstruction , mA 40 and kv 110, however, it should be noted that depending on the patient, there is a possibility of changing radiation conditions. And the only difference between philips and seimens is the slice thickness that is 1.5 mm in philips.

Conclusion:

At first, it may be assumed that there is no real HRCT because the slice thickness in the references is between 1 and 3 mm and the mas is between 50 and 100. However, due to the helical mode and the relatively high technology of detectors in CT devices, the editing of the HRCT protocol by the staff did not have much effect on the doctor's diagnosis. According to the guidlines provided by the Iranian Radiology Association , the HRCT protocol defined by Payambar Azam educational-medical complex is standard and has a suitable function in preventing the tube from wearing.

Keywords:

CT Scan, Dose, Coronavirus, Hormozgan

EVALUATION OF ARTIFICIAL INTELLIGENCE ALGORITHMS TO EVALUATE POTENTIAL CANCEROUS LESIONS IN MAMMOGRAPHY SCAN

Reza Afzalipour*
Hormozgan University of Medical Sciences
reza.afzalipour@hums.ac.ir
Omolbanin Delashoub
kimiya Negahdari

Introduction:

According to the World Health Organization, cancer is the second leading cause of death in the world, with breast cancer being one of the most common cancers. Early detection is still a challenge despite recent advances. Artificial intelligence has advanced to the point where it can detect cancer. The aim of this study was to evaluate artificial intelligence algorithms to investigate potential cancerous lesions in mammography scans.

Method:

This research is a review and has been prepared by searching the databases of Pubmed, Scopus, Medline Science direct, with the keywords, Mammography, Brest, Artificial intelligence and Cancer. Published articles were searched between 2019-2021. The number of articles obtained by this method was about 30 articles, which were selected after studying and reviewing about 21 articles.

Results:

The results of the study showed that the researchers have developed an artificial intelligence platform to examine potential cancerous lesions in mammography scans, which, unlike previous algorithms, can be interpreted, that is, when the final result, it will be presented to physicians. Because artificial intelligence has learned to take advantage of the subtle differences introduced by the equipment itself to detect cancerous images, and to know the highest probability that these lesions are cancerous. This allows the radiation lines, which are medically called mass margins and are not easily seen on mammography, to be well detected using artificial intelligence.

Conclusion:

The purpose of using artificial intelligence algorithms in the diagnosis process is to assist radiologists and accelerate the treatment process. If the diagnostic success of this method is proven, specialists can rely with full confidence on the results of the method to select and complete the treatment process, because the speed of diagnosis using modern and innovative methods is much faster than traditional methods; As a result, treatment can be performed at the most appropriate time, and as a result, patients' hope for treatment and recovery will increase.

Keywords:

Artificial Intelligence, Breast Cancer, Mammography, Radiologist, Diagnosis Process

ROLE OF CHEST CT SCAN AND INTERVENTIONAL RADIOLOGY IN COVID-19

Mahdi Khalilneghad*
Tabriz University of Medical Sciences
mahdi.radiology92@gmail.com
Nahideh Gharehaghaji

Introduction:

Coronavirus has been known to infect people worldwide for a long time. The World Health Organization (WHO) has deemed the situation with Coronavirus disease 2019 (COVID-19) to be an overall prosperity emergency. Different imaging modalities and treatment methods have been used for the diagnosis of COVID-19 and treatment of the involved patients. This study aimed to review the role of CT scan and interventional radiology in COVID-19.

Methods:

A literature search was performed to find the studies that elaborate the use of CT scan and interventional radiology in COVID-19. An organized search of PubMed/Medline, Web of Science, Embase, ProQuest, Scopus, Cochrane, and Google Scholar was performed dependent on Mesh keywords.

Results:

Chest CT scan is routinely utilized as a fundamental assessment in the finding of COVID-19. Chest CT plays a significant role in determining COVID-19 and is regarded as the most delicate imaging approach for distinguishing issues due to its high affectability and quick access. Pure ground-glass opacities (GGOs) were the most common chest CT findings in COVID-19. Interventional radiology provides advanced image-guided treatments for various patient conditions, from the healthy to the helpless and elective outpatients to the general emergency room. Interventional radiology has a decreased risk of blood loss, illness, and other common side effects associated with open surgery. Interventional radiology procedures have been used for thoracentesis/chest tube placement, image-guided biopsy, angiography, abscess drainage, and catheter-directed thrombolysis of massive pulmonary embolism.

