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**31st Annual Conference 2015**  
**Radiological Society of Pakistan**  
**Abstracts**

**ORAL PRESENTATIONS (O)**

**O-1**

**MRI of Shoulder joint**

Rashid Nazir

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**O-2**

**Painful foot - evaluation by ultrasound**

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Purpose of this presentation is to highlight the importance of ultrasound of foot as a first line investigation in patients with acute or chronic foot pain in the absence of trauma.

Advantages of ultrasound include real time imaging of tendon pathologies, synovial thickening and fluid, inflammation of bursae or soft tissues, mass lesions or plantar fasciitis etc.

In our experience at Radiology Department of PAF hospital Islamabad over a period of six months, out of seventy three patients referred for ultrasound or x-ray of foot, we found plantar fasciitis in 36 patients (49%) having sole pain with or without the presence of calcaneal spurs. Thirteen patients (17%) had tendonitis of long tendons of foot, six patients (8%) had Achilles tendonitis, cellulitis was found in diabetic foot of three patients (4%), while one was diagnosed as having Morton's neuroma. Rest of the patients had normal ultrasound. This yielded a 75% positive result overall.

Plantar fasciitis commonly presenting with thickening of plantar fascia is an easily detectable cause of foot pain. Thickening of tendons and soft tissues with surrounding fluid with hyperemia on Doppler indicates inflammation. Application of pressure for differentiation between Morton's Neuroma and intermetatarsal bursa is the advantage of real time ultrasound in forefoot neuralgia. Achilles tendon abnormalities including inflammation or tears are recognizable. Joint fluid, synovial thickening and presence of tophi in patients of arthritis can be detected with high accuracy and can be followed up for response to treatment. Doppler assessment of the soft tissues of foot helps in determining vascular supply of masses such as plantar fibromas, warts or Morton Neuromas, as well as detecting sites of active inflammation.

To conclude, real time ultrasound is a widely available, easy and cost effective imaging modality with advantage of contralateral comparison in assessment of foot pain.

**O-3**

**Diagnostic accuracy of DWI in differentiation of osteoporotic compression fracture vs malignant compression fracture**

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**ABSTRACT:** To evaluate the diagnostic accuracy of diffusion weighted images in differentiation of osteoporotic and malignant compression fractures.

**METHODS:** The study was conducted at the Khyber teaching hospital, Peshawar from 1st January 2015 to 1st July 2015. Forty five patients with vertebral compression fractures who were diagnosed on X-ray were included. Diffusion weighted sequences and apparent diffusion coefficient images on a 1.5 T MR scanner were obtained in all patients to identify the cause of the

vertebral compression fracture as benign or malignant. The observation was compared to histopathological findings.

**RESULTS:** Diffusion weighted MR imaging is found 90% sensitive, 82% specific and accuracy of 80% in differentiation of benign and malignant vertebral compression fracture. PPV and NPV was found to be 70% and 85% respectively.

**CONCLUSION:** DWI is a noninvasive accurate method to differentiate between benign and malignant compression fracture. Apparent diffusion coefficient values are of added benefit in differentiating between the two.

**O-4**

**X-RAY AND X-RAY CT OF IRANIAN AUTO MUMMIES**  
**Salt man Fractures diagnosed after 2000 years by X-ray and X-ray CT "non-medical X-ray use in Archeology"**

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**INTRODUCTION:** Very good penetrance of X-ray make it useful in radiography and CT - Scanning of paintings, artifacts, glasses, ceramics and even metallic objects especially in archeology. They are 3 types of auto-mummies, Ice MAN, Soup Man and salt man. There are 6 bodies of salt man is Iran, Rare in the world. They saved in salt mine from 1800 to 2000 years before. Salt man historical ages are 1800-2000 years measured by Radio active carbon 14 from years of powerful world emperor Sasanian "about 200 - 300 years before Islam". I managed imaging of salt man No: 1 and 4 by Radiographies, 2D CT and 3D CT. There are multiple Fractures in bodies of salt man from an earthquake occurred 1800-2000 years before. These fractures are waited so many years for X-ray of Roentgen and CT SCAN of Hansfield to assessment. There are multiple skulls, long bones, Rib and other bones fractures demonstrated by images.

**MATERIALS AND METHODS:** The first mummy was found in Hamzeloo village of Zanjan province (North west of Iran) in 1993 at a salt mine near Chehrabad River, that contained Lt. shoulder, neck, skull, left leg and a foot sole inside a precious boot.

At history of cultural anthropology there are three kinds of mummies: 1- Ice man who was found at Alpine mountain, and melted gradually after discovery "needs conservation in low temperature".

2- Soap men which were fatty, and when they had contact with clay there was a combination of fat and clay "kind of soap" that covered the corps, and made it a mummy.

3- Salt men which were salty and dry, like smoked fish, because salt stone mine is sterile, and dehydrated. As X-Ray penetrates painting canvas, Ceramic, wooden things, metal things, it can help us for knowing about ancient human beings. we can pass X-ray from bodies, and even graves. ( special portable X-ray unit).

**SCIENTIFIC ACTIONS ON SALT MEN INCLUDE :** Plain X-ray, X-ray - CT Scan, Sectional Scan and secondary tridimensional reconstruction, spectroscopy with high energy, hair DNA research for diagnosing of blood group type, and genetic, using calculation of radioactive carbon No 14 half life for finding historical age, DNA printing, chromatography of thin layer of cloth color, microbiology, determining of rare elements, knowing about cloth pattern, and shoes cut, archeological procedures, tools metallurgy, sexology with finding beard and mustache and in cases without any hairs (Salt man number 4) we had to do pelvic X-ray result, and finally it was a 15.5 - 16 years - old boy. (Age from wrist and palm and thumb bones).

1- First salt man complete investigation has done on it, and we have to use CAD-CAM method and SLA machine to build polymer similar of its head and neck bones.

2- Second salt man: It is a complete skeleton of body without meat, skin and hair.

3- Third salt man contained some skeleton and some skin and hair. Pelvic parts of case No 2, and case No 3 were deficient, and they have to go for X- ray after rebuilding.

4- The fourth salt man who was though a woman was mummified spontaneously completely with clothes, jars, knife and shoes. Distance of elbows and hands were longer than Gantry of CT "65cm". Therefore it was studied in CT with Gantry 70 cm. Mummy position looks like he was escaping and ceiling has fallen on him and he was killed with a pitiful condition.

5- Pelvic X- ray, DNA investigation, and genetic investigation showed its sexuality, and he was 15.5 -16 year old " epiphysis of thumb finger" and it was a man. "Acute angle under pubis symphysis at pelvic bone which is under 60° in men and above 110° in women".

6- The first salt man had earrings and seemed rich and like a chief officer or general but the forth salt man had silver earrings and looked like a worker.

7- The fifth and sixth salt man are found but they are not investigated. They are complete, and the sixth salt man is still inside mine.

**FINDINGS AND RESULT:** There were nothing found at the first salt man X- ray at legal-medicine, but at two dimensional and three dimensional X- ray CT showed obvious orbital fractures, and shrank brain tissue showed the position of his long sleep. Gold earrings and his precious hand made boot with tall body told us maybe he had been senior officer. There were lots of stones and sands in the boot and because of shrinking the leather the length of sole was reduced and bones were compressed and over-riden.

It's skin changed and reached to a density like a bone or sand. It was from 1800 - 2000 years ago that belonged to Sasanian period, and before coming Islam to Iran. Real age was 40 year - old " teeth investigation". Apparent from of corpus, Geographic topography, and radiological actions are at booklet of Iran cultural heritage. Nowadays the first salt man is keeping at Iran Ancient Museum in Tehran, the second, the third, the forth salt men are keeping at Rakhtshoykhan museum in Zanjan. The sixth salt man is in mine and the mine is under discovering.

## O-5

### Role of CT cisternography in the diagnosis of cerebrospinal fluid rhinorrhea with diagnostic nasal endoscopy and surgical correlation

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**OBJECTIVES:** To analyse the usefulness and accuracy of CT cisternography in the diagnosis of cerebrospinal fluid (CSF) leak with diagnostic sinonasal endoscopy and surgical correlation.

**MATERIAL AND METHODS:** This is a retrospective study conducted at Karachi Xrays and CT scan Centre from November 2011 till July 2015. Eighteen patients with clinically suspected CSF rhinorrhea were examined for CSF leak by CT cisternography. The CT imaging technique included 1mm thin slices in coronal, sagittal and axial views through base of the skull and paranasal sinuses in prone position before and after lumbar contrast injection. CT findings were correlated with diagnostic sinonasal endoscopy and surgical findings.

**RESULTS:** CT cisternography was positive for CSF leak in 12 patients and negative in 6 patients. Out of 12 patients with positive CSF leak, finding was confirmed by sinonasal endoscopy in 7 patients and by surgery in 2 patients. Three patients were managed conservatively. Six out of 12 patients were negative for CSF leak on CT cisternography. All six underwent diagnostic endoscopy and one out of six had small CSF leak. The accuracy for diagnosis of CSF leak by CT cisternography is 94%, sensitivity is 92% and specificity is 100%.

**CONCLUSION:** Though minimally invasive CT cisternography is a useful and accurate study in diagnosing and localizing, site and extent of CSF leak.

## O-6

### Accuracy of High Resolution Computed Tomography of temporal bone in diagnosis of Cholesteatoma; in correlation with surgical findings

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**BACKGROUND:** Cholesteatoma is a destructive and expanding non-cancerous cystlike mass consisting of desquamating debris frequently including cholesterol in the middle ear and/or mastoid process. Temporal bone imaging is challenging and involves thorough & accurate understanding of the anatomy, especially in relation to high resolution CT imaging, depicting the small structures of the middle and inner ear cavity and it turns out to be the best and most sensitive modality for diagnosing and localizing the extent of disease, when there is a query of cholesteatoma on otoscopic examination.

**AIMS AND OBJECTIVES:** The aim of our study is to determine the characteristic HRCT findings in patients with suspicion of cholesteatoma; to identify the prevalence of cholesteatoma in wide range of age group and calculate sensitivity and diagnostic accuracy of this imaging modality in relation to surgical and histopathological outcome.

**MATERIALS AND METHODS:** This was a retrospective study conducted at Karachi X-rays and CT scan centre from January 2014 till July 2015. Sixty-two consecutive patients underwent HRCT temporal bone, who presented with various ear complaints and clinical suspicion of cholesteatoma. Intravenous contrast was given in few patients with suspicion of intracranial extension. Gender distribution was 30 male, 32 female, Age range: 3months-78years. Preoperative radiological data were correlated with surgical and histopathological findings.

**RESULTS:** The study showed that there is high incidence of cholesteatoma in 3rd-4th decade of life (age range 20-45). No definite gender predilection seen. Fourteen out of 62 patients were diagnosed to have cholesteatoma on imaging, out of which 10 patients subsequently underwent surgery and had positive correlation. Two were lost to follow and 2 were diagnosed with fungal infection on histopathology. All patients had soft tissue density in the middle ear (100%); 11 (91%) had erosion of scutum; 08 (66%) had erosion of the ossicles, and 09 (75%) had tegmen tympani erosion. The correlation of pre-operative CT with surgical and histopathological findings was excellent having diagnostic accuracy of 97%, sensitivity of 100% and specificity of 96%.

**CONCLUSION:** The importance of HRCT imaging lies in the early detection of cholesteatoma leading to prompt surgical intervention for disease management and avoid possible complications.

## O-7

### Assessment of correlation between electrodiagnostic and ultrasonographic findings in patients with carpal tunnel syndrome

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**BACKGROUND:** Carpal tunnel syndrome (CTS) is the most commonly diagnosed entrapment neuropathy of the upper extremity. It accounts for 90% of all entrapment neuropathies. The diagnosis of CTS involves combination of a detailed clinical history, accurate examination, and appropriate electrodiagnostic studies (EDS) High resolution ultrasound (HRUS) has emerged as a feasible, simple, relatively low-cost, rapid, accurate, and noninvasive imaging method for evaluating the MN in the carpal tunnel.

**OBJECTIVE:** To evaluate the relationship between electrodiagnostic studies and high resolution ultrasonography (HRUS) in assessing the severity of carpal tunnel syndrome (CTS).

**MATERIALS AND METHODS:** A prospective cross sectional study of 32 patients with symptoms of CTS attending the Neurology outpatient department (OPD) at Services Hospital. Electrodiagnostic studies including nerve conduction studies and electromyography of median nerve were performed at the wrist for all patients with clinically suspected CTS to assess severity of carpal tunnel syndrome. High resolution ultrasound (HRUS) was performed at wrists of all patients with different severity of CTS (as proved by NCS). The cross sectional area (CSA) of the median nerve (MN) was obtained using HRUS at the carpal tunnel inlet by direct tracing method. Then, comparisons between ultrasonography and nerve conduction study were made. The grading severity according to nerve conduction study was used as a gold standard reference.

**RESULTS:** 32 patients included in the study (25 women and 7 men). Only 23 (72%) of the 32 patients had bilateral CTS, while the remaining 9 patients (28%) had unilateral CTS. Of these 55 diseased wrists, 20 (36%) showed mild, 25(45%) showed moderate, and 10(18%) showed severe CTS according to electrophysiologic results. US measurement of cross sectional area (CSA) could give information about severity of MN involvement and ultrasound cut-off points that discriminate between different grades of CTS severity are as follows: 10.0–13.0 mm<sup>2</sup> for mild, >13.0–15.0 mm<sup>2</sup> for moderate, and >15.0 mm<sup>2</sup> for severe symptoms. On assessing the correlation among modalities assessed, a highly significant positive correlation was observed between the conduction abnormalities of the median nerve as detected by electrodiagnostic tests and the measurement of the cross-sectional area of the nerve by US (P<0.05).

**CONCLUSION:** High-frequency US examination of the median nerve and measurement of its cross-sectional area should be strongly considered as a new alternative diagnostic modality for the evaluation of CTS. In addition to being of high diagnostic accuracy it is able to define the cause of nerve compression and aids treatment planning. US also provides a reliable method for following the response to therapy.

## O-8

### Role of MRI in soccer related musculoskeletal injuries of the pelvis

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To determine the pattern of soccer related injuries of the pelvis on MRI

**MATERIAL AND METHODS:** This retrospective study was performed at the Radiology and Imaging dept. (SULEMAN HABIB HOSPITAL, BUREDAH, SAUDI ARAB ) from March 2015 to August 2015. 35 cases of Pelvic MRI, studied with MRI were retrospectively evaluated to identify the Pattern of musculoskeletal injuries.

**RESULTS:** Injuries of symphysis pubis, adductor longus and rectus abdominus including First-degree strains, or stretch injuries, partial-thickness tears of the myotendinous junction, Complete myotendinous rupture and tendon avulsions were commonest among the pelvic injuries.

**CONCLUSION:** Soccer -related injuries around the hip and groin are a diverse group of injuries that can be difficult to diagnose and manage and often require a multidisciplinary team of caregivers. MRI can be extremely helpful in the diagnosis and triage of these patients and may expedite their return to soccer.

## O-9

### Diffusion tensor imaging of the brain: Concepts and applications

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Diffusion tensor imaging is a recent advancement of the basic diffusion weighted images and has unprecedented ability to map the structural organization of the

brain. This has a multitude of applications in basic as well as clinical medicine. The DTI imaging depends on the anisotropic diffusion of water molecules and is carried out by applying the gradients along many directions. The data acquired is then plotted in a matrix and is solved using diagonalisation. This generates Eigen values and Eigen vectors which in turn are used to calculate the diffusion parameters such as *Fractional anisotropy, TRACE, Relative anisotropy*, etc. The fractional anisotropy maps are then utilized to perform *tractography* using either deterministic or probabilistic algorithms.

DTI including tractography has numerous clinical applications especially in the field of neurology including white matter disorders, developmental brain disorders among many others. However, it's most important role is in brain tumour imaging where it is used to determine white matter involvement by the tumour and in pre-surgical planning.

DTI is now being utilized frequently in the western countries. However, in Pakistan, it is still unfamiliar to many and the purpose of this article is to enlighten our audience regarding the basic principles, interpretation and applications of DTI imaging.

## O-10

### Diagnostic Accuracy of Diffusion weighted MRI for differentiation of benign from metastatic vertebral compression fracture

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**BACKGROUND:** Vertebral metastasis is common and can be seen in 10% of all patients with cancer. Diffusion weighted magnetic resonance imaging is a safe, accurate and excellent non-invasive modality to differentiate vertebral compression fracture from benign and malignant causes. Conventional MR techniques cannot always be used to differentiate benign from malignant lesions because of their similar appearances as osteopenic or infective compression fracture can be indistinguishable with metastatic compression in the acute phase.

As DWI is highly sensitive to cellularity and free water micromolecular mobility, DWI should be useful in differentiating between vertebral body compression fractures caused by malignant (tumour) and benign (infection and osteoporotic) lesions.

To diagnose cause of vertebral compression fracture is of paramount clinical importance because benign and malignant collapses have different management and outcomes. Though multiple studies have been carried out in different countries in the past; however its diagnostic accuracy is still questionable due to variation in terms of sensitivity and specificity of DW Imaging in detecting the disease process.

**OBJECTIVE:** To determine the diagnostic accuracy of diffusion weighted (DWI) magnetic resonance imaging for detection of metastatic vertebral compression fractures taking histopathology as gold standard.

## O-11

### Value of DW-Imaging & MR spectroscopy in evaluation of leukodystrophies

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Dysmyelinating diseases, or leukodystrophies, encompass a wide spectrum of inherited neurodegenerative disorders affecting the integrity of myelin in the brain and peripheral nerves. Most of these disorders fall into one of three categories - lysosomal storage diseases, peroxisomal disorders, and diseases caused by mitochondrial dysfunction - and each leukodystrophy has distinctive clinical, biochemical, pathologic, and radiologic features. Magnetic resonance

(MR) imaging has become the primary imaging modality in patients with leukodystrophy and plays an important role in the identification, localization, and characterization of underlying white matter abnormalities in affected patients. MR imaging has also been extensively used to monitor the natural progression of various white matter disorders and the response to therapy. Although conventional magnetic resonance imaging has significantly contributed to recent progress in the diagnostic work-up of these diseases, diffusion-weighted imaging and MR-spectroscopy has the potential to further improve our understanding of underlying pathological processes and their dynamics through the assessment of normal and abnormal diffusion properties of cerebral white matter. Evaluation of conventional diffusion weighted and ADC map images allows the detection of major diffusion abnormalities and the identification of various edema types, of which the so-called myelin edema is particularly relevant to leukodystrophies. Depending on the nature of histopathological changes, stage and progression gradient of diseases, various diffusion weighted & MRS imaging patterns may be seen in leukodystrophies.

### O-12

#### A review of practical aspects and diagnostic value of DWIBS

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Diffusion-weighted magnetic resonance imaging (DWI) provides functional information and can be used for the detection and characterization of pathologic processes, including malignant tumors; it may therefore be of value in staging and follow-up imaging of malignant tumors. Like bone scanning, whole body MRI offers a whole-body overview of disease and hence is particularly useful in assessing diseases that infiltrate throughout the body, such as carcinoma and lymphoma.

First purpose of this review is to acquaint the reader with the basics and features of DWIBS. Second, although evidence regarding its effectiveness is still limited, the potential applications of DWIBS in oncology will be described and illustrated. Finally, drawbacks, limitations, and future considerations of DWIBS will be discussed.

### O-13

#### A review of role of diffusion weighted MRI in gynaecological malignancies

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Diffusion-weighted imaging (DWI) reflects changes in proton mobility caused by pathological alterations of tissue cellularity, cellular membrane integrity, extracellular space perfusion, and fluid viscosity. Functional imaging is becoming increasingly important in the evaluation of cancer patients because of the limitations of morphologic imaging. DWI is being applied to the detection and characterization of tumors and the evaluation of treatment response in patients with cancer. The advantages of DWI include its cost-effectiveness and brevity of execution, its complete noninvasiveness, its lack of ionizing radiation, and the fact that it does not require injection of contrast material, thus enabling its use in patients with renal dysfunction. In this review, we describe the clinical application of DWI to gynecological disorders and its diagnostic efficacy therein.

### O-14

#### Diffusion weighted MRI for discriminating Brain Abscess from necrotic tumor - An excellent guiding tool for Neurosurgeons

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**OBJECTIVE:** To determine the diagnostic accuracy of Diffusion Weighted Magnetic Resonance Imaging in discriminating brain abscess from necrotic brain tumor using histopathology as gold standard in our population.

**STUDY DESIGN:** Descriptive cross sectional study (On going).

**PLACE AND DURATION OF STUDY:** Department of Radiology, Jinnah Postgraduate Medical Center, Karachi, from January 2015 to date. Data till October 2015 is included in study.

**METHODOLOGY:** Diffusion weighted imaging (DWI) was performed on 83 patients with clinical suspicion of brain abscess referred from Neurosurgery. These lesions were characterized as brain abscess or necrotic neoplastic lesion on the basis of diffusion restriction properties and ADC values. Correlation was done with histopathology obtained. Sensitivity, specificity, positive and negative predictive values and diagnostic accuracy of DWI were calculated. Comparisons of mean ADC values of abscess and neoplastic lesions were also done using t-test.

**RESULTS:** DWI had a sensitivity of 100%, specificity of 97%, positive predictive value of 98%, negative predictive value of 100% and diagnostic accuracy of 98.7% in differentiating brain abscess from neoplastic brain lesions. Mean ADC values in central cavity of neoplastic lesions and brain abscesses were calculated with significant p-value of 0.001 and 0.025 respectively.

**CONCLUSION:** Diffusion weighted MRI is an advanced non-invasive MR technique that adds important physiological information to that obtained with conventional MRI. It should be included in the routine imaging workup of all patients with suspected brain abscess.

### O-16

#### Imaging of RCC

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### O-17

#### Management of uro-oncology patients; how and where can Interventional Radiology help?

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Interventional Radiology (IR) is subjugating an increasingly prominent role in the care of patients with cancer, with its involvement from the initial diagnosis, right through to the treatment of the malignancy and its complications. Adequate diagnostic samples can be obtained under image guidance by percutaneous biopsy and needle aspiration in an accurate and minimally invasive manner. IR techniques may be used to place central venous access devices with well-established safety and efficacy.

