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**32<sup>nd</sup> Annual Conference 2016**  
**Radiological Society of Pakistan**  
**ABSTRACTS**

**ORAL PRESENTATIONS (O)**

**SESSION I: Central Nervous System (CNS)**

**O-1**

**MRI stroke protocol: one stop shop in setting of acute infarct with multiple co-morbid**

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**PURPOSE:** Purpose of our study is to predict progression of infarct size as depicted by venous congestion on susceptibility weighted imaging (SWI).

**METHOD AND MATERIALS:** We retrospectively enrolled all diagnosed cases of stroke from January 2013 to December 2015. We included only thirty patients since we had stringent inclusion and exclusion criteria. Inclusion criteria were: 1 acute infarct on diffusion weighted imaging (DWI) in MCA, ACA or ICA territory. 2 Stroke protocol performed including DWI and SWI on first day and repeat DWI within three days. Exclusion criteria were: 1. tissue plasminogen activator (TPA) given. 2 Haemorrhagic infarction on initial presentation. 3 Watershed infarcts. Patients were imaged on 1.5T Siemens and 3T Toshiba machines. Venous congestion was defined as numerous and larger veins with greater hypointensity compared with contralateral hemisphere. We used ASPECTS scoring system to estimate infarct size. Degree of venous congestion was graded as none, moderate and extensive on the basis of ASPECTS scoring. SPSS 21 version was used for analysis. The venous congestion grading was used to predict infarct growth.

**RESULTS:** There was interval increase in ASPECT score on DWI in 15 patients with moderate degree of vascular congestion on SWI. The extent of venous congestion was significantly correlated with infarct growth ( $P < 0.001$ ). In 2 patients there was development of hemorrhage with stable size of infarct. In 13 patients there was no vascular congestion and no increase in size of infarct.

**CONCLUSION:** Venous congestion seen in infarcted territory is related to poor prognosis and this can be reliably used as a surrogate marker of oxygen extraction in penumbra.

**CLINICAL RELEVANCE/APPLICATION:** Susceptibility weighted imaging (SWI) can predict tissue at risk and can be a replacement for perfusion scan in clinical scenario of acute ischemic infarct with multiple co-morbid.

**O-2**

**Imaging appearances on MRI brain after heat stroke**

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**PURPOSE:** Heat stroke is a medical emergency defined by a body temperature greater than 40°C (104°F) that causes altered mental status and deterioration of multiple organ systems. Heat stroke can cause many different reactions within the body that lead to neurologic dysfunction, including decreased cerebral perfusion and aberrations in coagulation. Although the pathophysiologic mechanism of neuronal damage is fairly well understood but documentation of these changes on MR images is infrequent. Due to global climatic change, severe heat wave with temperatures as high as 49°C (120°F) struck province and its capital city, in June 2015 and 2016. Heat stroke has generally reported in case reports or small patient series in our knowledge. This is the first study reported on imaging appearances of MRI brain after heat stroke done in 56 patients.

**MATERIAL AND METHODS:** This prospective study was conducted in radiology department of Ziauddin university hospital from May 2015 till July 2016. All the patients with clinical suspicion of heat stroke with neurological deficit underwent MRI brain and evaluated by two senior radiologists.

56 patients were included in study (12 female and 44 male). All patients had clinical symptoms of fever and most of them had additional symptoms of altered level of consciousness. Out of 54 patients, 8 patients had normal MRI brain. 6 patients presented with bilaterally symmetrical hyperintense signals on T2WI in thalami and basal ganglia. 2 patients demonstrated focal high signal intensity in pons representing pontine myelinolysis, rest of the patients presented with cerebral or cerebellar infarcts.

**CONCLUSION:** Heat stroke may cause multiple brain lesions such as ischemia, hemorrhage, infarction and inflammation. MRI plays an important role in the diagnosis and evaluation of heat stroke.

**O-3**

**MRI of primary central nervous system lymphoma**

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**PURPOSE:** Differentiation between glioblastoma multiforme (GBMs) and primary central nervous system lymphomas (PCNSLs) using multi-sequence magnetic resonance imaging (MRI) is an important task in medical imaging diagnosis which is valuable for treatment planning. However, this task is a little challenging because GBMs and PCNSLs may demonstrate similar appearances in MR images. This study intended to investigate the usefulness of computer aided analysis of contrast enhanced T1-weighted images for discriminating PCNSLs from GBMs.

**MATERIALS AND METHODS:** The institutional review board approved this study and did not require patient informed consent. MR images from 37 consecutive patients with pathologically proved PCNSLs (20 men, 17 women with mean age of 56.7 years) and 58 with GBMs (42 men, 16 women, mean age of 56.6 years) were retrospectively evaluated. The key slice was selected from contrast enhanced T1WI and region of interests (ROIs) were drawn around the tumor region. Hyperintense lesions on contrast enhanced T1-weighted images were determined as tumor and hypointense region inside the tumor as necrosis. Features that include intensity, histogram, shape, and texture were extracted and validated using a t-test ( $p < 0.05$ ).

**RESULTS:** 14 PCNSL patients demonstrate necrosis ( $n=14$ , 37.84% in 37) in the mass while all 58 GBMs show necrosis ( $n=58$ , 100% in 58). Homogeneity, shape complexity, skewness, kurtosis and texture feature have significant statistic differences between PCNSLs and GBMs ( $p < 0.05$ ).

**CONCLUSION:** This semi-automatic computer aided analysis of contrast enhanced T1-weighted images provides additional quantitative information of the tumor which may be used in clinic to differentiate PCNSLs from GBMs.

**O-4**

**Evaluation of intracranial vascular malformations with computed tomography and cerebral angiography in the setting of intracranial hemorrhage**

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**OBJECTIVE:** In intracranial hemorrhage preexisting hypertension, the site and age of the patients are important factors in determining the possibility of an underlying vascular abnormality by cerebral angiography. It is essential to

identify an underlying vascular malformation causing intracranial hemorrhage to reduce morbidity and mortality and to prevent recurrence.

**MATERIALS AND METHODS:** We retrospectively evaluated 132 patients who were referred to radiology department and were reported as intracranial hemorrhage on CT Scan Head, followed by conventional angiography to rule out the underlying vascular pathology. We excluded some of the patients from the study who were neurologically disabled, refused angiography, in whom severe coagulopathy accounted for the hemorrhage, intratumoral bleed or with high surgical risk factors.

**RESULTS:** In this study, we evaluated etiology, risk factors, bleeding site, cause of hemorrhage and the vessel involved showing vascular malformations. The most common risk factor was hypertension. The most common site of hemorrhage was intraparenchymal bleed (69.7%) followed by subarachnoid (16.7%) and intraventricular hemorrhage (7.6%). The main vascular abnormality being aneurysm (45.5%) followed by arteriovenous malformation (30.3%). Based on the site and cause of hemorrhage middle cerebral artery was found to be the most common vessel involved (25.8%).

**CONCLUSION:** The most common cause of intracranial hemorrhage in our population on computed tomography brain was intraparenchymal with predilection of temporoparietal region. Angiographic findings showed that aneurysms were the leading cause of intracranial hemorrhage. However arteriovenous malformations are most common in young individuals.

### O-5

#### Lecture on MR Spectroscopy and functional MRI in neurosurgery

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### O-6

#### Worth of ADC values in differentiating typical from atypical meningiomas

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**BACKGROUND:** Meningioma comprise around 14-20% of all intracranial brain neoplasms, out of these atypical account for 7.2% and malignant for 2.4%. As these varieties mostly recur with aggressive patterns, they significantly increase patient's morbidity and mortality. The radiological distinction between these is the trickiest of all.

**PURPOSE:** The aim of our study is to investigate the utility of diffusion weighted imaging (DWI) and apparent diffusion coefficient values (ADC) in distinguishing typical from atypical/malignant meningiomas.

**MATERIAL & METHODS:** The study was approved by ethical committee. All patients with meningioma diagnosed at the Radiology Department of Jinnah Postgraduate Medical center, Karachi from April 2016 to September 2016 were included. Out of 72 cases, 66 fulfilled the inclusion criteria, whereas 6 had treated / recurrent pathology. On a 1.5 Tesla Philips MR scanner, standard contrast enhanced MRI brain protocol along with DWI at b=0, b=500 and b=1000 mm<sup>2</sup>/sec was performed. ADC values were calculated from normal parenchyma, tumor and perilesional edema. Data was analyzed using SPSS version 19.

**RESULTS:** On the basis of histopathology 55 meningiomas were: Grade I (typical) in 35 (53.0%), Grade II (atypical) in 15 (22.7%) and Grade III (anaplastic) in 5 (7.5%). In 11(16.6%) cases biopsy was not performed. All

20 atypical and anaplastic cases were hyperintense on diffusion imaging with perilesional edema. The average ADC values were 0.725x10<sup>-3</sup>mm<sup>2</sup>/sn for atypical, 0.692x10<sup>-3</sup>mm<sup>2</sup>/sn for anaplastic meningiomas, 0.987x10<sup>-3</sup> mm<sup>2</sup>/sn for typical, 0.850x10<sup>-3</sup>mm<sup>2</sup>/sn for all cases and 0.750x10<sup>-3</sup>mm<sup>2</sup>/sn for normal parenchyma. The mean ADC of all cases was higher than normal brain (p<0.001); the mean ADC of typical meningiomas was higher than normal brain (p=0.02) and atypical meningiomas (p<0.01) and the mean ADC value of atypical meningiomas was lower than normal brain (p=0.042). The mean ADC of perilesional edema was higher than meningiomas (p=0.012) and normal brain parenchyma (p<0.01).

**CONCLUSION:** Diffusion imaging is a novel, non-invasive and reliable bioimaging technique for grading meningioma according to its aggressiveness. ADC values are significantly lower for atypical/malignant meningiomas.

### O-7

#### Agreement between Kang's magnetic resonance imaging grading system and clinical symptoms for assessing cervical cord compression

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**PURPOSE:** To determine the agreement between Kang's grading system and neurological symptoms for the assessment of spinal canal compression.

**MATERIAL & METHODS:** Referred patients attending radiology department of our institution for MRI cervical spine meeting the inclusion criteria were enrolled in the study after taking informed consent by principal investigator from 29/4/2014 to 1/12/2015. Among 126 study subjects, 58 (46%) were males and 68 (54%) were females. The age of the study subjects ranged from 19-83 years, however the mean and median age were found 50.3 ± 14.3 years and median age was 51 years respectively. Duration of disease of the patients ranged from 01-24 months. T2 sagittal and T2 axial images were taken through the cervical spine on Vantage Titan 3T. MRI reporting for cervical cord compression assessment was done by a consultant neuroradiologist with 5-years clinical experience and findings were recorded on standard performa by the principal investigator. The radiologist assessed the presence and grade of cervical cord compression at the maximal narrowing point, in accordance with the MR grading system suggested by Kang et al. Neurologic clinical symptoms were acquired by the history taken by principal investigator.

**RESULTS:** Out of 126 subjects, 82 (65.1%) subjects were identified positive & 44(34.9%) were negative for Kang grading system with spinal canal compression. Most of the patients' MRI findings were found at C5-C6 level i.e. 58(46%). Majority of the neurological symptoms included pain & numbness 125(99.2%) & 70 (55.6%) respectively. 64(50.8%) patients belong to age >50 years. Seventy five 75(59.5%) subjects were found having positive & 40(31.7%) were found having negative agreement between the results of Kang's grading system and neurological symptoms for the assessment of spinal canal compression by applying Cohen's Kappa coefficient which was found substantial (K=0.81).

**CONCLUSION:** The agreement of the Kang system was almost perfect and was higher than in the study by Kang et al. Grade 0 cervical canal stenosis represents negative neurologic manifestations and grades 2 and 3 cervical canal stenosis represent positive neurologic manifestations. The Kang system and clinical manifestations are significantly correlated, especially in the older age group (≥ 50 years).

### O-8

#### Unruptured MCA aneurysms , lone coiling versus stent assisted coiling , comparative double center study

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**O-9****Frequency of vertebral end plate modic changes in patients with lumbosacral spine degenerative disc disease using MRI as the imaging modality**

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**OBJECTIVE:** Lumbosacral spine degenerative disc disease is a common condition presenting usually with low back pain. It is frequently associated with vertebral end plate modic changes. In this article we evaluated frequency of vertebral end plate modic changes in patients with lumbosacral spine degenerative disc disease.

**MATERIALS AND METHODS:** The study was a retrospective study. It was conducted in Peshawar institute of medical sciences from 1st May 2015 to 1st May 2016 during which we evaluated the prevalence of modic changes and there type in 70 patients with lumbosacral spine degenerative disc disease.

**RESULTS:** Out of the 770 discs of 70 patients (from upper end plate of L1 to upper end plate of S1) 38% end plates (296) showed end plate modic changes with type II modic changes being the commonest (37%) followed by mixed changes (32.4%). Type I change was noticed in 16.2% while type III in 14.1%. The conversion of type I to type II was observed in two patients who came for follow up MRI with symptom improvement. The end plates commonly involved were at L5-S1 (49%) and L4-L5 (44%) level with other levels being involved but less commonly.

**CONCLUSION:** In this study we conclude that Modic changes are part of the normal age-related degenerative process affecting the lumbar spine. These lesions can convert from one type to another with time, with mixed-type changes probably representing the intermediate stages in this conversion

**O-10****Role of MRI planimetry and MR parkinsonism index (MRPI) in discriminating Parkinson disease and progressive supranuclear palsy: a retrospective analysis based on 1.5T and 3T MRI.**

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**OBJECTIVE:** Assessment of MR planimetric measurements such as midbrain/pons areas, middle cerebellar peduncles (MCPs) and superior cerebellar peduncles (SCPs) diameter and MR Parkinsonism index (MRPI) in differentiating Progressive Supranuclear Palsy (PSP) from Parkinson disease (PD) on 1.5 and 3T.

**MATERIALS AND METHODS:** After approval from ERC, analysis of 34 consecutive patients with PSP, 34 patients with PD and 34 healthy controls (HC) was performed. HC were age matched adults without any history of neurodegenerative disease or movement disorders. Retrospective data from past 10 years (January 2006 to December 2015) was obtained from Hospital Information Management System (HIMS) and informed consent was obtained from all the participants. The measurements of pons area-midbrain area ratio (P/M) and MCP width-SCP width ratio (MCP/SCP) were used and MRPI was calculated by formula [(P/M) (MCP/SCP)].

**RESULTS:** Midbrain area and SCP width in patients with PSP (19 men, 15 women; mean age, 66.7 years) were significantly ( $p < .001$ ) smaller than in patients with PD (20 men, 14 women; mean age, 66.7 years), and control participants (17 men, 17 women; mean age, 66.1 years). P/M and MCP/SCP were significantly larger in patients with PSP than in patients in other groups

and control participants. All measurements showed some overlap of values between patients with PSP and patients from other groups and control participants. MR parkinsonism index value was significantly larger in patients with PSP (median, 21.00) than in patients with PD (median, 9.50;  $P < .001$ ) and control participants (median, 9.63;  $P < .001$ ), without overlap of values among groups. No correlation was found between the duration of disease, PSP rating scale, PSP staging system, and MRPI in the present study. No patient with PSP received a misdiagnosis when the index was used (sensitivity and specificity, 100%).

**CONCLUSION:** MRPI is most sensitive, specific and accurate in differentiating patients with PSP from those with PD on an individual basis. It should be made an essential part of all MRI brain reporting, whenever, differentiation between PD and PSP is sought.

**O-11****Cyberknife Robotic Radiosurgery; a new horizon in treatment of cancer**

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Cyberknife treatment is a cutting-edge technology. The treatment delivered is precise, painless, and noninvasive (No injections/anesthesia is required). It is used for curative treatment of tumors anywhere in the body, including the brain, spine, prostate, lung, liver etc. and is also used for pain management in trigeminal neuralgia. It is a day-care procedure without any significant side-effects. The patient can go back to work the next day. Cyber knives are installed only in 34 countries with a total of 250 units around the world. The perpatient cost of treatment in Europe/USA varies from US Dollars 50,000 to 90,000. Patients Aid Foundation, JPMC, Karachi, Pakistan is the world's first and, so far, the only NGO offering free Cyberknife treatment irrespective of nationality, religion, ethnicity etc. (Ref Google Cyberknife Wikipedia worldwide locations). Patients are coming for treatment from all over the country, and also abroad including Bahrain, Abu-Dhabi, Sharjah, Saudi Arabia, Yemen, Nigeria, Russia, Canada, Oman and Afghanistan. Only 40% of patients come from Sindh, 31% from Punjab, 18% from KPK, 6.0% from Baluchistan and 5.0% come from abroad. The Radiologist is an important member of the Radiosurgery team for imaging, tumor mapping, and post treatment follow-up. Our radiologists should be preparing themselves for their role in such technologies to become a part of therapeutic teams. The basics of radiosurgery, Cyberknife, its indications and our experience with at JPMC will also be discussed.

**O-12****Normal variations in cerebral venous anatomy and their potential pitfalls on 2D TOF examination.**

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**SESSION II: Genitourinary System (GU)****O-13****Imaging Endometriosis**

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**O-14****Diagnostic accuracy of ultrasound (u/s) and magnetic resonance imaging (MRI) in prenatal diagnosis of placenta accreta taking operative findings as gold standard**Kalsoom Nawab,<sup>1</sup> Sadaf Naveed,<sup>1</sup> Majid Khan<sup>2</sup><sup>1</sup> Department of Radiology, Khyber Teaching Hospital, Peshawar, Pakistan.<sup>2</sup> Department of Radiology, Medical A Unit, Khyber Teaching Hospital, Peshawar, Pakistan.