Conclusion:

CT scan and interventional radiology can be thought of as complementary. CT scan is used to identify lung illnesses and infections, whereas interventional radiology can treat COVID-19 complications.

Keywords:

CT Scan, Interventional Radiology, COVID-19, Diagnosis

GE HEALTHCARE

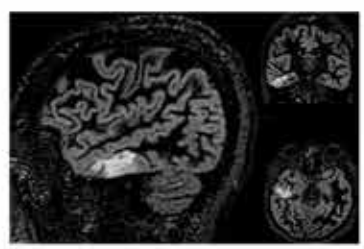
تجهیزات پزشکی پیشرفته

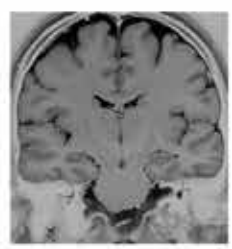
Magnetic Resonance Imaging

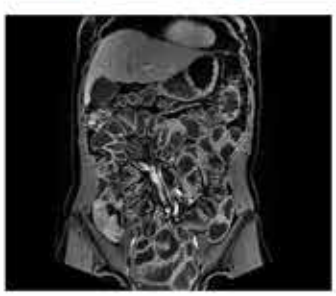
SIGNA™ Architect - MRI 3T

Elevate

Raise your MR performance to new heights with groundbreaking technolog







ReFINE
DeFINE

نماینده انحصاری محصولات پزشکی جنرال الکتریک در ایران
تهران، میدان ونک، خیابان شهید عباسپور (توانیر شمالی) ، کوچه سامی ، پلاک ۱
کد پستی: ۱۴۳۵۷-۵۳۴۸۴ تلفن: ۴۲۶۸۱ نمابر: ۸۸۸۸۲۳۴۰
www.tppge.net

تجهیزات پزشکی پیشرفته

HOLOGIC®

The Science Of Sure

MAMMOGRAPHY

BONE DENSITOMETERY

No Comparison, No Compromise

Horizon	سنجش تراکم استخوان به روش DXA
TBS iNsight	تعیین کیفیت ریزساختار استخوانی (microarchitectur)
3Dimensions	ماموگرافی توموسنتز (سه بعدی)

Selenia Dimensions	ماموگرافی دیجیتال دو بعدی و سه بعدی توموسنتز
Affirm	تومو بایوپسی به روش استریوتاکتیک
SUROS Brevera	سیستم های وکیوم نمونه برداری بافت پستان تحت گاید سونوگرافی، استریوتاکتیک و ام آر آی
ATEC	کنسول وکیوم بایوپسی پستان تحت گاید سونوگرافی، استریوتاکتیک و ام آر آی

تهران، کریمخان زند، خردمند جنوبی، پلاک ۴۳، طبقه ۴، کد پستی: ۱۵۸۴۸-۴۳۱۶۶
تلفن: ۷-۸۸۸۱۱۱۰۶ ، فکس: ۸۸۸۲۶۴۰۷
www.takapo.com, takapo@takapo.com

تکاپو طب

CERTIFIED IQNet MANAGEMENT SYSTEM

ISO 9001 CERTIFIED

International Organization for Standardization ISO 13485

Affirm®
Prone Biopsy System

سیستم بایوپسی استریوتاکتیک
پستان به روش پرون 2D - 3D

Brevera®
Breast Biopsy System

کنسول وکیوم بایوپسی و
رادیوگرافی بایوپسی پستان

ATEC®

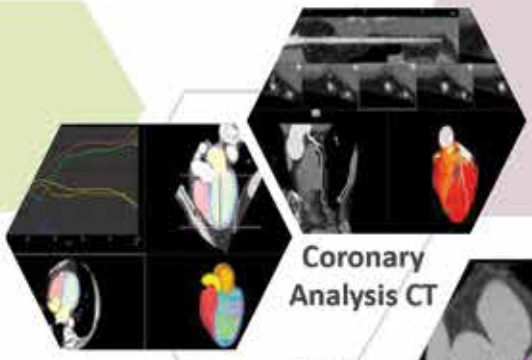
کنسول وکیوم بایوپسی پستان تحت گاید
سونوگرافی، استریوتاکتیک و ام آر آی