Therapeutic applications of IR in the oncology patient include local tumor treatments such as transarterial embolization and radiofrequency ablation, as well as management of complications of malignancy such as pain, organ obstruction, and venous access.

In this review we will discuss main renal and prostatic tumor management by interventional radiologist. Review updated protocols, when to intervene and when not, tricks and treat of doing a procedure along with management of the complications.

**O-18****Urinary bladder malignancies - transitional cell carcinoma**

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In this review we detail imaging features of urinary bladder cancer with specific emphasis on multiparametric MRI. Included is a review of the staging system, imaging findings during various stages of the disease, as well as treatment and surveillance.

**O-19****Bladder tumors other than TCC**

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**O-20****Dynamic prostate MRI**

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**O-21****TRUS guided prostate biopsy for screening cancer - who, when, how**

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Prostate cancer screening is a very controversial topic with varying guidelines across various societies and regions regarding who should be offered screening, when (at what age) and what should be the methodology. Should we do S/PSA (serum PSA) alone with DRE (digital rectal examination); when biopsy should be considered and what should be the total number of cores to be taken?

All of the above mentioned issues become even more important considering many of these cancers will remain indolent and many patients die with prostate cancer rather than of prostate cancer. Screening may detect low risk cancers not needing treatment rather watchful waiting or active surveillance alone is treatment of choice. That means patient needs follow up with S/PSA and interval biopsies. There are further pros and cons regarding cost effectiveness of this approach as TRUS guided prostate biopsy has inherent risks of infection leading to sepsis requiring hospitalization.

This review will look at TRUS biopsy with emphasis on prostate cancer screening as per NCCN guidelines from February 2015.

**O-22****Paediatric trauma protocols and guidelines**

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No formal paediatric trauma guidelines are available in literature. Most hospital in UK used to follow adult guidelines to image children with trauma which lead to unnecessary examinations and radiation doses. Paediatric trauma pattern and sites is significantly different from adult trauma. Relative elasticity in children does protect them in certain areas and most paediatric trauma is in the periphery. Recently a group of paediatric radiologists developed the paediatric

trauma protocols under the guidance of Royal college of Radiology for imaging children involved in major blunt trauma. The purpose of the review is to explain the recommended protocols and guidelines, reasons for the imaging recommendations and difference of paediatric population with adults.

**O-23****Acute abdomen in children**

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**O-24****Use of MR Spectroscopy in diagnosis and classification of leukodystrophies in infants**

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**OBJECTIVE:** Objective of this study is to demonstrate the use of MR Spectroscopy in diagnosis and classification of leukodystrophies in infants.

**MATERIAL AND METHOD:** 10 Infants with age group of less than 2 years are chosen after demonstrating white matter abnormal signals on MRI and MR Spectroscopy is performed by placing ROI in basal ganglia region whether it is normal or abnormal and spectrum is interpreted and further classified on the basis of different brain metabolites peaks.

**RESULTS:** MR Spectroscopic pattern is found determinative of leukodystrophies and their further characterization in all infants.

**CONCLUSION:** MR Spectroscopy is found diagnostic of leukodystrophies in infants and their further characterization.

**O-25****Frequency of rare disorders of spinal dysraphism in view of MRI findings of dysraphism patients**

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**AIM:** To determine the frequency of rare disorders of spinal dysraphism in view of MRI findings of spinal dysraphism patients.

**STUDY DESIGN:** Cross sectional survey.

**DURATION:** The study was conducted from 1st June 2015 to 31st August 2015.

**SETTINGS:** Radiology department, Allied hospital Faisalabad.

**METHODS:** A total of 20 consecutive pediatric age group patients presented with clinical diagnosis of spinal dysraphism were included. MRI L/S spine was carried out on 1.5Tesla Philips and diagnosis of various disorders of spinal dysraphism was made.

**CONCLUSION:** Magnetic resonance imaging is the first-choice examination for the detection of occult spinal dysraphism, thus improving surgical & medical outcome as well as better & long term care of patients with spinal dysraphism. Majority of patients in the current study had tethered cord, myelomeningocele & diastematomyelia followed by associated spinal lipomas & dermal sinus tract.

**O-26****MR Characterization of Cardiac SOL in Paediatric Age group**

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**O-27****Spectrum of inner ear anomalies in children presented with sensorineural hearing loss**

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Congenital sensorineural hearing loss is one of the most common birth defects with incidence of approximately 1:1000 live births. Imaging of cases of congenital sensorineural hearing loss is frequently performed in an attempt to determine the underlying pathology. There is a paucity of literature from Pakistan and for this reason we decided to conduct this study in Pakistani context to evaluate various inner ear anomalies by MRI with 3D scan of inner ear in children hospital and institute of child health, Lahore.

**OBJECTIVE:** The purpose of this work was to study the diagnostic value of MRI in children with sensorineural hearing loss and to analyze anatomic abnormalities of the inner ear and the vestibulocochlear nerve in this patient group.

**MATERIAL AND METHODS:** A total of 120 children with congenital deafness (72 males and 48 females), between June 2009 to June 2015 were included in the study and they were assessed radiologically by MRI with 3D scan of inner ear.

**RESULTS:** In the present study we found various congenital anomalies of bony labyrinth and vestibulocochlear nerve. Out of 240 inner ears we found 38 anomalous inner ears. Out of these 38 inner ears 27 had cochlear anomaly, 68 had anomalous vestibule, 4 had anomalous IAC, and 13 had abnormal cochleovestibular nerves.

**CONCLUSION:** In present study, we found lower incidences of congenital anomalies comparative to existing literature.

**O-28****Paediatric radiology & its challenges**

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Paediatric radiology is a sub specialty of radiology involving the images of fetuses, infants, children, adolescents, and young adults. Specialty has to take into account the dynamic of growing body, from pre-term infants to large adolescents, where the organs follow growth patterns and phases. These require specialized imaging and treatment, which has all the facilities necessary to treat children and their specific pathologies.

To successfully diagnose a condition, high quality images are required. Rooms must have child friendly environment. Staff shall wear colourful uniform to gain the confidence of the child.

Radiation shall be kept as low as possible by using specific machines (X-ray, CT) with special protocols for children and by using alternate modalities like ultrasound, MRI more frequently.

**O-29****Approach to ultrasound examination of infant spine**

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Spinal ultrasound is the first line screening test in neonates and infant with suspicious of spinal dysraphism and can be useful in the detection of tumours, vascular malformations and evaluation cases of trauma. The advantages of spinal ultrasound are it have the real time visualization of tissue planes, blood vessels and nerves, it is cheap, readily available, lacks of radiation hazard, it also has a diagnostic sensitivity equal to MRI, and unlike MRI, spinal ultrasound can be performed without the need for sedation or general anaesthesia. In addition, MRI is dependent on many factor as those affecting resolution, including patient movement, normal motion of cerebral spinal fluid pulsation and vascular flow, those factors do not affect the spinal ultrasound. The aim of this presentation is to give a review regarding the indication, protocol of examination, normal anatomy and anatomical variant, and common pathology of spine in neonate and infant using spinal ultrasound.

**O-30****Differentiating common pulmonary diseases on HRCT**

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**O-31****Clinical applications of 128 slice coronary CT scan**

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**BACKGROUND:** Coronary artery disease is one the leading cause of morbidity & mortality in Pakistan as well as worldwide & its incidence is steeply rising in Pakistan. Cardiac imaging is a challenges of 21st century & is answered by 128 slice dual source CT as it has good temporal resolution, high scanning speed as well as low radiation dose & is non invasive & operator independent.

**AIM:** To use non invasive technique (128 slice cardiac CT) as a primary modality of choice as compared to invasive conventional catheter cardiac angiography for evaluation & follow up of various conditions related to heart & great vessels.

**O-32****Diagnostic accuracy of 320 slice Computed Tomography in identifying malignancy in solitary pulmonary lesions**

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**OBJECTIVE:** The aim of this study is to evaluate the diagnostic value of 320 slice Computed Tomography (CT) for identifying malignancy in solitary pulmonary lesions (SPLs) taking histopathology as a gold standard.

**MATERIALS AND METHODS:** We performed a prospective cross-sectional validation study on a group of one hundred and twelve patients which were referred for characterization of solitary pulmonary lesions (SPLs) by CT guided biopsy from 01-07-2013 to 31-07-2015 at the Radiology department, Shifa International Hospital, Islamabad, after seeking institutional review board approval. CT scan chest was performed for each patient prior to biopsy and these lesions were analyzed by size, nature of margins, internal attenuation, presence or absence of cavitation and intra nodular fat and calcium and then were categorized as benign or malignant. It was followed by CT guided Biopsy. Histopathological diagnosis from tissue samples was taken as the gold standard.

**RESULTS:** Among the 112 patients, there were 78 males and 34 females. Patients were in age range between 12 to 89 years. CT was found to be 71 % sensitive, 86% specific and 95% accurate for diagnosing malignancy in solitary pulmonary lesions while PPV and NPV were 95% and 96 % respectively.

**CONCLUSION:** 320 slice MDCT shows improved specificity as compared to earlier generations of CT scan in diagnosing malignancy in solitary pulmonary lesions, however diagnostic accuracy is still suboptimal and it cannot be used as a definitive diagnostic tool for diagnosing malignancy in solitary pulmonary lesions.

### O-33

#### Prevalence of normal variations of the coronary arterial vascular anatomy in our local population as observed on coronary CT angiography

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**INTRODUCTION:** Coronary vascular disease is on the rise across the world, and especially in the current generation of our population. It is necessary to establish a pattern of normal anatomical variations in our population as data obtained from international literature may not be reflective of our population and differences do exist between populations. Determining the prevalence of coronary artery variations on high resolution multi-detector CT would help to determine the variations in our population's frequencies from a diagnostic, interventional and surgical perspective.

**OBJECTIVE:** To determine the frequency of normal variations of the coronary arterial vascular anatomy in our local population ranging from 30 to 80 years of age as observed on multidetector-CT.

**STUDY DESIGN:** Cross Sectional study

**SETTINGS:** Radiology department, Shifa International Hospital, Islamabad both inpatient and outpatients.

**DURATION OF STUDY:** 12 months

**MATERIAL AND METHODS:** Coronary anatomy variations assessment was performed measuring frequency of variables in dominance of coronary circulation, as determined by origin of posterior descending artery and posterior lateral ventricular branches. Origin of the conus artery from either the right coronary artery or directly from the aorta with a separate ostium, sino-atrial nodal artery as a branch of the right coronary artery or circumflex artery, and the frequency of trifurcation of the left main artery. These variables were measured in a total of 398 subjects including 128 females and 270 males, using picture archiving and communication system (PACS) software and 3D reformats from Vitrea FX® software. Statistical analysis was performed and analyzed using SPSS (version 16). Effect modifiers like age and gender were controlled for by stratification, and were also expressed as percentage and frequency. Post-stratification Chi-square test was applied.

**RESULTS:** Out of 398 examined subjects, the percent of men and women assessed was 67.8 % and 32.2 % respectively. The mean age was 51.76 years  $\pm$  10.63 (SD). The conus artery was a branch of the right coronary 73.9 % and branch of the aorta 26.1 %, SA Nodal artery was 93.2 % from the right coronary and 6.8 % from the circumflex. The trifurcation of the left main coronary artery was observed in 46 % of the population and right, left and co-dominance of the coronary circulation was seen 82.9%, 11.1% and 6.0 % respectively. Using Chi-square test age or gender did not show statistically significant correlation with any of the examined variables except for gender with trifurcation with  $p < 0.05$ .

**CONCLUSION:** In conclusion, the frequency of coronary artery variations in the local population show a majority right conus artery origin (73.9 %), right coronary artery SA nodal artery branch (93.2 %), no trifurcation (54 %) and

right dominant circulation (82.9 %). Statistical significance was observed between trifurcation and gender, however age or gender did not show any similar significance with any other measured variable.

### O-34

#### Follow-up of Indeterminate Pulmonary Nodules in Osteosarcoma Patients, Does it Really Matter?

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**BACKGROUND:** Sarcoma metastasizes most frequently to the lung. Computed tomography (CT) frequently identifies small, un-calcified nodules of uncertain clinical significance which remain indeterminate. The aim of the study was to see how these nodules behaved in our patients.

**PATIENTS & METHODS:** We retrospectively reviewed chest CT scans of 62 sarcoma patients treated between April 2010 and April 2015 to see if small, indeterminate pulmonary nodules are of prognostic significance. 5 patients out of 67 had metastatic pulmonary nodules on baseline imaging and were excluded from study. Clinical notes were followed for 5 years post baseline imaging.

**RESULTS:** A total of 17/62 (27.4%) patients had indeterminate pulmonary nodules on baseline CT chest; 11 of these were  $\leq$ 4mm in size and 6 were  $>$ 4mm but  $<$ 10mm. In 12/17 (70.58%) patients, indeterminate nodules progressed to metastatic disease. However, only in 1/17 (5.88%) mets were in the area of the original indeterminate nodule and the rest of 11/17 (64.7%) patients had lung met remote from the site of indeterminate nodule. In 3/17 (17.6%) patients, nodules remained stable till last follow up while in 2/17 (11.76%), the nodules regressed.

**CONCLUSION:** Presence of indeterminate nodules predicts high risk of development of pulmonary metastasis which may be remote from the initial nodule.

### O-35

#### Validation of CT venography in diagnosis of deep vein thrombosis in patients with suspicion of pulmonary embolism

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**OBJECTIVE:** To assess the validity of CT venography in diagnosis of deep vein thrombosis in patients with suspicion of pulmonary embolism. (Findings on color Doppler sonography were taken as gold standard)

**MATERIALS AND METHODS:** In this study patients with strong suspicion of pulmonary embolism, meeting the inclusion and exclusion criteria of the study were included from October 1, 2014 to September 30, 2015. Indirect CT venography from iliac to calf veins was performed in every patient following the CT pulmonary angiogram. Doppler ultrasound was selected as gold standard. Findings on CT venography were compared with those on Doppler sonography. Data was analyzed on SPSS version 20 and overall sensitivity, specificity, positive and negative predictive value of CT venography was calculated. These values were also calculated individually for iliac, femoral and popliteal veins.

**RESULTS:** The early results show excellent sensitivity, specificity, positive and negative predictive values of CT venography. More patients will be included till the completion of study duration and the complete results will then be compiled.

**CONCLUSION:** The excellent sensitivity, specificity, positive and negative predictive values of CT venography make it a modality of choice for diagnosis of DVT in patients with strong suspicion of pulmonary embolism.



**O-36**

**CT aortography for pre-operative evaluation of aortic diseases with the use of 128 slice CT scanner**

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**PURPOSE:** To evaluate the reliability of 128-slice Multidetector computed tomographic (MDCT) angiography in differentiating different types of aortic diseases and for preoperative aortic morphologic assessment.

**MATERIALS AND METHODS:** 114 patients underwent pre-operative CT aortography on 128 slice Toshiba CT scanner in the radiology department of Rehman Medical Institute Peshawar, over a period of one year. With a breath-hold of 15 to 20 seconds and 1 or 2 mL/kg (80 to 150 mL) of nonionic contrast by power injector at 3 to 5 mL/s, axial images from above the arch to the femoral arteries were obtained and reconstructed at 0.5-1mm intervals. Pre-contrast scans were obtained in patients with symptoms of acute aortic syndrome. Axial images were reformatted to yield 2-dimensional (2D) images and 3-dimensional (3D) images. Images were reviewed on vitrea workstation for type and location of pathologic lesions. Imaging findings were compared with surgical findings.

**RESULTS:** The types of aortic abnormalities present in the patients included: Coarctation (25%), thoracic aortic aneurysms (22%), Thoraco-abdominal diffuse aortic ectasia (1%), Pseudo aneurysms/ Mycotic aneurysms (2%), Dissections (19%), PDA aneurysms (3%), Interrupted aorta (2%), Right sided aortic arch (2%), Kummels diverticulum (2%) and aortitis (2%), midaortic syndrome (1%) and leriche syndrome (1%). Atherosclerosis was seen in multiple Aortograms. Different anatomical congenital variations were seen; commonest was common origin of right brachiocephalic and left common carotid arteries. Aberrant subclavian artery was seen in 2 of the cases. Right sided aortic arch was also seen in 2 cases. The accuracy of diagnosis by CT was 100%.

**CONCLUSION:** MDCT with the use of multiplanar reconstruction enables highly accurate differentiation among diseases of the aorta. MDCT angiography with multiplanar and three-dimensional techniques should be the method of choice for preoperative morphologic assessment of aortic diseases in adult patients.

**O-37**

**Spectrum of MDCT angiographic findings of abdominal aortic aneurysms**

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**OBJECTIVES:** To describe the MDCT angiographic patterns of abdominal aortic aneurysms in a hospital based sample.

**MATERIALS AND METHODS:** A retrospective study was conducted in the Radiology Department of CMH Rawalpindi in which records of 157 patients referred for CTA abdomen and lower limbs from Feb 2012 to AUG 2015 were reviewed on work station. Image review was performed of MIP and volume-rendering technique reconstructions and axial images together. Window settings were selected interactively. A frequency table of the findings was prepared using SPSS version 22.0.

**RESULTS:** A total of 21 Patients were found to have abdominal aortic aneurysms. They were elderly (mean age, 72 years). Female to male ratio was 1:7. The mean diameter of the aneurysms was 6.1 cm and the mean length of the involved segment was 7.23 cm. Associated abnormalities pointing towards

impending rupture such as thrombosis, crescent sign and calcifications were also documented.

**CONCLUSIONS:** Of the total patients undergoing CT angiography of the abdomen and limbs the incidence of abdominal aortic aneurysms was 13%. This disease is predominantly seen in elderly male patients. A culture of follow-up of the disease needs to be established for diagnosing early signs of impending rupture and thus reducing mortality.

**O-38**

**Peripheral vascular disease Correlation of risk factors with outcome**

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Peripheral vascular disease affects 8-12 million people in the united states. Its true incidence is not known in Pakistan. Risk factors for peripheral vascular disease include diabetes, hypertension, dyslipidemias, history of smoking. These factors were considered in this study. A single reading of lipid profile was taken with the patient in fasting state. The parameters included serum cholesterol, triglycerides, LDL cholesterol, HDL cholesterol levels. Any abnormal parameter out of these was considered as dyslipidemia. History of smoking was taken. History of whether the patient was currently smoking as well as history of ex smoking was taken.

198 patients were included in the study. Out of these, outcome was normal in 35 patients (17.7%) and abnormal in 163 patients (82.3%). Each factor was considered along with the outcome. Hypertension was seen in 28 patients (14.1%), diabetes was noted in 71 patients (35.9%), dyslipidemias were seen in 38 patients (19.2%), history of current smoking was noted in 71 patients (35.9%). There were 47 ex smokers (23.7%). In all, 118 patients (59.6%) gave history of smoking at some stage of their life. Individual variables were correlated with outcome. Chi square test was applied with each individual variable. The results of significance are as under.

Sr#	Association	P values
1	Association of outcomes with hypertension	0.034
2	Association of outcomes with Diabetes Mellitus	0.31
3	Association of outcomes cholesterolemia	0.93
4	Association of outcomes with smoking	0.427

From the data available from our study, the only significant factor contributing to peripheral vascular disease was hypertension.

**O-39**

**Endovascular treatment in cavernous aneurysms**

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**OBJECTIVES:** To highlight the variable techniques for treating cavernous aneurysm depending upon its size/ shape and clinical presentations.

**METHODS:** 70 patients during interval of 5 years. 40 males and 30 females were included age ranging 12 to 70 years, mean age 36 years.

Prior to interventional procedure diagnostic DSA were performed on Biplane Siemen Artis Z. Depending on the location direction shape of the aneurysms different types of endovascular techniques were used ranging from ballooning, coiling, coiling with stunting or just stunting on all patient except on 3 patients were performed under GA.

**RESULTS:** Out of all 70 patient only one patient developed small ischemia change reverted back no other significant complication were occurred.

**CONCLUSION:** According to our experience of 70 cases endovascular treatment appears the preferred and safest choice of treatment for cavernous aneurysm with minimal complications. Still the parent artery occlusion is a choice of Endovascular Treatment in Cavernous Aneurysms.

**O-40****Differentiating neoplastic and infectious focal brain lesions on perfusion imaging**

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**OBJECTIVE:** To determine the diagnostic accuracy of perfusion weighted MRI in differentiating neoplastic and infectious brain lesions using histopathology as a gold standard.

**MATERIALS AND METHODS:** Five patients who had suspected space occupying focal brain lesions on plain CT brain underwent MRI for further evaluation after taking informed consent. A preload of paramagnetic contrast agent was administered 30 seconds before acquisition of dynamic images, followed by a standard dose 10 seconds after starting imaging acquisitions. The relative cerebral blood volume (rCBV) values were determined by calculating the regional cerebral blood volume in the solid areas of lesions, normalized to that of the contralateral normal-appearing white matter. Final diagnosis was confirmed by histological examination of surgical specimens from all patients.

**RESULTS:**

Out of five patients, three patients were classified as having neoplastic brain lesion and two as having infectious lesion. Perfusion weighted MRI showed neoplastic lesions had higher rCBV values ( $4.28 \pm 2.11$ ) than infectious lesions ( $0.63 \pm 0.49$ ) ( $p < 0.001$ ). When using arCBV value  $< 1.3$  as the parameter to define infectious lesions, the sensitivity of the method was 87.2% and the specificity was 70.6%.

**CONCLUSIONS:** An elevated discriminatory value for diagnosis of infectious brain lesions was observed in this sample of patients when the rCBV cutoff value was set to 1.3 suggesting that PWI is a useful complementary tool in distinguishing between infectious and neoplastic brain lesions.

**O-41****Diagnostic accuracy of skull radiographs in trauma patients for skull fractures**

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**PURPOSE:** Trauma is a leading cause of morbidity and mortality. The skull and brain is the second most common site of injury. The purpose of this study is to evaluate the benefits and limitations of skull radiographs in trauma patients.

**METHODS AND MATERIALS:** We diagnosed and studied 100 adults at PIMS with skull trauma between Jan 1, 2015 and July 31, 2015.