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**BACKGROUND:** Placenta Accreta is the extension of chorionic villi into myometrium due to abnormality in deciduabasis which may lead to massive peripartum haemorrhage, hence putting the life of patient at risk. Therefore, antenatal diagnosis of PA is essential for which ultrasonography (USG) and magnetic resonance imaging (MRI) play a pivotal role. However, USG is an easily accessible and low cost imaging modality as compared to MRI and that is why it is more widely used for screening purposes.

**OBJECTIVE:** To determine diagnostic accuracy of USG and MRI in prenatal diagnosis of placenta accreta taking operative findings as gold standard.

**METHODS:** A prospective study was conducted in radiology department of Khyber Teaching Hospital, Peshawar from June, 2014 to June, 2016. Twenty five antenatal patients who were at high clinical risk of placenta accreta were identified and undergone USG and MRI for confirmation of diagnosis. Sensitivity, specificity, positive predictive value, negative predictive value and accuracy were calculated both for USG and MRI.

**RESULTS:** Twenty five patients at risk of placenta accreta underwent both USG and MRI. Seven cases were diagnosed with placenta accreta per operatively (gold standard). The sensitivity, specificity, positive predictive value, negative predictive value and accuracy of the USG were 85.7%, 83.3%, 66.7%, 93.8% and 84% respectively. While the sensitivity, specificity, positive predictive value, negative predictive value and accuracy of the MRI were 71.4%, 72.2%, 50%, 86.7% and 72% respectively.

**CONCLUSION:** The study concluded that diagnostic accuracy of USG is higher than MRI for the antenatal diagnosis of placenta accreta.

**O-15****Transvaginal Ultrasonography and Saline Infusion Sonohysterography for Detection of Intrauterine Lesions in Women with Abnormal Uterine Bleeding**Iqbal Hussain Dogar, Masood Mahjabeen, Mahjabeen Tariq, Gautam Mahesh  
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**PURPOSE:** Abnormal Uterine bleeding (AUB) is one of the frequent complaints of female patients of all ages. AUB is present in 33% of women referred to gynecologists and this increases to 69% in peri-menopausal and post-menopausal women. About 10% of postmenopausal bleeding results from endometrial cancer and imaging is the mainstay for its identification. Imaging plays a vital role in differentiating structural lesions like endometrial carcinomas, myomas and polyps which require surgical management from functional disorders requiring medical management. Transvaginal Ultrasonography (TVUS) is the first line imaging modality for AUB after selecting the patients with inconclusive pelvic ultrasonographic results. Sonohysterography (SHG) also plays a pivotal role. With the help of a catheter, sterile saline is infused into the uterine cavity causing its expansion and thus providing an echographic contrast with the adjacent structures to allow for better visualization of the endometrium. The current study is aimed at providing a comparison between TVUS and SHG in the detection and identification of intrauterine lesions in patients with abnormal uterine bleeding, and comparing the sensitivity and specificity of the respective methods in the detection of such lesion.

**MATERIALS AND METHODS:** This study was conducted in Department of Radiology, Mayo Hospital Lahore. Fifty women who presented with history of abnormal uterine bleeding were included in this study. Pregnancy was ruled out by transabdominal scan. Transvaginal ultrasound and sonohysterography were performed in all the patients. All the data were coded and analyzed using SPSS version 20.

**RESULTS:** Out of 50 patients, 16 patients had intra-myometrial fibroid, 13 had submucosal fibroid, endometrial polyp was found in 10 patients and 11 patients had thickened endometrium (thickness > 8mm). The sensitivity and specificity of TVUS was found to be 83.2% and 82.7% respectively whereas SHG showed sensitivity and specificity of 95.4% and 91.5%. In the detection of the submucosal fibroid and endometrial polyp SHG showed highest sensitivity and specificity as compared with transvaginal ultrasound.

**CONCLUSION:** Both the TVUS and SHG has comparable sensitivity and specificity in the detection of endometrial disease in patients presented with abnormal uterine bleeding however SHG is more sensitive in the detection of polyps.

**O-16****Clinical Applications of Ultrasound in CKD and its use as Biomarker**

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Chronic Kidney Disease (CKD) continues to be an emerging health problem in many countries with a continuously rising incidence. The causative factors are multifactorial and hence disease prevention is a major challenge. Chronic Kidney Disease of Unknown Aetiology (CKDu) has also reached crisis proportions in the main agricultural regions under reservoir based irrigation, in Sri Lanka.

CKD is defined as either kidney structural damage or a decrease in GFR < 60 ml/min/1.73 m<sup>2</sup> for three or more months. Histologically this is a progressive "tubulointerstitial" nephritis followed by gradual progressive fibrosis.

Staging CKD is based on estimation of GFR. Patients with CKD stages 1-3 are generally asymptomatic. They get to realize that they have CKD only when their kidney function is down to 25% of normal. But symptoms appear when kidney function is less than one-tenth of normal.

Therefore it is vital to detect this disease early and start treatment. Newer imaging modalities specially Ultrasound with doppler and elastography is being studied as potential modes of early detection of CKD.

Typical findings of a long-standing CKD (especially stage 4 & 5) are small renal size and cortical thinning, increased cortical echogenicity with less distinct pyramids and renal sinus, irregular contour etc. Doppler findings are diminished renal vascularity, increased RI in segmental and interlobular arteries. Quantification of kidney fibrosis has a potential as a biomarker and a prognostic indicator for CKD. Ultrasound and MRI are ideal such non invasive methods in this respect instead of biopsy.

Fibrosis decreases the elasticity and affects the Young's Modulus (YM) of tissue thus measure of tissue elasticity can be an indicator of fibrosis. There are several techniques to measure elasticity in tissue using ultrasound (US). Strain transient elastography is not feasible in the kidney unlike in quantification liver fibrosis.

Acoustic radiation force impulse (ARFI) imaging and shear wave velocity (SWV) are two other US elastography techniques though their effectiveness is inconsistent and fail to correlate with kidney fibrosis. This could be due to the fact that kidney unlike liver is not homogenous, more perfused, and pathologically more complex organ. Studies in the liver have shown that B-

mode texture correlates with the presence of fibrosis. The B-mode image can be constructed from the raw Radio Frequency (RF) echo signal received at the transducer. The characteristics of radio frequency (RF) echo signal can be used to quantify fibrosis in CKD. This is a novel approach as it depends on the fundamental tissue-wave interactions.

### O-17

#### Role of diffusion weighted imaging in diagnosis of prostatic cancer

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**INTRODUCTION:** Prostate cancer represents the most frequent cause of a new cancer diagnosis and the second most frequent cause of cancer death in United States according to the 2012 American Cancer Society statistics. At present, serum prostate-specific antigen (PSA) levels and digital rectal examination (DRE) are the mainstays of clinical detection of prostate cancer. Abnormal findings are followed up by transrectal ultrasound (TRUS)-guided biopsy. Transrectal Ultrasound (TRUS)-guided prostate biopsy has become a standard method to obtain specimen for histopathological examination. Positive results of biopsy of the prostate confirm clinical suspicion of prostate cancer, but they provide limited information on extent and differentiation of prostate cancer. Furthermore, prostate biopsy without evidence of prostate cancer does not rule out its presence. DWI is potentially useful in tumor detection, staging, assessment of treatment response and disease relapse. Diffusion weighted imaging assesses the diffusion of water molecules within different tissues. Normal prostate glandular tissues have a higher water diffusion rate than cancer tissue owing to restricted diffusion in tightly packed cancerous cells. The aim of study is to illustrate the role of diffusion weighting imaging (DWI) in the evaluation of patients with prostate cancer.

**PATIENTS AND METHODS:** This prospective study included 201 patients with clinical suspicion of prostate cancer using 1.5 T MR Unit. Axial, coronal and sagittal thin sections, high resolution T2 Weighted spin echo (SE) images through the prostate and seminal vesicles were obtained. Based on T2I W, DWI was obtained by applying a single shot echo planer imaging sequence in axial orientation to include the whole prostate. ADC mapping was generated from the DWI sequence in each pixel of each slice and presence of increase signal intensity on DWI as compared to adjacent tissues labeled as prostatic cancer. Taking histopathology as gold standard, diagnostic accuracy of DWI in diagnosis of prostatic cancer was obtained.

**RESULT:** In this prospective study, 201 men were examined and T2WI, DWI, and ADC values were measured. The specificity of DWI in diagnosis of prostatic cancer comes 87%, sensitivity 89% and diagnostic accuracy of 90%.

**CONCLUSION:** Our study indicates that DWI provides significantly more accurate results for prostate cancer detection and staging.

### O-18

#### Fetal anomalies detected in first trimester

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First trimester scanning for the screening of chromosomal abnormalities has gained importance in the last decade and has been incorporated in routine practice. During scanning for nuchal translucency in 10-14 weeks for screening details of fetal anatomy is clearly seen and structural abnormalities can be detected. Due to recent advancement of ultrasound resolution and advent of Transvaginal probe wide range of structural fetal anomalies are readily diagnosed in late first trimester. When major structural abnormalities are detected in first

trimester counseling and termination would be less traumatic and harmful to the mother. In our experience of 30 years, Ultrasound Technology has been improved drastically. Transvaginal probe, Doppler and 3D and 4D has improved diagnostic skills of Radiologists and Sonologists resulting in early detection of chromosomal abnormalities and fetal structural anomalies.

In this presentation Fetal NT measurements and detection of fetal structural anomalies are discussed.

### O-19

#### Assessment of apparent diffusion coefficient values as predictor of aggressiveness in peripheral zone prostate cancer: comparison with Gleason score

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**PURPOSE:** Carcinoma of the prostate is a significant health issue affecting predominantly elderly men. We aimed to determine association between apparent diffusion coefficient value on diffusion-weighted imaging and Gleason score in patients with prostate cancer.

**MATERIALS AND METHODS:** This retrospective case series was conducted at Radiology Department of Aga Khan University between June 2009 and June 2011. 28 patients with biopsy-proven prostate cancer were included who underwent ultrasound guided prostate biopsy and MRI. MRI images were analyzed on diagnostic console and regions of interest were drawn. Data were entered, analyzed on SPSS 20.0. Proportions mean ADC values of Gleason scores were calculated individually  $\pm$  standard deviation. Shapiro-Wilk test of normality was assessed as a numerical means for testing normality at p value  $> 0.05$ . A one-way between and within subjects analysis of variance (ANOVA) was conducted to compare the effect of ADC values on aggressiveness of tumor as predicted by Gleason score. p value  $< 0.05$  was taken as statistically significant. Tukey's post hoc analysis was computed to assess statistically significant difference among various levels of Gleason scores.

**RESULTS:** In 28 patients, 168 quadrants were biopsied and 106 quadrants were positive for malignancy. 89 lesions with proven malignancy showed diffusion restriction. The mean ADC value for disease with a Gleason score of 6 was 935mm<sup>2</sup>/s (SD = 248.4mm<sup>2</sup>/s); Gleason score of 7 was 837mm<sup>2</sup>/s (SD = 208.5mm<sup>2</sup>/s); Gleason score of 8 was 614mm<sup>2</sup>/s (SD = 108mm<sup>2</sup>/s); and Gleason score of 9 was 571mm<sup>2</sup>/s (SD = 82mm<sup>2</sup>/s). Inverse relationship was observed between Gleason score and mean ADC values.

**CONCLUSION:** DWI and specifically quantitative ADC values may help differentiate between low-risk (Gleason score, 6), intermediate-risk (Gleason score, 7), and high-risk (Gleason score 8 and 9) prostate cancers, indirectly determining the aggressiveness of the disease.

### O-20

#### Sonology in IVF

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Imaging plays a key role in the diagnostic evaluation of women for infertility. The imaging work up begins with hysterosalpingography to evaluate fallopian tubes patency. Further evaluation requires hysteroscopic or pelvic sonography or

pelvic MRI imaging. In vitro fertilization (IVF) is one of the several assisted reproductive techniques used to help infertile couples to conceive child with ultrasound being integral part of procedure for oocyte retrieval and embryo transfer as well as analyzing healthy female reproductive status. We conducted a retrospective descriptive study in Radiology department of Rehman Medical Institute Peshawar. 20 patients undergoing IVF procedure were included in the study. Transvaginal ultrasound was done for ovum retrieval / pick up. Transabdominal ultrasound was done for embryo transfer. Ultrasound was done using GE voluson machine. For all 20 patients, ovum was retrieved by transvaginal route. Out of these 20, 18 were performed without abdominal compression whereas for 2 patients, abdominal compression had to be applied due to obesity. Doppler detected vessel lying close to ovary in the line of guiding needle in 1 patient.

## O-21

### Role of ultrasound in characterization of ovarian masses

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**PURPOSE:** Ovarian cancer happens to be the second most common malignancy that accounts for 4% of all the cancers in female population. Annually more than 190,000 new cases are diagnosed world over with the life time risk of developing ovarian cancer in India is 0.75% which vary considerably world over. However, the mortality is highest in comparison to the other gynecological cancers. Owing to this, and high mortality rate associated with ovarian malignancy, ultrasound has attained its role as the most important preliminary investigation of choice to rule out ovarian malignancies. The aim of this study was to determine sensitivity, specificity, positive and negative predictive values, 95% Confidence Intervals of ultrasound in characterization of ovarian masses in patients presenting at public and private tertiary care hospitals in Karachi, Pakistan.

**MATERIALS AND METHODS:** We adopted a cross-sectional analytical study design to collect data from January 2011--13 from medical records of two tertiary care hospitals in Karachi, Pakistan. We recruited a sample of 86 women by non-probability purposive sampling technique. Women aged between 15 and 85 years fulfilling inclusion criteria were included with histopathologically proven ovarian masses presented for an ultrasound examination in radiology departments of tertiary care hospitals.

**RESULTS:** Results gathered from our retrospective data depicted sensitivity and specificity of ultrasound to be 90.7%, 95%CI [0.77-0.97] and 91.4%, 95%CI [0.76-0.98] respectively. Positive predictive value was 93%, 95%CI [0.79-0.98] and negative predictive value was 89%, 95%CI [0.73-0.96]. A Total of 78 ovarian masses were detected out of which 42 were malignant and 36 were benign.

**CONCLUSION:** Results of our study further reinforces the fact that ultrasound should be used as an initial modality of choice in the workup of every woman suspected of having an ovarian mass. This not only results in decreasing the mortality but also avoids unnecessary surgical interventions.

## O-22

### Penile Doppler ultrasound for erectile dysfunction

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**INTRODUCTION:** Erectile dysfunction (ED) is a common and debilitating condition with physical, psychological and pharmacological aetiologies. The physical causes can be divided into problems with arterial inflow, structural penile abnormalities, or problems with the venous occlusion mechanism. Penile Doppler sonography is a specialized technique requiring a thorough knowledge of the topic in order to aid diagnosis and direct subsequent treatment. This

technique is indicated in those patients with erectile dysfunction who do not respond to oral pharmacological agents. In addition, Penile Doppler Ultrasound may be of use in anatomical delineation for patients with post-traumatic or post-surgical abnormalities where curative or reconstructive surgery is being considered.

**METHOD:** Penile Doppler Ultrasound aims to examine the cavernosal arteries and the response of their spectral Doppler waveforms following intracavernosal injection of a pharmacostimulant agent, commonly a prostaglandin E1 derivative such as alprostadil. The fundamental principle is repeated sampling of these waveforms in a stepwise manner until maximal peak systolic and minimal diastolic velocities have been reached.

**CONCLUSION:** ED is a complex multifactorial condition, which has a potentially heavy impact upon the physical and psychosocial well-being of the patient. Penile Doppler Ultrasound is of vital importance in documenting any vascular abnormalities contributing to ED.

## O-23

### Diagnostic Accuracy of Diffusion- Weighted MRI in the Detection of Non Palpable Undescended Testes; In Comparison with Laparoscopic Findings

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**BACKGROUND:** Cryptorchidism or undescended testes means failure of one or both testes to descend into scrotum from abdomen where they develop before birth. It is a common disorder of childhood. 20% of the undescended testes are non-palpable. Of the non-palpable testes 50% are in the abdomen, 45% are atrophic and 5% are in the inguinal canal. Early intervention is required for repositioning or removal of the undescended testes. Ultrasound is a reliable modality for picking undescended testes. The accuracy rates of diagnosis and localization of a non-palpable testis with MRI and ultrasound are equally moderate (85% and 84% respectively). Conventional MRI is good for the detection of cryptorchidism but adding DWI to conventional MRI improves sensitivity and specificity.

**OBJECTIVES:** The aim of this study is to assess the value of adding DWI to routine MRI in the identification of non-palpable undescended testes.

**METHODS:** This cross sectional validation study was conducted in the radiology department of Khyber Teaching Hospital Peshawar from June 2015 to June 2016. In this study 24 boys underwent preoperative abdominal and pelvic MRI to identify the location of testes. Conventional MRI including T1W and T2W, and DWI were done for all patients. MR scans were reviewed and compared with the results of surgical and laparoscopic evaluation.

**RESULTS:** Sensitivity and specificity for conventional MRI and combined conventional MRI and DWI were calculated. The sensitivity, specificity, and accuracy for the conventional MRI and combined conventional MRI and DWI were 86.5%, 84.3%, 85.5% and 94.5.1%, 82.7%, and 91.5% respectively.

## SESSION III: Pediatrics, Musculoskeletal and GIT (1)

### O-24

#### Tramp - stamp edema- an indirect indicator of backache and BMI relationship

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**PURPOSE:** Posterior lumbar subcutaneous edema described as tramp – stamp edema by some radiologists is a common incidental, though neglected finding in patients undergoing lumbar MRI for differential diagnosis of lower back

pain. The purpose of our study was to determine the association between tramp-stamp edema/ fluid collections and BMI on lumbar spine MRI in Pakistani population.

**STUDY DESIGN:** Descriptive cross sectional study.

**PLACE AND DURATION OF STUDY:** Department of Radiology, Jinnah Postgraduate Medical Center, Karachi, from August 2014 to August 2015.