نماینده انحصاری
تکاپوطب
تهران، کریمخان زند، خردمند جنوبی پلاک ۴۳، طبقه ۴، کد پستی: ۱۵۸۴۸-۴۳۱۶۶
www.takapo.com, takapo@takapo.com | تلفن: ۸۸۸۱۱۱۰۷، فکس: ۸۸۸۲۶۴۰۷

FUJIFILM
Value from Innovation

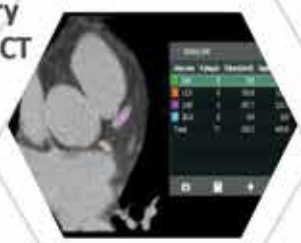
شرکت مهندسی پزشکی
پایون پرتو

Liver Analysis (CT&MRI)



Coronary Analysis CT

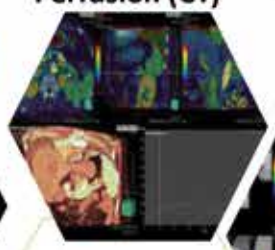
Chamber Analysis



Calcium Scoring

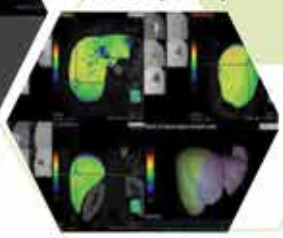
Automatic Colon Extraction

Abdominal Perfusion (CT)



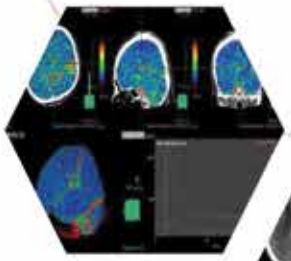
Simple and Easy use Liver Volumetry Automatic extraction Of Liver, P V, HV and HA

Regional Signal Ratio(MRI)

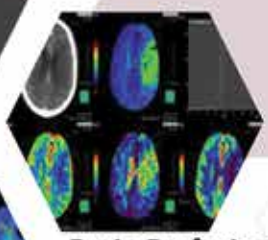


Segmentectomy (CT)

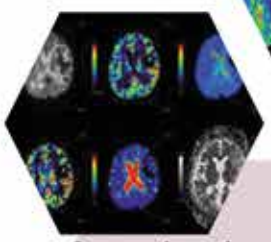
SYNAPSE®



4D Perfusion

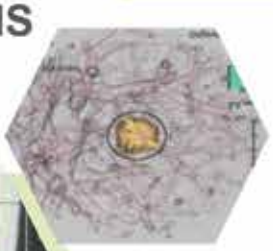


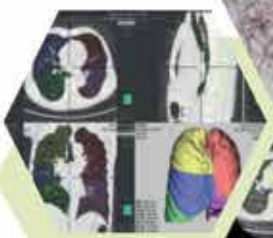
Brain Perfusion (CT)

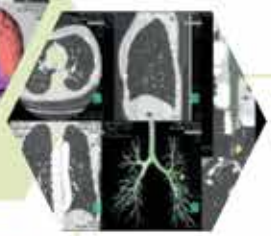


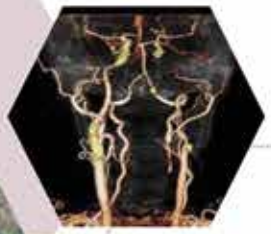
Brain Perfusion (MRI)

LUNG ANALYSIS SCOPE

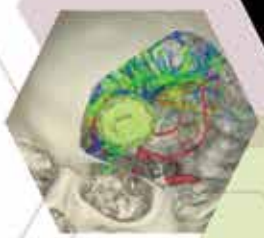




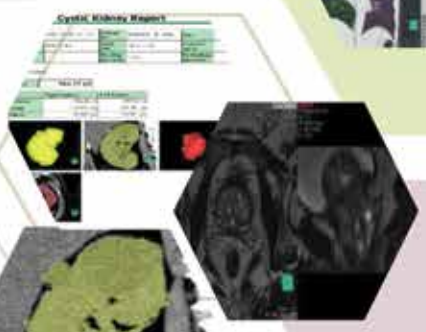




Vessel Extraction



Craniotomy/Tensor Analysis



Prostate Viewer

Kidney Volumetry

Preoperative Simulation for Nephrectomy Automatic Extraction of Kidney and Vessels for 3D Visualization