**RESULTS:** Our radiographic observations detected skull fractures in 45 patients. Thirteen (13) patients had brain injury but no fracture and therefore were not detected by radiographs. The sensitivity of radiographs was 0.61 and the negative predictive value was 0.44.

**CONCLUSION:** While radiography has limited utility in assessment of adult skull trauma, it is primarily useful in the initial detection of fractures in trauma patients. Although skull radiographs have insufficient sensitivity and negative predictive value, it can be used as a screening imaging test in hemodynamically stable adults with blunt skull trauma.

**O-42****Magnetization transfer MRI: A trump card sequence in the evaluation of infective meningitis**

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**OBJECTIVE:** The objective of this study is to determine the validity of MT-MRI sequence for the evaluation of infective meningitis in comparison with standard post-contrast T1 MRI sequence keeping CSF findings as gold standard.

**STUDY DESIGN:** Cross-Sectional (Validation) Study performed prospectively.

**SETTING:** Department of Diagnostic Radiology, Shifa International Hospital, Islamabad.

**DURATION:** 2 years

**SUBJECTS:** In this study, 52 consecutive patients who met the inclusion and exclusion criteria were enrolled.

**METHODS:** Magnetic resonance imaging (MRI) and CSF analysis was performed on all patients with suspicion of meningitis based on history and clinical examination. Findings on standard post contrast and MT-MRI sequences were compared with CSF analysis.

**RESULTS:** The standard post-contrast T1 MRI sequence had sensitivity, specificity, positive predictive value and negative predictive values of 68.42%, 85.71%, 92.86% and 50% respectively. In contrast the MT-MRI sequence showed an overall improvement in all parameters and had sensitivity, specificity, positive predictive value and negative predictive values of 92.11%, 92.86%, 97.22% and 81.25% respectively.

**CONCLUSION:** MT-MRI is a universally available sequence in most scanners that requires a few extra minutes of imaging but greatly increases yield as shown by this study.

**O-43****Conventional magnetic resonance imaging and magnetic resonance angiography findings in stroke and its etiologies**

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**PURPOSE:** Stroke can be evaluated with both conventional magnetic resonance imaging (MRI) and MR angiography (MRA) sequences. This article discusses the appearance of stroke on conventional MR sequences and MRA and their role in evaluating stroke etiologies.

**MATERIAL AND METHODS:** A prospective descriptive study was carried out at Radiology Department, Khyber Teaching Hospital Peshawar from January 2011 to June 2012. 52 consecutive patients with suspected or known stroke underwent MRI brain including T1, T2, FLAIR and DWI sequences along with contrast enhanced T1W and time of flight MR cerebral angiography. Scans were observed for findings in infarcts of different stages such as loss of normal vascular flow void in affected vessels and lack of vascular enhancement, FLAIR and T2W parenchymal abnormalities including Wallerian degeneration, parenchymal swelling, parenchymal enhancement, hemorrhagic components and MRA findings.

**RESULTS:** Out of 52 patients with stroke 41 (78.84%) were female and 11 (21.15%) were male. Mean age was  $50 \pm 5$  years. Acute infarcts were found in 38 (73.076%) patients, subacute infarcts in four patients and chronic infarcts in 10 (19.23%) patients. Loss of vascular flow voids and vascular enhancement was seen in 23.07% patients. Wallerian degeneration was found in two out of 10 patients with chronic infarcts. Acute hemorrhagic infarcts were seen in 20 (73.076%) patients. Vascular occlusions on MRA were found in nine patients.

**CONCLUSION:** MR imaging plays a primary role in the diagnosis of stroke and its etiologies. Conventional MRI can diagnose infarcts at all stages but are most sensitive after the hyperacute stage. Different complications such as hemorrhagic transformation, gliosis and wallerian degeneration can be seen on conventional MRI sequences but it was observed that detection of acute hemorrhagic infarct requires the use of a T2\* GRE susceptibility sequence since other conventional MRI sequences are not sensitive enough for acute bleeds. MRA is useful for determining the severity of stenosis, vascular occlusion, and collateral flow. MRA is also useful in the determination of stroke etiologies such as arteriovenous malformations and vasculitis.

#### O-44

##### Subarachnoid haemorrhage in cerebral venous sinus thrombosis - A diagnostic consideration

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**OBJECTIVES:** Subarachnoid haemorrhage (SAH) with cerebral venous sinus thrombosis (CVST) is a relatively rare entity and only a few case reports have been published in literature. However, it is important to recognize CVST as a cause of non-traumatic SAH because the treatment differs radically. In this study, we determined the frequency of SAH in patients with CVST and other imaging features associated with these.

**MATERIALS AND METHODS:** A retrospective study was carried out in Radiology Department, Aga Khan University. Patient data was gathered using Radiology information system and PACS. All the patients having CVST confirmed on MRV were included in the study. A consultant radiologist having more than 5 years of experience in neuroradiology and a fourth year radiology resident gathered the data. SPSS version 20 was used for statistical analysis.

**RESULTS:** A total of 138 patients with CVST confirmed on MRV were included in the study. A total of 15 (10.9%) patients had evidence of SAH. Majority (73.3%) had evidence of haemorrhagic venous infarcts. One patient had an infarct without haemorrhage and three had no infarcts. In 122 CVST patients without associated SAH, 70 (57.4%) patients had venous infarcts and 51 (41.8%) were haemorrhagic. The incidence of haemorrhagic venous infarcts was more in CVST patients having associated SAH as compared to those not having SAH. (p-value = .021)

**CONCLUSION:** Although SAH occurs rarely in patient with CVST, it is still important to recognize CVST as a cause of non-traumatic SAH as treatment for this radically differs from treatment for other causes of non-traumatic SAH.

#### O-45

##### Acute Toxic and Metabolic Encephalopathies - Spectrum of MRI findings

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Acute toxic-metabolic encephalopathy is an acute condition of global cerebral dysfunction encompassing delirium and the acute confusional state in the absence of primary structural brain disease. Toxic and metabolic encephalopathies are common among critically ill patients and usually present with seizures and focal neurological deficits.

A large number of conditions can present with similar clinical condition and MRI can help narrow the differential diagnosis. Also, in a patient with known exposure to a toxic agent, topographic distribution of the lesions can help exclude other causes of neurologic impairment. In general, toxic and acquired metabolic disorders produce a widespread, symmetric pattern of injury that

often involves the deep gray nuclei and cerebral cortex. Myelin, with its high lipid content is particularly vulnerable to lipophilic toxic substances.

The Objective of this talk is to pictorially demonstrate imaging spectrum of the common toxic and acquired metabolic encephalopathies and to formulate a differential diagnosis based on clinical and imaging findings which will help in correctly identifying the cause of encephalopathy.

#### O-46

##### Endovascular coiling of intracerebral aneurysms, our experience

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**OBJECTIVES:** There are two basic treatment available options for intra cerebral aneurysms namely surgical clipping and endovascular embolization with coils. Objective is to assess the results of Coiling of anterior and posterior circulation aneurysms.

**MATERIALS AND METHODS:** 130 patients were coiled between Jan 2014 to Sept 2015 in Department of interventional neuroradiology, Lahore General Hospital, Lahore. Patients were of both genders with age ranging from 22-65 yrs.

**RESULTS:** Out of 130 patients 90 were females (69.2%) and 40 (30.8 %) males. Maximum number of patients were in fifth and sixth decades. Coiling was successfully done in most of the patients with complications vaso spasm leading to infarction in 5 (3.8 %) and rupture of aneurysm in one (0.7 %) patient.

**CONCLUSION:** Endovascular coiling is better option for treatment of both anterior and posterior circulation aneurysms with less morbidity and mortality.

#### O-47

##### Tension Pneumocephalus: Conquering Mount Fuji In The Medical Intensive Care Unit

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We describe a series of cases of symptomatic tension pneumocranium; a rare, potentially life-threatening neurosurgical emergency usually a consequence of complications during intracranial surgical interventions.

Tension pneumocephalus is defined by intracranial subdural air causing mass effect on the brain. The development of relative negative intracranial pressure (IP), and 'one way valve' closure mechanism preventing egress of air are two postulated pathophysiological mechanisms of TP. Clinical presentation includes headache, agitation, delirium, pupillary changes and frontal lobe syndrome. Bruit hydroaerique, (a splashing noise on head movement) a pathognomonic sign of pneumocephalus has been noted in 7% cases.

The Mount Fuji sign is a characteristic finding that can be observed on computed tomographic (CT) scans of the brain, in which bilateral subdural hypoattenuating collections cause compression and separation of the frontal lobes. The collapsed frontal lobes and the widening of the interhemispheric space between the tips of the frontal lobes have the appearance of the silhouette of Mount Fuji — hence, the Mount Fuji sign.

The typical 'peaking' of frontal lobes is explained by the bridging veins entering the superior sagittal sinus, rupture of which can lead to subdural hematoma. Treatment options include supine or Trendelenburg positioning, surgical removal of intracranial air (craniotomy, needle aspiration via ventriculostomy placement), administration of 100% and repair of bone/dural defects.

Tension pneumocranium can behave like other intracranial mass lesions and cause worsening of the neurological status of patients. In cases of suspected pneumocranium, CT scan of the brain is the gold standard for diagnosis with ability to detect 0.5 cm of air. CT can play a vital role in determining the precise and definite location of the gas collection and the amount of mass effect on the brain which may need urgent recognition and intensive observation with decompression to minimize pressure over the brain parenchyma. Serial CT scans with close neurological follow-up is recommended until resolution of subdural air.

The radiologist's role on the trauma team is to promptly and accurately recognize and report the degree of injury. It is important to have a high index of suspicion to make the correct diagnosis as appropriate interventions will prevent morbidity and mortality in these patients.

#### O-48

##### **Pareidolia in Radiology and Imaging**

Jalal Jalal Shokouhi  
Iran.

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#### O-49

##### **Clinical application of diffusion tensor imaging and tractography**

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#### O-50

##### **MRI characterization of equivocal FDG PET/CT lesions in Cancer Patients**

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**OBJECTIVE:** To evaluate the role of MRI in characterizing equivocal lesions identified on FDG PET-CT in oncological patients.

**MATERIALS & METHODS:** Retrospective analysis of oncological patients who underwent whole body FDG PET-CT at SKMCH&RC. 43 patients who were advised regional MRI after FDG PET-CT from March 2010 to June 2015

were included in study. Accuracy of MRI was calculated on basis of imaging, histopathological and clinical follow up.

**RESULTS:** The data set included 16 (37.2%) females and 27 (62.8%) males with an average of 43 years ( $\pm 15.48$  SD). The major oncological patients in the study are DLBCL (23.3%) following CA lung (16.3%), gastric CA (14.0%) and esophageal CA (9.3%).

On PET-CT – total 18 (41%) patient had osseous lesions with 14 (32%) involving the axial skeleton, while visceral involvement was seen in 12 (27%) patient followed by 9 (20%) and 4 (9%) patients with brain / spinal and muscular / other involvement respectively.

There was agreement in FDG PET-CT and MRI characterization in 26/43 (60%) patients and disagreement in 14 (32%), while in 3 (7%) patients MRI was advised but not done. Accuracy and precision of MRI was calculated to be 92.5% & 90% respectively taking follow up (clinical, imaging & histopathological) as gold standard.

**CONCLUSION:** MRI is useful in characterizing equivocal and non-specific FDG PET-CT findings.

#### O-51

##### **Bomb blast Injuries: Diagnostic And Therapeutic Role of Radiology**

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**AIM:** To evaluate the imaging pattern, frequency and severity of bomb blast injuries. Delineate the therapeutic role of interventional radiology in the management.

**MATERIALS AND METHODS:** Retrospective study. We evaluated 200 patients who suffered bomb blast injuries and presented to our hospital during last 7 years. The patients who had at least one radiologic imaging (ie; X-ray, CT, MRI, Angiography) for their injuries were included. Radiological pattern, frequency and severity of the injuries were evaluated. The patients who underwent interventional procedure for the management for their injuries were also included. Evaluation of these procedures was done in terms of their success and clinical outcome.

**RESULTS:** Out of 200 patients 65 died due to significant injuries which were identified on imaging. Approximately 37 of the patients suffered severe head and neck injuries evident on imaging and who required immediate intervention. 90 suffered intra-abdominal injuries depicted on X-rays and CT. 35 patients underwent interventional radiology procedure for management of their injuries most common of which were the angiographic embolization for active bleed.

**CONCLUSION:** Because of the complexity of injuries encountered in bomb blasts, fast and accurate imaging plays an essential role in triage and evaluation of the injured. The imaging and interventional radiology is the crucial part of the first-line management in these patients. Knowing the radiological pattern of these injuries is of utmost importance and impacts the clinical outcome.

#### O-52

##### **Leadership and its role in radiology**

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**O-53****Multi-disciplinary team meetings and radiologist workload. Can radiology department continue to support them all?**

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**OBJECTIVE:** To quantify the increase in workload associated with multidisciplinary team meeting for radiologist workload in a tertiary care center over a 1 year period.

**MATERIALS AND METHODS:** For 1 year all work related to multidisciplinary clinical meetings was documented and later analysed.

**RESULTS:** Prospectively 177 meetings were held over 1 year (1st April 2014 to 31st March 2015) for 13 clinical specialities. There were 789 case discussions and a total of 1525 documented individual imaging studies reviewed. Residents preparation time was 10.18 hours/week, senior registrar's preparation time was 6.78 hours/week, consultant's preparation time was 3.39 hours/week. Delivery time of meeting was 5.78 hours/week.

**CONCLUSION:** Multidisciplinary team meeting now represent a significant workload of radiology & reduced the time dedicated to other academic activities within the department.

**O-54****Concordance of CT reporting by residents versus final reporting by faculty**

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**PURPOSE:** The objective of this study was to determine the concordance in provisional CT reporting by on-call residents with final reporting by the faculty.

**MATERIALS AND METHODS:** All CT scans performed during on call hours and initially interpreted by the oncall resident were included in this study from June 2012 to December 2012. Interpreted findings were then compared with those reported by a credentialed radiologist the next morning and discrepancy rates were assessed.

**RESULTS:** We included 156 CT reporting exams that were conducted during oncall hours during the duration of 6 months. Examinations were interpreted by senior residents on call and then the final report was reviewed and concordance rates were determined. Of the 156 examinations, 66 were reported by residents of training year III and 90 exams were interpreted by year IV residents. Of all the scans interpreted, 141 scans (90.3%) had no errors, 11 scans (7%) had minor discrepancies which were corrected in the reports, and 4 scans (2.5%) had major discrepancies, which required immediate corrective measures including intimation of the primary team. These errors led to change in management in 4 cases, increased patient morbidity in 3 cases, required additional imaging in 2 cases, necessitated or resulted in extended hospital stay in 1 patient and did not potentially alter the patients' clinical outcome in eleven of the cases.

**CONCLUSION:** The results of this investigation demonstrated significant concordance rate of on-call radiology resident opinion with final reporting. Similar reporting model can be put in place to reduce turnaround time for image interpretation which has a positive effect on the quality of patient care. It also boosts confidence at the end of the requesting primary team physicians relying on these preliminary interpretations made by radiology residents for patient management.

**O-55****Association of facet tropism with lumbar disc degeneration, disc bulge and disc herniation**

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Facet tropism is defined as asymmetry between right and left facet joints. This has been postulated to have possible association with degenerative changes in intervertebral disc as well as disc bulge and herniation. In the present study, 1.5 T MRI will be used to investigate association between

- facet tropism and degenerative changes in intervertebral discs
- facet tropism and disc bulges resulting in spinal stenosis and nerve root compression
- facet tropism and disc herniation

Fifty patients undergoing MRI of lumbosacral spine for low backache will be included in the study. Facet angles will be measured on the axial MRI images at L3-L4, L4-L5 and L5-S1 levels using the method described by Karacan et al. Degree of tropism will be recorded with an asymmetry of more than 7° regarded as significant. At the same time any degenerative changes in the disc at that level will be recorded. Presence and side of disc herniation at these levels will also be recorded. Any disc bulges resulting in spinal canal stenosis or nerve root compression will also be noted. Normal disc adjacent to the joint in the same subject will be used as control. Fischer Exact Test will then be used to determine if there is any statistically significant relationship between the variables;  $p < 0.05$  will be considered as significant.

**O-56****Role of Imaging Modalities in Diagnosis of HCC**

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**O-57****Brain Aneurysm Coiling**

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Cerebral aneurysms are estimated to affect approximately 2% of the population worldwide. Rupture of a cerebral aneurysm results in subarachnoid hemorrhage (SAH) and is associated with substantial mortality and morbidity. The rupture rate of an aneurysm is thought to vary with its size, location and morphological characteristics as well as patient's personal and family medical history, and these variables help to guide the clinical management of these lesions. For those aneurysms requiring treatment, two primary methods are used: microsurgical clipping or endovascular coiling.

In 2002, outcomes for patients with ruptured cerebral aneurysms were reported in the International Subarachnoid Aneurysm Trial (ISAT), a randomized, controlled clinical trial that compared the mortality and clinical outcomes of patients with aneurysmal SAH treated with either surgical clipping or endovascular coiling. The study reported that patients who underwent coiling had lower mortality and better outcome at 1 year than those who had open surgery. As a result of this trial, a change in practice pattern was followed with more ruptured aneurysms treated endovascularly. There has now been sufficient level I evidence and recommendation by the American college of cardiology and American heart association which establishes the endovascular role in treating aneurysms. The modality is scanty in our country and practiced in only few centers. The limitations are the skills and available resources to set up the modality.

The presentation will highlight the basics of the pathology and outcome of the endovascular treatment. I will also briefly describe the various techniques, the challenges, complications and our local experience.

**O-58****survival benefit of transarterial chemoembolization for hepatocellular carcinoma**

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**BACKGROUND:** Transarterial chemo-embolization (TACE) is a palliative treatment option for hepatocellular carcinoma (HCC) with improved patient survival. The aim of the study was to see the outcome of our patients at SKMCH & RC 2 years post TACE.

**PATIENTS AND METHODS:** Electronic records were retrospectively reviewed for patients who had TACE from 1<sup>st</sup> November 2009 – 31<sup>st</sup> October 2012. Baseline imaging, multidisciplinary team (MDT) and clinical notes, pathology labs, TACE angiograms and follow up imaging was reviewed for 2 years after first TACE. Procedure complications, clinical status and findings at follow up CT were reviewed and analyzed in SPSS version 19. Survival was assessed using Kaplan Meier curves.

**RESULTS:** A total of 104 patients had TACE for HCC. Amongst these 68 (65%) were male and 79(76%) were 51-70 years of age. The commonest cause for HCC was HCV in 92 (88.5%) patients. Target lesion size at baseline CT was <5cm in 48(46%) patients, 5-10cm in 47 (45%) patients and >10cm in 9(8.7%) patients. On post TACE CT, 56 (54%) patients had good packing of lipiodol in the lesion.

Only 11(10.5%) patients had liver failure after TACE and 2 patients had hepatorenal syndrome. Only 1 patient died within 30 days after TACE.

**CONCLUSION:** TACE improves survival in HCC.

**O-59****Comparison of patency of stent grafts for Transjugular intrahepatic portosystemic shunt creation: Fluency stent versus bare stents: Two year experience from a single centre**

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**PURPOSE:** Transjugular intrahepatic portosystemic shunt has been effectively used in the management of portal hypertension related complications. Fluency stent graft is an expanded polytetrafluoroethylene-covered- stent and has been described in literature to create TIPS. Different centres describe variable patency rates of Fluency expanded PTFE covered stents. We are conducting this study to compare the patency of Fluency expanded PTFE covered stents and bare stents that we placed in last 2 years in order to improve our standard and quality of care.

**MATERIALS AND METHODS:** A retrospective study was conducted in a single centre after approval from institutional research board, enrolling 15 patients regardless of their age and gender, in whom the TIPS were placed between July 2013 to Aug 2015. The hospital data base system and patient's medical record was used for collecting data.

**RESULTS:** Preliminary results have been compiled after scrutiny of medical record of 15 patients (n=15). Indications for TIPS placement was Budd Chiari syndrome in 66.6% (n=10), cirrhosis with recurrent ascites in 13% (n=2) and recurrent variceal bleeding in 20% patients(n=3). Fluency ePTFE covered stents were used in 60 % (n=9) and bare stents (wall stents) in 40% patients (n=6). Follow up was done by Doppler ultrasound. 66% (4 out of 6) patients with Bare stents developed stenosis and TIPS failure; 50% (n=2) underwent successful TIPS revision, 25% (n=1) lost follow up and 25% (n=1) was managed with angioplasty which again failed. 11% (n=1) patients with Fluency stents lost to follow up, 22 percent (n=2) died, one in immediate postoperative period likely due to metabolic encephalopathy and other died almost a year after TIPS placement due to unrelated cause. Rest of the patients 66% ( n=6) with Fluency stents had variable period of follow up ranging from 3 months to 15 months and no TIPS failure was observed in them. Final results and statistical analysis yet to be compiled.

**CONCLUSION:** Our initial experience shows that Fluency expanded PTFE covered stents are able to improve patency and require less re-interventions when compared to use of conventional bare metal stents in our setting.

**O-60****Interventional Radiology in Budd-Chiari Syndrome, Trnasjugular VS percutaneous approach, an initial experience in our local population**

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**INTRODUCTION:** Budd-Chiari syndrome (BCS) is an uncommon condition induced by thrombotic or nonthrombotic obstruction of hepatic venous outflow and characterized by hepatomegaly, ascites, and abdominal pain. Many treatment options are available; new interventional radiology techniques, forrecanalization of stenotic or occluded hepatic veins or inferior vena cava, to restore venous outflow may play an important role as an alternative to surgical shunting. Among the available endovascular interventional techniques are Balloon angioplasty and Transjugular intrahepatic portosystemic shunt (TIPS). Isolated hepatic vein or IVC webs, stenosis or occlusion may be successfully treated with balloon angioplasty good technical outcomes.

**AIM:** To evaluate the clinical effects and efficacy of balloon angioplasty in Budd-Chiari Syndrome via Percutaneous Transhepatic transjugular approach, in our local population.