**METHODOLOGY:** This is a descriptive cross sectional study, from August 2014 to August 2015, at the Radiology Department of JPMC KHI. After institutional review board and signed informed consent noncontrast MR lumbosacral spine of 983 patients were studied. MR images were obtained on 0.3T as well as 1.5 T Philips Scanner. 564 female and 419 male patients were reviewed on the basis of MR imaging signal characteristics for the presence, degree, size, and location of presumed subcutaneous posterior soft-tissue edema and fluid collections. Inclusion criteria comprised of patients who had backache with no previous trauma or no strenuous physical work but had severe persistent backache. The patients with trauma, metabolic or marrow replacement disorder were excluded. The patients were divided into three weight groups (<70, 70-85, or > 85 kg) and two age groups (25-50 or ≥50 years old). A consultant Neuroradiologist with a minimum of three years' experience studied the scans. Edema was graded on a scale of 0-5 according to its length relative to the vertebral bodies. When present, the fluid collection volumes were calculated. The vertical epicenter of the signal abnormality was noted by vertebral body level.

**RESULTS:** Tramp - stamp edema was seen in 391 patients and discrete fluid collections were seen in 53 patients. Both degree of edema and volume of fluid collection were associated with increasing BMI and age. The degree of edema in females was significantly greater than in males. The L3-L4 levels accounted for 54% of edema epicenter.

**CONCLUSION:** The severity of tramp -stamp edema and the volume of fluid collections on MR imaging are associated with increased body weight, BMI, female sex and older age. Because body weight reflects the degree of obesity in patients with similar height, we postulate that the underlying risk factor is obesity.

## O-25

### Radiological findings of Sudeck's dystrophy

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**INTRODUCTION:** Sudeck's dystrophy was first described in 1864 by Mitchell et al. The synonyms include reflex sympathetic dystrophy syndrome, complex regional pain syndrome 1, algodystrophy, algoneurodystrophy, causalgia, post traumatic osteoporosis. It is characterized by four cardinal symptoms: pain out of proportion to initial injury, swelling, stiffness and discoloration.

**CASE DISCUSSION:** Here I describe a case of a 70 years old male patient, who came to our department with history of trauma 8 months back, at present complaining of right wrist swelling and limited hand movements for 2 months. On physical examination there was swelling at wrist, shiny red skin and tenderness on deep palpation. On plain radiograph it showed marked periarticular osteopenia with preserved joint spaces and posterior distal radio ulnar dislocation with soft tissue swelling. Ultrasound examination showed thickened extensor tendons and ulnar bursitis showing rice bodies in it. MRI examination reveals extensive patchy marrow edema. Abnormal fluid signal intensity seen in the joint spaces. There is marked fluid distension of ulnar bursa and abnormal fluid signal also seen in the small radial bursa alongwith synovial thickening. A localized cystic bulge is noted in the region of clinically palpable swelling over medial aspects of wrist with tenosynovitis along the extensor tendons. Overall imaging features are suggestive of extensive radio-ulnar bursitis with extensor's teno-sinovitis in association with Sudeck's dystrophy. Although MRI plays an important role in diagnosis of sudeck's dystrophy but basically it is a clinical diagnosis.

**CONCLUSION:** Sudeck's dystrophy is a chronic painful disorder that usually develops after limb trauma without obvious peripheral nerve damage. The diagnosis of Sudeck's dystrophy should be made cautiously. One must look for an underlying cause before it gets to the chronic phase. Although its outcomes are very difficult to predict, an early diagnosis and treatment increases the likelihood of successful outcomes.

## O-26

### Importance of musculoskeletal ultrasound in shoulder joint

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## O-27

### Imaging in Pediatric Trauma

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**INTRODUCTION:** Trauma is the leading cause of death in children over one year of age. The role of radiologist in today's world has become pivotal. Radiologist now comes in first line of management. Prompt diagnosis by the radiologist of the multiple injuries assists the clinician to manage the patient. With the help of modern imaging diagnosis is swift and precise. Anatomy and physiology of children is different from adults. Mechanism of injuries may also differ and the resultant spectrum of injuries is also different.

A large study done in North America concludes that in emergency department children with trauma should be carefully examined and imaging needs to be tailored accordingly. Imaging requirements should be evidence based rather than anxiety driven, so as to minimize radiation burden to this sensitive population. National Institute of Clinical Excellence guidelines are recommended for trauma to the head and neck. In a patient who is stable with potential chest, abdominal, and pelvic trauma, it is recommended that pre-assessment chest radiograph must be undertaken prior to a CT examination, so that the region examined by CT may be tailored appropriately.

In summary Trauma in Children is different, every case may need a different imaging protocol with close monitoring with emphasis on multidisciplinary approach.

## O-28

### Challenges and advances in the field of orthopedic oncology

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Primary and secondary bone and soft tissue tumors are a rare group of pathologies. Advances in the field of chemotherapy over a period of last 30 years has greatly improved the survivorship and outcome of this select group of patients and this no more remains a death sentence. Numerous long term and large case series have shown that the outcomes for ablative surgery and limb salvage surgery remain the same. This would not have been possible without the advances in biomaterials and surgical techniques and improvements in histopathological diagnosis and the development of various tumor markers.

The role of radiology remains paramount in the management of bone tumors. Early recognition leading to prompt referrals and appropriate radiological investigations paves way for individualized treatment plans. The ever evolving field of radiology doesn't just play a role in diagnosis of these tumors. The



clinical and interventional radiologists have become an integral part of the multidisciplinary team that manages these tumors. The role of plain radiographs remains paramount, supplemented by various cross sectional imaging techniques and nuclear medicine which aids the surgeons in planning surgery. The role of radiofrequency ablation in the management of some bone tumors is well established with some recent studies exploring the use and efficacy of Magnetic resonance guided focused ultrasound (MRgFUS). US and CT guided biopsies by the interventional radiologist in difficult access areas have been a very well established tool for management. Intensity modulated radiotherapy (IMRT), carbon ion therapy and proton beam therapy are also some of the advances in nuclear medicine being utilized in the management of bone and soft tissue tumors.

Development of internationally agreed protocols for chemotherapy based on long term studies aid as a guide for management. Focus is currently being placed on targeted and immune therapy which may abolish the need for surgery completely in the future.

Outcomes of these tumors can only be improved by appropriate training of our undergraduate and post graduate trainees, early recognition of the red flag features, prompt referrals to specialist units where they are dealt by a multidisciplinary team fully equipped with the current evidence based knowledge and appropriate skills. In our resource stricken environment, financial constraints are a major issue. Chemotherapy remains expensive and so do megaprosthesis. Biological reconstruction is an option but that has its own disadvantages. In our country, educating our trainees, family physicians and surgeons about the red flag features and development of specialist units will establish the basic platform on which we can then consolidate. This is only possible with collaboration and recognizing the roles and responsibilities of the involved physicians and patient awareness.

## O-29

### Entero enteric fistulae in acute bowel ischemia

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**PURPOSE:** Gastrointestinal fistulae are commonly encountered in surgical practice and mostly arise as a complication of surgical interventions performed on the bowel. Spontaneous fistulae, i.e. those fistulae that arise without any history of surgical intervention, are usually associated with diseases such as inflammatory bowel disease and pancreatitis. Acute bowel ischemia has rarely been mentioned as a cause of spontaneous fistulae, and a literature review conducted for this purpose failed to yield any reported case.

**MATERIALS AND METHODS:** We report the cases of two patients who developed Entero-enteric fistulae secondary to bowel ischemia. Both patients presented to Aga Khan University in Karachi, Pakistan.

**RESULTS / PRESENTATION:** A 38 year old male patient initially presented with acute abdominal pain and vomiting. CT scan revealed SMA thrombus, and the patient was managed conservatively with warfarin and NPO. He presented again after 4 months with weight loss. This time, CT scan of the abdomen showed ischemic strictures in left sided jejunal loops with multiple loops coalescing to form an enteroenteric fistula. The fistula was confirmed with barium follow through. The patient was successfully managed with bowel resection and stricturoplasty.

The second patient was a 24 year old female who presented with an acute abdomen, and CT scan revealed mesenteric and portal vein thrombosis. She was conservatively managed and anticoagulation was done. She returned 5 days later with the same complaints and this time CT showed a stricture at the duodenojejunal junction and an enteroenteric fistula between the proximal jejunal loops. She was successfully managed with gastrojejunostomy.

**CONCLUSION:** This report highlights acute bowel ischemia as a rare cause of spontaneous enteroenteric fistulae. This complication of bowel ischemia, although extremely rare, alters the disease course and choice of treatment significantly. Surgical management is an effective management option in our experience.

## O-30

### Diagnostic accuracy of US FAST (Focused assessment with sonography for trauma) in detecting free fluid in adult patients with abdominal trauma taking CT abdomen as reference standard

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**INTRODUCTION:** Abdominal trauma is one of the commonest injuries, a frequent cause of death, and is found in 7 to 10% of trauma patients. Better diagnostic accuracy of ultrasound in detecting free fluid can replace CT scan in initial evaluation of patients with abdominal trauma in emergency management.

**OBJECTIVE:** To evaluate diagnostic accuracy of ultrasound FAST in detecting free fluid in adult patients with abdominal trauma coming to the emergency department taking CT abdomen as reference standard.

**METHODS:** 275 patients with abdominal trauma who presented to the emergency department and underwent ultrasound FAST examination were enrolled in our study. These patients then subsequently underwent CT abdomen in department of radiology AKUH. The study was conducted from 20/11/16 to 14/04/16.

**RESULTS:** Our results yielded sensitivity of 65.7 %, specificity of 96%, positive predictive value of 85.7 %, and negative predictive value of 88.58 % and diagnostic accuracy of 88 %. Out of 25 false negative cases, 5 patients with pelvic fractures and hematoma had positive ultrasound FAST examination and 14 patients with pelvic fractures and hematoma formation in pelvis or extending into the retroperitoneum could not be picked by ultrasound FAST examination. This reduces the overall sensitivity of ultrasound FAST.

**CONCLUSION:** Our study suggests that the diagnostic accuracy of ultrasound FAST in detecting free fluid is very good in cases of visceral organ injury and is limited when there are pelvic fractures with associated pelvic and retroperitoneal hematoma. Hence, overall ultrasound FAST is a useful modality in emergency settings along with clinical examination to correctly identify high risk patients.

## O-31

### Role of Magnetic Resonance Cholangiopancreatography (MRCP) in obstructive jaundice

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**OBJECTIVE:** To determine the diagnostic accuracy of magnetic resonance cholangio-pancreatography in the evaluation of obstructive jaundice.

**METHODS:** The cross-sectional study was conducted at the Radiology Department of the SIUT. It comprised 50 patients (23 males and 27 females) with clinically obstructive jaundice referred for magnetic resonance cholangio-pancreatography (MRCP) evaluation. The findings were compared with the gold standard Endoscopic retrograde cholangiopancreatography (ERCP). Data was analysed using SPSS version 22.

**RESULTS:** The sensitivity of magnetic resonance cholangio-pancreatography for obstructive jaundice was 93.02%; specificity was 57.14%, while positive predictive value (PPV) and negative predictive value (NPV) were 93.02% and

57.14% respectively. The significance for MRCP ( $p > 0.0001$ ) is  $p = 0.028$ .

**CONCLUSION:** Magnetic resonance cholangio-pancreatography is a relatively quick, accurate and non-invasive imaging modality for the assessment of obstructive jaundice in ruling out potentially correctable underlying causes and reducing unnecessary invasive interventions.

### O-32

#### MR guided focused ultrasound in bone tumors

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**INTRODUCTION:** Magnetic resonance guided focused ultrasound (MRgFUS) is a new modality in the management of bone tumours. The safety and efficacy of MRgFUS was assessed in primary (malignant and benign) bone tumours and metastatic bone disease.

**AIMS AND OBJECTIVES:** The present study was aimed to investigate the safety, efficacy and feasibility of using magnetic resonance guided focused ultrasound (MRgFUS) for the treatment of benign tumours of bone with intent of complete ablation of tumour, for primary malignant bone tumours with intent to get the surgical margin and for metastatic bone disease with intent to get pain relieve after periosteal ablation.

**MATERIALS AND METHODS:** 26 patients with biopsy-proven primary malignant bone tumours, metastatic bone disease or benign bone tumours were treated with one session of MRgFUS. Contrast enhanced MRI after the procedure was used to assess and quantify the area of ablation. All the patients under the treatment were followed up for three months to assess for the side effects and pain scores after the treatment. Histopathological assessment for the patients with primary malignant bone tumours was also done.

**RESULTS:** Significant volume of ablation was noted on contrast enhanced MRI after the treatment. We were able to ablate the benign tumours of the bone and patients stayed asymptomatic. The patients with metastatic bone disease were successfully treated with significant decrease in pain scores. We were also able to ablate the sections of primary malignant tumours with significant finding of coagulative necrosis on post procedure MRI. Follow up assessment of pain scores showed significant decrease in VAS pain scores and also decreased reliance on pain medications. Only two patients showed significant side effects after the treatment.

**CONCLUSION:** MRgFUS is potentially effective, safe and non-invasive procedure that can be part of the management of primary (malignant and benign) and metastatic bone tumours.

### O-33

#### Pictorial review of Extra-osseous Ewing's Tumour

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**BACKGROUND:** Ewing Family of Tumor is an exceedingly rare tumor, with annual incidence rates among Caucasian children less than 21 years being in the range of 2-3 cases per million in the U.S.A. There are mainly three subtypes of ESFT including Ewing sarcoma of bone, extraosseous Ewing tumor and Peripheral primitive neuroectodermal tumor (PPNET). Although extremely rare, this study represents annual review of various types of cases and the significance of imaging including its baseline and post treatment radiological characteristics. In young people who present with soft-tissue tumors, EOS should be considered. In the management of patients with tumors, imaging techniques are useful for biopsy guidance, evaluation of the possibility of resection, and tumor response to treatment.

**MATERIAL AND METHODS:** Electronic records were retrospectively reviewed from 01-05-2011 to 01-05-2016 with patients who were diagnosed as histologically proven Ewing's sarcoma. Number of patients, gender and baseline CT/MRI findings for staging were reviewed.

**RESULTS:** A total of 568 patients with diagnosed Ewing's Sarcoma were analyzed out of which 15 patients had extra osseous type of Ewing's Sarcoma. Out of which only 8 patients had baseline imaging available including tumor arising from occipital region, orbit, anterior mediastinum, anterior abdominal wall, mesentery, kidney, prostate gland and presacral region.

**CONCLUSION:** This is case series review of extremely rare extraosseous Ewing's sarcoma. This tumor can be considered as a possible differential diagnosis.

### SESSION IV: Medical Imaging

#### O-34

#### Optimization of adequate phase of contrast enhancement on CT: an audit

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**AIMS AND OBJECTIVES:** During CT reporting, it noted that a number of routine scans have early portal venous phase enhancement resulting in a suboptimal study. In order to confirm this, an audit was performed and contrast enhanced (CECT) scans were reviewed for optimal phase so that factors responsible were to be identified and improved on.

**MATERIAL AND METHODS:** On random 4 days over a period of 4 months, without radiographer knowledge, all CECT scans were reviewed retrospectively by a single senior resident for optimal contrast enhancement phase. It was observed that two different iodine concentration contrast media was being used in the department with fixed same delay time. Based on this radiographers were educated to vary scan time with scan concentration.

**RESULTS:** It was seen on serial cycles of study that delay of 85-90 seconds gave good portal venous phase enhancement rather than 70 seconds for routine scans with Iodine concentration 370mg/mL using similar contrast volume and injection rates. Fixed delay time was increased for contrast medium with iodine concentration of 370mg/mL and this change was incorporated in daily practice & radiographers were educated. The percentage of suboptimal contrast enhancement phase reduced from 23.5% to 4% after setting new scan delay timings with higher iodine concentration contrast agents.

**CONCLUSION:** Higher iodine concentration contrast material affects scan dynamics and hepatic enhancement phase. Ideally same contrast material should be used, if it's changing then radiographers should take iodine concentration factor in account at the time of scan.

#### O-35

#### Internal audit of radiation exposure time of patient during fluoroscopy HSG procedure

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**PURPOSE:** To reduce the radiation exposure time of patients during fluoroscopic hysterosalpingography (HSG) procedure.

**MATERIALS AND METHODS:** Internal audit was conducted at Radiology Department, Shifa International Hospital, Islamabad after obtaining approval

from institutional review board. Study period extends from February to May 2016. The data is still in the process of compilation. 67 HSG examinations were carried out during this period. Radiation exposure times for HSGs with normal and abnormal findings were recorded by two experienced radiologists. Data was also collected regarding medical registration number of patients and date of procedure. Level of expertise of the residents and supervising radiologists were documented for each HSG procedure. Results were obtained with the maximum, minimum, the mean, the median and the standard deviation values of radiation exposure time (in seconds) for normal, abnormal HSGs and compared with the other studies. The causes of increased exposure times were identified and corrective measures were taken.

**RESULT:** The radiation exposure time (mean  $\pm$  SD) was  $94.9 \pm 49.6$  seconds for 55 HSG examinations with normal findings. The radiation exposure time (mean  $\pm$  SD) was  $181.5 \pm 99.6$  seconds for 12 HSG examinations with abnormal findings.

**CONCLUSION:** The causes of increased radiation exposure time were identified and eliminated.

### O-36

#### Analysis of completeness of CT request form

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**PURPOSE:** Radiology request form plays an important role in both diagnosis and treatment in most of the patients. The problem of inadequately completed radiology request form is considered widespread.