www.pion-parto.com

۰۲۱ - ۸۸۶۲۴۶۹۰ - ۹

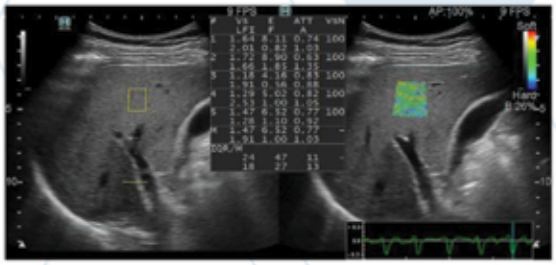
FUJIFILM
Value from Innovation

شرکت مهندسی پزشکی
پایون پرتو

Norihisa Yada et al, "Diagnosis of Fibrosis and Activity by a Combined Use of Strain and Shear Wave Imaging in Patients with Liver Disease",Dig Dis 2017;35:515–520.
https://pubmed.ncbi.nlm.nih.gov/29040983/

Abstract

Objective: Performing shear wave imaging is simple, but can be difficult when inflammation, jaundice, and congestion are present. Therefore, the correct diagnosis of liver fibrosis using shear wave imaging alone might be difficult in mild to-moderate fibrosis cases. Strain imaging can diagnose liver fibrosis without the influence of inflammation. Therefore, the combined use of strain and shear wave imaging (combinational elastography) for cases without jaundice and congestion might be useful for evaluating fibrosis and inflammation. ***Conclusions:*** The combined use of strain and shear wave imaging (combinational elastography) might increase the positive diagnosis of liver fibrosis and inflammation.



Fujifilm Healthcare

"DeepInsight: noise reduction technology for ultrasound systems"

(DeepInsight is a registered trademark or a trademark of FUJIFUILM Healthcare Corporation in Japan and other countries.)

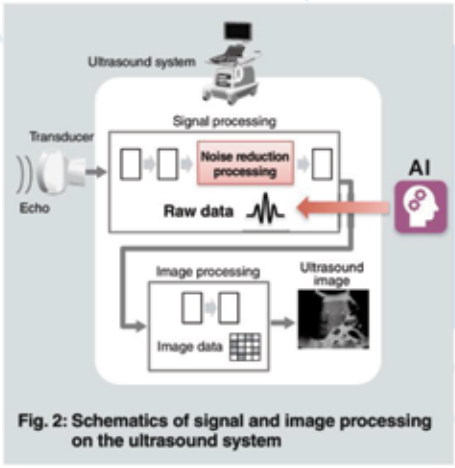


Fig. 2: Schematics of signal and image processing on the ultrasound system

Fujifilm Healthcare

FUJIFILM Healthcare Corporation has developed a noise reduction technology named *DeepInsight* that significantly improves the quality of images produced by ultrasound systems. This technique uses AI to distinguish between echo signals and noise, and selectively extracts the signals necessary for diagnosis. This enables ultrasound systems to provide high-quality images even from deep regions of the body that have been difficult to examine due to the weak received signals, thereby supporting more accurate ultrasound examinations. *DeepInsight* is a technology based on AI that can effectively reduce unnecessary electrical noise from echo signals while improving the basic performance required for ultrasound images. This enabled to obtain clearer images of the shape shape and dynamics of tissues deep inside the body, where they used to be blurred by noise. In the future, we will seek to the early release of a product supporting this technology in cooperation with medical institutions, and we will contribute to the realization of more accurate ultrasound examinations.

Sofuni et al., "Real-time virtual sonography visualization and its clinical application in biliopancreatic disease",World J Gastroenterol 2013 November 14; 19(42): 7419-7425 ISSN 1007-9327 (print) ISSN 2219-2840.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3831224/

Abstract: AIM: To evaluate the usefulness of real-time virtual sonography (RVS) in biliary and pancreatic diseases. CONCLUSION: RVS has potential usefulness in objective visualization and diagnosis in the field of biliary and pancreatic diseases.

www.pion-parto.com
۰۲۱ – ۸۸۶۲۴۶۹۰ – ۹

رادیوگرافی سقفی دیجیتال

- طراحی زیبا با کاربری آسان
- تیوب سقفی با مانور حرکتی در تمامی جهات مناسب برای مراکز درمانی دارای بخش تروما بدون محدودیت حرکتی و تصویر برداری
- تخت عریض فول موتورایز (۶ جهته)
- سنسورهای متعدد برای جلوگیری از برخورد در حین کار (Proximity Sensor)
- نرم‌افزار USER Friendly فول آپشن با ابزارهای اندازه گیری
- ارتباط تخت شبکه (multi Pacs) استاندارد Dicom3
- دارای SID ، DAP ، AEC ، Auto Tracking
- دارای ویژگی 3joint و Stiching و Alignment View