**PATIENTS AND METHODS:** Medical records and radiological images of all patients undergoing balloon angioplasty for BCS in Shifa International Hospital (SIH) between September 2012 and September 2015 were retrospectively analyzed. Of 57 patients diagnosed with Post-contrast CT scan and Doppler ultrasound evidence of Budd-Chiari syndrome, 23 were treated with balloon angioplasty. There were 15 men and 8 women with a mean age of 32.6 years (Range 4 to 59 years). Balloon angioplasty was successful in 21 patients. Percutaneous transhepatic approach was used in 13 patients, single right transjugular technique was used in 8 patients while right transfemoral approach was used in 2 patients. Pretreatment clinical and investigative features were reviewed and compared with post treatment data. Follow up assessment of patency of hepatic veins and IVS was done by Doppler ultrasonography. Longest follow up period was 23 months. One patient was lost to follow up so he was not included in final analysis. Re-intervention in early post-intervention period was required in 3/21 14% patients. In 2/21 9.5% patients transjugular approach was used and in 1/21 4.7%.

**RESULTS:** All 21 patients with technically successful balloon angioplasty, showed marked symptomatic improvement. Hepatomegaly and ascites decreased promptly as well as serum bilirubin levels. Re-intervention rates were low in those who were treated with percutaneous balloon angioplasty. Patients treated with percutaneous transhepatic approach showed better outcomes as compared to those in which transjugular or transfemoral approach was used.

**CONCLUSION:** With appropriate case selection many patients with Budd-Chiari Syndrome caused by hepatic vein or IVC occlusion can be managed successfully by angioplasty alone. Percutaneous transhepatic balloon angioplasty showed promising results as compared to transjugular or transfemoral approach.

**O-61****Empirical embolisation for upper GI bleeding: Experience from a tertiary care hospital in developing country**

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**INTRODUCTION:** Acute gastrointestinal haemorrhage is a medical emergency and can lead to significant morbidity and mortality if prompt appropriate action is not taken. Endoscopic management is usually the first line treatment for acute upper GI bleeding. However, at times it is not possible to identify or successfully treat the cause of GI bleed. In these circumstances, empirical embolization of the gastroduodenal artery may be performed to control the haemorrhage. Sparse data from the western world and almost none from the developing world exists regarding the utility of empirical embolization for the management of acute upper GI bleeding.

**MATERIALS AND METHODS:** A total of 30 patients underwent empirical embolization for acute upper GI bleeding at our institute. Data was retrospectively retrieved using Radiology information system. A consultant radiologist having more than 5 years of experience in interventional radiology reviewed all the data. Data analysis was performed using Microsoft Excel 2010.

**RESULTS:** 25 patients underwent angioembolization of gastroduodenal artery. Two patients underwent embolization of left gastric and one for embolization of gastroepiploic artery. One had embolization of GDA as well as the gastroepiploic artery. In one patient, empirical embolization was not performed due to anatomy of the GDA which was filling retrogradely from the SMA and was also retrogradely filling hepatic and gastroepiploic arteries. Overall success rate was 29/30 (96.67%). Procedure related complications occurred in three patients (10%) in which the metallic coil accidentally slipped into the right hepatic artery. However, there was no significant restriction of blood flow to the liver and no serious complications occurred in these patients. No other procedure related complications were observed.

**CONCLUSION:** Empirical embolization of the GDA artery is a feasible procedure in patient in which endoscopic management of upper GI bleed is not feasible or unsuccessful.

#### O-62

##### Changing trend of central venous access in adult cancer patients in a tertiary care hospital - single center experience

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**BACKGROUND:** Central venous access is needed for intermittent intravenous injection of long term chemotherapy in cancer patients. There are various options including tunneled broviac line, implanted port A catheter and peripherally inserted central (PIC) line. Since we started placing port Acath in interventional radiology (IR) suite, the requests for PIC lines have decreased. The aim of the study was to see this change in trend in central venous access in adult cancer patients at our institute.

**PATIENTS AND METHODS:** Electronic records were retrospectively reviewed for patients who had central venous access from 15-10-2014 to 14-10-2015. All central venous access procedures done in adult cancer patients in IR suite and broviac lines done by anesthesia department were included. Number of patients, primary cancer histology and site and complications after each procedure were observed and analyzed in SPSS 20.

**RESULTS:** A total of 297 patients had central venous access; out of these 181(61%) patients were male. Commonest primary malignancy was lymphoma followed by osteosarcoma and breast cancer. 116/137(84.7%) patients underwent PIC line insertion in first 6 months of study duration followed by broviac catheter insertion in 21(15.3%) patients. Port Acath insertion was started in second half of the period by IR team. In second half, 68(42.5%) patients had port A cath insertion decreasing number of PIC lines to 76(47.5%) and 16(10%) had broviac line insertion; 1 by IR and 15 in operation theater by anesthetist.

**CONCLUSION:** There has been a rise in referrals for port Acath in the last 6 months with decreasing referrals for PIC and broviac catheters.

#### O-63

##### Image guided different techniques of tumour ablation

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Radiofrequency ablation (RFA) is a treatment that uses imaging guidance to place a needle electrode through the skin into a tumor. High-frequency electrical currents are passed through the electrode, creating heat that destroys the cancer cells. RFA is an effective treatment option for patients who might have difficulty with surgery or those whose tumors are less than one and a half inches in diameter. The success rate for completely eliminating small liver tumors is greater than 85 percent.

There are several different technologies have been employed for the local ablation of tissue by thermal techniques. At the present time the most widely favoured technique is radiofrequency ablation (RFA). RFA is also having different techniques like RFA alone, RFA with cool tip technique, RFA with wet cool tip technique, RFA with vein block to avoid heat sink affect. In thyroid moving shot technique is also quite popular and having good results.

In many countries RFA is accepted therapies for patients with Childs Pugh Class A or B cirrhosis and early hepatocellular carcinoma (HCC). Results for RFA in large series of patients with liver metastases from colon cancer are very promising.

Sufficient experience has now been gained in lung and renal ablation to show that these are minimally invasive techniques which can produce effective tumour destruction with a limited morbidity.

#### O-64

##### Liver nodule assessment in non cirrhotic liver

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#### O-65

##### Thyroid Nodule assessment

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#### O-66

##### Adrenal lesion

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#### O-67

##### Adenexal cyst evaluation

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**O-68****Carotid and vertebral arterial doppler how i do it and its clinical implications**

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- When the carotid arteries become blocked / stenosed, symptoms may include TIA, dizziness, confusion, drowsiness, headache, momentary blindness in one eye, and/or a brief loss of ability to speak or move. These symptoms may indicate early warning signs of a possible stroke (brain attack, or cerebrovascular accident [CVA]).
- A carotid artery duplex scan may also be performed when no symptoms of occlusion are present, a bruit is heard with over the artery.
- Reasons
- Measure the IMT (Intima Media Thickness)•• Visualize plaques and there morphology. •• To evaluate stenosis /Thrombosis of vessels•• Evaluate blood flow through the artery after surgery. (carotid endarterectomy)•• Evaluate the placement and effectiveness of a stent•• Locate a collection of clotted blood (hematoma) that may prevent blood flow•• Detect other carotid artery abnormalities that may disrupt blood flow•• Evaluate Vertebral arteries for abnormal blood flow and for Subclavian steal syndrome.

**O-69****Obstetric doppler imaging**

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**O-70****Renal artery doppler evaluation**

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**O-71****How I do peripheral vascular doppler**

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1. Each normal major vessel in the human body has a characteristic flow pattern that is representable in spectral waveforms obtained with Doppler ultrasonography (US) and that reflects both the anatomic position of the vessel and the physiologic need of the organ it supplies. The Doppler spectrum is a time-velocity waveform that represents variation in intravascular blood flow velocities during the cardiac cycle.
2. Time is represented along the horizontal axis, and frequency shift (velocity) is depicted along the vertical axis. The intensity or brightness (also referred to as the gray-scale velocity plot) of the spectral line represents the number of red blood cells that are reflecting the ultrasound beam at each velocity. The width of the spectral line represents the range of velocities within a vessel. The width may vary during the normal cardiac cycle, narrowing during systole and widening in diastole. The spectral window is the clear black zone between the spectral line and the baseline. Widening of the spectral line and filling of the spectral window is called spectral broadening. Spectral broadening is normally seen in the presence of high flow velocity, at the branching of a vessel, or in small-diameter vessels.

3. Demonstrate ATA TPT

4. PSEUDOANEURYSMS A pseudo aneurysm is a complete rupture through the three walls of the artery. The intima, media and adventitia are compromised. In the lower extremity, the escaping blood pools as a well circumscribed mass and is constrained by the surrounding soft tissues. Pseudo aneurysms can develop following penetrating trauma or arterial catheterization. The communicating channel between pseudo aneurysm and arterial lumen is detectable by color Doppler imaging. Often, a high velocity scale (PRF, peak repetition frequency) is needed since blood flow velocities are very high.

5. The presence of a "to-and-fro" or "forward-backward" waveform is typically seen when the Doppler gate is placed over the communicating channel of the pseudo aneurysm. The "to" or "forward" component is due to entry of blood into the collection as the soft tissues expand to accommodate entry of blood within the pseudo aneurysm cavity. This occurs during systole. The "fro" or "backward" component is seen during diastole as the blood stored in the cavity is ejected back into the artery. This is caused by the stored energy due to the elasticity of the surrounding soft tissues. Pseudo aneurysms can have multiple compartments as well as be solitary. Blood flow in a pseudo aneurysm cavity has a tendency to show a swirling pattern.

6. PSEUDOANEURYSMS Color swirl on CD and "to & fro" sign on pulsed doppler

7. classic to-and-fro waveform of a pseudo aneurysm

8. Arteriovenous fistulas arteriovenous fistulas (AVFs) can result when there is puncture of an artery and vein with a direct communication between the two injured vessels. A significant pressure gradient will result in a focal area of significantly increased velocity at the site of the AVF with flow directed from the artery to the vein. Color Doppler imaging of AVFs will often I DO demonstrate a bruit artifact and/or a thrill may be palpable.

9. Spectral Doppler analysis of the effected artery above the AVF will demonstrate a mono-phasic continuous waveform with elevated systolic and diastolic velocities. Flow in the injured artery distal to the AVF will generally have normal Pulsatility. Spectral Doppler analysis of the effected vein central to the AVF will demonstrate "arterialized flow" with pulsations during systole and a lack of respiratory phasicity.

10. This CDI demonstrates a typical color bruit artifact associated with tissue vibration.

11. Spectral Doppler analysis image of common femoral vein above fistula shows arterIALIZED flow.

12. A. Color flow Doppler image shows a high-velocity jet (arrow)from the common femoral artery (A) into the distended common femoral vein (V) B. The arterial type signals sampled in the common femoral vein are consistent with a large AV fistula showing an arterIALIZED venous blood flow pattern.

**O-72****Hepatic Doppler evaluation**

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**O-73****Doppler of AVF**

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**O-74****Ultrasound evaluation of liver cirrhosis: what needs to be done**

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Ultrasound helps in architectural evaluation of liver. Liver margins, liver size, morphology of liver including enlargement of one or both liver lobes is well evaluated by ultrasound. Development of hepatoma liver can be well evaluated with ultrasound.

Doppler ultrasound helps in further characterizing the degree of fibrosis and presence of varices. Varices can be directly visualized on Doppler. In this regard the liver vessel blood flow helps in evaluating the degree of cirrhosis and development of portal hypertension. The blood flow in the liver vasculature including hepatic artery, portal vein and the hepatic veins shows changes which helps in evaluating the degree of cirrhosis and portal hypertension.

Ultrasound elastography is a new technique which helps in evaluating degree of liver fibrosis.

By studying all these parameters, evaluation of a patient with liver cirrhosis can be done using non invasive means.

**O-75****Interventional Sialography**

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The Salivary stones and strictures are the most common cause of unilateral parotid or submandibular gland swelling. Traditionally, these patients treated by open surgery submandibular stones are still the most common cause of submandibular gland resection parotid gland resection is less frequent as it is major surgical procedure with postoperative complication like facial nerve paresis. The common cause of stone formation is obstruction, stricture formation leading to stasis of saliva, dehydration, change in salivary pH associated with oropharyngeal sepsis.

Over the last two decades, increasing awareness for minimally invasive treatment and with development of interventional radiological procedures for the management of obstructive sialadenitis has led to avoid surgical removal of gland and complications associated with surgery.

The interventional sialographic procedures can be used to remove salivary duct stones and is treatment of first choice in salivary duct strictures (Balloon ductoplasty). For stone removal and stricture dilatation local anesthesia, I/V cannulas of different sizes, balloon dilators and wire baskets are used under fluoroscopy. The wire guided sialographic technique is used for sialography and the I/V cannula used for sialography is used as access for interventional sialography.

For salivary glands mass or parasaiolomas needs tissue diagnosis. Biopsy FNAC/ True cut under Ultrasound or CT Guidance is performed.

**O-76****Magnetic resonance imaging evaluation of hepatic nodules**

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Detection along with characterization of focal lesions in the liver is critical for patients with chronic liver disease for evaluation as well management. The aim of this prospective that is conducted at Liver Centre Faisalabad in collaboration with Department of Radiology and Medical imaging, Punjab Medical College was to investigate the accuracy of magnetic resonance imaging (MRI) for the

diagnosis of hepatic nodules in cirrhotic patients starting from February 2015 to July 2015, 34 cirrhotic patients (mean age,  $53.5 \pm 9.3$  years; 24 males) were included. All patients had MRI done followed by initial screening done with Doppler Ultrasound and computed tomography examinations using contrast media, and findings were matched with the histological findings along with pathological markers (Alpha Feto protein). Data analyses were made using the chi-square test and also bar charts. A total of 87 nodules were found in the 33 patients: 21 dysplastic nodules (mean size,  $10.6 \pm 4.2$  mm) in 10 patients, 55 hepatocellular carcinoma (HCC) (mean size,  $17 \pm 9$  mm) in 20 patients, 21 dysplastic nodules (mean size,  $10.7 \pm 3.3$  mm) in 10 patients, and 12 macro regenerative nodules in 15 patients. Lesion-by-lesion analyses showed that sensitivity of MRI for nodule, HCC or dysplastic nodule diagnosis was 44.3 ( $P = 0.02$ ), 61.1 ( $P = 0.2$ ), and 27.3 ( $P = 0.04$ ), respectively. In conclusion, in patients with liver cirrhosis, MRI is more accurate than any other imaging modality for the detection of liver nodules and dysplastic nodules. However, tumor size is always a restricting factor for these two techniques, which are unable to detect small HCC in more than 60% of cases.

**O-77****MR - spectroscopy in focal liver lesions**

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**OBJECTIVE:** TO determine the diagnostic accuracy of MR-Spectroscopy in focal liver lesions taking histopathology as gold standard.

**MATERIALS AND METHODS:** In this study 33 patients who had suspected hepatic lesions(not less than 3cm in diameter)on abdominal ultrasound underwent MRS for further evaluation and characterization of lesions after taking informed consent. The voxel of interest was located in largest solid portion of hepatic tumor in patients. The choline to lipid ratio (cho/lipid) measured by dividing the peak area of choline at 3.2ppm by the peak area of lipid at 1.3ppm.

**RESULTS:** Out of 33 lesions, 21 were HCC secondary to cirrhosis liver parenchyma, 2angiosarcomas, 1 lymphoma and 9 hemangiomas.

Malignant tumors have elevated total choline resonances compared to benign tumors. Also cirrhotic liver tissue and HCC were distinguished with sensitivity and specificity of 95.8% and 88.9%.

**CONCLUSION:** MR-Spectroscopy is helpful for evaluation of focal hepatic lesions, in monitoring HCC and liver cirrhosis development.

**O-78****Diagnostic accuracy of CT scan in detection of intestinal obstruction taking the histopathological examination findings as gold standard**

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To Determine the diagnostic accuracy of CT scan in detection of intestinal obstruction taking the histopathological examination findings as gold standard.

**OUTCOME MEASURE:** Diagnostic accuracy of CT scan

**STUDY DESIGN:** Cross sectional study

**SETTING:** The study was performed at the Department of Radiology, Liaquat National Postgraduate Medical Centre, Karachi.

**O-79****Multidetector Computed tomography (MDCT) in detection of esophageal varices by taking endoscopy as the reference standard**

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**INTRODUCTION:** Chronic liver disease and cirrhosis is a worldwide disease, accountable for significant morbidity and mortality having 10-30% risk of variceal hemorrhage per year. Multidetector Computed Tomography (MDCT) can be considered as a potential noninvasive modality for esophageal varices identification and risk stratification.

**OBJECTIVE:** To determine the diagnostic accuracy of Multidetector Computed Tomography (MDCT) in detection of esophageal varices by taking endoscopy as the reference standard.

**MAIN OUTCOME VARIABLE:** Diagnostic accuracy of Multidetector Computed Tomography (MDCT) in detection of esophageal varices.

**STUDY DESIGN:** This was a cross-sectional descriptive study.

**SETTING:** The study was conducted in Department of Radiology, Aga Khan University Hospital Karachi, Pakistan.

**SUBJECTS & METHODS:** 196 patients with suspicion of chronic liver disease undergoing liver MDCT were enrolled in our study and underwent CT in department of radiology AKUH. The study was conducted from 1/08/2012 to 01/08/2013 for a duration of 12 months.

**RESULTS:** Our results yielded sensitivity of MDCT being 98.96 %, specificity of 100%, positive predictive value of 100%, negative predictive value of 66.67 % and diagnostic accuracy of 98.97% for esophageal varices in CLD patients.

**CONCLUSION:** The rate of detection of esophageal varices in patients with chronic liver disease on MDCT in our country is comparable to the international data and we advocate that MDCT should be used as a screening tool in patients with Chronic liver disease to exclude esophageal varices.

**O-80****Comparison of MRI with Surgical Findings in the diagnosis of Fistula-in-Ano**

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**INTRODUCTION:** An anal fistula is a connection between two epithelial lined spaces, one of which is the anus or rectum. In recent years, MRI has developed as a tool to diagnose and classify fistula-in-ano. The rationale for using MRI is to find a non-invasive procedure for classifying fistula-in-ano, thus directing proper management of the fistula, including surgical procedure. This can decrease hospital load in terms of patient follow-up.

**OBJECTIVE:** To determine the diagnostic accuracy of MRI in classifying fistula-in-ano compared with surgical findings.

**OUTCOME MEASURE:** Diagnostic accuracy of multi-dimensional CT scan

**STUDY DESIGN:** Cross sectional study

**SETTING:** Department of Radiology, Jinnah Postgraduate Medical Centre (JPMC), Karachi

**SUBJECTS:** Patients clinically suspected of having fistula-in-ano due to presence of external opening around the anal region.

**METHODS:** Patients meeting the inclusion criteria underwent MRI fistula-in-ano after taking consent from patients and maintaining all ethical considerations. The images were evaluated for the presence and site of the fistulous tract according to Parks and colleagues' Criteria for fistulas. All MRI and surgical findings were recorded on a MRI/Surgery fistula-in-ano form and statistically evaluated using SPS version 10.0.

**RESULTS:** A total of 173 patients showing 201 fistulous tracts were enrolled in this study. The mean age of enrolled participant was 43.5 ±8 years. The overall sensitivity of MRI in diagnosing fistula in ano was 95 % and specificity 68.2 %. Positive predictive value for correctly diagnosing fistula in ano was 92.1 % and Negative predictive value, 77.7 %.

**CONCLUSION:** MRI is a very sensitive and specific modality for diagnosis and classification of fistula-in-ano.

**O-81****Agreement between MRCP and ERCP in diagnosis of iatrogenic CBD injuries**

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**INTRODUCTION:** Bile duct injury is a rare but potentially life threatening complication which can occur after many abdominal surgeries. Bile duct injuries include excision injury, stricture, biliary dilatation and biliary leak, leading to free fluid in peritoneal cavity. ERCP have been traditionally performed for definitive evaluation of these patients. However MRCP is a rapidly evolving technique as it does not use contrast media, radiation, non-invasive and complication-free.

**STUDY DESIGN:** Cross-sectional study.

**SETTINGS:** This study was conducted in Department of Radiology, Sheikh Zayed Hospital, Lahore, in collaboration with Gastroenterology department of Sheikh Zayed Hospital.

**DURATION OF STUDY:** 6 months.

**RESULTS:** A total of 30 cases were enrolled to find out agreement between MRCP and ERCP. Agreement between two was recorded where, 70.83% shows agreement while remaining 29.17% had no agreement, SE of Kappa - 0.089 which shows significant agreement between the two modalities.

**CONCLUSION:** We concluded that agreement between MRCP and ERCP in diagnosis of iatrogenic CBD injuries is higher and MRCP can be used as initial modality of choice.

**O-82****MR enterography**

Halil Arslan

*Turkey.*

Although conventional enteroclysis is a main diagnostic technique in the small bowel diseases, it has some limitations and new enterographic methods have been developed and the number of enterographic techniques increased significantly in the recent years to overcome those limitations. In this presentation, technique and clinical details, advantages and disadvantages of the MR enterography (MRE) will be discussed.

MRE can be performed with administration of oral contrast material similar to CTE and eliminate the disadvantages of small bowel intubation which is necessary in the enterographic techniques. MRE examinations are usually in the first line of choice for most of patients with small bowel disease in our department since it more tolerable, practical and faster technique.

Adequate small bowel distension is essential for acquisition optimal enterographic images and evaluation of them. Collapsed and contracted small bowel loops may mimic wall thickening or some pathologic conditions or may mask the intraluminal lesions.

Oral contrast agents (OCA) can be classified as negative, positive and biphasic. Negative OCAs are hypointense on T1 and T2W images. Positive OCAs are hyperintense on T1W and T2W images which are generally used for the evaluation of the contrast material passage through intestinal loops. Biphasic ones are hypointense on T1W images while those are hyperintense on T2W images. Water, mannitol, locust bean gum, low dose barium, manganese and polyethylene glycol (PEG) are considered among this group. Biphasic OCAs are the most preferred ones in daily routine practice. The hypointensity of the intestinal lumen on T1W images facilitates the discernibility of inflamed wall or any mass from the intestinal lumen and also the angiographic studies might be performed simultaneously and the vascular structures could be evaluated clearly and easily.