**MATERIAL AND METHODS:** The study was conducted in Department of radiology Aga Khan University Hospital. Radiology request forms for CT scan were assessed retrospectively on PACS for the month of April 2013. Randomly 1000 request forms were assessed. 65 request forms were excluded from the study as these forms were either from other hospital, generated for the purpose of biopsy, requests for limited studies, second opinion or were for intervention radiology regular follow.

**RESULTS:** 935 scanned request forms were evaluated retrospectively and results were made using Microsoft Excel software. Clinical description & relevant history was given in 745 (79.6%) forms whereas 140 (14.9%) were incomplete and 50 (5.3%) were not filled.

In 559 (59.7%) forms the mode of transportation was given and in 376 (40.2%) this field was left blank. Name of treating physician was given in 666 (71.2%) forms and in 269 (28.7%) forms the name was not mentioned. In 538 (57.5%) forms the patient location was filled and in 397 (42.4%) it was left blank.

**CONCLUSION:** It is necessary to prompt the doctor to complete and sufficiently fill all the required information in the application form. Therefore it is recommended that the request forms should be electronic rather than manual.

### O-37

#### Awareness and knowledge of ionizing radiation hazards among medical students and residents in Kabul

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**PURPOSE:** The use of ionizing radiation in medicine has led to major improvements in diagnosis and treatment of human diseases. As benefits for

patients' gain recognition, exposure to ionizing radiation increases causing potential health hazards for patients and staff. Objective was to assess and compare awareness of medical students and residents towards ionizing radiation hazards.

**MATERIALS AND METHODS:** Cross-sectional analytical study was designed to elicit information regarding awareness and knowledge of ionizing radiation hazard among medical students, residents. Medical students of fourth, fifth and final year were enrolled after an informed consent for participation from private medical colleges. Resident doctors from any discipline were enrolled from French Medical Institute for Children, Kabul, Afghanistan. Residents were excluded if they were under training in the Radiology department. Non-probability convenience sampling technique was employed.

**RESULTS:** A total of 137 participants were included in the study among which 111 were medical students; 26 residents. Response rate: 100%. Structured, validated questionnaire with 12 multiple choice questions mainly focusing on radiation protection and hazards was utilized. Overall Knowledge and awareness on radiation hazards was inadequate. Only 61 (44.5%) of students; 19 (13.8%) residents were aware regarding "As Low as Reasonably Practicable" principle. A small number of medical students and residents (20.4% of the students; 18.2% of residents) knew that thyroid gland should be protected. 24 (17.5%) of students; 1 (3.4%) residents were not aware that CT-SCAN uses X-rays. Only 30.38% of the students; 22.9% of residents knew that Chest CT scan is associated with greater dose of radiation.

**CONCLUSION:** Awareness of medical students and residents on ionizing radiation is inadequate and there is a strong evidence of association between awareness on radiation hazards and having exposed to previous course on radiation hazards, knowledge on radiology and medical physics.

### O-38

#### Patient preparation for coronary Computed Tomography Angiography (CCTA) and procedure

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To discuss the protocol of preparation for coronary computed tomography angiography (CCTA). It is essential to explain the patient about the procedure and preparation of CT coronary angiography, to avoid excessive waiting time and to obtain the quality images of coronary vessels. Patient preparation includes: Not to eat for about 4 to 6 hours before CT coronary angiography. Avoid tea, coffee and cigarette before the scan as these contain caffeine which can raise the heart rate. The heart rate /pulse rate is better if it is below 65 beat per minute. A low and regular heart rate is possible to be achieved by the administration of Beta-blocker like tablet Mepresor 50mg or 100mg and injection Lopresor 5mg. If patient is diabetic and taking Metformin, then required to stop taking the Metformin on the day of CT scan and the following 24 hours. Recent Renal function test results are required before the scan.

### O-39

#### Evaluation of acute stroke with multi-slice CT and MRI

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**INTRODUCTION/OBJECTIVE:** We prospectively evaluated the influence of different imaging techniques (time-of-flight MR angiography [TOF-MRA], multi-slice CT angiography [CTA]) and post processing methods (maximum intensity projection [MIP], multiplanar reformation [MPR]) on acute stroke. To determine the worth of MR angiography of the circle of Willis as a supplement to routine MR in the examination of patients with symptoms of acute stroke in terms of its depiction of the number and distribution of arterial

stenosis or occlusions. We also sought to compare the accuracy of MR angiography with CT angiography.

**MATERIALS & METHODS:** This study was carried out from June 2015 to May 2016 in tertiary care hospital Karachi. Data were collected from RIS (Radiology information system) Aga Khan University hospital Karachi Pakistan. Thirty patients (22 men, 08 women) were selected, who had undergone CTA and MRI head for symptoms of acute stroke. CT and MR studies were evaluated for the presence of arterial infarction. In MRI 3D-TOF technique were applied for MRA, MIP was used for post processing, and CT used intracranial arteries protocol with IV bolus contrast injected.

**RESULTS:** CT angiograms were rated good or excellent in 89% of cases whereas MR angiograms were rated good or excellent in 62% of cases. Arterial stenosis or occlusions were present on 58% of CT angiograms, 42% of MR angiograms. Findings agreed in 92% of the vessels analyzed by CT angiography and MR angiography. Similarly, there was overall agreement of findings in 99% of vessels analyzed by CT angiography. None of the patients had any immediate adverse reactions after administration of intravenous nonionic iodinated contrast material.

**CONCLUSION:** CT angiography is an accurate and safe method for evaluating arterial stenosis or occlusions in the vessels about the circle of Willis. CT angiography should be used in patients with symptoms of acute stroke for whom evaluation of the intracranial vasculature is desirable

#### O-40

##### Cardiovascular MRI and Cardiovascular CT

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**OBJECTIVE:** The cardiovascular system is difficult to assess owing to its complex morphology, structure and function. Cardiovascular magnetic resonance (CMR) and cardiovascular computed tomography (CCT) each provide three-dimensional (3D) imaging, high-resolution evaluation, and functional assessment without geometric assumptions. In this study, comparison was made between CMR and CCT to examine the strengths of each modality for the assessment and evaluation of cardiovascular diseases.

**MATERIAL AND METHOD:** Twenty subjects prospectively underwent CCT and CMR examinations on a 64-slice Multi-Detector CT (MDCT) and 1.5 T MR scanner, respectively. Patients are selected on the basis of inclusion and exclusion criteria. The major techniques for each modality are outlined, as well as imaging data from both modalities are compared on the basis of sensitivity and specificity. Scans are reported to compare the results to assess the utility of both modalities for the evaluation of cardiovascular system. Comparison also made to analyse the clinical application and role in disease diagnosis, decision pathways and treatment plans.

**RESULTS:** In comparison with CMR, 84 % showed moderate agreement CCT, 6% CCT has inadequate contrast opacification, and 10% were inadequate due to motion artefacts or inadequate contrast between myocardium and endocardium. CMR is virtually non-invasive, 3D tomographic technique and allows accurate quantification of structure, function, geometric assumptions, chamber volumes, soft tissue mass, blood vessels, blood flow, and tissue characterisation including cardio-pulmonary diseases, ischemia, cardiomyopathy, heart failure or congenital heart diseases etc. without the use of ionising radiation as compared to CCT.

**CONCLUSION:** CMR and CCT offer advantages for detecting cardiovascular system. CMR provides more accurate details than CCT without exposing patients to ionizing radiation, and thus is well-suited for functional assessments and serial studies. In contrary, limited availability of CMR and increase use of MR-incompatible cardiovascular devices underscore the potential utility of CCT for cardiovascular disease analysis.

#### O-41

##### Radiation dosimetry and risk assessment in nuclear medicine

Misbah Javed

#### O-42

##### Measurement of radiation doses of CT and cancer risk estimation

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The use of Computed Tomography (CT) for accurate and effective diagnosis has continued to increase considerably over the past two decades and has improved health care significantly. However, CT delivers substantially higher radiation doses than conventional diagnostic x-rays which may increase a person's lifetime risk of developing cancer. In the present study effective doses are measured and the corresponding radiation-induced cancer risks are calculated for patients undergoing CT examinations. This study would help to estimate the radiation dose associated with common CT examinations in clinical practice and quantify the cancer risk associated with these studies.

Organ doses were estimated using scanner derived parameters and use of TLD chips, for 20 patients having CT scans for clinical indications. Age, weight, height and sex for each patient undergoing CT examination were documented and different scanner parameters also noted. Two TLD chips were used for each patient in AP/PA fields. The exposed TLDs were read with TLD reader installed at PINSTECH to evaluate the doses. Lifetime cancer risks were estimated using different models given in BEIR-VII, NCRP-160 and ICRP-103 from the measured doses.

Radiation doses varied considerably for different types of CT examinations. The results are compared with different international bodies and found within acceptable limits. The overall mean effective doses ranged from 1.8 millisieverts (mSv) for a routine head CT scan to 18 mSv for abdomen and pelvis CT scan. It is concluded that patients undergoing CT examinations at NORI have doses within the range of recommended action levels. Dose reduction in computed tomography is based on the principle of ALARA and it is important to evaluate the risks and benefits of imaging examinations to control the radiation dose and image quality

#### O-43

##### Normal cervical spinal canal and cord measurements on MRI in Pakistani population

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**PURPOSE:** To determine normal reference values of the cervical spinal canal and cord dimensions in sagittal plane with respect to spinal level, age, gender, patient height and weight in Pakistani population.

**MATERIALS AND METHODS:** This is a prospective, single center study of one year duration from August 2014 to August 2015. After institutional review board approval and signed informed consent of all patients, MR scans without intravenous contrast were performed on Phillips 1.5 Tesla MR Scanner including axial and Sagittal T1W and T2W images. A consultant neuroradiologist examined all cervical spine images of patients who presented to our radiology

department with complaints of neckache with or without radiation to upper limbs. A total of 796 patients were selected from 1874 examinations performed during the last one year. Patient's ages ranged from 16 to 68 years (average 42 years). Inclusion criteria comprised of an MR examination that was interpreted as normal by the neuroradiologist or if it had only a minor diskogenic type abnormality without thecal sac indentation or spinal cord compression. Exclusion criteria were that an MR scan would be rejected if the clinical history indicates possible intrinsic spinal cord disease, a degenerative process or if the MR scan was of substandard quality. The midsagittal diameters and areas of spinal canal and cord, respectively, were measured at the midvertebral levels of C1, C3, and C6 vertebrae. A multivariate general linear model described the influence of sex, patient height, age, and spinal level on the measured values. Few studies have been conducted in this regard but keeping in view the geographical, environmental, ethnic and nutritional factors under consideration, a dedicated study was conducted in Asian population to evaluate the influence of these factors on the cervical spinal canal and cord dimensions and observe any variation from the western population if present.

**RESULTS:** We observed that there were differences for sex, spinal level and patient height, while age had significant yet limited influence. Normative ranges for the sagittal diameters and areas of spinal canal and spinal cord were defined at C1, C3, and C6 levels for men and women. In addition to a calculation of normative ranges for a specific sex, spinal level, age, and body height data, data for three different height subgroups at 45 years of age were extracted. These results show a range of the spinal canal dimensions at C1 (from 12.0 to 18.0 mm), C3 (from 10.0 to 16.0 mm), and C6 (from 11.0 to 17.0 mm) levels.

**CONCLUSION:** In conclusion, the dimensions of the cervical spinal canal and the spinal cord in healthy individuals are dependent on spinal level, sex, age, and height. The consideration of these normal values should help Radiologists and Neurosurgeons to interpret MR imaging data more accurately and to assess the severity of potential cervical spinal canal stenosis in Asian population.

**ACKNOWLEDGMENT:** Acknowledge services of our technicians Mr. Asif and Mr. Ali for their support in data collection.

#### O-44

##### Volume rendering technique

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**PURPOSE:** The majority of work performed in radiology is presented as 2-Dimensional (2-D) information, from conventional x-rays images to the most advanced computed tomography (CT), magnetic resonance imaging (MRI) or ultrasound studies. In early days of radiology, when there was a need for 3-D presentation of, it was performed by special stereotactic devices displaying two images, one for each eye with a minimal change (about 5 degrees) in the view angles between two studies. When axial imaging began with CT, imaging information became available in digital form. With an average of 400-1000 images in each volume data set, 3-D post-processing is crucial to volume visualization. Radiologists now have workstations that provide them to make sense of these data sets by using a range of software programmed processing tools. The diagnostic value of such reconstruction techniques is well documented in literature but there is lack of a comprehensive literature review diagnostic value of the technology.

**MATERIALS AND METHODS:** PubMed, Cochrane and googlescholars were used to access the published articles, 28 articles were identified for review and were analysed based on CASP tool.

**RESULTS:** Number of articles suggests that 3-D medical images of CT data sets can be generated with a variety of computer algorithms, CT volumetric rendering techniques such as Maximum Intensity Projection (MIP), Minimum Intensity Projection (MinIP), Shaded Surface Display (SSD), Volume Rendering (VR) and Virtual Endoscopy (VE) provide added diagnostic capabilities in medical conditions.

**CONCLUSION:** This review concludes that these techniques permit the exploration of fine anatomical detail that would be difficult to evaluate using axial reconstructions alone.

#### O-45

##### Misdiagnosis of cholelithiasis and other GB abnormalities on U/S in patients' undergone surgical treatment

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#### O-46

##### Understanding and Confronting Our Mistakes: The Epidemiology of Error in Radiology and Strategies for Error Reduction

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There are different types of radiological errors depending upon the underlying cause. Two basic types are perceptual and cognitive, perceptual being the most common accounting for more than 70% of radiological errors. Perceptual errors deemed to have occurred when you have completely missed a pathology on an image. Cognitive errors occur when an abnormality is identified on an image but its importance is incorrectly understood, resulting in an incorrect final diagnosis.

Some attempts should be made to minimize the risk to reduce the frequency of these radiological errors like checklist and structured reporting, communicate significant abnormal findings appropriately and in a timely fashion directly with treatment team, review and obtain clinical information.

#### O-47

##### Laryngeal anatomy and imaging of laryngeal malignancy on multidetector CT scan

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Multidetector CT is the gold standard for assessing the larynx and its pathologies. It is important to delineate the level of laryngeal malignancy as it affects the management of patient. The key differentiation is identification of the tumor at supraglottic, glottic, or subglottic levels. Supraglottic extends from the tip of epiglottis superiorly to the level of ventricle inferiorly; glottis includes the true vocal cords to one cm below the free edge of vocal cords, and sub-glottis spans from this level to the inferior margin of cricoid cartilage. An attempt is made in this presentation to simplify this rather complicated anatomy with the help of some useful tips for young radiologists. Laryngeal cancer is the commonest non-cutaneous cancer of the head and neck, and MDCT evaluates the level and extent of cartilaginous and nodal involvement in this disease. Staging of laryngeal carcinoma is determined by the site of the tumor, its impact on the vocal fold mobility, and extent of cartilage involvement. Determining the location of disease within the larynx is important as treatment varies depending on whether the tumor is located in the supraglottic, glottic or infraglottic region. Making treatment decisions such as choosing radiotherapy over surgical resection are aided by the CT findings of cartilage involvement, transglottic spread or local nodal enlargement and assesment of pre-epiglottic, paraglottic and soft tissue dissemination of the tumor. Cartilage invasion in laryngeal tumors worsens the prognosis and indicates higher chances of recurrence of tumor post radiation; hence surgery is preferred in such patients.

The ability of multidetector spiral CT scanning for evaluation of laryngeal anatomy in millimeter and submillimeter details has made this an important tool in detecting the level of laryngeal malignancy, its staging and determination of treatment modality. Since location of the tumor is vital in choosing radiotherapy versus surgical resection, it is imperative that larynx anatomy is understood in details with respect to its divisions, and surrounding structures.

#### SESSION V: Interactive Session

Changez Khan Jadun

**SESSION VI: Role of Imaging in Oncology Practice****O-48****Preserving organs with the help of radiologists**

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Radiation therapy (RT) is an important component of treatment of cancer in this modern era. Starting from the earliest use of X-rays for treating Lymphoma and sarcoma in the beginning of last century, this modality has evolved tremendously. During 1990s the role of non-surgical treatment of carcinoma of larynx established is the standard of care which preserves the voice function. Radiation therapy can cure the squamous cell carcinoma of the anal canal along with chemotherapy, thus preventing the need of life-long colostomy. When used in neo-adjuvant setting, anal sphincter may be preserved in certain no of patients. Limb preservation surgery has evolved over last couple of decades and addition of radiation therapy gives similar outcomes.

All these advancements are possible with the help of adequate pre-treatment workup. This includes baseline diagnostic and staging work up. Multi-disciplinary interaction of clinical radiologist with treating physician and surgeon has proven to improve outcome in patients, especially where organ preservation approach is required. Terms like invasion, erosion, involvement, abutting has been variably used in reporting of cancer which may directly alter the management.

Through this discussion, we would like to share our experience of multi-disciplinary interaction with radiologist which helped offering better care to the patients leading towards cure with organ preservation.

**O-49****Diagnostic accuracy of resistive index in predicting malignant ovarian masses by color Doppler keeping histopathology as a gold standard**

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**BACKGROUND:** Ovarian malignancy is the second most common gynecological malignancy with highest mortality rate. Different imaging modalities are available for detection, characterization a staging of the tumor like ultrasound, CT scan and MRI but ultrasound is the primary choice for evaluating pelvic masses due to its easy availability, cost effectiveness and lack of ionizing radiations.

The transvaginal ultrasound is given priority as it helps in the detailed visualizations of the images. Color Doppler helps in differentiating benign from malignant mass as the malignant masses have low resistive index. Sonographically, cysts smaller than 2.5cm are considered follicles, which are benign. Findings that suggest malignancy in adnexal masses include irregular thick walls more than 3mm, septae more than 3mm, papillary projections and multilocularity.

**OBJECTIVES:** To determine the diagnostic accuracy of Resistive Index for predicting malignant ovarian masses keeping hispathology as a gold standard.