MEHRAN TEB
سیستم های تصویر برداری پزشکی

دستگاه رادیوگرافی موبایل دیجیتال

- طراحی فوق العاده و کاربری راحت جهت استفاده در بخش های ICU ، CCU و اورژانس
- فول دیجیتال و فول پارکینگ
- دارای سنسور جلوگیری از ضربه
- دارای حرکت ساده و روان با کمترین نیرو برای حرکت
- چرخش ۳۶۰ درجه بازو و تیوب دستگاه در بخش های شلوغ مراکز درمانی
- دارای دکمه حرکت دستگاه از روی کاور تیوب جهت پوزیشن دهی به هنگام تصویر برداری
- بالا ترین توان و قدرت جهت عکس برداری و کمترین دوز اشعه
- مجهز به باتری شارژی با بالاترین کیفیت و زمان عکس برداری
- دارای سبکترین فلت پنل وای فای با بالاترین استاندارد های روز دنیا از جمله IPX 6 (ضد آب و ضد ضربه) و با بالاترین کیفیت تصویر

MEHRAN TEB
سیستم های تصویر برداری پزشکی

شرکت مهران طب

تولیدکننده دستگاههای تصویربرداری دیجیتال

رادیوگرافی دیجیتال زمینی

- طراحی زیبا با کاربری آسان و نصب سریع
- مناسب برای درمانگاه ها و کلنیک های رادیولوژی
- قابلیت نصب در مراکز با ارتفاع کم
- قابل ارائه با دو فلت پنل و تخت شش جهته با تحمل وزن ۳۰۰ کیلوگرم
- قابل ارائه با تک فلت پنل و تخت پرتابل بدون محدودیت عکس برداری
- ارتباط تحت شبکه Multipacs با استاندارد Dicom3
- دارای نرم افزار پردازش تصاویر فول آپشن با ابزار های اندازه گیری
- دارای 3 joint , Stiching , خروجی Dicom3 و Dicom Print

www.mehranteb.com

Sales@mehranteb.com

شیراز/ سه راه برق /خیابان برق
خیابان شهید رضایی /پلاک ۸۸
۰۷۱-۳۲۳۲۰۴۱۵-۷

تهران/ خیابان وزراء/کوچه ۱۶/ پلاک۲/ واحد۷
۰۲۱-۸۸۴۸۱۱۲۰
۰۹۱۲۲۷۷۴۹۲۴

FUJIFILM
Value from Innovation

Mammography Solution

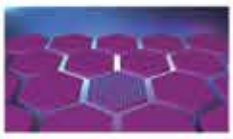
AMULET Innovality

AMULET

Innovality

FUJIFILM DIGITAL MAMMOGRAPHY SYSTEM

Amulet Bellus II
FUJIFILM Diagonstic Workstation



Amulet Innovality a-Se Hexagonal pixel
50 micron pixel image output

3D mammography
(breast tomosynthesis)
two moods tomosynthesis
Acquisition angle:±7.5/20
S-view synthesized 2D image
Static face guard

Advanced Biopsy system
Stereotactic Biopsy
lateral approach
Tomosynthesis Biopsy
Specimen X ray

Fit sweet paddle
Breast Density measurement
Intelligent AEC: Implant auto detection
CEDM function
Artificial Intelligence support
Mood Lighting

تهران فوکا
نماینده رسمی FUJIFILM در ایران
تهران بلوار میرداماد شماره ۲۲۹/۱ ساختمان فوجی فیلم
تلفن ۲۲۲۵۵۴۶۰ و ۲۲۲۵۵۴۶۵-۴۰ فاکس ۲۲۲۲۲۰۰۵

FUJIFILM
Value from Innovation

Supria® Plus

- 16/32 slice CT scanner
- 5MHU x-ray tube (physical value/not equivalent)
- 48kW generator (physical value/not equivalent)
- Detector width: 20 mm
- Highest spatial resolution : 17.2 lp/cm
- Biggest gantry aperture : 75 cm
- 4 kV steps : 80 , 100 , 120 , 140 kV
- mA range: 5-400 mA @ 135 kV (not only @ 80 kV)
- ±30 -degree physical tilt
- Synaps 3D software (full-license package)