For a routine MRE examination, anticholinergic should be administered intravenously to the patients who were taken to the MR suite before the examination to prevent the intestinal spasm, to provide homogenous small bowel distension and to decrease the abdominal discomfort of the patient. The sequences that are required for MRE examinations are fat-saturated and non fat-saturated 2D-T2W (axial and coronal planes), fat-saturated 2D-T1W (axial and coronal planes) and fat-saturated 3D-T1W (coronal planes) briefly. Diffusion and MR angiographic images are also very important. The fast sequences that have an adequate resolution should be preferred and parallel imaging techniques should be used where possible for MRE examinations.

After the examination and all the images are downloaded the workstation, all small bowel, colon segments and mesentery and peripheral tissue should be evaluated meticulously. The check-list of enterographic examinations has 8 major parts as follows:

- 1- Number, distribution, thickness and shape of the plica
- 2- Intestinal luminal diameter and presence of intraluminal mass
- 3- Thickness and contours of bowel walls
- 4- Presence of abnormal bowel wall enhancement or mural mass
- 5- Contour hyperemia or irregularity of the mucosa, halo or target sign
- 6- Fibrostenosis or perforation in examined segments
- 7- Mesenteric abnormalities: adenopathy, fistula formation, presence of abscess or mass, vascular engorgement (the comb sign)
- 8- The presence of other extra-intestinal pathological conditions should be determined and if known localization and characteristics of those should be defined.

Inflammatory pathology such as Crohn and their complication are the basic etiology for MRE, but also we can evaluate all other small bowel and colon pathologies such as tumor, diverticulitis, malabsorption, mesenteric involvement and so on.

As a conclusion, intestinal lumen, intestinal wall, extraluminal mesenteric tissue, vascular structures and other abdominal organs can be evaluated with MRE which is especially preferred in young and pediatric patients particularly those for whom follow up is needed in order to avoid radiation exposure.

### O-83

#### Evaluation of vasogenic erectile dysfunction (ED) using doppler & intracavernosal caverject injection

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Color Doppler sonography can be useful in the evaluation of erectile dysfunction, which is due to Vasogenic causes. Doppler is used to determine the integrity of the vascular mechanism. It has been estimated that more than 152 million men worldwide experienced erectile dysfunction in 1995, and that this number will rise by 170 million, to approximately 322 million by the year 2025.(6) In Pakistan ED is a taboo. People will hide this problem go to Hakims &

Quacks. They usually think Medical doctors are incapable to treat this condition. Not many studies are available. However the thinking is changing due to education. Diagnostic tests are available & medical /surgical treatment can be administered. Therefore exact prevalence in Pakistan is not available.

Erectile dysfunction (ED) is a common enough male problem. It is secondary to organic, psychogenic and combined causes. Out of organic causes the most common are VASOGENIC. (Arterial insufficiency, venous leakage o. This study describes the normal Anatomy & sonographic anatomy of the penis Sonographic & Doppler technique for evaluation of ED.

The penis is examined in Flaccid state & various phases of erection after intracavernous injection of Alprostadil (caverject).(I have been doing the Doppler studies since 1995. Patients are referred from all over the country I shall share with you my experience of more than 500 of ED case studies performed over the years and discuss causative VASOGENIC factors.

### O-84

#### Diagnostic value of The Twinkling Artifact sonographic sign

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### O-85

#### Sonographic evaluation of subchorionic hematoma in early pregnancy

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**OBJECTIVE:** To evaluate the intrauterine subchorionic hematoma ultrasonographically in early pregnancy in a general obstetric population.

**METHODS:** The study is cross sectional. The study was conducted in radiology department of Hayatabad Medical Complex Peshawar . Duration of the study is from January 2014 to January 2015 . A total of 150 patients in their early pregnancy presented with pervaginal bleeding or abdominal pain were included in this study.

**RESULTS:** Total of 150 patients in early pregnancy having pervaginal bleeding or abdominal pain/cramps were evaluated ultrasonically. 13(8.6%) patients shows subchorionic hematoma on ultrasound. 8(61.3%) patients have large hematoma and 4( 38.46%) patients have small hematoma using 13.2cm2 as a cutoff value. 9 (69.23%) patients have subchorionic hematoma in lower uterine segment and 4( 30.76%) patients have hematoma in upper uterine segment.

**CONCLUSION:** This study concluded that the ultrasound can detect the presence of the subchorionic hematoma in the early gestation and may identify a population of patients at high risk for adverse outcome of pregnancy. The ultrasonic evaluation of subchorionic hematoma is becoming more important. The detailed evaluation of subchorionic hematoma include its size , site and echogenicity. As the larger size and lower uterine segment of subchorionic hematoma are associated with spontaneous abortion .

### O-86

#### Color doppler evaluation of cerebral-umbilical pulsatility ratio and its usefulness in the diagnosis of intrauterine growth retardation and prediction of adverse perinatal outcome

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**OBJECTIVE:** The aim of our study was to evaluate the usefulness of the pulsatility index (PI) of the umbilical artery (UA) and that of the fetal middle cerebral artery (MCA), as well as the ratio of the MCA PI to the UA PI (C/U

ratio), in the diagnosis of small-for-gestational-age (SGA) fetuses and in the prediction of adverse perinatal outcome.

**MATERIALS AND METHODS:** The study population comprised 90 pregnancies of 30-41 weeks gestation that had been diagnosed clinically as intrauterine growth retardation (IUGR) over a period of 1 year (from January to December 2014). The UA PI and the MCA PI as well as the C/U ratio were calculated.

**RESULTS:** Of the 90 pregnancies in the study, 24 showed abnormal UA PI. Among these, 21 (87.5%) were SGA and 19 (79.2%) had adverse perinatal outcome. Of the four of the 90 pregnancies that showed abnormal MCA PI, all were SGA and had adverse perinatal outcome. Similarly, of the 20 out of 90 pregnancies that showed abnormal C/U ratio (<1.08), all 20 (100%) were SGA and had adverse perinatal outcome. The results were correlated with parameters of fetal outcome.

**CONCLUSION:** Inferences drawn from the study were:

- (1) The C/U ratio is a better predictor of SGA fetuses and adverse perinatal outcome than the MCA PI or the UA PI used alone,
- (2) The UA PI can be used to identify IUGR *per se* and
- (3) The MCA PI alone is not a reliable indicator for predicting fetal distress.

## O-87

### Atypical prostatic masses mimicking prostatic cancer: Correlation of clinical and radiological features with histopathology

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**OBJECTIVE:** The objective of this study is to illustrate the clinical, radiological and pathologic features of atypical prostatic masses and to review the imaging appearances of cystic and solid prostatic masses that may mimic prostatic adenocarcinoma.

**CONCLUSION:** The differential diagnosis for prostatic masses is broad, and masses arising from periprostatic structures may mimic the appearance of primary prostatic diseases. Attention to clinical and imaging features is helpful in narrowing the differential diagnosis. This study focuses on the clinical presentation and radiological features of mesenchymal, stromal and neuroendocrine tumors of prostate, tumefactive inflammatory conditions including chronic and granulomatous infection of prostate and periprostatic masses.

## O-88

### Spectrum of congenital abnormalities affecting female fertility; Understanding with MRI.

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**PURPOSE:** Understanding complex female pelvis anatomy is of paramount importance in accurately diagnosing patients with complex mullerian duct abnormalities to Androgen insensitivity syndrome. MRI imaging, because of its superior soft tissue contrast resolution, high accuracy and detailed elaboration of uterovaginal anatomy, has revolutionized management of these patients. T2W sequences offer best anatomical depiction especially if done with thin 3mm slices thickness with reconstruction in axial, coronal and sagittal images if volumetric data set is not available.

**MATERIALS AND METHODS:** During January 2015 to August 2015, 30 patients presented in department of radiology DUHS, Ojha campus, for evaluation of cause of primary amenorrhea to primary infertility. Ten patients were observed to have congenital abnormality and data was collected Prospectively. Age range of patient was from 14 to 35 yrs. MRI were evaluated by a consultant radiologist with fellowship training in female imaging. Modified technique of adding 3 mm thin slices MRI in T2W images was employed to

better depict anatomical structures. Diagnosis was established after reviewing patients' clinical examinations, lab findings, karyotyping and concomitant ultrasound.

**RESULTS:** Out of Six patients who presented with primary amenorrhea, four were found to have Mayer Rokitansky kauster hauster syndrome and one had incomplete complex uterine diadelphys. In another one, differential of Sawyer syndrome / CAIS was raised.

One patient presented with bilateral labial swellings along with primary amenorrhea and diagnosed with CAIS, Complete Androgen Insensitivity Syndrome.

Out of three patients with primary infertility, two with a clinical query of vaginal septum did not have any septum, and one of them had complete uterus diadelphys. Two patients underwent surgery and one patient had complete CAIS. Gonads were removed from bilateral inguinal regions and confirmed as testes on histopathology, and patients with complex partial uterine diadelphys also underwent surgery and her both uterine horns removed because of cyclic pain and hematocolpus.

**CONCLUSION:** In depiction of complex mullerian duct anomalies and CAIS, thin section MRI T2W images in addition to conventional MRI images found to be beneficial and showed a better accuracy in absence of volumetric 3D images.

## O-89

### 2D, 3D and 4D ultrasound in fetal skeletal abnormalites

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Conventional B mode or 2 dimensional ultrasound has proved its value in detecting fetal anomalies. In the last decade increased sophistication of ultrasound technology has improved diagnosis even better.

Many obstetricians rely on our findings for final decision for termination of pregnancy. Due to our religious faith it becomes a great responsibility to decide which is lethal and needs termination. Because of this we have to pin point the abnormality and give exact diagnosis.

Three dimensional ultrasound is an additional modality which confirms the findings of 2 dimensional ultrasound providing clear, detailed and well-defined images of abnormality.

By 2 dimensional ultrasound internal structures of fetus are visualized. By 3 and 4 dimensional ultrasound surface anatomy is seen very clearly.

In this presentation I have presented

- 1 Normal foetal features at different stages of development.
- 2 Skeletal Abnormalities detected by 2 dimensional ultrasound are confirmed by three dimensional ultrasound. In some cases further conformation was done by examination of baby after birth or termination.
- 3 Fetal skeletal dysplasia, limb abnormalities, neural tube defects and chromosomal abnormalities are very well appreciated by 3D and 4D.

## O-90

### Role of Color Doppler and SMI in diagnosis of Placenta increta and percreta in 3rd trimester

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## O-91

### Brain scintigraphy in dementia

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**O-92****Differences in perfusion and regional functional abnormalities identified by rest gmps in dilated cardiomyopathy patients with ischemic and non ischemic etiology based on coronary angiography results**

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Dilated Cardiomyopathy (DCM) is a common problem and it is very important to differentiate its ischemic cause from nonischemic for management and prognostic purposes.

**OBJECTIVE:** To evaluate rest gated myocardial perfusion scintigraphy (GMPS) in patients with ischemic and nonischemic DCM patients categorized on the basis of coronary angiography, and to compare mean summed perfusion score (SPS), mean summed thickening score (STS) and mean extent of perfusion abnormality (EPA) between them.

**DESIGN:** Descriptive case series.

**PATIENTS & METHODS:** This study was conducted at Nuclear Cardiology department of Punjab Institute of Nuclear Medicine (PINUM), Faisalabad over a period of six months from 01-01-2013 to 30-06-2013. Resting GMPS was performed in 102 known patients of DCM (aged 17 to 70 years with a mean age of  $49.12 \pm 11.8$  years, 86 Male and 16 Female) by injecting 20 mCi of  $^{99m}\text{Tc}$ -MIBI. Patients were subdivided into ischemic (n=74) and nonischemic subgroups (n=28) by using the coronary angiography results. Twenty segment model was used to evaluate the perfusion and wall thickening. Summed perfusion score (SPS), summed thickening score (STS) and extent of perfusion abnormality (EPA) were calculated. Results of GMPS were compared between ischemic DCM and nonischemic DCM by using independent samples t-test. P-value of  $<0.05$  was taken as statistically significant.

**RESULTS:** SPS and EPA were significantly higher in ischemic than non ischemic sub groups ( $26.46 \pm 10.80$  Vs  $7.86 \pm 5.13$   $P<0.001$ , and  $7.16 \pm 1.97$  vs  $4.32 \pm 1.70$   $P<0.001$  respectively). STS was significantly higher in non ischemic group than ischemic group of DCM patients ( $33.21 \pm 7.13$  vs  $23.99 \pm 7.81$ ).

**CONCLUSION:** Our study shows that there are statistically significant differences in the values of summed perfusion score, summed thickening score and extent of perfusion abnormalities between ischemic and non ischemic DCM groups, calculated by using rest gated myocardial perfusion scintigraphy. Combined evaluation of the perfusion and wall thickening on rest gated myocardial perfusion scintigraphy might be useful to identify ischemic and nonischemic etiology of DCM.

**O-93****Temporal trends in results of 9170 myocardial perfusion imaging studies (2004 to 2013)**

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**BACKGROUND:** To assess the frequency of normal and abnormal myocardial perfusion imaging (MPI) in a consecutive cohort of patients over a period of 8.5 years from Pakistan.

**MATERIAL AND METHODS:** We assessed 9170 patients who had undergone stress-rest MPI between January 2004 and June 2013. Patients were assessed for change in demographics, risk factors, and frequency of abnormal and normal MPI.

**RESULTS:** Overall mean age and male predominance of studied cohort was ~ 55 year and ~ 55:45 (M:F) respectively with no appreciable decline or rise. Marked decline in exercise as mode of stress (from 71% to 35%, p value significant) was noted during the study period. Regarding the risk factors for CAD, only hypertension was noted to have a significant rising trend during the study period. Trend of MPI results over study period was found non-significant from 2004 till 2006 but from 2007 onward (except 2008), a marginal but significant decline in abnormal MPIs (from 45% to 42%; significant p value) and rise in normal MPI (from 55% to 58%; significant p value) was noted.

**CONCLUSIONS:** We conclude that over the past 8.5 years, a marginal but significant decline in abnormal and a rise in normal MPIs trend have been observed. An exorbitant rise in use of vasodilator as stressor than exercise was also observed. We envisaged a follow-up study to ascertain lower negative predictive value of vasodilator as a possible reason and till than results of this and other such studies must be read cautiously.

**O-94****Renal radionuclide imaging, an evergreen forty years old modality revisit**

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**O-95****Predictive value of body mass index (BMI) and waist circumference (WC) for coronary artery disease (CAD) and clinical outcomes using gated myocardial perfusion imaging**

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**OBJECTIVE:** Obesity is generally considered as a risk factor for coronary artery disease (CAD) and cardiac deaths but some reports suggest better survival in obese with CAD. The objective of this study was to find out predictive value of body mass index (BMI) and waist circumference (WC) for CAD and its outcome using gated myocardial perfusion imaging (GMPI).

**MATERIAL AND METHODS:** This was a prospective study conducted at Nuclear Cardiology Department of Karachi Institute of Heart Diseases (KIHD), Karachi, Pakistan from August 2011 till May 2013. 400 patients who qualified study criteria were included and were divided in (a) to Obese (BMI  $\geq 30$  Kg/m<sup>2</sup>) and Non-obese (BMI  $< 30$  Kg/m<sup>2</sup>) and (b) Low-WC group (male  $< 90$ cm and female  $< 80$  cm) and High-WC group (male  $\geq 90$  cm and female  $\geq 80$ cm). Rest and stress GMPI using Tc-99m MIBI was performed in all patients and abnormal GMPI was followed by coronary angiogram. These patients were followed for 12-18 months regarding fatal and non-fatal events.

**RESULTS:** Non-Obese group included 281 patients (Male: Female = 131:150) with a mean age of  $58 \pm 12$  years and mean WC  $100 \pm 15$  cm. Obese group included 119 patients (Male: Female = 36:83) with a mean age of  $55 \pm 11$  years and mean WC  $101 \pm 13$  cm. Normal GMPI was found in 172 non-obese and 85 obese patients ( $p<0.05$ ). GMPI was abnormal in 109 non-obese and 34 obese patients ( $p<0.05$ ). WC was not found independent predictor of abnormal

GMPI but high WC was found to a significant predictor of CAD in non-obese females (Odd ratio 8.04; 1.041 – 62.127). At 18 months event-free survival in normal GMPI group for non-fatal MI was 99.4% in non-obese group and 94.1% for obese (significant P value). For fatal MI, event-free survival was 99.4% in non-obese and 100% for obese (non-significant P value). In patients with abnormal GMPI event-free survival for non-fatal events was 95.4% in non-obese group and 82.3% in obese group (significant P value). While event-free survival for fatal MI was 96.3% in non-obese group and 98.1% for obese (significant P value).

**CONCLUSION:** We conclude that CAD was found less prevalent in obese group and High-WC predicted CAD in non-obese females only and was not found an independent predictor. A normal GMPI predicted very high event free survival for fatal events in obese and non-obese but significantly lower for non-fatal events in obese group. Obese group with abnormal GMPI had lower risk for cardiac deaths but higher risk for non-fatal events than non-obese patients with abnormal scans.

**O-96**

**Dismal awareness about radiation hazards among healthcare radiation workers: Point to ponder?**

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**OBJECTIVES:** To find out core knowledge of healthcare radiation workers like physicians and technical staff including technologists, physicists and nurses and to measure knowledge-gained after attending a one day targeted symposium

**MATERIAL AND METHODS:** Fifty-five participants (21 physicians, 25 technologists, 5 physicists and 4 nurses) attended a one day symposium on ionizing radiation and its hazards for healthcare workers at a tertiary care hospital. The participants were registered from 18 different healthcare facilities having radiology, nuclear medicine and radiation oncology services. Participants were solicited to fill a questionnaire comprised of 15 questions focused upon basic of ionizing radiation, their interaction, biological effects and radiation protection methods before and after the completion of session.

**RESULTS:** Mean scores of all participants in pre-session assessment was 45.472% which improved to 60.472% after attending session with a mean difference of 14.527% (p <0.0001). Physicians scored significantly better (pre: 54.238%, post: 67.333%) than technical staff (pre: 39.471%, post: 55.088%). Importantly the knowledge-gained after attending session was greater in staff (15.617%) than physicians (13.095%) but not statistically significant (p 0.1183).

**CONCLUSION:** The level of knowledge about ionizing radiation hazards and radiation protection was not satisfactory in healthcare radiation workers. Physicians had significantly better pre and post session scores than technical staff but knowledge-gained after attending session was not significantly different. Lack of knowledge among radiation workers is a global issue and this is the time to revamp their training programs with a meaningful strategy and International Atomic Energy Agency (IAEA) must take the lead.

**O-97**

**Nuclear cardiology - The essentials**

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**O-98**

**SPECT-CT: how much radiation dose CT contributes**

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**OBJECTIVE:** Effective dose (E) is a single parameter to reflect the relative risk from exposure to ionizing radiation in term of detrimental biologic effects on whole-body exposure. SPECT with multi-slice CT systems has been employed for better attenuation correction and localization. The study was conducted to calculate effective radiation dose both from radiotracer and theCT component of SPECT CT to patients scanned from August, 2014, to August, 2015, on SYMBIA T16 SPECT CT in the department of Nuclear Medicine.

**MATERIAL AND METHOD:** We analyzed 151 patients injected with 99mTc-MDP for bone scan, 20 patients for stress 99mTc-MIBI, 6 patients for 99mTc-MIBI para-thyroid, 21 patients 99mTc HSA Sentinel, 45 patients Iodine whole-body post therapy. The CT and radiotracer doses were calculated using ICRP conversion factors. The CT portion of SYMBIA T16 system has variable tube current ranges from 20–345 mA.

**RESULTS:** The maximum dose for bone patients (% increase with respect to radiotracer) is 1.99 mSv (45.76%) for 99mTc trunk patients and least for head which bears 0.1 mSv (1.79%). The CT dose for abdomen & Pelvis, Chest, Head & neck is 0.78, 0.64, 0.18 mSv respectively. However, chest dose in case 99mTc-MIBI is 3.56 mSv in one phase of the myocardial perfusion imaging. The calculated neck CT dose for 99mTc parathyroid is 0.8 mSv where as it decreased to 0.75 mSv for the 99mTc Sentinel chest patients. The negligible dose rise is observed in case of Iodine-131 post therapy patients with an average CT dose of 1.02 mSv for trunk areas against 1976 mSv dose from radioactive Iodine.

Sr.	Primary Scan	Radiation Induce Dose in SYMBIA T16 SPECT/CT			
		CT Dose (mSv)	Radiopharmaceutical Dose (mSv)	Accumulative Dose	% Increase
1	<sup>99m</sup> Tc-MDP Bone				
	Chest	0.65	4.95	5.6	13.13
	Abdomen & Pelvis	0.87		5.75	16.17
	Trunk	10.45		15.4	211.11
Neck	0.29	5.24		5.85	
2	<sup>99m</sup> Tc-MIBI Myocardial Perfusion				
	Chest	3.67	6.96	10.62	52.72
3	<sup>99m</sup> Tc-MIBI Parathyroid				
	Neck	0.8	7.58	8.37	10.55
4	<sup>99m</sup> Tc-Sentinel				
	Chest	1.03	-		
5	<sup>99m</sup> Tc-Thyroid				
	Neck	0.01	2.15	2.16	0.46
6	<sup>131</sup> I Post Therapy	0.43	2790	2790.43	0.015

**Table 1:** The detailed dose table both from radiotracer and CT along with % increase with respect to injected radio-tracer dose

**CONCLUSION:** The risk factor in our case is 0.016% with the addition of diagnostic CT for SPECT/CT. Considering the benefit to the patient in comparison to conventional diagnostic CT the induced radiation doses by SPECT/CT are quite low in our calculations However, effective dose of CT may be balanced further by decreasing the injected nuclear medicine activity at the cost of increased patient scanning time.