**METHODS:** A cross sectional validation study was conducted in Radiology Department of Khyber Teaching Hospital, Peshawar from January 2016, to June 2016. 169 patients were at high clinical risk of carcinoma ovary were identified and undergone USG for confirmation of diagnosis. Sensitivity, Specificity, positive predictive value, negative predictive value and accuracy were calculated both for USG and hispathology.

**RESULTS:** Sensitivity and specificity of various cut off values of RI were calculated and it was found that for a cut off value 0.6, Sensitivity is 83%, specificity is 93%, positive predictive value is 92% and negative predictive value is 85%.

**CONCLUSION:** The study concluded that the diagnostic accuracy of Resistive Index is very high in predicting malignant ovarian masses keeping hispathology as a gold standard.

**O-50****Oncologist's views of Special Issues in Radiological Response**

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Diagnostic Radiology play an important role in the management of cancer. The initial staging workup of all the solid tumors is incomplete without cross sectional imaging. On the basis of this further management is decided within multidisciplinary team. The management of solid tumors may include surgical resection, systemic therapy or localized radiation treatment or a combination of these modalities.

In various clinical scenarios, cross sectional imaging is repeated after a certain course of treatment. The reporting of such investigations may sometimes be a challenging task. This includes thorough study of the baseline radiology and reporting of the treatment response in various dimensions. Understanding the disease biology for each diagnostic entity may be important for the radiologist to give pertinent answer to the treating oncologist for better assessment of disease status. In situations where radiation therapy is used as an upfront strategy, various challenges occur when a post treatment radiologic scan is advised to the patient. The challenge on part of the radiologist is to differentiate between inflammatory and gross tumor. In certain situations, adequately differentiating between a cystic lesion, necrotic tissue and abscess may be difficult but a necessity to report. For example, in head and neck region, post radiation edema is common and takes up to six to eight weeks to settle. This would result in delayed imaging to see the response of the primary lesion. Similar problem may occur in primary CNS lesion. Differentiating between radiation necrosis and residual lesion is important after radiation therapy for high grade gliomas. We intend to emphasize the importance of understanding the disease and treatment process on part of the radiologists for pertinent reporting of post treatment scans. This may be possible with the help of collaboration in a multi-disciplinary manner.

**SESSION VII: Cardiovascular & Thorax****O-51****Correlation between preoperative CT and postoperative pathological measurements of tumor length in cases of carcinoma esophagus**

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**OBJECTIVE:** To compare the result of preoperative computed tomography and post-operative pathological measurements of tumor length in cases of carcinoma esophagus.

**MATERIAL AND METHODS:** Computed tomography thorax and upper abdomen with oral and intravenous contrast was done of biopsy proven 100 cases of carcinoma esophagus. The patients were then referred to cardiothoracic surgery unit, PGMI, Lady Reading Hospital for esophagectomy. Tumor lengths measured on preoperative computed tomography and on the post-operative resection specimens were recorded.

**RESULTS:** Out of 100 patients, 65 were male and 35 were female. Age ranged from 18 to 82 years with a mean age of 59.9 years. Middle and lower third tumors were present in 50 cases each. On CT scan the esophageal tumor length ranged from 1cm to 13cm with a mean length of 4.93cm, whereas pathological measurements of esophageal tumor length ranged from 1cm to 12cm with a mean length of 4.72cm.

There was a significant linear correlation between CT and pathology measurements of esophageal tumor lengths.

**CONCLUSION:** CT assessments generally overestimates macroscopic esophageal tumor length and should not be the only modality used for management decisions.

### O-52

#### Takayasu arteritis; evaluation with 128 slice CT angiography

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Takayasu Arteritis is a granulomatous chronic idiopathic inflammatory disease that primarily affects large vessels such as aorta and its branches with/without pulmonary and coronary arteries involvement. Intimal fibroproliferation occurs in it which in turn results in segmental stenosis, thrombus formation, occlusion, dilatation and aneurysm formation of involved vessels. 90% of patients with Takayasu Arteritis are younger than 30 years. The disease has a high incidence in Asia with female predilection. CT Angiography is a mainstay in its diagnosis.

### O-53

#### Diagnostic Accuracy of Coronary CT Angiography

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**OBJECTIVE:** The aim of our study was to evaluate the diagnostic accuracy of Multidetector Computed tomography (MDCT) coronary angiography using a 128-slice scanner keeping conventional angiography as gold standard.

**MATERIALS AND METHODS:** This was a retrospective analytic study conducted at Radiology department of Rehman Medical Institute Peshawar. 403 consecutive patients, who undergone CT coronary angiography, were included. Out of these, only 55 underwent conventional angiography. The presence of plaques and extent of stenosis were evaluated in patients and compared with findings of conventional angiography. Patients were divided into two groups: Group A with severe disease (>50% stenosis in any of the coronary vessels) and group B with no severe disease (<50% disease in any of the coronary vessels). The demographic information and coronary artery disease (CAD), risk factors including diabetes mellitus (DM), hypertension, hyperlipidemia and smoking were obtained from the questionnaire. Data was analyzed using SPSS version 15.

**RESULTS:** Of the 55 patients, CT showed that 44 had significant (>50%) coronary stenosis and 13 (23.6% of total patients) had non-significant (<50%) coronary stenosis. CT showed sensitivity of 95%, Specificity of 73.3%, positive predictive value of 90.5% and negative predictive value of 84.6%. Overall diagnostic accuracy of CT angiography was found to be 89.1% in diagnosing coronary artery stenosis.

**CONCLUSION:** We conclude from our results that CT coronary angiography has diagnostic accuracy of 89.1% with a positive predictive value of 90.5%. Thus, showing that CT can be used as a screening examination for coronary vascular disease.

### O-54

#### Evaluation of coronary atherosclerosis by computed tomography coronary angiography in patients with zero calcium score

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**BACKGROUND:** Coronary artery calcification is known as a specific indicator of coronary atherosclerotic disease. However, calcium scoring may miss noncalcified plaques with clinical importance.

**OBJECTIVE:** The objective of our study is to identify the presence and severity of coronary plaques in computed tomography coronary angiography (CTCA) in patients with a zero calcium score.

**MATERIALS AND METHODS:** This was a retrospective descriptive-analytic study of 414 consecutive patients who undergone CT coronary angiography between Dec 2012 and April 2016 at Rehman Medical Institute Peshawar. 183 patients of both genders with a zero calcium score were included in the study. The demographic information and coronary artery disease (CAD), risk factors including diabetes mellitus (DM), hypertension, hyperlipidemia and smoking were obtained from the questionnaire. The presence of plaques and extent of stenosis were evaluated in patients with zero CAC score.

**RESULTS:** Of the 183 patients with a zero calcium score, 84 (45.9%) had atherosclerotic disease; 16 (8.7% of total patients) had significant (>50%) coronary stenosis and 68 (37.1% of total patients) had non-significant (<50%) coronary stenosis. 99 (54.1%) of the patients had normal coronary arteries with no disease. Hyperlipidemia, DM, and smoking were significantly associated with obstructive CAD.

**CONCLUSION:** We conclude from our results that 8.7% patients had significant coronary artery disease with zero calcium score. Hence, zero calcium score does not absolutely exclude the coronary artery disease.

### O-55

#### Evaluation of image quality and radiation dose of cardiac CT angiography in patients with congenital heart disease

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**PURPOSE:** To evaluate the image quality and radiation dose of MDCT in babies with congenital heart disease.

**MATERIALS AND METHODS:** From January 2014 to October 2016, 30 random infant patients with CHD referred for pre- or postoperative CT evaluation in the Radiology Department of Rehman Medical Institute Peshawar were included. CT scan was performed on 128 slice MDCT scanner. All these infants had angiothoracic MDCT scan after injection of 1ml/kg of iopromide at 0.5–1ml/s with a power injector using a low-dose protocol (80kVp) with prospective ECG-gating followed by a delayed venous phase scan.

**RESULTS:** Diagnostic quality images were achieved with the spiral acquisition in 100% of cases. The standard radiation dose was reduced to 0.5m Sv by prospective ECG-gating using 80 kVp setting. Compared to the retrospective mode, prospective ECG-gated acquisition significantly reduced the radiation dose with negligible effect on image quality. No serious adverse events were recorded.

**CONCLUSION:** Prospective ECG gating and 80 kVp MDCT angiography is a valuable tool for the routine clinical evaluation of infants with CHD. ECG-gated acquisition also provides reliable visualization of the origin and proximal course of the coronary arteries.

**O-56****Computed Tomography manifestations of Fibrosing mediastinitis: an unusual cause of pulmonary symptoms**

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**BACKGROUND:** Fibrosing mediastinitis is a rare disease characterised by fibrous proliferation in the mediastinum. It can be idiopathic or secondary to several conditions such as infections and malignancies. Computed tomography (CT) plays a vital role in the diagnosis and management of fibrosing mediastinitis.

**PURPOSE:** To describe the CT manifestations of fibrosing mediastinitis.

**MATERIALS AND METHODS:** In this study we describe the computed tomography (CT) findings in eight cases of pathologically proven fibrosing mediastinitis. Clinical data regarding the presentation and suspected aetiology were correlated with location of mediastinal disease, calcification, contrast enhancement, effect on mediastinal structures, and additional pulmonary findings on computed tomography (CT).

**RESULTS:** The mean age was 39 years, with two female and six male patients. The common presenting symptoms were dull chest pain and shortness of breath. Two patients had diffuse involvement of the mediastinum and six patients presented with a localized mass. Calcification was present in five cases. There was no contrast enhancement in all eight cases. Six of eight cases revealed narrowing of mediastinal structures, with two cases showing pulmonary artery narrowing, three with superior vena cava obstruction, two with tracheal narrowing, and one with narrowing of the pulmonary vein. Right ventricular dilatation was seen in two cases. Five cases were idiopathic and a definite etiology found in three cases. Three out of eight patients had additional pulmonary findings.

**CONCLUSION:** In this study, we found that fibrosing mediastinitis is an unusual etiology for the common complaints of cough, chest pain and shortness of breath. Fibrosing mediastinitis more commonly presented as a localized mediastinal mass than as diffuse mediastinal disease, with the hilar region most frequently involved. In majority of cases the etiology was tuberculosis. Obstruction of vital mediastinal structures frequently gives rise to complications.

**O-57****Review lecture on HRCT lungs**

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**O-58****Advantages of maximum-intensity-projection observer detection of small pulmonary nodules revealed by MDCT**

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**OBJECTIVE:** Our purpose was to assess the advantageous effect of maximum intensity projection (MIP) images processing on the ability of various observers to detect small (<1cm in diameter) lung nodules on MDCT.

**MATERIALS AND METHODS:** We retrospectively reviewed CT chests of patients with biopsy proven malignancies at our department; of these we identified 100 patients with metastatic disease, each having two or more than two nodules that were 3 – 9mm in diameter. Results are still in compilation. Initially axial images were reviewed in sequential fashion and we recorded the lobe, location (central or peripheral {within 1cm of the edge of lung}), time taken out of arbitrarily assigned 3 minutes window and number of time of the

series scrolled. MIP images (10-mm slab,) were then reviewed, two days after review of axial images. The observers were blinded to the previous nodules assessed on same patient and additional nodules if detected were recorded.

**RESULTS:** The mean age of patient's ranged from 19-80 years, SD+/- 5 years with male to female ratio of 44.3 to 66%. A total of 400 nodules were detected. The addition of MIP images reduced the time required to detect nodules and number of scrolls required to assess pulmonary nodules. In axial images average time ranged from 130 seconds to 170 seconds while in MIP images average time of detection of nodules ranged from 80 seconds to 120 seconds.

**O-59****Patterns of drug induced pulmonary changes on HRCT.**

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**BACKGROUND:** Treatment of different types of cancer include a chemotherapeutic protocol. Several drugs are used interchangeably within the protocol used. Some of the drugs used are known to cause pulmonary toxicities. ABVD protocol used for treatment of lymphomas include bleomycin, which is well known for its effects on lungs. Other cytotoxic drugs like cyclophosphamide and methotrexate are known to cause similar side effects. Spectrum of changes produced by these drugs include diffuse alveolar damage (DAD), non specific interstitial pneumonia (NSILD), bronchiolitis obliterans organizing pneumonia (BOOP), pulmonary hemorrhage.

**OBJECTIVE AND METHODS:** The purpose of this study was to identify the frequency of patterns of lung changes produced by specific drug. We retrospectively reviewed the electronic records of patients who underwent HRCT, with complaints of dyspnea and changes in pulmonary function test receiving cytotoxic drugs. All patients with no pulmonary changes or changes other than drug induced toxicities were excluded. Data over a period of 1 year and 8 months from 01 January 2015 to 01 September 2016 was collected and data was analyzed on SPSS.

**RESULTS AND CONCLUSION:** Total of 90 patients showed drug induced changes, more common in females (60%). All these patients have some kind of cytotoxic drug that caused pulmonary toxicity. The most frequently seen pattern was diffuse alveolar damage (40%) followed by NSIP and BOOP. Drug most commonly causing toxicity was cyclophosphamide. It was concluded that the most common pattern of lung injury was diffuse alveolar damage with cyclophosphamide being the most common drug used in these patients.

**O-60****Small intrapulmonary nodules on negative mode lung window**

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**PURPOSE:** To prospectively compare lung windows and negative mode images of lung windows of multidetector computed tomographic (CT) data for the detection of small intrapulmonary nodules.

**MATERIAL AND METHOD:** This prospective study included 500 oncology patients (284 women and 216 men; mean age, 45 years, who underwent clinically indicated standard-dose thoracic multidetector CT. Axial thin slices of the chest were reviewed on standard reporting workstation. Mean, minimum, and maximum reading time per examination and per radiologist was documented. Two radiology registrars with four years of experience in body imaging digitally annotated all nodules seen in a way that clearly determined their locations. The maximum number of nodules detected by the two observers and confirmed by



consensus served as the reference standard. Descriptive statistics were calculated, with  $P < .05$  indicating a significant difference. The McNemar's test and confidence intervals for differences between methods were used to compare the sensitivities of the two methods.

**RESULTS:** Negative mode images of lung windows performed significantly better than the lung windows with regard to both detection rate and reporting time. The superiority of the former method was significant for both observers and for nodules smaller than 10 mm in diameter. Sensitivities achieved with negative mode images ranged from 89 % to 98%, depending on nodule size.

**CONCLUSION:** Negative mode images of lung windows are the superior reading method compared with normal lung windows for the detection of small solid intrapulmonary nodules.

## **SESSION VIII: Practical Tips for Radiotherapy Treatment Planning**

### **O-61**

#### **Implementation of Practice of 3D Conformal Radiotherapy in PAEC Cancer Centers: Challenges & Solutions - Transition from 2D to 3DCRT**

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Cancer is one of the leading causes of death globally and radiotherapy is currently an essential component in the management of cancer patients, either alone or in combination with surgery or chemotherapy, both for cure or palliation. It is now recognized that safe and effective radiotherapy service needs not only substantial capital investment in radiotherapy equipment and specially designed facilities but also continuous investment in maintenance and upgrading of the equipment to comply with the technical progress, but also in training the staff. Advances in computer technology have enabled the possibility of transitioning from basic 2-dimensional treatment planning and delivery (2-D radiotherapy) to a more sophisticated approach with 3-dimensional conformal radiotherapy (3-D CRT). Whereas 2-D radiotherapy can be applied with simple equipment, infrastructure and training, transfer to 3-D conformal treatments requires more resources in technology, equipment, staff and training. A novel radiation treatment approach using Intensity Modulated Radiation Therapy (IMRT) that optimizes the delivery of radiation to irregularly shaped tumour volumes demands even more sophisticated equipment and seamless teamwork, and consequentially more resources, advanced training and more time for treatment planning and verification of dose delivery than 3-D CRT. 3-D CRT is the term used to describe the design and delivery of radiotherapy treatment plans based on 3-D image data with treatment fields individually shaped to treat only the target tissue. The design and delivery of a 3-D CRT treatment requires a chain of procedures all of which must be in place if the treatment is to be safe and accurate. A chain is as strong as its weakest link. If any of the links of a chain are weaker than the others the chain will break at that point, which illustrates the need for all the components of the conformal therapy programme to be in place. It is therefore essential that all the links have been established before embarking on patient treatment. The links in this chain are the precise immobilization of patients throughout the whole process, the use of high quality 3-D medical imaging to determine the gross tumour volume (GTV), clinical target volume (CTV), planning target volume (PTV) and planning organ at risk volume (PRV), the use of 3-D planning systems to choose beam orientations and to display beam's-eye-views (BEVs), the planning of beams, the computation of 3-D dose to the PTV and PRV, the evaluation of the dose plan and the biological effect using dose volume histograms (DVH), tumour control probability (TCP), normal tissue complication probability (NTCP), the transfer of these planning data to the delivery machine, the verification of patient position, beam placement and dosimetry, the measurement of outcome. The ideas of three-dimensionality, beam shaping, and irradiation of tumours through multiple fields from different beam angles to reduce the dose to normal tissues have always been present in radiotherapy practice. When the appropriate technology to deliver 3-D CRT, such as CT simulators, radiation treatment planning systems (RTPS) capable of performing three dimensional dose calculations, producing digitally reconstructed radiographs (DRRs) and DVHs, and beam shaping devices such as multi-leaf collimators (MLCs) became available, this way of

planning and delivering radiotherapy soon gained popularity. This has now become standard practice in the developed world when treating many types of tumours with curative intent. The aims of 3-D CRT are to achieve conformity of the high dose region to the target volume and consequently to reduce the dose to the surrounding normal tissues. This should reduce both acute and late morbidity. If the adverse effects of treatment can be reduced in this way, the dose to the target volume can be increased with the expectation of improved cure of the tumour. In a randomized study of 3-D CRT against conventional radiotherapy, Dearnaley et al. demonstrated a significantly lower risk of developing late radiation-induced proctitis in the patients treated in the 3-D CRT arm. Their subsequent RT01 randomized trial showed improved biochemical prostate specific antigen (PSA) control with dose escalation of 74 Gy versus 64 Gy, using 3-D CRT. A systematic review of 3-D CRT for prostate cancer was carried out by American Society of Therapeutic Radiology and Oncology (ASTRO) and the paper by Morris et al. summarized the results. Seventy two published articles were included. It was found that gastrointestinal and genitourinary toxicities were lower in patients treated with 3-D CRT than with earlier techniques. Nilsson et al. published another systematic review of radiotherapy in prostate cancer, including randomized trials, prospective trials, and 210 retrospective studies, with a total of 152 614 patients. The conclusions were that dose escalation could be safely performed with 3-D CRT, and that its use resulted in reduced late rectal toxicity and acute anal toxicity compared with radiotherapy administered with non-conformal treatment volumes. A third systematic review on prostate cancer, published by Brundage et al showed that the use of 3-D CRT reduces the rates of both early and late bowel and bladder toxicity, and that escalation of the dose results in increased biochemical response and control rates. A number of Phase I studies have demonstrated the tolerability and feasibility of dose escalation with 3-D CRT in lung cancer. Bradley reviewed the dose escalation RTOG lung trials and reported that doses can be escalated using 3-D CRT from 60 Gy (RTOG 9410) to 83.8 Gy (RTOG 9311). When 3-D CRT is combined with chemotherapy, the maximum tolerable dose is in the range of 70 Gy to 74 Gy.