تهران فوکا
نماینده رسمی فوجی فیلم درایران

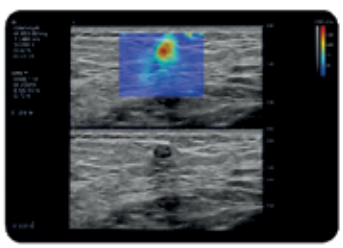
تهران بلوار میرداماد شماره ۲۲۹/۱ ساختمان فوجی فیلم
تلفن ۲۲۲۵۴۸۱۰ و ۴۰–۲۶۴۰۷۶۲۵ فاکس ۲۲۲۲۱۰۰۲

HOLOGIC®
SUPERSONIC™
imagine

- دستگاه های سونوگرافی پیشرفته ساخت کمپانی Hologic Supersonic
- تحولی شگرف در دستگاه های سونوگرافی، دارای نسل جدید تکنولوژی سخت افزاری و پردازش تصاویر
- پیشرفته ترین و دقیق ترین الاستوگرافی شیر ویو 2D Realtime ShearWave Elastography / ShearWave PLUS
- مدهای تصویربرداری هوشمند جهت سهولت کاربری و تشخیص دقیق
- مشاهده بیشترین جزئیات آناتومیکی و رزولوشن بالای تصاویر و عمق نفوذ بسیار بالا (45 cm)

SUPERSONIC™ mach 20

ShearWave® PLUS



The next level of SWE performance

SonicPad®

Designed to help you focus on what you see not on what you do

Transducer family

Takes imaging to a new level

شرکت تن آسا طب نوین (نماینده انحصاری کمپانی سوپرسونیک فرانسه و تراسون آمریکا در ایران)
تهران، خیابان سهروردی شمالی، کوچه کوروش، پلاک ۶۸، طبقه اول کدپستی ۱۵۵۹۷۱۳۷۱۵
فکس: ۸۸۵۲۷۶۹۴-۰۲۱ تلفن: ۸۸-۸۸۵۳۸۴۸۶ - ۸۸۵۰۱۳۴۴-۰۲۱
www.tanasateb.com

HOLOGIC®
SUPERSONIC™
imagine

UltraFast Imaging : قابلیت تصویربرداری بسیار سریع با سرعت ۲۰،۰۰۰ فریم در ثانیه که باعث افزایش رزولوشن شده و تصاویر با کیفیت و دقت بالایی را ارائه می کند.

UltraFast Doppler : دستگاه دارای سرعت و حساسیت بسیار بالا در داپلر می باشد که کلیه اطلاعات تصاویر و داپلر را در فاصله زمانی ۲ تا ۴ ثانیه دریافت نموده و امکان بازیابی تصاویر و اطلاعات داپلر را پس از فریز کردن تصاویر، در سه نقطه مجزا بصورت همزمان به همراه اندازه گیری های دقیق سرعت خون فراهم می سازد.

2D Real Time ShearWaveElastography : الاستوگرافی شیرویو منحصر بفرد سوپرسونیک در تمامی پروب ها فعال بوده که تنها الاستوگرافی دقیق و قابل اعتماد و دارای تاییدیه آمریکا می باشد که امکان بررسی کلیه توده ها از قبیل توده های پستان، تیروئید، پروستات و کبد را فراهم می کند و همچنین دارای الاستوگرافی جهت بررسی عضلات، عصب و تاندونها (*MSK*) نیز می باشد.

Liver Fibrosis Assessment : دستگاه دارای دقیق ترین ابزار جهت بررسی فیبروز کبد، با قابلیت نمایش *Real Time* و اندازه گیری بصورت کمی و کیفی بوده و همچنین دارای پارامترهای اندازه گیری و تشخیص گرید کبد چرب بصورت کمی نیز می باشد.

AngioPLUS : جدیدترین تکنیک تصویربرداری در آشکارسازی و نمایش عروق بسیار ریز با جریان و سرعت پایین بوده و امکان نمایش *MicroVascular Flow* در شکم و بافت های سطحی را فراهم می سازد که امکان بررسی خون رسانی توده های مختلف را به کاربر می دهد.