**O-99**

**Frontiers in Breast Imaging – Applications in Breast MRI**

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**O-100****“Digital mammography: Basic interpretation and future applications”**

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Digital mammography offers the potential for significant advances in breast cancer diagnosis, including lower radiation dose, reduced breast compression pressure and improved cancer detection rates. In digital mammography, imaging acquisition, display and storage processes are separated and individually optimized. Advanced applications are made possible through digital imaging, such as CAD, contrast-enhanced mammography including digital subtraction angiography and digital tomosynthesis. They are expected to further improve diagnostic sensitivity and specificity.

**O-101****Ultrasound breast and axilla: Current Trends**

Kulsoom Fatima

*Department of Radiology, The Aga Khan University Hospital, Karachi, Pakistan.***O-102****Usefulness of preoperative breast magnetic resonance (MR) imaging in newly diagnosed breast cancer patients with dense mammogram**

Shahper Aqil

*Department of Nuclear Medicine, Shaukat Khanum Memorial Cancer Hospital & Research Center, Lahore, Pakistan.***O-103****Diagnostic accuracy of ultrasound and mammography in predicting complete pathological response in post neoadjuvant non-palpable breast cancer**Eisha Tahir, Waqas Ahmad, Shahper Aqeel, Imran Khalid Niazi, Amjad Iqbal  
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**BACKGROUND:** Neoadjuvant chemotherapy is the mainstay for treatment of locally advanced breast cancer as it reduces the size of the lesion prior to surgery; making it amenable to treatment by conservation. Accurate prediction of response to neoadjuvant chemotherapy is critical in surgical planning of non-palpable cancers. Mammography and ultrasound are the modality used for this purpose. We assessed the accuracy and the of both these techniques to predict complete pathological response and compared the two techniques as well.

**METHODS:** We retrospectively reviewed the data of 225 patients diagnosed with stage 2 or locally advanced breast tumor. These patients had no palpable lesion post neoadjuvant chemotherapy and were selected for sono or stereo guided wire localization as a part of breast conservation treatment. All the patients were evaluated by sonomammogram at diagnosis and at the time of procedure after chemotherapy. Patients with complete mammographic (mCR) and sonographic (sCR) response were correlated with pathological complete response (pCR). Agreement between predicted radiological and pathological response, as well as sensitivity and specificity was calculated separately for both imaging modalities.

**RESULTS:** 81 out of 225 patients demonstrated pCR which is defined as no residual microscopic or macroscopic tumor foci. mCR was achieved in 66% of patients and sCR in 60% of patients. Kappa method was used to calculate the agreement between mammography and sonography in predicting pCR as well as to individually correlate mCR and sCR with pCR. The sensitivity, specificity,

PPV, NPV of mammography in predicting pCR was 65%, 80%, 66% and 79% respectively. The sensitivity, specificity, PPV and NPV of sonography in predicting pCR was 59%, 83%, 68% and 77% respectively. The sensitivity, specificity, PPV and NPV of combined mammography and sonography was 65%, 86%, 72% and 81% respectively.

**CONCLUSION:** Both mammography and ultrasound are important in assessing tumor response post neoadjuvant chemotherapy. Mammography is more sensitive while sonography demonstrates better specificity. However the combination of sonomammogram increased the specificity of the study. The agreement of pCR with mCR and sCR was moderate.

**O-104****Breast Radiology: Recent challenges and updates.**

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Review of modalities used for the diagnosis of breast cancer in our set up. New emerging imaging modalities with special emphasis on Digital mammography and mammo tomosynthesis for breast cancer diagnosis, their indications and advantages.

**O-105****Wire localization procedures in non-palpable breast cancers: an audit report and review of literature**

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**BACKGROUND:** Breast conservation surgery applies a number of techniques for accurate localization of lesions. Wire localization remains the method of choice in non palpable breast cancers post neoadjuvant chemotherapy. Objective: The aim of our study was to determine the accuracy of wire localization procedures in our department and compare it with internationally set protocols as per the Royal college of Radiologists. Post wire mammography as well as the margin status of the post-operative specimen assessed the accuracy of the procedure.

**METHODS:** We retrospectively reviewed the data of 225 patients who presented to our department from May 2014 to June 2015 post neoadjuvant chemotherapy with non palpable cancers. These patients are a candidate for wire localized lumpectomies either under ultrasound or stereotactic guidance. Metallic marker was placed in all the patients at the time of biopsy. Post wire mammogram was performed in all the patients and the distance of the wire tip from the marker was calculated. The presence or absence of the metallic clip in the postoperative specimen as well as the marginal status of the postoperative specimen was noted.

**RESULTS:** 157 sonographic and 68 stereotactic wire localization procedures were performed. 95% of the wire tips were within 1 cm of the metallic marker. Marginal status was negative in 94% of the patients on histopathological specimen.

**CONCLUSION:** Our audit report declares more than 95% accuracy of image guided wire localization in successful excision of non-palpable breast lesions.

**O-106****"Relationship between mammographic breast density (MGD) and background parenchymal enhancement (BPE) at breast MRI with histopathological features of invasive breast cancers"**

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**O-107****Correlative Cardiac Imaging - an Update**

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**O-108****Role of <sup>99m</sup>Tc MDP bone SPECT in Facial Asymmetry due to Unilateral Condylar Hyperplasia**

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*Nuclear Medical Centre, Armed Forces Institute of Pathology, Rawalpindi, Pakistan.**Email: rebeccasharoon3@gmail.com***OBJECTIVE:** To determine the role of <sup>99m</sup>Tc MDP bone SPECT in the diagnosis of facial asymmetry due to unilateral Condylar hyperplasia (UCH)**STUDY DESIGN:** Prospective observational study**SETTING:** Study was conducted at Nuclear Medical Centre, AFIP Rawalpindi from July 2014 - Oct 2015**SAMPLING TECHNIQUE:** Non probability consecutive sampling technique**INCLUSION CRITERIA:** Young adult patients with facial asymmetry due to suspected unilateral Condylar hyperplasia referred for bone scintigraphy were included in the study.**EXCLUSION CRITERIA:** Patients with the history of trauma or any bone pathology (including any surgery involving the mandible) were excluded. Informed consent and approval of institutional ethical committee was sought and granted before the start of study.**PROTOCOL:** 16 patients (8 male and 8 females) were included. Age ranged from 10 to 28 years with mean age of 18.5 years with SD of 4.5. Each patient was injected with 20mCi of <sup>99m</sup>Tc MDP intravenously followed by SPECT of skull /facial bones at 150 minutes post injection. Scans were independently evaluated for asymmetrical radiotracer uptake in the Condylar region of both mandibular rami by two consultant nuclear physicians. In case of disagreement consensus was achieved through mutual discussion. Difference of  $\pm 2$  SD in tracer uptake in Condylar region was considered significant.**EQUIPMENT:** Siemens Symbia dual head Gamma camera was used. A secular 360o orbit with step and shoot mode and 64x64 matrix size was employed. Data were reconstructed through Iterative reconstruction.**RESULT:** 14 out of 16 patients (87.5%) showed active bone lesion in Condylar region of one of the mandible. None of the patients showed increased tracer localization in both condyles.**CONCLUSION:** <sup>99m</sup>Tc bone SPECT is an effective test to evaluate UCH in young adults presenting with facial asymmetry.**O-109****Intraosseous haemangiomas on <sup>99m</sup>Tc MDP SPECT-CT**

Zoya Khan, Humayun Bashir, Mairah Razi

*Department of Nuclear Medicine, Shaukat Khanum Memorial Cancer Hospital & Research Center, Lahore, Pakistan.**Email: zoya\_dr@hotmail.com***PURPOSE:** Osseous haemangiomas are benign skeletal tumours with incidence rate of 10% and usually identified as incidental findings. We present a review of haemangioma identified on bone scans at our department.**MATERIALS AND METHODS:** Electronic Hospital information system (HIS) was used to identify the term 'haemangioma' and 'haemangioma' in bone scan reports from July 2010 to September 2015.**RESULTS:** Twenty patients were identified to have osseous haemangioma on bone scan. There were 16 females and 4 males with age range of 13 to 72 years [median age = 56.5 years].

Seventeen patients were referred for skeletal metastatic work up while 3 underwent bone scintigraphy for backache. Breast cancer was the most common primary malignancy.

In total 23 lesions were identified in 20 patients with 3 patients having multifocal haemangiomas. 20 lesions [87%] showed increased radiotracer uptake while 3 had reduced tracer uptake.

Thoracic spine [n=12] was the commonest site of haemangioma followed by lumbar spine [n=8], iliac bone [n=1] and skull [n=2].

Out of 20 only 3 patients had osseous metastases with incidental haemangiomas. In 6 [30%] patients haemangioma was the only abnormal lesion on scintigraphy where correlation with radiology was essential for characterization. 11 patients had other benign findings along with incidental haemangioma.

Haemangiomas were characterized with SPECT-CT in 13 [65%] patients while 3 were characterized with CT and 4 with MRI.

**CONCLUSION:** Intraosseous haemangiomas show variable <sup>99m</sup>Tc MDP avidity and can be readily characterized with SPECT-CT.**O-110****Prognostic significance of negativity of FDG-PET/CT scan on the follow-up of patients with differentiated thyroid carcinoma with tennis syndrome (negative I-131 scan),**

Ahmad Qureshi

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**O-111****Survival analysis of papillary thyroid carcinoma in relation to stage and recurrence risk - 20 year experience in Pakistan**

Mairah Razi

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**O-112****Follicular Thyroid Carcinoma - Disease response evaluation by ATA risk assessment guidelines**

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*Department of Nuclear Medicine, Shaukat Khanum Memorial Cancer Hospital & Research Center, Lahore, Pakistan.**Email: nmresidents@skm.org.pk***OBJECTIVE:** Evaluate the overall and progression free survival of follicular thyroid carcinoma (FTC) based on the American Thyroid Association (ATA) staging system for recurrence risk assessment and the TNM staging system.**METHODS:** Clinical review of FTC patients between 1995 and 2014 at a single center. Data was classified by TNM staging system and low, intermediate and high-risk of recurrence as per ATA risk Assessment.**RESULTS:** Over 19 years 114 (11.9%) of all thyroid cancer patients presenting to our hospital had FTC. 78 females and 36 males. Age range: 15 to 80 year. 94 resectable and 18 irresectable. 16 excluded due to insufficient information on recurrence risk.



By ATA categorization: 36 had low recurrence risk. All are alive, 1 showed progressive disease. 38 had intermediate recurrence risk. 1 died and 2 showed progression. 24 had high recurrence risk. 7 died and 6 showed progression.

TNM stage wise; Stage I, 2 (3.2%) died; stage II, 3 (17.6%) died; stage III, 1 (14%) died; and stage IV, 2 (12.5%) died during follow up.

Both ATA risk classification and TNM staging were significant predictors of disease free survival. On bivariate analysis, ATA classification (hazard ratio (HR)=4.67, 95% confidence interval (CI) 1.74 to 12.5; P=0.002) was better predictive of survival compared to the TNM classification (HR=1.26, 95% CI 0.98 to 1.62, p=0.063).

**CONCLUSION:** ATA risk stratification predicts disease recurrence rate and survival better than the TNM staging. Age does not have an association; the risk category with dynamic reassessment effectively better predicts the course of disease in follicular thyroid carcinoma.

### O-113

#### Survival analysis of papillary thyroid carcinoma in relation to stage and recurrence risk - 20 year experience in pakistan

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**OBJECTIVE:** To evaluate the overall and progression free survival of papillary thyroid carcinoma (PTC) based on the American Thyroid Association (ATA) staging system for recurrence risk assessment and the TNM staging system.

**METHODS:** Clinical review of PTC patients between 1995 and 2015 at a single center. Data was classified stage wise by TNM staging system and low, intermediate and high-risk of recurrence as per ATA risk assessment.

**RESULTS:** Over 20 years, 689 (72%) of all thyroid cancer patients presenting to our hospital had PTC. 469 females and 220 males. Age range: 6 to 87 years. 535 resectable and 58 irresectable. 96 excluded due to insufficient information on recurrence risk.

By ATA categorization: 207 had low recurrence risk, all are alive, 1 died of unknown cause. 238 had intermediate recurrence risk, 3 died. 93 had high recurrence risk, 32 died during follow up.

5-year disease free survival based on ATA risk categories [Low = 54%, Intermediate = 26%, High = 5%]. The Log-Rank test shows a significant difference in the percent survival of the ATA risk groups (P<0.01).

TNM stage wise; Stage I, 5 (1.3%) died; stage II, 1 (2.2%) died; stage III, all alive; and stage IV, 30 (37.5%) died during follow up.

20-year disease free survival by TNM categorization [Stage I=43%, Stage II=28%, Stage III= 18%, Stage IV =2%]. There is a significant difference in survival rate [P<0.01].

Both ATA risk classification and TNM staging were significant predictors of disease free survival. On bivariate analysis, ATA classification (hazard ratio (HR) =2.1, 95% confidence interval (CI) 1.64 to 2.67; P=0.001) was better predictive of survival as compared to the TNM classification (HR=1.3, 95% CI 1.11 to 1.43, P=0.063).

**CONCLUSION:** ATA risk stratification predicts disease recurrence rate and survival better than the TNM staging. Age does not have an association. Risk category with dynamic reassessment effectively better predicts the course of disease in papillary thyroid carcinoma.

### O-114

#### Incidental findings on SPECT/CT done for sentinel node localization in early stage breast cancer patients

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**PURPOSE:** To explore the incidental findings on SPECT/CT done for pre-operative axillary sentinel lymph node localization in early stage breast cancer patients and further evaluate them by radiological follow up for better characterization.

**METHOD:** Prospective analysis of SPECT/CT acquired for sentinel mapping in early stage breast cancer patients [Ductal Carcinoma in-situ (DCIS)/T1/T2] with non-palpable axillary nodes prior to nodal biopsy for axillary nodal staging. Concomitantly acquired limited unenhanced CT of neck, chest and upper abdomen was reviewed for additional incidental findings and further evaluated by radiological or histopathological examination where available.

**RESULTS:** 110 patients were enrolled during a 21-month period between January 2014 and September 2015. All were females. Mean age 48.15 years; age range 26 to 82 years. Right breast cancer in 58, left in 50 and bilateral in 2 cases. By TNM classification: 37 were T1, 67 T2 and 6 had DCIS/ Paget's disease.

Incidental findings seen in 45 cases. 19 had indeterminate lung nodules, 11 multinodular goitre (MNG), solitary hypodense thyroid nodules in 10 cases, chronic inflammatory lung changes in 8 cases, 2 with moderate pleural effusion, calcified lung granulomas 3 cases and 1 case with hepatic granuloma. Focal hepatic hypodensities seen in 2 cases, revealed to be hepatic cysts on further ultrasonography. 1 case of splenule and 1 right adrenal adenoma. Known primary breast tumor was visualized in almost all cases with post biopsy changes in soft tissue.

FNA of thyroid in 2 showed a Bethesda category II nodule, one case of toxic MNG while the rest were euthyroid. 8 sub centimeter lung nodules followed by conventional CT and remained indeterminate. Lung effusions resolved on follow up imaging, likely post inflammatory.

**CONCLUSION:** Incidental findings on SPECT/CT should be correlated clinically and followed by imaging, as the association of thyroid disease is high with breast primary. In our study, lung nodules remained indeterminate in almost all the reviewed cases.

### O-115

#### To assess the commonly encountered artifacts in Computed radiography versus Digital radiography at a tertiary care hospital

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**INTRODUCTION:** Despite the recent advances in radiology, general radiography still contributes to a significant portion of a radiology department's work. Artifacts and technical faults represent important limiting factors in radiography. These not only affect the technical quality of the radiographs but also can have effect interpretation and diagnosis. Artifacts can present in a variety of ways including abnormal shadow noted on a radiograph or degraded image quality. Common causes can include improper handling of the films, errors while processing the films and patient movement while taking the shoot. This study was undertaken to assess commonly encountered artifacts in computed versus digital radiography.

**MATERIALS & METHODS:** 100 radiographs were reviewed for a period of 5 consecutive days on Picture Archiving and Communication System of Aga Khan University Hospital, Radiology Department. Images were analyzed by two blinded residents for image quality, technical factors and artifacts. Artifacts

and technical factors were categorized in groups according to their impact in image interpretations.

**RESULTS:** A total of 527 radiographs were included in the sample which included an equal mix of both digital radiographs (DR) and computed radiographs (CR). The most common artifacts found in computed radiographs were grid artifacts, positioning artifacts, motion artifacts, improper collimation, and external radio-opaque density artifacts. The most common artifacts in digital radiographs were related to improper positioning or annotation and were less frequent than CR. The inter-observer agreement between the two independent observers was excellent.

**CONCLUSION:** CR results in more detectable artifacts than DR, with most of the artifacts being preventable. With more training and education of the radiographers, the rate of artifact occurrences can be reduced. In addition, more use of DR where possible would help reduce the frequency of low quality radiographs.

### O-116

#### **A critical analysis on quality of chest radiographs postero-anterior projection based on european guidelines; our limitations and improvements**

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**INTRODUCTION:** Chest X-ray is one of the most common examinations performed in any health facility center. It has a significant value in diagnosing early pathology related to lungs, mediastinum and bones, while many times it is also very helpful in detecting upper abdominal and other soft tissue abnormalities.

**MATERIAL AND METHODS:** An audit on Chest radiographs (Postero-Anterior projection) has been conducted in department of Radiology Shaukat Khanum Memorial Cancer Hospital by selecting a subset of 500 Chest radiographs out of 6660 X-rays after applying an Inclusion and Exclusion criteria in a duration of 3 months.

Quality of radiographs were assessed on 8 different criteria including: Adequate inclusion, adequate projection, adequate penetration, adequate inspiration, rotation, Scapular retraction, vertical tilt and presence of artifact. Each radiograph was reviewed carefully and scored individually on each of these criteria with an aggregate score of 8.

**RESULTS AND CONCLUSION:** Results were compiled and the average score of the audited radiographs is calculated as 5.9 with mode = 6 and median = 6. The study revealed that 14.4% of the radiographs were of sub-standard (<50% score) quality. The main causes were wrong positioning, lack of proper collimation, non-usage of optimal radiographic factors, non-cooperation from patients and poor radiographic practice.

Re-evaluation study showed that sub-standard radiographs dropped to 7%. However regular quality auditing is the answer for continuous maintenance of standard. These types of studies are meaningful only if they are briefed to all radiographers and remedial measures are implemented.

### O-117

#### **MRI safety – The Dos and Don'ts**

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**PURPOSE:** With increased utilization of MRI for patient care the concern for safety increases as safety related issues continually present during routine clinical practice. The purpose of this presentation is to review the MRI safety

concerns and the ACR Guidance Document for Safe MRI Practice, and development of implementation strategies for use in our clinical practice.

**MATERIALS AND METHODS:** Ferromagnetic detectors are now recommended for new MRI facilities; their role to prevent projectiles and siting strategies inside of the MRI suite will be presented. Active and passive implanted devices continue to grow in our patient population and strategies to assess MRI safety will be discussed. Device labeling can include conditions under which some of these devices can be safely imaged in MRI. Scenario's involving maximum spatial gradient and MR safe pacemaker will be reviewed.

**CONCLUSION:** Recent MRI developments include heightened safety concerns, new safety equipment, new safety information, and new implanted devices, all of which requires awareness of the issues and understanding of the available information for use in our clinical practice. The learning objectives for attendees include:

1. To know the safety issues within MRI
2. To know the safety items and practice strategies presented in the ACR Guidance Document for Safe MRI Practice
3. To understand the strengths and limitations of ferromagnetic detectors and how they can be used and sited in MRI suites.
4. To be able to interpret information about conditional implanted devices and implement safe MRI scanning strategies

### O-118

#### **Comparison of MRI lumbar spine screening with plain films of patients with non-specific lumbar pain**

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### O-119

#### **Ultrasound sensitivity for detection of metastatic axillary nodes in Ca breast**

Omer Altaf  
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### O-120

#### **Radiology reporting errors; voice recognition software versus dictation-transcription methods in non-native english speakers.**

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**OBJECTIVE:** The purpose of this study is to compare error rates and its types in final radiology reports (FRR) generated using voice recognition software (VRS) and conventional dictation-transcription (DT) method for operators who do not have English as a first language in a South Asian population.

**MATERIAL & METHOD:** 2808 FRR were randomly selected from six different radiology modalities: CR, USG, CT, MRI, NM and VIR. 50% FRR were generated using DT during July 2007-July 2008. The rest of the 50% FRR were dictated using VRS during July 2011-July 2012. All FRR were retrospectively evaluated for six different types of errors: wrong word submission, nonsense phrase, deletion, insertion, spelling & punctuation mistake and multiple errors.

**RESULTS:** Of 130 (4.63%) FRR containing errors; 33 (2.35% of DT reports) were generated using DT and 97 (6.9% of VRS reports) were dictated using

VRS. Errors were most common in MRI-FRR (27.3% of DT) & CT-FRR (38.1% of VRS) and least common in CR FRR (9.1% of DT & 9.3% of VRS). Residents made 72 (74.2% of error FRR) errors while using VRS and faculty made 24 (72.7% of error FRR) errors while using DT ( $p < 0.0001$ ). High error rates were seen during 'evening & on-call' reporting (51.5% for VRS & 84.8% for DT) ( $p < 0.001$ ). Similarly, high error rates in cross-sectional imaging (CSI) (CT + MRI) FRR (64% for VRS & 42.4% for DT) ( $p < 0.041$ ). Overall, Type-E (spelling & punctuation mistake) errors were common (29.9% for VRS & 30.3% for DT). Type-C (deletion) errors were more frequent in DT (31% of error) FRR and Type-A (wrong word submission) errors in VRS (25.8% of error) FRR.

**CONCLUSION:** FRR dictated using VRS is associated with significantly higher error rates than using DT. The dictator's grade, time of dictation and imaging modality used can prognosticate regarding occurrence of errors in FRR. However, patient source and academic rank of faculty do not influence substantially on error rates.

### O-121

#### Impact of Technology (CR/DR, PACS and Speech Recognition System) on a radiology department performance.

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**BACKGROUND:** During the last 10 years in Pakistan, new technology has changed the role of radiology services in healthcare delivery process. Particularly with the introduction of PACS, VRS, CR/DR and integrated information systems, few of benefits are: 1) the speedy access to finalized diagnostic reports, 2) manipulation of radiological images and 3) comparatively lesser image-retakes to patient.