The initial cost of implementing 3-D CRT is greater when compared with the implementation of a conventional 2-D programme. On the other hand, the replacement of custom blocks by an MLC can save between 5% and 20% of treatment time. Some cost analyses have demonstrated that the initial bigger implementation cost is counterbalanced by the improvement in treatment outcome, resulting in lower overall costs of care.

### **O-62**

#### **Appropriate selection of technology for each patient**

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The radiation treatment technology has rapidly advanced over the past few decades. Treatment techniques has evolved from simple clinical markup based upon surface anatomy to two dimensional treatment planning using orthogonal x-ray films, computed tomography based three dimensional conformal radiation treatment, intensity modulation, volumetric delivery of radiation, image guided treatment with real-time verification and radiosurgery and beyond. Selection of the correct treatment modality for each patient is rightly based upon the disease entity. The evidence based practice tells us that which technique would deliver best outcome for each cancer patient. Having the best machine with a particular advance treatment technique may not always be helpful for the patient. The treatment technology must be accompanied by the correct methodology used for management along with trained team of physicist, radiation oncologist and radiation therapy technologist.

There are always ethical considerations involved with the management of any cancer patient. A treating oncologist may not be having the appropriate technique for a particular tumor and this would require referral to another specialized radiation treatment center. Having collegiality among peers would help selecting the most appropriate treatment technique for each patient. The responsibility lies with the treating oncologist!

**O-63****R.T planning: issues in specific clinical scenarios**

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Radiation therapy (RT) is a vital modality in the curative management of solid cancers. It may be used in the neoadjuvant, definitive or adjuvant setting as well as a salvage option in few scenarios. The advancement of technology has not only facilitated dose escalation but also helped reduce toxicity of treatment. The challenges of treatment planning are faced with dose escalation and for locally advanced tumors which are being treated with radical intent. Some of these challenges include the definitive treatment of head and neck cancers e.g. primaries arising from nasopharynx, hypopharynx and oropharynx. Curing the gross disease like intracranial extension in nasopharyngeal carcinoma, bulky neck nodes with adequate dose and at the same time avoiding normal tissue damage of critical structures like brain and spinal cord is simultaneously vital. Radiation therapy has proven benefit in the management of GI malignancies. For esophageal cancers it is offered in the pre-op setting and given as adjuvant treatment along with systemic therapy for gastric, pancreatic and biliary tract adeno carcinomas. Avoiding critical structures of abdomen and mediastinum is better possible with the modern treatment planning in this era. Non-operative treatment of prostatic carcinoma gives results comparable to surgery with dose escalation, however sparing normal adjacent organ (rectum) is possible with intensity modulated treatment.

Through this discussion we aim to address the pertinent planning issues faced by the oncologist in the treatment of solid cancers. The pros and cons of various RT techniques will be demonstrated in different scenarios.

**O-64****Radiation Necrosis of Brain: Is it challenging to diagnose and manage**

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Necrosis of brain usually occurs from therapeutic radiation to whole brain, partial brain or after stereotactic radiosurgery (SRS). It is the well-recognized treatment risk of SRS & conventional RT. It is the avascularization of tissue at SRS site. It is reported to occur in >50% of brain metastasis treated with SRS. Most of the necrotic site remains asymptomatic and heal gradually. However, it is difficult to diagnose and hence treatment is delayed. Usually it is asymptomatic but when gets symptomatic presents with headache and vomiting. Necrosis of brain is directly proportional to area of brain being radiated and total dose delivered. MRI perfusion and diffusion scan are quite helpful in diagnosing it. Best treatment is steroid. However, good response can be seen with Bevacizumab therapy.

**O-65****Preparing for tomorrow's R.T issues**

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Radiotherapy planning is an evolving science. Planning techniques range from simple skin mark up to conformal planning. A clear understanding of volume to be irradiated is an essential requirement. I.M.R.T (Intensity Modulated Radiation Treatment) and newer treatment techniques, which comprises a series of steps and all of which are essential for a seamless and successful outcome. These steps include detailed imaging of patients to generate precisely defined planning target volumes in 3 dimensions. This image information is then used with a computerized radiation therapy planning system (RTPS). The aim is to define the number of beams and the size and shape of each beam to cover the target volume with precision. Accurate dose calculation algorithms, which

account for the nature of the patient shape and internal anatomy, are generated. The resultant technique employs non-coplanar fields and requires a sophisticated form of beam shaping.

This discussion will provide an insight into the definition of various volumes employed in the planning of a radical course of treatment. Participants will get an opportunity to have an opportunity to discuss various site specific treatment plans. Relevant related topics like sources of errors and quality assurance (Q.A.) would be discussed in an interactive way following the methodology of Modified Problem Based Learning (PBL).

**SESSION IX: Interventional Radiology (IR)****O-66****Image guided biopsy; outcome and complications at RMI**

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**PURPOSE:** To evaluate the outcome and complications due to image guided biopsy at RMI.

**MATERIALS AND METHODS:** 300 biopsies were done in radiology department of Rehman Medical Institute Peshawar (RMI) between July 2015 to October 2016. 100 patients were biopsied by CT guidance. 200 patients had ultrasound guided biopsies. Local anesthesia was given for all patients. CT guided procedure was done using 128 slice Toshiba MDCT scanner. For ultrasound procedure, direct vision was obtained using GE LOGIC E BT 12 ultrasound machine. Patients included in the study had age range of 1-80 years. All patients had PT, APTT, INR done before the procedure.

**RESULTS:** Of the three hundred biopsies, only 6 patients had inconclusive/non diagnostic samples and these biopsies were repeated. The overall negative/inconclusive biopsy rate was 2%. No major complications occurred in the study population. Only 1 patient of ultrasound guided peritoneal biopsy was kept overnight for suspicion of hemorrhage, which was ruled out and the patient was discharged next day. Majority of patients experienced post procedure pain of various intensities which was treated conservatively. Of the lung biopsy patients, 10% had mild hemoptysis that settled conservatively.

**CONCLUSION:** We conclude from our results that we have good diagnostic yield of image guided biopsies with no major complications.

**O-67****Intracranial endovascular stent implantation of middle cerebral artery atherosclerotic stenosis in Korea**

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**BACKGROUND:** Atherosclerotic stenosis of the major intracranial arteries is an important cause of ischemic stroke among Asians, Hispanics, and blacks, especially in Chinese populations. According to Korean statistical information service, the prevalence rate diagnosed as stroke by province is from 3.1 to 12.5 per 1000 people in South Korea in 2001. The number of stroke patients is expected to grow exponentially in aging society. In the early 2000s, the number of stroke patients is 100000 per a year, so prevalence of stroke is 400000 in South Korea. We expect that there are 350000 cases of stroke per a year in about 2030 in South Korea. Brain lesion of ischemic stroke is located in anterior circulation (62%) & in posterior circulation (36%). 2% of ischemic stroke is located in multiple regions. Vascular stenosis-obstruction lesion is the most common in the middle cerebral artery (34.8%), followed by vertebrobasilar artery (31.1%), internal carotid artery (25.2%), anterior cerebral artery (5.1%), and posterior cerebral artery (3.1%). The middle cerebral artery (MCA) is related to the extensive blood supply to the lateral hemisphere and deep basal ganglia area. Although embolism is the predominant mechanism affecting the MCA,

primary arteriosclerosis at this site occurs in African Americans and Asians and may play a significant role in MCA occlusive disease, compared with whites. Traditionally, antiplatelet or anticoagulation therapy has been used as the first treatment. Although antithrombotic therapy is benefit to prevent stroke in patients with intracranial stenosis, its stroke and death rates are notable. High subsequent stroke rate necessitates more effective treatment methods for the secondary prevention of further ischemic events in patients with symptomatic intracranial stenosis.

Revascularization by means of extracranial–intracranial bypass surgery in stenotic intracranial arteries may be another therapeutic option, but it does not have proved efficacy, as compared with medical therapy. With advances in device technology, intracranial angioplasty has emerged as a potential therapeutic option. Although successful intracranial artery angioplasty has been attempted, the efficacy of angioplasty alone seems limited because of the increased possibility of distal embolism, vascular dissection, elastic recoil, vasospasm, and immediate high-grade residual stenosis.

There are many reports that intracranial stent placement is useful and safe. Stent placement to treat MCA stenosis remains a technical and clinical challenge. **PURPOSE:** The purpose of this study is to evaluate the initial success rate and follow-up result of the stent-assisted angioplasty for atherosclerotic stenoses of MCA.

**METHODOLOGY AND RESULTS:** In South Korea, We demonstrated intracranial stent placement as a treatment for M1 stenosis of MCA. Thirty two lesions of twenty eight patients were included in this study from March 2004 to September 2009. All patients had cerebral infarction averagely 54.75 days before the procedure. The locations of the stent implantation were all in M1 segment in MCA. Average follow-up period was 36 months. The kinds of stents we used were Endeavor (n=19), Flexmaster (n=18), Neuroform (n=3), Arthros pico (n=3), Vision (n=2), Driver (n=1), Guidant (n=1). The stent implantation was successful in 26 lesions (78.8%). However, We had two cases (6.25%) of microselection failure due to the tortuosity of the ICA. There was one case (3.12%) of selection failure due to tortuosity of aortic arch. In one case (3.12%), advance at the cavernous siphon was not achieved. In one case (3.12%), the patient did not cooperate nor was sedated enough for the procedure. There were two severe procedure-related complications (6.25%). In one case (3.12%), MCA rupture occurred after the ballooning of the stent. Immediate coiling was done, but the patient became comatose. In one case, ICH developed 2 weeks after the procedure. Mild restenoses occurred in 2 patients without significant symptom changes during the follow-up period.

**CONCLUSION:** In conclusion, Stent implantation in MCA stenosis is technically feasible and has relatively low rate of periprocedural complication. Still there are risks of serious complications such as rupture, hemorrhage. MCA Angioplasty shows relatively better results than bare stent (14%: 20% restenosis rate). Drug eluting stent shows better results than MCA angioplasty and bare stent (Drug eluting stent restenosis rate 0% -12%)

We have small amounts of MCA angioplasty and stents. We need long term follow up study, further study and large amount comparative study (angioplasty, bare stent, and drug eluting stent).

## O-68

### Endovascular coil embolization of ruptured and unruptured intracranial aneurysms: review of a 13-year single center experience

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**OBJECTIVE:** To report our experience with the endovascular management of ruptured and unruptured ICA during the past 13 years at tertiary care University hospital.

**MATERIAL & METHOD:** A retrospective study was performed at Radiology Department of Aga Khan University hospital between April 2003 to April 2016. All 189 patients (95 men and 94 women), with ICA undergoing endovascular treatment were included.

**RESULTS:** Total 146(77%) patients presented with ruptured ICA, 28(15%) patients with unruptured ICA & data of 15(8%) patients was not available. Based on the Hunt and Hess grading scale; 13% patients presented with Grade I ICA, 24% with Grade II ICA, 20% with Grade III ICA & 14% with Grade IV ICA. 33% ICA were located in ACOM, 15% in the ACA, 12% in the vertebrobasilar artery, 17% in the internal carotid artery, 6% in MCA, 11% in PCOM, 2% in PICA, PCA and paraophthalmic artery. Mean age was 46.5 years (Range: 10-78 years). 169(89%) patients (46% women and 45% men) underwent successful embolization (greater than 95% occlusion of the dome without any coil prolapsing into the parent vessel), 18(10%) patients (5% men and 5% women) had unsuccessful embolization. 2 patients (1%) it was not attempted due to tortuosity of vessel.

Total 92 patients had wide neck ICA & 84 patients had narrow neck ICA. Complications occurred in 20% patients; 8% had major complications with bad outcome; 12% had minor complications with good clinical outcome. 1 patient had small carotid artery dissection. Infarction was commonest complication (39%). 5 patients had expiry secondary to procedure related complications. According to modified ranking score 79.3% patients had good clinical outcome with scores of 0-2.

**CONCLUSION:** Endovascular treatment of ICA is a safe and effective technique with a small associated risk of permanent morbidity or mortality. Risk of further bleeding is small with vast majority of patients achieving independent recovery.

## O-69

### Spine intervention

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## O-70

### Percutaneous trans hepatic cholangiography with stenting as palliative care option in patients with unresectable biliary or pancreatic lesions.

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**BACKGROUND:** PCI stenting in patients with non resectable biliary and pancreatic tumors is a palliative procedure. It is a standard measure for patients with end stage disease, to relieve jaundice, pruritus and other associated symptoms.

**PURPOSE:** The purpose of this study is to assess the clinical outcome of biliary stenting in patients with unresectable biliary or pancreatic lesions.

**METHODOLOGY:** This is a retrospective descriptive study performed in Radiology department of Rehman Medical Institute Peshawar from 26<sup>th</sup> August 2015 to 29<sup>th</sup> September 2016. A total of 26 patients were included in this study (13 males and 13 females, Mean age =57 yrs) with pancreatic or biliary lesions. 4 patients had pancreatic mass, 17 had hilar cholangiocarcinoma/ klatskin, 3 patients had extrahepatic biliary tumors/ CHD involvement and 2 patients had extra biliary tumors compressing the biliary tree (1 was metastatic lesion, other was GIST). Procedure was performed under live fluoroscopy. 10 Fr PTBD was inserted via percutaneous trans hepatic route. No complication during procedure was observed.

**RESULTS:** Stenting the biliary tract markedly decreased the serum bilirubin levels and therefore reduced the jaundice and pruritus. There was a significant reduction in nausea and indigestion. Patients reported improved quality of life.

**CONCLUSION:** We conclude from this study that biliary stenting has good clinical outcome with significant improvement in LFTs, alleviating symptoms like jaundice, pruritus, nausea and indigestion, and improving quality of life in terminally ill patients.

#### O-71

##### **Response of intra-arterial chemoembolization using hepasheres in hepatocellular carcinoma: our initial experience**

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**PURPOSE:** To retrospectively assess the response of intra-arterial chemoembolization using hepasheres in patients of hepatocellular carcinoma.

**MATERIALS AND METHODS:** Being tertiary care facility and largest liver transplant centre in the country, our centre is a primary referral centre for patients of hepatocellular carcinoma. From March 2014 to November 2015, 38 (27 males and 12 females) patients with 43 Hepatocellular carcinoma lesions fulfilled the criteria for intra-arterial chemoembolization and underwent the procedure. All patients were evaluated with dynamic CT or MRI scans. Local response to Trans-arterial chemoembolization (TACE) was evaluated with follow up dynamic CT and / or MRI six weeks after the procedure using modified response evaluation criteria in solid tumors (mRECIST).

**RESULTS:** Mean size of lesions was 4.9 cm (range 1.1 to 10 cm). Child-Pugh score was A in 26 patients and B in 12 patients. Technical success rate of TACE was 100 %. No major complications were documented. Complete response was observed in 13.9% of lesions whereas partial response in 65.1 % of lesion. 13.9 % of lesions remained stable and progressive disease was documented in 13.9% of the lesions.

**CONCLUSION:** Our initial experience shows that in patients with unresectable HCC, Trans-arterial chemoembolization (TACE) using hepasheres is a safe option with good response.

#### O-72

##### **Role of uterine artery embolization in treatment of gynaecological and obstetrical hemorrhage**

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**PURPOSE:** Uterine artery embolization is an effective treatment tool for management of gynaecological and obstetrical hemorrhage. Obstetrical hemorrhage i.e post-partum hemorrhage is an emergency and major cause of maternal morbidity. Uterine fibroid is a most common pelvic tumor in women that leads to gynaecological hemorrhage and is responsible for infertility or other adverse pregnancy outcomes.

**MATERIALS AND METHODS:** We conduct a study to evaluate the utility of uterine artery embolization in the management of gynaecological and obstetrical hemorrhages. It is a retrospective study done on 13 patients at radiology department of Ziauddin University Hospital Karachi during the period from June 2012 to June 2014 in collaboration with department of gynaecology and obstetrics of our institute.

**RESULTS:** A total of 13 patients underwent uterine artery embolization during this period out of which seven patients had post partum hemorrhage while rest of six patients had gynaecological cause i.e heavy menstrual bleeding and pain

secondary to fibroids. Technical success was defined as the cessation of bleeding on the post embolization angiogram and cessation of vaginal bleeding at speculum inspection performed immediately after uterine artery embolization. Clinical success was said when the bleeding stopped completely after the first course of uterine artery embolization and no additional uterine artery embolization or surgery was required.