TriVu : قابلیت تصویربرداری و نمایش همزمان سه مد: *2D*، الاستوگرافی*ShearWave* و *Color* که امکان بررسی همزمان *Stiffness* و خون رسانی بافت و توده های مختلف را فراهم می سازد.

Image Quality : مشاهده بیشترین جزئیات آناتومیکی در سونوگرافی بارداری، زنان، *Breast*، *MSK*، شکم، لگن، تیروئید، اندام، کبد، کلیه و *General* با بهره مندی از تکنولوژی *Single Crystal* در ساخت پروب و نیز نرم افزارهای پیشرفته جهت پردازش تصویر در دو حالت *Real Time* و *Post Processing*

شرکت تن آسا طب نوین (نماینده انحصاری کمپانی سوپرسونیک فرانسه و تراسون آمریکا در ایران)
تهران، خیابان سهروردی شمالی، کوچه کوروش، پلاک ۶۸، طبقه اول کدپستی ۱۵۵۹۷۱۳۷۱۵
فکس: ۸۸۵۲۷۶۹۴-۰۲۱ تلفن: ۸۸-۸۸۵۳۸۴۸۶ - ۰۲۱-۸۸۵۰۱۳۴۴
www.tanasateb.com

NOAVARAN

DARMAN ATLAS

moonray

COMPACT

SIMAD

X-RAY MEDICAL TECHNOLOGY

A **Sago Medica** Company

GENORAY

PAPAYA PLUS

Combination Imaging System

NOAVARAN
DARMAN ATLAS

Helianthus DBT
HIGH RESOLUTION MAMMOGRAPHY
METALTRONICA

ALPINION
MEDICAL SYSTEMS
XCUBE 90

www.noavaran-da.com
شماره تماس : ۰۲۱۸۸۵۳۶۲۷۱

mindray

healthcare within reach

Resona I9

Powered by ZST+ Platform

Innovation, in every facet

Contact Us!

شـرکت آرایـه زیستـی پیشرفتـه نماینده انحصـاری کمپـانی Mindray در ایـران

Arayeh Zisti Pishrafteh

SAMSUNG

Pursuit of Perfection

HERA W9

جدیدترین دستگاه Premium کمپانی سامسونگ ضمن تشخیص دقیق و ارائه تصاویر خیره کننده OB/GYN و رادیولوژی دارای ارگونومی مبتکرانه و پیشرفته جهت رضایت هرچه بیشتر شماست.

Step up confidence

V8/V7

محصول شاخص کمپانی سامسونگ که با کیفیت فوق العاده طیف وسیعی از نیازهای تصویر برداری را پوشش می دهد. دستگاه همه کاره ای که قابلیت های سیستمهای Premium ازجمله 2D-Shearwave,Fusion,MV-Flow Shadow HDR در آن ارائه شده است.

TAKVIN تکوین طب TEB

تهران - خیابان خرمشهر - خیابان عربعلی - خیابان هفتم - پلاک ۱۶
تلفن: ۸۸۱۷۹۵۰۱-۸ فاکس: ۸۸۱۷۹۵۰۹
www.takvin.net info@takvin.net

SAMSUNG

PhionCT

Cone-Beam CT

-قابلیت تصویربرداری

از نواحی متعدد بدن با قدرت تفکیک فضایی بالا و رزولوشن بهینه ی استخوانی از :

- ستون فقرات ، اندام ها ، سر و گردن ، دهان و دندان.

- دوز اشعه ی ایکس پایین تر

این دوز معادل یک چهارم اشعه ی دریافتی بیمار از دستگاه های سی تی اسکن معمولی می‌باشد .

- زمان اسکن سریع

زمان اسکن و بازسازی خودکار تصاویر در پلان مختلف ساژیتال، کرونال، اگزیال و سه بعدی کمتر از ۵۰ ثانیه.

- نصب و کاربری آسان

-عدم نیاز به ژنراتور برق سه فاز

- عدم نیاز به سرب کوبی اتاق ها

- CBCT با FOVبزرگ

به منظور اسکن از ناحیه دندان ، فک و صورت و اندام و ستون فقرات.

L&C AI

Phion 2.0

GMP MFDS KOREA ISO 13485:2016 CE

تهران، خیابان شریعتی، پایین تر از بهار شیراز، خیابان نیرو، پلاک۳ ، ساختمان تداک

(۰۲۱) ۷۷۵۰۰۳۳۳ (۰۲۱)۷۷۵۰۰۲۰۹ tepak.ir www.tepak.ir

تپاک (تدارکات پزشکی ایران کالا)

PHILIPS

MRI Systems

Excel in your daily MR services **helium-free**

BlueSeal magnet

Taimaz | www.taimaz.com

Products

A New Generation of Machines.
New Choices for Your Practice.