**PURPOSE:** To find out the impact of technology on performance of a radiology department in a 500-bed tertiary healthcare hospital.

**MATERIAL AND METHODS:** A time-motion-analysis was performed to compare pre and post technology scenarios. Radiology procedure was time-stamped at different steps as the patient moves from registration desk till he receives the reports. Similarly radiology procedures retake incidence was also recorded. Extracted data from Radiology information system, CR, PACS and VRS was then combined, populated and analyzed in software (Spreadsheet) for scientific evaluation and comparison.

**RESULTS:** Before CR/DR, PACS and VRS (in 2003), after completion of the exam the average time of availability of films for reporting was minimum of 35 min to maximum 18 hours, retake rate was 4-5%. However, after CR/DR, PACS and VRS (in 2010), the average time after completion of the exam films availability for reporting is 30 minutes, retake rate is now less than one percent. Furthermore, availability of films on PACS has considerably saved the time and reduced the hassle for referring consultant to visit and view the films by themselves. The images are now available through-out hospital through digital workstations.

**CONCLUSION:** Despite considerable initial investment in new technologies, the impact on radiology performance has a significant value in overall improvements in healthcare delivery process.

### O-122

#### Accuracy of CT Scan in staging of RCC keeping histopathology as gold standard

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### O-123

#### An analysis of cumulative effective doses from radiologic procedures for pediatric wilms tumor patients. Are we meeting the annual dose limits?

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**INTRODUCTION:** The aim of this study is to estimate the cumulative effective doses (CEDs) from radiologic procedures for a cohort of wilms tumor patients with diagnosed nephroblastoma on pathology. This study is important in highlighting the significant exposure that can be accumulated by children through diagnostic and interventional radiologic procedures, and it discusses the issues of potential future malignancy risk and approaches to help minimize the risks.

**METHODS:** A retrospective cohort study of pediatric Wilms tumor patients was performed with complete data of imaging histories for one year. All procedures involving ionizing radiation were recorded, including plain radiography, computed tomography (CT), nuclear medicine (NM) studies, fluoroscopy, and interventional procedures. CED estimates were calculated.

**RESULTS:** Individual CED estimates ranged from --mSv to --mSv, with a median of -- mSv. CT and NM were the greatest contributors; CT constituted --% of procedures but --% of the total CED, and NM constituted --% and --%, respectively. There was considerable variability between tumor subgroups. CED estimated in nephroblastoma patients was ---mSV. (Data analysis is in process, results to be compiled)

**CONCLUSIONS:** CEDs from diagnostic and interventional imaging for pediatric Wilms tumor patients vary considerably according to individual clinical courses, and imaging modalities used. However, increased awareness of radiation protection and justification of procedures, keeping in view the risk to benefit ratio of each examination may promote strategies to reduce the radiation burden to this age group.

### O-124

#### Role of radiation protection in Diagnostic & Intervention Radiology

Hajra Malik

*Aznostics*

X-rays and Gamma rays are used for diagnosis and treatment purposes. These electromagnetic waves carry high frequency ionizing radiations that have enough energy to ionize an atom or molecule. Ionized molecules are unstable and may undergo chemical changes quickly. These chemical changes may lead to stochastic and detrimental effects. These effects can be minimized by adopting the rules of radiation protection.

Radiation protection rules should be followed by all radiation workers and must be adhered and checked by supervisors. Different methods have been used to protect patients and workers from the radiations. Once the radiation effects will be controlled, radiation workers will feel content and safe.

## POSTER PRESENTATIONS (P)

### P-01

#### Rare presentation of Fibrous dysplasia: Bilateral symmetrical involvement of calvarium and facial bones, mimicking Paget's disease.

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Fibrous dysplasia is a benign developmental dysplasia of bone in which there is replacement of bone by fibrous tissue. Seventy five percent occurs before age 30 years. Clinically fibrous dysplasia has three types, that is, monostotic form: affects one bone only (70\_80%), polyostotic form: multiple bones affected (20\_30%) and craniofacial form (Leontiasis ossea) described by Daves, which involves unilateral overgrowth of facial bones and calvarium. In addition to these forms, a localized form of fibrous dysplasia was described by Jones, which is also a hereditary familial form called Cherubism which involves bilateral mandible.

Today we present a case of fibrous dysplasia in a middle aged male, who presented with complain of facial deformity and swelling in gums involving both sides of face for the past two years. On Computed Tomography there was bilateral symmetrical involvement of calvarium, skull base and facial bones with typical radiological findings of bone expansion, ground glass haze and bubbly appearance, mimicking Pagets disease.

### P-02

#### Ossifying fibroma of mandible

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**INTRODUCTION:** The OF is a relatively rare benign tumor mostly affecting the jaws. These lesions occur more commonly in the middle age with predilection for females as in this case. We are reporting this case due to its unknown incidence and distinct nature as it is a true neoplasm so a correct final diagnosis is essential.

**CASE REPORT:** 21 years old female presented with hard painless progressive lump over right mandibular region. On examination, the swelling was located in the right premolar region causing displacement of adjacent teeth but no root resorption was observed. Plain radiograph demonstrated uniloculated well circumscribed lytic lesion with punched out appearances. CT revealed expansile low density lesion in the right side of the mandible with non-coalescing foci of mineralization giving it a ground glass appearance with intact margins favouring the ossifying fibroma. Final diagnosis is confirmed by histopathology which revealed spindle cells with few trabeculae of bone and areas of osteoid rimmed by osteoblasts without any evidence of atypia.

**CONCLUSION:** In conclusion, OF is a rare benign fibro-osseous neoplasm occurs as a mixed radiographic image specifically in the mandible. Computerized tomography (CT) is essential for a complete evaluation of the lesions. A correlation between clinical, radiological and histopathological features is the key to establish the correct diagnosis.

### P-03

#### Unusual Radiological Manifestation of Maxillary giant Cell Granuloma

Maria Hameed

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### P-04

#### Reporting a rare case of osteosarcoma of skull

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**INTRODUCTION:** Primary osteosarcoma of skull is a rare finding. Although it is the most common primary malignancy of bones, osteosarcoma of skull is very rare. Such cases constitute fewer than 2% of all sarcomas. Because of rarity of this tumor, we report here on a case of osteosarcoma of skull vault with an extensive intracranial and intra orbital extensions. Our patient was 17 years old girl from periphery who presented to Eye OPD with history of sudden onset right sided blindness and an ipsilateral painless scalp swelling over parieto-temporal region for 1 year. Neurological examination was negative. Eye specialist referred her to Radiology Department for contrast enhanced CT brain and orbits which revealed an aggressive, densely calcified tumor involving right fronto-parieto-occipital region with an extensive involvement of soft tissue and bony destruction, producing cloud like pattern of mineralization. On histopathological correlation, mass lesion proved to be an Osteosarcoma. Detailed description of radiological findings and differential diagnosis will also be included.

### P-05

#### Calcified choledochal CYST

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**INTRODUCTION:** Choledochal cysts are benign congenital cystic dilations of the extrahepatic and/or intrahepatic biliary tree. The classical presentation of choledochal cysts is a triad of abdominal pain, jaundice and a palpable lump seen in 13 to 63% of patients. The two most frequent complications of choledochal cysts are stone formation and malignancy. Congenital cysts of the CBD are rare, occurring in 1:100,000-150,000 live births and are typically found in children. Here we report a case of an 35-year-old patient combining a cystic CBD with giant primary CBD stone.

**CASE REPORT:** A 37 years old male presented with complaint of right hypochondrial, fever and vomiting for 1 week. On physical examination he was found to be jaundiced. His Liver function tests results were: increased direct and total bilirubin (11.3 mg/dl & 6.8 mg/dl) and raised gamma glutamyl transferase (479 u/l) and alkaline phosphatase (239 u/l) levels.

**IMAGING FINDINGS:** CT scan abdomen of the patient revealed marked dilatation of intra and extrahepatic biliary channels extending upto the distal end of common bile duct. Representing type IV choledochal cyst A confluent hyperdensity noted within the lumen of CBD, CHD, right and left hepatic ducts confronting their shape suggesting stone formation. Multiple small calculi of varying sizes also noted within intrahepatic biliary tree of right lobe.

MRCP revealed a large signal void area in the common bile duct extending from the right and left hepatic duct upto the distal common bile duct representing a large calculus. It was associated with dilatation of intra and extra hepatic biliary channels. Gall bladder appeared to be normal.

**DISCUSSION:** Common bile duct (CBD) stones usually occur in association with cholelithiasis. It is generally accepted that the majority of stones found in the CBD are secondary stones having migrated from their primary site of origin in the gallbladder into the CBD through a patent cystic duct or a cholecysto-biliary fistula. CBD stones are occasionally present in patients with an apparently normal gallbladder without stones (2, 3). These primary CBD stones may have formed de novo within the CBD as a result of stasis caused by ampullary stenosis, periampullary diverticula, cholangiocarcinoma, haemolytic anaemia or choledochal cysts.

The aetiology of choledochal cyst is uncertain but a close association with anomalous formation of the pancreaticobiliary ductal junction is reported. The two most frequent complications of choledochal cysts are stone formation and malignancy. The diagnosis of choledochal cyst and CBD stones is made by ultrasound, CT scan and MRCP. MRCP is considered as the Gold standard for the diagnosis of choledochal cyst and choledocholithiasis.

#### P-06

##### Adrenal Neuroblastoma with calvarial involvement and without orbital involvement

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**STRUCTURED ABSTRACT:** Neuroblastoma is third commonest childhood tumor. It is the most common extracranial pediatric neoplasm. It is a tumour of neuroblastic origin. Intra abdominal occurrence is common with adrenals (35%) being the most common site of origin. Other sites may be retroperitoneum: 30-35%, posterior mediastinum: 20%, neck: 1-5%, pelvis: 2-3%. They have been associated with a number of disorders, such as Hirschsprung disease, fetal alcohol syndrome, DiGeorge syndrome, Von Recklinghausen disease, and Beckwith-Wiedemann syndrome. Approximately 70-80% of patients older than 18 months present with metastatic disease in liver, lymph nodes, bones, and bone marrow. Skull vault metastases are generally more common in adults and infrequent in children. Calvarial metastases are characteristically seen with simultaneous involvement of the orbits and isolated metastasis rarely occurs. We report a case of five year old male who was diagnosed as a case of neuroblastoma which initially presented with extensive calvarial metastasis with no involvement of the orbits. CT showed cortical irregularity and thinning of the skull bones and hair on end periosteal reaction which was involving the fronto parieto temporal bones bilaterally. The coronal and sagittal sutures were also widened. Intracranial soft tissue component was noted along the fronto-parieto-temporal bones bilaterally. Concave convex extracranial soft tissue component was also noted in both fronto parietal regions. The differentials included lymphoproliferative disorders. Patient ultrasound abdomen showed a well-defined hyperechoic mass in right adrenal gland. It showed no internal calcifications. Abdominal lymphadenopathy was also noted. Patient was further referred to oncologist.

#### P-07

##### Congenital AVM in Wilms' Tumor

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**INTRODUCTION AND OBJECTIVE:** We report a case of a 3-year-old child with a Congenital AVM in Wilms' Tumor.

**MATERIALS AND METHODS:** A 3-year-old male child, presented to the ER with a history of minor fall from the bed. Patient had no hematuria, fever or other complains. On examination, a palpable Right flank mass was noted. Biochemical investigations were within normal limits.

**RESULTS:** Ultrasound showed a heterogeneous mass arising from the mid and lower part of the Right Kidney having some necrotic component, and turbulent flow on Doppler. CT showed a large solid cum cystic mass with an AVM within it encasing the right renal vein and artery and displacing adjacent structures. No mets were observed.

**CONCLUSION:** This case signifies the importance of radiological investigations especially ultrasound in an ER setting for identification of such non-symptomatic incidental lesions.

#### P-08

##### Helical CT of pulmonary vascular congenital anomalies

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**PURPOSE:** The purpose of this exhibit is to illustrate multidetector helical CT manifestations of a variety of congenital pulmonary vascular malformations

**MATERIALS AND METHODS:** 30 patients were included who underwent CT pulmonary angiography for congenital anomalies on 128 slice Toshiba CT scanner in the radiology department of Rehman Medical Institute Peshawar, over a period of two years. With a breath-hold of 15 to 20 seconds and 1 or 2 mL/kg (80 to 150 mL) of nonionic contrast by power injector at 3 to 5 mL/s, axial images from above the arch to the upper abdomen were obtained and reconstructed at 0.5-1mm intervals. Axial images were reformatted to yield 2-dimensional (2D) images and 3-dimensional (3D) images. Images were reviewed on vitrea workstation for type and location of pathologic lesions. Imaging findings were compared with surgical findings.

**RESULTS:** The types of pulmonary vascular congenital abnormalities present in the patients included: Main pulmonary artery stenosis in 20 (66%), Pulmonary artery aneurysm in 1(3%), Right and left pulmonary artery stenosis in 2 (6%), Total anomalous pulmonary venous return in 4,(13%), Partial anomalous pulmonary venous return (Scimitar) in 1(3%), Intralobar pulmonary sequestration in 1 (3%), Pulmonary arteriovenous malformation (1,3 %). Commonest was main pulmonary artery stenosis seen in patients with tetralogy of Fallots. The accuracy of diagnosis by CT was 100%.

**CONCLUSION:** MDCT with the use of multiplanar reconstruction enables highly accurate differentiation among pulmonary vascular abnormalities. MDCT pulmonary angiography with multiplanar and three-dimensional techniques should be the method of choice for preoperative morphologic assessment of vascular diseases in adult and pediatric patients.

#### P-09

##### Unilateral pulmonary artery agenesis

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**BACKGROUND:** Unilateral Pulmonary Artery Agenesis is a rare congenital anomaly due to malformation of sixth aortic arch during embryogenesis, patient usually remains asymptomatic until adolescence. It can occur as a single disorder or may be associated with other congenital cardiovascular malformations.

**DISCUSSION:** We present a case of 20 yrs old girl with history of repeated respiratory tract infections. Her chest radiograph was abnormal showing hypoplasia of right hemithorax and ipsilateral mediastinal shift. CT scan shows hypoplastic / aplastic right pulmonary artery with small right hemithorax and ipsilateral mediastinal shift- Patchy infiltrates identified involving right upper lobe suggestive of infection. Massive life threatening hemoptysis and pulmonary hypertension can complicate disease process.

**CONCLUSION:** Unilateral Pulmonary Artery Agenesis can remain asymptomatic until adulthood. Diagnosis can be difficult due to the rarity of the condition and its nonspecific presentation. The diagnosis can be confirmed and anatomic details can be discerned by CT and MRI. Angiography is reserved for patients requiring embolization or revascularization surgery.

**P-10****Pericardial CYST**

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**INTRODUCTION:** Pericardial cysts are uncommon benign congenital anomalies. They are the most common benign tumors of pericardium after lymphoma. Common in both sexes, and identified in 30s and 40s. They represent 11% of mediastinal case. Clinically and radiologically, they resemble other tumors of pericardium. CT scan, Ultrasound, Echocardiography and MRI are the most useful investigation.

**CASE PRESENTATION:** 52yrs old male of Indian/Pakistani origin came with complain of left lumbar pain, chest pain and dyspnea. The results of USG KUB showed multiple obstructing calculi in left kidney causing Mild Hydronephrosis. Upon further workup, patient was advised CT KUB. Subsequent Computer Enhanced Tomography (CT) showed a huge cyst of low density in the right lower lung field as an incidental finding, other findings were renal stones in left kidney causing mild obstructive uropathy. ECHO and Chest XRAY Postero-Anterior (PA) and Lateral views were done to further evaluate the possibility of pericardial cyst.

**CONCLUSION:** Although pericardial cysts are asymptomatic, they can cause compression effects leading to dyspnea and chest pain. Since they occur as mediastinal masses, they need to be ruled out, when they are found incidentally by imaging choices of CT scan, MRI and ECHO as an adjunct to the modalities.

**P-11****A rare case of Criss Cross Pulmonary Arteries with Coarctation of the aorta: Emphasis on Computed Tomographic Imaging**

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Crossed pulmonary arteries are due to an anomalous origin of both pulmonary arteries from the main pulmonary trunk. The pattern of "crisscross pulmonary arteries" (CPA) is a rare classic malposition of the branch pulmonary arteries, which is considered benign but may be associated with other anomalies. Typically, the pulmonary arteries cross each other and supply their respective lungs. The crisscross origin results from either faulty differential growth during partitioning of the truncus arteriosus or abnormal rotation of the aortic and pulmonary trunks. To date, only a few cases have been reported, and most of these cases have been associated with complex cardiac abnormalities. In most reported cases, this anomaly is diagnosed in association with truncus arteriosus and interrupted aortic arch, VSD, ASD, tetralogy of Fallot, left superior vena cava and anomalous pulmonary venous return. Some patients also had other congenital and chromosomal abnormalities, including trisomy 18 and 22q11 deletions.

Recognition of this rare pathology is important because it generally is accompanied by other congenital heart defects, extracardiac anomalies, and certain genetic problems. Our report describes a case of criss cross pulmonary arteries with Coarctation of the aorta, an association which has never been reported before in literature.

**P-12****Pulmonary artery aneurysm in bechet disease**

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**INTRODUCTION:** Behcet disease is a multisystem and chronic inflammatory vasculitis of unknown etiology. The pulmonary artery is the second most common site of arterial involvement in Behcet's disease.

**CASE:** A 22 year old male was presented with on/off fever, weight loss, and recurrent oral and genital ulcers since adolescence. He started having episodes of hemoptysis for last 6 months. On clinical examination oral and genital ulcers with multiple ulcers on legs and feet and bilateral pedal edema was observed. CT before and after contrast administration was done which demonstrate varying size aneurysmal dilatation of pulmonary vasculature in both lungs. There is suggestion of stenosed IVC with development of multiple varicosities in anterior abdominal wall, in the retroperitoneum and along the left gonadal vessels. The diagnosis of bechets disease was established on the basis of the presence of oral and recurrent genital ulcers in association with skin lesions and multiple pulmonary artery aneurysms.

**CONCLUSION:** Ct is a powerful, noninvasive technique can be used for the diagnosis of bechet disease, demonstrating vascular and pulmonary alterations. It is also important in the evaluation of therapeutic response.

**P-13****Pituitary stalk transection syndrome in a 16 years old girl presenting with short stature and delayed puberty – A case report**

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**INTRODUCTION:** Pituitary stalk transection syndrome also known as pituitary stalk interruption syndrome is a rare entity with an estimated incidence rate of 5/1,000,000 births. It is characterized by the presence of classical triad of a thin or absent pituitary stalk, hypoplastic or aplastic anterior pituitary and ectopic posterior pituitary on magnetic resonance imaging. This can be associated with midline defects and various pituitary endocrine deficiencies, ranging from isolated growth hormone deficiency to combined pituitary hormone deficiency. It may be congenital in origin or a sequelae of ischemic insult or head trauma. However, exact mechanism is unknown. There is a male predominance with a male to female ratio of 6.9:1 and mean age at diagnosis of around  $9.4 \pm 11.6$  years. Usual presenting symptoms are short stature, decreased growth rate, seizures, hypotension, intellectual delay and delayed puberty.

**CASE REPORT:** We are presenting case of a 16 year old girl who came to our Radiology Department for the evaluation of her short stature and delayed puberty. On examination she had not developed secondary sexual characteristics. She has been well with no chronic medical problems, no hospitalizations, and no surgeries. She was student in ninth grade and was persistently shortest in her class. Her hormone analysis revealed decreased levels of growth hormone, estradiol and vitamin-D. Contrast enhanced MRI of pituitary gland was performed which revealed an ectopic posterior pituitary gland appearing hyperintense on T1W in the midline at the median eminence. Additionally, the anterior pituitary appeared significantly smaller in size with barely perceptible midline pituitary stalk which could hardly be figured out on both pre and post contrast imaging. Sella appeared small in size. On the basis of her clinical presentation, hormone analysis and MRI findings, the diagnosis of pituitary stalk transection syndrome was made and patient was started on hormonal replacement therapy.

**DISCUSSION:** Pituitary stalk transection syndrome should be suspected when there is lack of pituitary stalk visibility and hypoplasia of the anterior hypophysis in a patient who clinically presents with features of isolated or multiple growth hormone deficiency. The presence of MRI features suggestive of pituitary stalk transection syndrome should prompt a full pituitary hormonal evaluation. It is important to closely follow up these patients in the long term so that their natural history of progressive radiological and hormonal deterioration can be ascertained and these patients can be managed better. Progression to complete anterior pituitary hormone deficiency may occur, even during the 2nd or 3rd decade of life.

**P-14****Hemichorea-hemiballism syndrome and its association with non ketotic hyperglycemia**

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Hemichorea-hemiballism may occur due to stroke, neoplasm, traumatic brain injury, vascular malformations, tuberculomas or non-ketotic hyperglycemia. Aim of this study was to highlight the important aspects pertaining to the clinical and radiological diagnosis of hemichorea associated with non ketotic hyperglycemia. In this observational study, non probability purposive sampling technique was used. It was conducted in radiology department, Bahawal Victoria Hospital (BVH) from January 1<sup>st</sup> to July 31<sup>st</sup>. During this period a total of 20 patients, who were admitted in BVH with acute hemichorea and hemiballism were brought to the radiology department for MRI. A detailed history and examination was done in all patients. Blood sugar, serum electrolytes, serum calcium, Hb A1C, liver function tests, renal function tests, lipid profile and MRI were done in these patients. Ten patients had hyperglycemia and showed high signal intensity on T1 weighted MRI scans which is typical for hyperglycemia associated hemichorea and hemiballism. In conclusion non ketotic hyperglycemia is a common cause of hemichorea and hemiballism in our area especially in elderly diabetic patients. Recognition of this condition is important as correction of underlying hyperglycemia leads to rapid improvement in these patients.