**CONCLUSION:** We concluded that selective uterine artery embolization is a safe and effective treatment for acute obstetric or gynaecological hemorrhage and should be part of the management algorithm for post-partum hemorrhage and for the treatment of symptomatic fibroids in females who especially want to conserve their uterus.

#### O-73

##### **Outcomes of trans arterial embolization rather than conventional TACE at RMI**

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**BACKGROUND:** HCC is 2nd leading cause of cancer related death globally. Its incidence is on the rise in Pakistan due to high prevalence of HCV and HBS, which is aetiology in 80-90% of cases of HCC in Pakistan. Conventional Transarterial chemoembolization (TACE) is palliative invasive treatment for HCC. TAE is also a palliative invasive treatment with reported similar survival outcomes.

**METHODOLOGY:** At Rehman Medical Institute, there is electronic database for all patients referred with suspected HCC. We reviewed the 40 cases of TAE performed from July 2015 to October 2016. Our aim was to assess the outcome in terms of survival.

**RESULTS:** Of the 40 patients 90% were male and 40 % were female. Mean age was 57.44. 25% of the patients were HBS +ve and 75% were HCV +ve. Over a maximum follow up of 15 months, 83% of the patients are alive. 17 % of the treated patients died.

**CONCLUSION:** Our results show that TAE (bland embolization) with small particles using superselective embolization produce similar survival outcomes as with conventional TACE.

#### O-74

##### **Revascularization of lower limb in patients with critical limb ischemia**

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#### O-75

##### **Complications of image guided transarterial chemoembolization**

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**PURPOSE:** Image-guided transcatheter hepatic chemoembolization (TACE) is accepted worldwide as an effective treatment for patients with unresectable hepatocellular carcinoma (HCC) and for adequate preservation of liver function. Although considered relatively safe, TACE has been associated with several complications. The aim of this study was to determine the the complications associated with TACE therapy and to identify the risk factors associated with adverse events.

**MATERIAL AND METHODS:** Approval from institutional review board was sought. Electronic records were retrospectively reviewed for patients, who had TACE from 1st November, 2009 – 31st August, 2016. Baseline imaging, multidisciplinary team (MDT) and clinical notes, pathology labs, TACE angiograms and follow up imaging were reviewed. Procedure complications were reviewed and analyzed in SPSS version 19.

**RESULTS:** Total of 171 patients had TACE for HCC. 58 patients had chemotherapy related side effects which included post embolization syndrome. 79 patients had transient liver failure, 2 had hepatorenal syndrome and access site hematoma in 3 patients. Post procedural paraparesis was noted in 1 patient. There was dissection of segmental branch of hepatic artery in 1 patient, tumor perforation in 1 patient and death in 1 patient.

**CONCLUSION:** TACE is relatively safe procedure with low complication rate.

## O-76

### To evaluate the emerging indications, clinical parameters, outcomes and hospital stay of the patients undergoing percutaneous cholecystostomy for the management of acute cholecystitis

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**BACKGROUND AND PURPOSE:** Acute cholecystitis is a frequent cause of general surgical admissions with a mortality risk that is related to the age of the patient. Standard treatment for acute cholecystitis is cholecystectomy but some patients are at high risk for immediate surgery. Percutaneous cholecystectomy might be the procedure of choice in this group. Percutaneous cholecystectomy has been used as a bridging technique while awaiting resolution of sepsis. We evaluated the outcome of our study population following percutaneous cholecystectomy for acute cholecystitis due to benign etiologies.

**METHODS:** We performed a retrospective analysis of patients undergoing PC from Jan 2015 to Dec 2015. Patients were reviewed for demographic features, co-morbidity, and resolution of symptoms, hospital stay and outcomes. The cases with complications were carefully examined.

**RESULTS:** 62 patients underwent PC for acute cholecystitis. 49 patients had calculous cholecystitis. 61% (n/4 38) were 60 years old. 92% had resolution of symptoms within 48 h, and 8% had partial or no resolution. 84% had a decline in total leucocyte counts. The mean hospital stay was 10.6 days and 30 day mortality was 15%. 69% patients had no post procedure complication. Of the remaining 1 patient had post procedure hemorrhage and the remaining developed complications that included pneumonia, hypotension and vasovagal reactions. The duration of drainage ranged from 1 to 3 months. 3 patients underwent emergency cholecystectomy during the same admission, 20 patients underwent interval cholecystectomy. 22 patients had no further intervention and had no recurrent symptoms, of these 73% (n/416) had calculous cholecystitis.

**CONCLUSIONS:** PC is low risk management option for high risk patients with acute cholecystitis. In experienced hands, percutaneous cholecystectomy is easy to perform, with low complication and high success rates. It is the procedure of choice in patients with acute cholecystitis unfit for emergency surgery. It can be used as temporizing measure while awaiting resolution of sepsis and optimization of co-morbidities, or as a definitive therapeutic option for calculous cholecystitis. We also conclude that it has a good potential to be used as a definitive therapy for high risk patients with acute calculous cholecystitis.

## O-77

### Complications associated with permanent tunneled haemodialysis catheter, a retrospective study

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**INTRODUCTION:** Permanent tunneled venous catheters are used for patients with renal failure who are in need of immediate haemodialysis without available established access and patients on maintenance haemodialysis who have lost their permanent access function. We contemplated to study complications of haemodialysis catheters placed in different central veins.

**DESIGN AND METHOD:** We retrospectively analyzed 212 patients, 150 men and 62 women, who went through haemodialysis at our hospital. The results were primed using descriptive method for the study; complications were categorized as early or late complications.

**RESULT:** A total of 178 venous catheters were placed in internal jugular vein, 21 catheters in femoral vein and 13 catheters in subclavian vein. Complications noted with the femoral vein approach: infection 16%, hematoma 6%, sepsis 5%. With the jugular vein approach infection developed in 16%, puncture bleed in 20% and sepsis in 7% of patients. With the subclavian vein approach catheter dysfunction was found in 4% and infection in 5% of patients.

**CONCLUSION:** Permanent tunneled venous catheters placement should be made with lot of discreteness. Experience in practice at venous catheter placement markedly reduces complication rates. Patients with catheter placement at the start of haemodialysis presented with a high morbidity and mortality rate than those with fistula. It is necessary that a careful monitoring be done after performing of a permanent vascular access from early stages.

## O-78

### Head and neck tumor embolization

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## O-79

### Various endovascular treatment options for caroticoavernous fistula

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Endovascular option is the first line of treatment in most cases of caroticoavernous fistula (CCF). The aim of management of CCF is to close the fistula and at the same time preserving the parent artery. In some cases of direct CCF, parent artery occlusion is still the best option with good outcome. Detachable balloon has been the preferred endovascular method in treating direct or traumatic CCF with reported very high success rates. And in indirect CCF, liquid embolic material or transvenous approaches usually give high success rate. However in some circumstances detachable balloon might not work in direct CCF, thus other options like coiling or combination of balloon and coiling and even stenting were used.

We present our experiences using various endovascular techniques including detachable balloon, transarterial, transvenous or mixed coiling and balloon assistance, with case illustrations for direct CCF. We illustrate cases of indirect CCF, including those using co-polymer. We include cases using new membrane based flow diverter stent.

**SESSION X: Nuclear Medicine & Molecular Imaging****O-80****Noninvasive techniques to detect recurrent disease vs. post radiation necrosis after brain tumor radiation**

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The development of radiological imaging techniques for the evaluation of recurrence brain tumors has progress significantly in recent year. Two modalities that play crucial role in the evaluation of brain tumor recurrence VS radiation necrosis are C.T Scan and MRI (including Diffusion weighted image and MR Spectroscopy). Despite the new digital radiological technique examination algorithm of brain tumor is inconclusive. In few years' time there is another modality PET CT Scan yield a better technique which provide more detailed characteristics and information. FDG PET seems to be a valuable diagnostic tool. Imaging challenges to distinguish between recurrent tumor and treatment induce changes such as radiation necrosis.

**O-81****Significantly Low Effective Dose from <sup>18</sup>FDG PET/CT Scan Using Dose Reducing Strategies: "Lesser is Better"**Maseeh uz Zaman,<sup>1</sup> Nosheen Fatima,<sup>1</sup> Areeba Zaman,<sup>2</sup> Unaiza Zaman,<sup>3</sup> Rabia Tahseen<sup>3</sup>*<sup>1</sup>Department of Radiology, Aga Khan University Hospital (AKUH), Karachi, Pakistan.**<sup>2</sup>Department of Radiology, Soliman Fakeeh Hospital, Jeddah, Saudi Arabia**<sup>3</sup>Students MBBS, Dow University Health Sciences (DUHS), Karachi, Pakistan.**Email: maseeh.uzzaman@aku.edu*

**BACKGROUND:** Fluorodeoxyglucose (<sup>18</sup>FDG) PET/CT imaging has become an important component of management paradigm in oncology. However, significant radiation exposure imparted by it is a matter of growing concern especially in younger population who have better odds of survival. Aim of this study was to estimate the effective dose received by patients having whole body <sup>18</sup>F-FDG PET/CT scanning as per recent dose reducing guidelines at a tertiary care hospital.

**MATERIAL AND METHODS:** This prospective study included 63 patients with different cancers who were referred for PET/CT study for various indications. Patients were prepared as per departmental protocol and <sup>18</sup>FDG was injected at 3 MBq/Kg and a low dose, non-enhanced CT protocol (LD-NECT) was used. Diagnostic CT studies of specific regions were performed afterward if required. Effective dose imparted by <sup>18</sup>FDG (internal exposure) was calculated by using multiplying injected dose in MBq with coefficient  $1.9 \times 10^{-2}$  mSv/MBq according to ICRP publication 106. Effective dose imparted by CT was calculated by multiplying DLP (mGy.cm) with ICRP conversion coefficient "k" 0.015 [mSv / (mG. cm)].

**RESULTS:** Mean age of patients was 49 ±18 years with a male to female ratio of 35:28 (56%:44%). Median dose of <sup>18</sup>FDG given was 194 MBq (range: 139-293). Median CT DIvol was 3.25 (2.4-6.2) and median DLP was 334.95 (246.70 – 576.70). Estimated median effective dose imparted by <sup>18</sup>FDG was 3.69 mSv (range: 2.85-5.57). Similarly the estimated median effective dose by low dose (non-diagnostic) CT examination was 4.93 mSv (range: 2.14 –10.49). Median total effective dose by whole body <sup>18</sup>FDG PET plus low dose non-diagnostic CT study was 8.85 mSv (range: 5.56-13.00).

**CONCLUSION:** We conclude that the median effective dose from a whole body <sup>18</sup>FDG PET/CT in our patients was significantly lower if not the lowest. We suggest adhering to recently published dose reducing strategies, use of ToF scanner with CT dose reducing option to achieve this lower if not the lowest effective dose. This would certainly reduce the risk of second primary malignancy in younger patients with higher odds of cure from first primary cancer.

**O-82****Gallium-67 uptake in histological variants of non-Hodgkin's lymphoma: a correlative study**Basit Iqbal,<sup>1,2</sup> Geoffrey Currie,<sup>2,3</sup> Humayun Bashir,<sup>4</sup> Uzma Afzal,<sup>4</sup> M. Khalid nawaz,<sup>4</sup> Samina Mansoor,<sup>4</sup> Janelle M Wheat,<sup>2,3</sup> Muhammad Numair Younis<sup>5</sup>*<sup>1</sup>Gujranwala Institute of Nuclear Medicine & Radiotherapy, Gujranwala, Pakistan**<sup>2</sup>Centre for Research in Complex Systems, Charles Sturt University, Australia**<sup>3</sup>Australia School of Advanced Medicine, Macquarie University, Australia**<sup>4</sup>Shaukat Khanum Memorial Cancer Hospital & Research Center, Lahore, Pakistan**<sup>5</sup>Institute of Nuclear Medicine & Oncology, Lahore, Pakistan**Email: drbasitiqbal@gmail.com*

**PURPOSE:** The malignant lymphomas are the fifth most common neoplasm in both men and women. Staging, re-staging and treatment response evaluation pose a difficult task in many patients of lymphomas. Histological variants in both Hodgkin's and Non-Hodgkin's types of lymphoma greatly affect the response to treatment and overall prognosis. This study was conducted to correlate the degree of abnormal Gallium-67 uptake with the histological variants of non-Hodgkin's lymphoma. This project was a part of the study to see the ability of Gallium-67 scintigraphy to predict the response to chemotherapy early in the course of therapy.

**MATERIAL & METHODS:** 65 patients were included in the study with a mean age of 25 years. All patients had undergone medical imaging, bone marrow biopsy and histopathology.

**RESULTS:** Sixty-five patients were classified according to the REAL classification. 11 patients were of T-cell type, 50 were of B-cell type and 4 were anaplastic. 46 showed gallium-67 uptake in the lesions, whereas 19 (29.2%) had no discernible Gallium-67 uptake.

**CONCLUSION:** There was no correlation between histological sub-types and Gallium-67 uptake in all sub-types of NHL.

**O-83****Spectacular musculoskeletal scintigraphy**

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Bone scintigraphy with Tc99m Diphosphonate tracers is in clinical use for four decades. It is the most frequently performed scintigraphic procedure and deserves to be called the work-horse of the discipline. High sensitivity makes planar whole body bone scan (PWBS) the procedure of choice for identifying sclerotic skeletal metastases. The closet rival of PWBS is F18 Fluoride scan however its use is limited by availability of PET scanners. Pattern recognition is a hallmark of PWBS i.e. random multiple lesion in axial and appendicular skeleton favour metastases as opposed to one or two lesions. Similarly, rib and sternal lesions in a patient with breast cancer and pelvic lesions in prostate cancer need due consideration. Multiple skeletal metastases are relatively easier to identify with PWBS, however, it can be a challenge to characterise solitary lesion or to decipher response to treatment; progression vs regression on serial PWBS. Metastatic lesions can develop sclerosis as a response to treatment and mimic progression. Similarly, age and treatment related degenerative changes also pose a challenge in the background of multiple metastases. Three dimensional Single Photon Emission Computerised Tomography-Computerised Tomography [SPECT-CT] imaging with its functional and anatomic information provides the high specificity required for characterisation of such lesions. All other indications of Tc99m Diphosphonate bone scanning i.e. inflammation / osteomyelitis; arthropathies (facet joints, impingement syndromes, degeneration); sports or stress related injuries; bone viability (avascular necrosis, bone graft); assessment of prosthesis also tend to benefit from use of SPECT-CT. There review will highlight the logarithmically enhanced power of bone scan in the new spectacular era of hybrid imaging.

**O-84****Comparable Ablation Efficiency of 30 and 100 mCi of I-131 in Low to Intermediate Risk Thyroid Cancers Using Triple Negative Criteria**

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**BACKGROUND:** There is a controversy about ablation efficacy of low or high doses of radioiodine-131 (RAI) in patients with differentiated thyroid cancers (DTC). Purpose of this prospective study was to find out efficacy of 30 mCi and 100 mCi of RAI to achieve successful ablation in patients with low to intermediate risk DTC.

**MATERIALS AND METHODS:** This was a prospective cross sectional study which was conducted from April 2013 till November 2015. Inclusion criteria were patients of either gender, 18 years or older, having low to intermediate risk papillary and follicular thyroid cancers with T1-3, N0/N1/Nx but no evidence of distant metastasis. Thirty-nine patients were administered 30 mCi of RAI while 61 patients were given 100 mCi of RAI. Informed consents were acquired from all patients and counseling was done by nuclear physicians regarding benefits and possible side effects of RAI. After 06 months (range 6-16 months; after 2-3 weeks thyroxin withdrawal), these patients were followed up with stimulated TSH, thyroglobulin (sTg) and thyroglobulin antibodies, ultrasound neck (U/S) and a diagnostic whole body iodine scan (WBIS) for ablation outcome. Successful ablation was considered if stimulated Tg < 2ng/ml with negative antibodies, negative U/S and a negative diagnostic WBIS (triple negative criteria). ROC curve analysis was used to find diagnostic strength of baseline sTg to predict successful ablation.

**RESULTS:** Successful ablation based upon triple negative criteria was 56% in low dose and 57% in high dose groups (non-significant p value). Successful ablation based on single criterion (follow-up sTg < 2 ng/ml) was 82% in low dose group than 77% in high dose group (p – non-significant). The ROC curve revealed that baseline sTg level ≤ 7.4 ng/ml has the highest diagnostic strength to predict successful ablation in all patients.

**CONCLUSION:** We conclude that 30 mCi of RAI has similar ablation success to 100 mCi dose in patients with low to intermediate risk DTC. Baseline sTg ≤ 7.4 ng/ml is a strong predictor of successful ablation in all patients. Low dose RAI is safer, more cost effective and more convenient for patients and healthcare providers.

**O-85****Role of neck ultrasound and tc-99m sestamibi scintigraphy in patients with hyperparathyroidism due to chronic kidney disease**

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**PURPOSE:** The purpose of this study is to find out role of neck US and Tc-99m Sestamibi scan in patients with hyperparathyroidism due to chronic kidney disease.

**METHODS:** A retrospective review was performed from May 2012 to October 2015. There were 34 patients (9males, 25 females) with suspected hyperparathyroidism that underwent Tc-99m Sestamibi scintigraphy and US. Scintigraphy data collected from Nuclear Medicine and ultrasound data base at radiology department SIUT. Patients were divided into six groups on basis of dialysis, urea, creatinine, PTH level, US and MIBI findings. Sensitivity,

Specificity, Accuracy and Positive predictive value of Sestamibi scan is find out. Correlation between ultrasonography and MIBI scan, and correlation between PTH and renal function was done on SPSSV22.