We bring innovations to the world of ultrasound imaging

Tel: +98 21 88195911
Fax: +98 21 88196112
URL: www.Hiradteb.com

شرکت مهندسی پزشکی
اندیشگران هیراد طب

DR 100s
A NEW FORCE IN MOBILE DR

- Customer Driven Design
- MUSICA intelligence
- First time right imaging
- Streamlined workflow
- Excellent ergonomics
- Enhanced productivity

Find out more, visit agfa.com

AGFA

PAYAMED

شرکت صنایع **پایامد** الکترونیک

تولیدکننده دستگاه های ماموگرافی با تکیه بر دانش بومی

CE 0068

PMA100-FD

Full Field Digital Mammography

- کیفیت عالی تصاویر
- کاهش دوز دریافتی بیمار
- راحتی بیمار و کاربر

تولیدکننده دستگاه های رادیوگرافی دیجیتال ستون زمینی و سقفی

DRX-FL

Floor Mounted Digital Radiography

DRX-CS

Ceiling Suspension Digital Radiography

تهران، خیابان وزرا، کوچه ۲۹، پلاک ۱۵

۰۲۱-۸۸۶۷۰۰۴۲

www.payamed.com

payamed.electronic

PAYAMED

شرکت صنایع **پایامد** الکترونیک

تولیدکننده انواع دستگاه های رادیوگرافی موبایل دیجیتال

SM-HF Plus

Digital Mobile Radiography

ارائه کننده انواع دستگاه های پانورکس دیجیتال و CT دندانی Myray ایتالیا

Hyperion X9 pro

3D Imaging System

Hyperion X5

2D CEPH Imaging System

www.payamed.com

payamed.electronic

تهران، خیابان وزرا، کوچه ۲۹، پلاک ۱۵

۰۲۱-۸۸۶۷۰۰۴۲

Digital Radiography / Software / OPG / C-ARM

شرکت دانش بنیان مهندسی آرین درمان پژوه

Radiographic X-Ray
Single Detector

Radiographic X-Ray
Ceiling Suspension

Radiographic X-Ray
Floor mounted

Radiographic X-Ray System
Extreme

C-Arm

Genoray Fluoroscopic X-Ray

Stitching Whole Body

OPG/Cephalometric

Worlds Premier Dental Imaging Company
vatech

Intra Oral X-Ray
Vatech Ez Ray

Fire CR Dental Reader
PSP

شرکت مهندسی
آرین درمان پژوه

۰۲۱-۴۱۸۵۲
www.adp.co.ir

تهران، خیابان مطهری، خیابان لارستان
خیابان افتخاری نیا غربی، پلاک ۲۱

شرکت مهرکام تجهیز

نماینده انحصاری کمپانی esaote ایتالیا

تولید کننده دستگاه های فوق پیشرفته سونوگرافی

مشاهده کاتالوگ ها

تهران، خیابان مطهری، خیابان میرعماد، کوچه چهاردهم، شماره ۳

mehrcom.ir واتس اپ ۰۹۰۲۶۵۰۸۱۹۳ تلفن ۸۸۷۵۱۰۹۹

PHILIPS

innovation you

It Understands Your Everyday
PHILIPS ULTRASOUND SYSTEM

PHILIPS

نماینده انحصاری اولتراسوند فیلیپس در ایران

تلفن : ۸۸۵۱۹۷۱۷-۲۰ - ۸۸۷۳۴۷۰۱

Web : www.tgsina.com

تجهیز گسترش سینا

SonoScape

Caring for Life through Innovation

شمیم سلامت پارگاد

● S60

Intelligence Empowers More

● P60

Intelligence Articulated

● X3

Lighten Your Imaging

● E1 EXP

Exactly To Your needs

شرکت شمیم سلامت پارگاد نماینده انحصاری کمپانی سونوگرافی SonoScape در ایران می‌باشد.

تهران، خیابان کریمخان زند، خیابان ایرانشهر، خیابان آذرشهر، پلاک ۳۸، واحد ۷ و ۸ تلفن: ۰۲۱۸۸۴۹۱۵۱۲