**P-15****Anterior sacral meningocele simulating a complex pelvic mass - A case report**

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A rare form of spinal dysraphism, the anterior sacral meningocele is characterized by herniation of meningeal sac through a bone defect anteriorly in the sacrum. It may be discovered incidentally in asymptomatic patients during investigation of another pelvic pathology or may be symptomatic as a result of compression on adjacent organs. It can mimic a pelvic mass on radiological investigations and recognition is important as aspiration of meningocele can be potentially dangerous. We report a 27 years old male patient presenting to our medical clinic in CMH Rawalpindi with severe constipation of few months duration. He stated he passed hard stools after weeks and there was mild abdominal pain associated with it. On examination a mass was palpable in the pelvis extending into the lower abdomen and predominantly lying on the right of midline. A provisional diagnosis of pelvic mass was made and further work up advised. Ultrasound abdomen/pelvis showed a cystic lesion in pelvis in midline with thin internal septae suggestive of a complex cyst which may represent a cystic tumor. To investigate this mass, X-ray pelvis was advised which showed sickle shaped defect along the right lateral margin of lower sacral vertebrae. CT pelvis showed a thin walled fluid density lesion in pelvis and extending upward to pelvic brim with displacement and compression of adjacent gut loops. The mass was probably originating from an anterior sacral defect and an MRI study of pelvis was advised for confirmation of anterior sacral meningocele. MR findings were consistent with an anterior sacral meningocele which was causing compression of adjacent gut loops hence consistent with history of constipation. The patient was referred to neurosurgical OPD where he got scheduled for posterior transsacral surgery followed by a microsurgical reconstruction of thecal sac through transsacral approach. The patient is relieved from constipation and is doing well on follow up.

**P-16****Spectrum of white matter lesions on magnetic resonance imaging in our setup**

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MRI is a very sensitive imaging modality in detection of brain and spinal pathologies, in particular for white matter diseases where it far surpasses other

imaging modalities. It has the ability to detect even minute abnormalities not appreciated with CT, however the imaging findings are nonspecific with a spectrum of different diseases mimicking similar characteristics. Even though a definitive diagnosis requires correlation with clinical and laboratory results but certain differentiating features such as location, signal intensities and pattern of enhancement are often helpful in narrowing the differential diagnosis. We studied the imaging features of white matter lesions in 40 patients over a period of 6 months and correlated our results with clinical history and lab results. We aim to describe the pattern of white matter abnormalities as well as their location and signal intensities in addition to patterns of enhancement. Finally, the usefulness of MRI in the detection of white matter lesions will be discussed.

**P-17****Removal of malfunctioning biliary plastic stent via percutaneous transhepatic cholangiography: Case report**

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**INTRODUCTION:** Percutaneous biliary intervention is provided as an adjunct to planned surgical resection or as a palliative procedure for inoperable malignant biliary obstruction. The removal of malfunctioning plastic biliary stents percutaneously is very difficult and not well described previously.

**CASE:** Here we describe a case of 42 yr old male patient, known case of carcinoma of pancreas who was referred to us after plastic stenting via ERCP and gastrojejunostomy from other tertiary care hospital. The failure of ERCP and deterioration of patient's condition left us with no option than to proceed with removal of plastic stent via polypectomy snare and replace it with metallic stent through percutaneous approach as a palliative treatment because the patient was not fit for surgery. The procedure went uneventful with improvement in patient's clinical symptoms.

**CONCLUSION:** Biliary obstruction due to malignant strictures of bile ducts or irresectable hepatobiliary cancers may be relieved surgically. On the other hand, nonsurgical biliary drainage can be achieved either through percutaneous transhepatic approach or endoscopically. Percutaneous transhepatic cholangiography is usually performed in those clinical settings where endoscopic retrograde cholangiopancreatography is not possible or in the cases of its failure.

**P-18****Symptomatic esophageal webs in epidermolysis bullosa with typical skin and skeletal features - A Case Series**

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**P-19****Traumatic diaphragmatic rupture, a diagnostic dilemma in blunt abdominal trauma: A case report**

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**INTRODUCTION:** Blunt diaphragmatic rupture is an uncommon injury. This entity poses diagnostic and therapeutic challenges to the treating team. It can be overlooked if not evaluated with the fair degree of clinical suspicion. Despite the advances in diagnostic modalities, it remains a difficult diagnosis leading to missed or late presentations with increased risk of morbidity and mortality. Its incidence ranges between 1% and 7% of severe blunt trunk trauma cases.

If the diagnosis of TDR is missed, the mortality and morbidity may rise up to 50% due to visceral herniation and strangulation.

**CASE REPORT:** A 8-year-old boy was involved in a motor vehicle accident (MVA) on a highway. He was received in the emergency room in a critical condition. He was unconscious, vitally unstable and was breathing with difficulty. His chest examination revealed reduced air entry on the left hemithorax. Ultrasound FAST examination showed free fluid at hepatorenal angle and right kidney laceration. Routine trauma series examination was done that showed multiple fractures involving pelvic bones, left femur, 10th and 11th ribs. His initial CXR showed lung contusion and raised left hemidiaphragm. Initially the clinician suspected hydropneumothorax and chest tube was placed on the left side. After that to rule out visceral injury CT Scan chest and abdomen was done. CT showed that the stomach lies within the thoracic cavity mimicking hydropneumothorax. The left diaphragm was not visualized in its entire extent. The radiologist raised the possibility of left diaphragmatic rupture with intrathoracic herniation of stomach. To further confirm the diagnosis, small amount of non ionic contrast was given to the patient through NG tube and x-ray was taken that confirm the diagnosis. The patient then went for emergency exploratory laparotomy and a linear diaphragmatic tear was seen that was repaired.

**CONCLUSION:** Increased level of suspicion is essential in order to timely diagnose blunt Diaphragmatic rupture in multiple trauma patients. Early diagnosis can lead to the proper surgical management and reduce the incidence of complications.

## P-20

### Cystic esophageal Gastrointestinal stromal tumour (GIST)

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**INTRODUCTION:** Gastrointestinal stromal tumors (GIST) are solid tumors. An esophageal cystic GIST has never been reported. We reported an esophageal duplication cyst that finally turned out to be a GIST.

**CASE PRESENTATION:** A 35 year old male presented with chest pain, dysphagia and odynophagia. A CT scan revealed a large exophytic cystic lesion from esophagus. Ct scan showed well defined non enhancing hypodense mass. Mri showed cystic lesion showing minimal contrast enhancement. The histopathology of the lesion was esophageal GIST.

**DISCUSSION:** This case posed diagnostic difficulty as it was thought to be a duplication cyst of esophagus. It turned out to be a GIST on histopathology. An extensive literature search yielded only few reports that have reported cystic GISTs, all arising from the stomach or pancreas. This is the first report of a cystic GIST arising from the esophagus.

**CONCLUSION:** GISTs can present as a predominantly cystic lesion and needs to be considered in the differential diagnosis of cystic lesions of the esophagus.

## P-21

### MR enterography: Protocol and clinical applications in small bowel pathology

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**OBJECTIVE:** To discuss protocol for MRE and to review some common applications of this technique.

**BACKGROUND:** Small bowel is not easily accessed by endoscope and diagnosis of its pathology relies on clinical assessment and imaging. Traditional contrast studies have the disadvantage of not including the mural and extramural details. This is best seen with MR Enterography (MRE) which is rapidly replacing CT enterography due to better soft tissue resolution and lack of ionizing radiation. We will share our departmental protocol and discuss clinical applications of MRE.

**SUBJECTS AND METHODS:** We have a modified MRE protocol at our institute. Patients take nil by mouth for 4-6hours prior to the appointment. They have to take about 1-1.5 liter of a 2.5% polyethylene glycol solution at regular intervals over a period approximately 40min prior to the study. The aim of using this hyperosmolar agent is to achieve luminal distention. It appears low signal intensity on T1-weighted images (T1-WI) and high signal intensity on T2-weighted images (T2-WI). On table 0.5 mg intravenously glycopyrolate is administered as spasmolytic agent. The study is performed on a 1.5-T MRI Philips scanner, using a phased array surface coil in supine position. Comprehensive MRE requires axial and coronal T1 and T2-WI, high-resolution diffusion weighted images (DWI), fat-suppressed three-dimensional (3D) T1-W breath-hold gradient-echo images of the abdomen and pelvis before and after intravenous gadolinium-based contrast material administration.

**CONCLUSION:** MRE is the preferred imaging technique for small bowel pathology owing to its ability to show mural and extramural details which allows differentiation in acute, active and chronicity of changes. Being radiation free, there is no age limitation for its use.

## P-22

### Isolated dorsal pancreatic agenesis

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Developmental anomalies of the pancreas have been reported but agenesis of dorsal pancreas is an extremely rare entity. It may be asymptomatic and incidentally detected on imaging or may be associated with diabetes mellitus or attacks of pancreatitis. We report a rare case of agenesis of dorsal pancreas that was detected incidentally on imaging and there was no other coexisting anomaly or complication.

## P-23

### Imaging features of non gestational metastatic ovarian choriocarcinoma on ultrasound and ct scan. Case report and review of literature.

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We report a case of non-gestational ovarian choriocarcinoma. The patient presented with pain abdomen, heaviness in lower abdomen, cough and shortness of breath. Patient was para four and last child birth was 5 years ago with no history of any pregnancy or miscarriage in last 4 years. Her examination revealed marked pallor. Ultrasound abdomen and pelvis showed a highly vascular left adnexal mass with echogenic vascular mass in left kidney. CT chest abdomen and pelvis with coronal reformation revealed features of metastatic left ovarian choriocarcinoma with vascular metastases in both kidneys, liver and lungs. We report this case with special emphasis on ultrasound, MDCT and CT angiography.



**P-24****Leiomyoma of the Urinary Bladder**

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**INTRODUCTION AND OBJECTIVE:** We report a rare case of young married female with history of burning micturation and hematuria.

**MATERIALS AND METHODS:** A 28 Year old married female presented in the ER with burning micturation and hematuria since 6 months. On physical Examination both kidneys and bladder were palpable.

**RESULTS:** Biochemical Investigations showed Hb of 4 mg/dl, Urea of 127 mg/dl, Creatinine of 4.12 mg/dl and Urine D/R showed presence of RBC's. Two pints of blood were transfused immediately in the ER. Ultrasound was done that showed bilateral moderate to severe hydronephrosis with hydroureter; there was a smooth-walled homogeneous hypochoic solid mass in the bladder with thin echogenic surface completely occupying the bladder lumen with vascularity on Doppler Imaging. Uterus appeared normal with normal endometrial cavity; however the mass was pushing the vagina. Both kidneys were externally drained with PCN. MRI pelvis was done that demonstrated a large well-defined abnormal signal intensity mass in bladder which is sub mucosal in origin with preservation of the muscle layer. It appeared hypo- to iso-intense signals on T2WI and iso-intense on T1WI and STIR sequences. An out pouching was identified in the posterior wall of the urinary bladder and the mass was seen to be extending posteriorly with smooth margins. It is pushing and displacing the vagina with intact fat planes. Uterus and Endometrial cavity appeared normal. Provisional diagnosis was made as benign smooth muscle lesion likely leiomyoma other differential were rhabdomyoma, pheochromocytoma. Cystoscopy was done that showed a growth at the base of the bladder. Partial resection of the mass was done and multiple samples for biopsy were taken. The biopsy showed the mass as a benign smooth muscle lesion consistent with Leiomyoma.

**CONCLUSION:** This case signifies the importance of radiological investigation especially MRI for pelvic masses.

**P-25****Torsion of paraovarian cyst in second trimester of pregnancy**

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**INTRODUCTION:** Paraovarian cysts originate from the mesothelium and are remnants of the mullerian /wolfian duct. They are the third most common type of ovarian tumors in pregnant patients. Incidence is 5 per 10,000 pregnancies. We report a rare case of twisted paraovarian cyst in a 27 wks pregnant patient.

**CASE REPORT:** 29 yr old lady presented with acute pain in the left iliac fossa. Ultrasound showed well-defined 2.5cmx1.8 cm hypochoic lesion in left iliac fossa extending to pelvis. It also showed a single alive intrauterine fetus of 27 wks. Through an emergency laparotomy cystectomy was done. Histopathology report showed paraovarian cyst torsion with extensive hemorrhagic infarction.

**CONCLUSION:** Torsion of paraovarian cysts is three times more common in pregnancy than in non-pregnant patients. Complications include hemorrhage, torsion or rupture. Ultrasound plays a vital role in prompt diagnosis and enables preservation of fallopian tube, ovarian function and fertility.

**P-26****Tuberculous Salpingitis as a possible cause of Salpingo Enteric Fistula- A Case Report**

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Salpingo-enteric fistula is a rare disease causing infertility. A search of literature by Hunt et al revealed that till 1990, 14 out of 20 previously documented salpingo-enteric fistula cases were discovered incidentally by hysterosalpingography in infertile women.

Hysterosalpingography is a common radiological examination done as routine investigation of infertility and sub fertility. It can accurately diagnose salpingo-enteric fistula.

We report a case of a 29yr old female, diagnosed with primary infertility and past history of treated pulmonary Koch's. Her hysterosalpingography examination showed definite evidence of communication of left fallopian tube with adjacent bowel. She was managed conservatively with clinical improvement.

**P-27****Scar Endometriosis: Review of three cases**

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Scar endometriosis is an uncommon but well described condition. It is caused by the dissemination of endometrial tissue in the wound at the time of surgery usually Cesarean section and hysterectomy. We report three cases with prior history of surgery who presented with swelling and pain along the abdominal scar. The diagnosis was suggested by ultrasound and MR imaging and confirmed on histopathology after resection.

**P-28****Breast papillary lesions: An analysis of 150 cases**

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**P-29****Image based response evaluation of cyber knife robotic radiosurgery for malignant intracranial tumors - A comprehensive radiological review**

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**P-30****OHVIRA syndrome ( obstructed hemi-vagina and ipsilateral renal anomaly ) with uterus didelphys, an unusual presentation**

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**BACKGROUND:** Obstructed hemivagina and ipsilateral renal anomaly (OHVIRA), or Herlyn-Werner-Wunderlich syndrome, is a rare Mullerian duct anomaly with uterus didelphys, unilateral obstructed hemi-vagina, and ipsilateral renal agenesis. Patients with this anomaly usually present after menarche with pelvic pain or a mass and rarely, in later years, with primary infertility. Strong suspicion and knowledge of this anomaly are essential for a precise diagnosis.

**CASE:** A 15-year-old female presented with backache, dysmenorrhea and abdominal distension since 7 months. Patient has pain during defecation and hemorrhoids since 2 months. On examination 16 weeks pelvic mass is palpated. Patient was diagnosed as a case of OHVIRA syndrome with uterus didelphys. We describe the findings from ultrasound, computed tomography (CT), and magnetic resonance imaging (MRI). She was treated with hemivaginal septal resection.

**SUMMARY AND CONCLUSION:** OHVIRA syndrome should be considered among the differential diagnoses in young females with renal anomalies presenting with pelvic mass, dysmenorrhea or painful defecation.

**P-31****Anaplastic Ca. thyroid-An institutional review**

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**OBJECTIVE:** Institutional experience of anaplastic carcinoma thyroid.

**METHODS:** Data was collected retrospectively of all anaplastic ca. thyroid patients registered at Shaukat Khanum Memorial Hospital and Cancer Research Center between 1995 and 2014. Survival data was analyzed at intervals of <3 months, >3 months - 1 year and >1 year and was correlated to the patient characteristics clinical/radiological presentation and treatment.

**RESULTS:** Over the 19 years; 6.1% of total thyroid cancer patients were histopathologically diagnosed as anaplastic ca. Total 47 cases; 18 males, 29 females. Age range: 15 - 85 years; mean 55 years. Provincial distribution was: Punjab 33, -57.5% (19/33) passed away, Khyber Pakhtoonkhwa 11 - 72.2% (8/11) passed away, Kashmir 1, and Sindh 2. Pre-existing co-morbidities, including diabetes and hypertension seen in 9.

In 27, thyroid was irresectable on baseline imaging showing invasion into the carotid sheath, trachea or vertebral fascia. 20 were resectable. 19 underwent complete thyroidectomy, 11 chemotherapy and 38 radiation therapy. Baseline staging with CT chest, bone scan and neck MRI showed 12 nodal, 21 pulmonary and 6 osseous metastases. 14 had no metastases.

Overall 30 passed away, 4 are alive and insufficient survival information is available on 12 patients.

9 patients survived >1 year. Of these two patients had an osseous lesion and one was irresectable. The rest had no metastasis and were resectable

Our longest survivor is alive at 7 years. He was 26 at the time of diagnosis. Disease was resectable at baseline with no evidence of metastatic disease.

**CONCLUSION:** Anaplastic thyroid carcinoma has a very high mortality rate. No difference in survival based on geographic location was seen. Complete upfront resection, no evidence of metastasis at presentation translate to a better survival.

**P-32****Breast cancer: Awareness and screening practices among women of Lahore, Pakistan**

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**OBJECTIVE:** To determine awareness and screening practices of breast cancer among women of Lahore, Pakistan. This study also intended to investigate the relationship between socio-demographic variables and breast self-examination (BSE) performance.

**METHODS:** This was a cross sectional study conducted in Lahore, Pakistan between June and August 2015. A total of 112 women, aged 18 years and above were selected randomly from two randomly selected towns of Lahore. Data was collected by means of structured questionnaire (after obtaining informed consent). Data was analyzed by using SPSS version 19. Descriptive statistic was used to describe the background characteristic profile of the respondents. Chi square was used to find the association between socio-demographic variables and BSE performance.

**RESULTS:** The findings of this study have shown inadequate breast cancer awareness among women. Overall awareness of breast cancer risk factors was 32%. The most accepted risk factors for breast cancer reported by majority of women were: "Positive family history of breast cancer" (68.8%), "no breast feeding" (58%), "alcohol consumption" (54.5%) and "Race/ethnicity" (48.2%). Overall awareness about warning signs of breast cancer was 45%. 72% women included in the study had never heard about breast self-examination. Approximately 78% women never performed breast self-examination. 88.6% women did not know the correct technique of performing BSE. Only 15.2% practiced BSE monthly. The main reason for not performing BSE was "I don't know how to perform BSE" (64.5%). 98.2% women never had CBE and mammogram performed on them.

Age, education level, occupation and socioeconomic status (Family monthly income) were significantly associated ( $p < 0.001$ ) with BSE performance in this study while family history of breast cancer and marital status were not significantly related to BSE performance.

**CONCLUSION:** This study has revealed inadequate knowledge of breast cancer as well as poor screening practices among women which substantiates the fact that it is crucial to educate the woman about this disease. Awareness of facts about breast cancer will help us move together to achieve the common goal- prevention.

**P-33****Precision of DEXA in the measurement of bone mineral density & bone mineral content - A phantom based study**

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**OBJECTIVE:** Precision is the ability to measure a true value of Bone Mineral Density (BMD) and Bone Mineral Content (BMC) using densitometry. Reliability and consistency against the specified standard phantom dedicated by the manufacturer is the essential factors in the reliable BMD results for the patients. The study aims to reveal the accuracy in the measurement of phantom based Bone Mass Density (BMD), Bone Mass Contents (BMC) over the area of phantom by calculating percentage coefficient of variation (% CV) for one year quality assurance results (261 quality assurance results from August, 2014 to August, 2015) for Lunar Prodigy DEXA of GE.

**MATERIAL AND METHOD:** We took results of 261 daily quality assurance results of GE Lunar Prodigy DEXA machine. The % Coefficient of Variation is the recommended and accurate measurement of precision, this was calculated using,

$$\% CV = \frac{\text{Standard Deviation} \times 100}{\text{Mean}}$$

**RESULTS:** The % Coefficient of Variation in BMD and BMC were 0.3 and 1.72 whereas %CV for phantom area was 0.21 daily quality assurance results. Testing trueness of the bone densitometry procedure is mainly the task of manufacturers. It is rarely done under clinical conditions. FDA 510K clearance requires an error of less than 10 % for all BMD devices. Most manufacturers in bone densitometry claim that the trueness of the bone mass measurement is lower than 5-6 %.

**CONCLUSION:** Our results are quite lower than the recommended 5-6% variation in % CV. This shows the accurate and confident reproducibility of our technologists in scanning phantom for daily quality assurance.

#### P-34

##### **Medullary thyroid carcinoma: assessment of disease status in relation to rising calcitonin level and treatment perspectives**

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**PURPOSE:** Review of all patients with medullary carcinoma thyroid evaluating for disease status and recurrence based on stage and calcitonin levels at presentation.

**METHODS:** Retrospective review of all medullary ca thyroid patients registered at Shaukat Khanum Memorial Hospital and Cancer Research Center from 1995 to 2014. We classified survival and disease status based on biochemical levels, stage at presentation, presence and type of MEN syndrome. Calcitonin levels were sub classified as <100, 100-500 and >500.

**RESULTS:** 70 patients with medullary ca thyroid presented during a 19 year period. 22 females and 48 males. Mean age 37 years; range 17 to 67 years. At baseline 13 were irresectable and 58 resectable. 44 had nodal metastasis, 9 pulmonary, 5 liver, 12 bone and 1 brain. 39 received radiation therapy to the thyroid bed; 21 had recurrence/progression of disease. 12 received chemotherapy; 7 progressed. 10 were given a combination of chemoradiotherapy and 8 of these progressed.

Baseline calcitonin levels were available on 57 patients. Based on calcitonin levels; 15 were <100, 4 were between 100 - 500, of these 2 progressed, 32 had >1000 of these 15 progressed, 7 were lost to follow up. 15 patients have follow up calcitonin levels and 8 showed doubling compared to baseline. Range for progression was 3-6 years.

During follow up 2 patients died. Both were stage IV at baseline.

15 patients did not have baseline staging information. No patient was stage 1, 10 stage II, 6 stage III; 2 progressed, 40 stage IV; 15 progressed.

F-18 FDG PET/CT scan was performed in 10 patients; positive in 5 showing hypermetabolic cervical, mediastinal nodes and osseous lesions.

##### **CONCLUSION:**

As calcitonin level rises in medullary ca thyroid, the chance of metastatic disease increases. Calcitonin doubling does not correlate with increased likelihood of metastatic disease seen on F-18 FDG PET/CT. Medullary ca thyroid as part of an MEN syndrome behaves no different from sporadic disease.