**RESULTS:** Among 34 patients, 13 patients had US findings of adenoma and 1 patient had US findings of hyperplasia, total 14 patients with abnormal parathyroid glands detected on US and 20 patients had normal US findings. Out of same 34 patients, 14 patients had positive findings of adenoma and 3 patients had findings of hyperplasia, total 17 patients with abnormal parathyroid glands detected on MIBI scan and 17 patients had normal MIBI scan. The Sensitivity, Specificity, Accuracy and Positive predictive value of Tc-99m Sestamibi scan is 64.2%, 60%, 61.7% and 52.9% (with 95% CI i.e. 30.96 to 73.83%) respectively. By correlating US with MIBI scan, results showed weak correlation; (r) = 0.239 and p-value 0.173 which is not statistically significant and by correlating PTH values with renal function there is positive correlation with p-value 0.01 which is statistically significant.

**CONCLUSION:** Study shows that Tc99m Sestamibi scan is more accurate and superior to find out the hyperparathyroidism in patients with chronic kidney disease because US is an operator dependent technique and it's results are inaccurate in order to trigger the hyperparathyroidism.

**O-86****Estimation of kidney size in Pakistani children with Technetium-99m DMSA scintigraphy and its correlation with ultrasonography**

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**PURPOSE:** The purpose of this study is to estimate kidney size in Pakistani children with 99mTc-DMSA scintigraphy and its correlation with ultrasonography.

**MATERIALS AND METHOD:** A retrospective review was performed from March 2010 to August 2015. There were 558 patients in which 367 male and 191 were female subjects of age between 1-16 years. Patients that underwent US and DMSA scan having single or both normal kidneys showing no abnormalities are included. Scintigraphy data collected from Nuclear Medicine department SIUT. Patients were divided into six age groups (1-2years, >2-5years, >5-7years, >7-10years, >10-13years, >13-16years). On DMSA scan Infinia Xeleris software and on US renal length was done on Toshiba machine and length was measured in (mm). Correlation was done on SPSSV22.

**RESULTS:** There were 320 right and 268 left normal kidneys. On DMSA scan, right renal length ranges from 50mm to 124mm with mean of 89.19mm and left renal length ranges from 51mm to 121mm with mean of 88.75mm. After the measurement with US and DMSA scan we have noticed that US showed slightly smaller kidney than DMSA with an average difference of 6.85mm. The age was categorized into six groups and ranges of renal length were observed in each group. By correlating the renal length of DMSA with US, results showed strong correlation. The value statistically is high showing significant values as p < 0.001.

**CONCLUSION:** This study estimates the kidney size in Pakistani children with 99mTc-DMSA scintigraphy and provides the ranges of renal length with respect to different age groups. Study shows that DMSA scan is more accurate and superior in measuring size of kidney because US is an operator dependent technique and it shows slightly smaller kidney than DMSA. Measured renal length by two different imaging modalities showed significant correlation with p-value as < 0.001.

**SESSION XI: Multisystem Imaging****O-87****To determine the prevalence of non-tumorous hepatic pseudolesions in cirrhotic patients on CT liver dynamic scans in a local setup**

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**OBJECTIVE:** The objective of this study was to determine the prevalence and imaging features of pseudolesions in patients with liver cirrhosis on CT Liver dynamic scan performed in our department.

**MATERIALS AND METHODS:** The CT liver dynamic scan of 128 patients were retrospectively analyzed by two readers for the presence of pseudolesions. The pseudolesions were classified as around the falciform ligament, segment IV posteriorly, and in gallbladder fossa. The prevalence and imaging features were assessed. The pseudolesions were confirmed either by pathologic correlation, followup imaging or MRI scans.

**RESULTS:** A total of 34 nontumorous hepatic pseudolesions were found on 128 examinations (26%). The compilation of results is ongoing. 22 pseudolesions were around falciform ligament 64%, 8 were located in gallbladder fossa 23%, and four were in segment III (11%). 32 lesions (94%) were seen during the arterial phase of the bolus injection as hypoenhancing areas. All pseudolesions (100%) were seen during the portal phase. The presence of true tumors at these sites was excluded in ten cases by pathology and in 24 cases by follow-up MR/CT imaging examinations.

**CONCLUSION:** Pseudolesions are not rarely seen in the routine three phase helical CT examination of with pseudolesion around falciform ligament being most commonest. The pseudolesions are more encountered in the portovenous phase of helical CT examination. Thus, recognition of these pseudolesions is crucial because they may be misinterpreted as true lesions.

**O-88****Exploring chart stimulating recall as teaching tool for radiology residents**

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**PURPOSE:** Diagnostic imaging report is one of the most important means of communication between the radiologist and the primary clinician, and has a high impact on patient care. Traditionally, emphasis has been how to diagnose the image findings, but more effort is needed to teach and assess effective report writing skills. Bristol Radiology Report Assessment Tool (BRRAT) is a workplace based assessment tool which is recommended to assess written radiology reports. Chart Stimulated Recall (CSR) based discussion of radiology reports is considered to provide good learning opportunities to residents and teaching opportunities to the faculty. The purpose of the present study was to explore if CSR can be used as a teaching tool to improve report writing skills of radiology residents of AKU.

**MATERIALS AND METHODS:** In the first fortnight, five reports of all twenty-five radiology residents were assessed by three assessors using BRRAT for the quality of writing skills, later twelve residents were randomly assigned to the IG and thirteen to the CG. CSR technique was used with residents in the IG group and they were provided with constructive feedback. After two weeks, five reports of residents in both groups were evaluated for improvement in writing skills by the same assessors again using BRRAT.

**RESULTS:** The inter-rater reliability between the three raters was 0.875, all three raters were crossed. Cronbach's alpha was 0.726 for assessors, 1.0 .681 for assessor 2 and 0.761 for assessor 3. Significant improvement was observed in report writing skills of radiology reports in the intervention group in all years (p-value<0.005) except in years three (p-value was 0.086).

**CONCLUSION:** Resident scores for the IG who underwent CSR interviews were significantly higher than residents scores in the CG. CSR was a useful and suitable technique for improving the report writing skills of radiology residents.

**O-89****Latest research trends in the field of clinical radiology in Pakistan: where do we stand!**

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**OBJECTIVE:** To evaluate latest research trends in the field of clinical radiology in Pakistan by category of publication, title of journal, yearly contribution and regional representation.

**METHODS:** An online systematic search was conducted using key words of clinical radiology and its subspecialties to find studies published in Pubmed and Pakmedinet journals. These included original articles, case series, case reports, review papers, pictorial essays and editorials. These files were scanned and publications that were related to the field of clinical radiology or its subspecialties, written by a radiologist as first or second author and conducted within Pakistan were selected. Exclusion Criteria included non-clinical radiology related studies and those published by non-residential Pakistani radiologists. Data was entered in MS Excel and analyzed using SPSS version 19 for number and percentages of publications originating from different provinces and cities of Pakistan along with yearly contribution.

**RESULTS:** Total of 1158 publications were identified out of which 614 (53%) were from Pubmed and 544 (46%) from Pakmedinet. Most of these were published in indexed local journals. Majority of studies (41%) were published by radiology centers of Sindh followed by Punjab (40%), Khyber Pakhtunkhwa (10%), Baluchistan (2%) and AJK (1%). Maximum publications were from the radiology centers of Karachi (N= 209, 38%), followed by Lahore (N= 139, 25%) and Rawalpindi (N=58, 10%). Most popular local journal was Journal of College of Physician and Surgeons Pakistan (N=88) followed by Journal of Pakistan Medical Association (N=76).

**CONCLUSION:** We observed a healthy trend in terms of quantity of publication over the past few years. However, our publications are still inferior in terms of quality. Quite a few studies satisfy the standards of international journals. As a result, we have merely any presence in the international journals. Since there is a universal growing trend on significance of research and publication, particularly in the field of clinical radiology, Pakistan also needs to flow within the streamline with more quality oriented research output.

**O-90****The 3rd millennium economic, administrative and ethical considerations in medical imaging**

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Science, technology and experience fuel the pace of rapid development in the field of medical imaging. Medicine is now an enormously sophisticated business in which the patient in need of medical care is deemed as a customer. Referral criteria, diagnostic standards and the patients' economic status are more than often missed in medical practice and with the advent of new hi-tech facilities, often the ethical aspect of practice are turned a blind eye upon. As a radiologist with over 20 years of work experience in a country which has endured revolution, war, reconstruction and sanctions in a relatively short period of time, I may be in a position to offer strategic administrative and economic methods especially for contingency situations in the 3rd millennium based on a different experience as compared to affluent societies and its comparison with other experiences.



While we, as radiologists are still physicians, a radiology department or center is no longer an office. Radiology centers are usually challenged by the need for capital for investment on procurement of up to date equipment and their maintenance as well as often specifically made material which inevitably add to the incumbent costs of venue, staff and their education and energy which may potentially compromise the quality of service. At the ISR, a panel of experts are working on the development of administrative measures to reduce costs of isolated investments which having set the development of a road map for delivery of radiology services in Iran its core activity, it has pursued this task in close affiliation with key decision and law making bodies. However, all problems in the world share a common pathology and do not resolve as isolated issues.

At micro level and the domain of urban administration we have concluded that shared use of medical venues and facilitates may be profoundly useful particularly in the field of Medical Imaging (in view of global development of telemedicine) Southeast Asia with its traditional healing methods has fostered less room for the use of medical imaging. In India and china, Industrial medical methods are rapidly developing and the high cost of raw material, medical equipment and energy has imposed serious problems on the developing and even developed countries.

Development of a pilot platform in four corners of the globe with elaborate description of the need for services in each countries' towns, cities and capitals and rationing of facilities and humanresources and the amount of education needed for them may illuminate the mid-range and long range road map for the respective countries. The second phase stresses on the rate of stratification and rational referral on reducing the costs incurred as a consequence of part time, geographically dispersed services.

The results of a successful road map maybe extrapolated to be used a regional, continental, and global level. The scheme may include the use of skilled workforce in affluent countries for education as well as their capital for the development of convenient low cost access for patients to public and private imaging facilities by time effective use of their equipment which may make up for the development of new facilities and upgrading of the existing facilities in low income countries. The global community of the 3rd millennium has no choice but to develop a common pool of secured financial, technical and human resources to cover the global needs for medical services. Putting an end to the viscous cycle of non-sustainable investment.pressed by powerful companies, overproduction of skilled workforce and wasting of resources on establishment of medical facilities without a real demand as well as the development of an organization which advocates quality medical imaging services, are the goals of our project in 2017. Establishment of an organization in which all radiologists and their respective country's society of radiology act in conjunction with regional, continental and global bodies to advocate correct delivery of services particularly in contingency situations(Famine, war, Sanctions) is instrumental in efficient running of radiology centers and helps them avoid bankruptcy in contingency situations

### O-91

#### Improving workflow in emergency ultrasound service during call-hours

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**BACKGROUND:** There had been multiple complains against Radiology Department (RD) regarding delays in performing Ultrasound examinations (US) Emergency Department (ER) patients, especially during call hours (CH). **OBJECTIVE:**The purpose of this study is to assess time delays (TD) while performing ER-US and to suggest measures to improve workflow during call hours.

**MATERIAL & METHOD:** An audit was conducted in US-Section of RD. All the US requests (USR) generated during Call-Hours (CH) from ER included. The data during 1st cycle (C1) was gathered in last week of March-2015. USR

were evaluated for different TD; 'TD in receiving request after generation' (TDR), 'TD in action taken by RD' (TDA), 'Time taken for requested US' (TTE) and 'Total time lapse between receiving USR till US' (TTL). Subsequently, following intervention was done after C1. To reduce TDR; an additional and dedicated Radiology counter was made operational and Unit Receptionist & porter were directed for prompt delivery of USR. To reduce TDA and TTL; 'One minute reaction' policy was introduced. To maintain TTE; on-call Residents were time n' again reminded for service quality and service excellence. Second cycle (C2) was conducted 10 weeks post-intervention, during last week of June-2015.

**RESULTS:** Total 108 USR from C1 and 114 USR from C2 were included and evaluated. Overall compliance in proper documentation improved from 65% to 81% post-intervention. No or inadequate clinical history in C1 (49%) and C2 (67%) increased mean TDA. Pre-US preparation in C1 (39%) and C2 (45%) increased mean TTL. Paired Sample T-Test was used to assess change in TD after intervention. p-value of <0.05 is considered significant. Mean TDR reduced from 17 min to 14 min (p <0.007), mean TDA reduced from 38 min to 20 min (p <0.011) and mean TTL reduced from 117 min to 79 min (p <0.001). No significant change in TTE occurred from 24 min in C1 to 23 min in C2 (p <0.631).

**CONCLUSION:** Overall results elucidate the effectiveness of intervention to ensure better workflow in Emergency Ultrasound Service during call hours.

### O-92

#### Out-of-hours imaging; establishing if a difference to patient management is made before the next in-hours examination

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**PURPOSE:** For any department, part of each day is designated as out-of-hours. For our department, 5pm – 8am next morning and weekends are considered out of hours. The number of requests for out-of-hours examinations has been rising steadily leading to an increase in radiology resident and radiographer on-call costs. Limited staff availability also results in difficulties in obtaining patient escorts and increased portering costs out of hours. It often causes distress to the patient without a change in management.

**MATERIALS AND METHODS:** This prospective descriptive audit reviewed 100 consecutive out-of-hours examinations including ultrasound (US), computed tomography (CT) and MRI. Physicians electronic notes database was reviewed for these patients (before next in-hours during weekdays and within 24 hours during weekends) to see any change in patient management in this time. The standard recommended by Royal college of Radiologists (RCR), UK, is that all out-of-hours examinations should make a difference to patient management and the change in management should occur before the next available in-hours routine examination.

**RESULTS:** Out of 100 consecutive scans done out-of-hours, change in management was observed in 77%(77/100) patients. However, change in management before next working hours was observed only in 51% while the rest of 26% patient management changed in next in-hours timings. In total, 49% scans were not meeting the standard recommended.

**CONCLUSION:** We are not currently meeting the RCR standard for out of hours imaging and depending upon clinical triage, indications for the scans not meeting the criteria can be reviewed and discussed with referring services in order to seek agreement as to when out-of-hours investigations can be scheduled within social hours.

**O-93****Imaging in neonatal bowel**

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Clinical presentation in neonates with gastrointestinal problems is often non-specific so imaging plays an important role in the diagnosis and management of gastrointestinal disorders in both full term and preterm neonates. It helps to establish precise diagnosis, decide an effective management and to identify associated anomalies. Intestinal obstruction is the commonest surgical emergency in the neonatal period, a newborn with intestinal obstruction can elicit unease in many radiologists and neonatologist. Its etiology could lie anywhere from esophagus to anus. So early and accurate diagnosis of intestinal obstruction is paramount for proper patient management. The overarching goal of this presentation is to provide a helpful and practical imaging strategy for evaluation of imaging finding in neonate, focusing on neonatal intestinal obstruction.

**O-94****Knowledge, attitude and practices of Pakistani radiologists toward radiological research**

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**PURPOSE:** Radiology is one of the main cornerstones in the optimal management of diseases. All advancements and innovations have come forward due to extensive research. This study was conducted to assess the knowledge, attitude and practices of Pakistani radiologists toward research in radiology.

**MATERIAL AND METHODS:** This was a cross sectional survey done in 2009 Annual Radiological Society of Pakistan Conference. Convenient sampling was used. Data was collected on self-administered questionnaire, gathered from consultants, residents, sonographers and students, and was analyzed by SPSS version 22.

**RESULTS:** There were a total of 261 respondents, with a mean age of 33±7years with 51% females and 49% males, both from public(55%) and private institutes(45%). 58% were residents, 26% consultants and rest were sonographers and students. 49% of the respondents had one or more publications in last 5 years. Number of papers published by them were 288 and only 24(8.3%) of them were funded research projects. 30% of respondents were currently engaged in ongoing research. Out of all researches done, 11% were basic and rest were clinical. Most of these were in the subspecialty of Sonology(41%) while least were in Angiography(4%). 66% of respondents had no formal research training. Most important hurdles towards research were unavailability of time(70%), lack of resources(65%), lack of institutional support(46%), no access to statisticians(61%) and lack of training(78%). The main suggestions by respondents to promote research were incentive on research(73%), availability of statistician(65%), instilling culture of research in students(48%), development of research evaluation committee(57%) and patient database registry formation(65%). 47% of respondents opinioned that research is inevitable for evidence based medicine.

**CONCLUSION:** Radiologists in Pakistan understand the importance of research but there is lack of formal training. There is need to develop and implement strategies to promote research in Radiology in Pakistan.

**O-95****CT Enterography**

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Computed Tomographic Enterography (CTE) is simply defined as the utilization of CT scanning specifically to evaluate the bowel. CT enterography combines neutral or low-density (close to water attenuation) oral contrast agents with

intravenous contrast to depict small bowel diseases optimally. With this technique, small bowel vascular malformations, tumors, and inflammatory bowel diseases can be detected. CT enterography has also become an important alternative to traditional fluoroscopy in the assessment of other small bowel disorders such as celiac sprue and small bowel neoplasms.

Routine CT Scan used to detect extra-enteric findings of bowel pathology while CTE clearly intra-enteric findings like polyps, mucosal and mural abnormalities.

Adequate luminal distention is key for good results it can usually be achieved with fairly large quantity of neutral oral contrast.

The availability of MDCT along with advancements in 3D CT imaging systems has greatly expanded the role of CT in evaluation of suspected small bowel pathology. CTE is now considered a first line for the evaluation of a wide variety of bowel diseases in combination with neutral oral contrast. It can also evaluate other abdominal pathologies related to solid organs and provide valuable information of the abdominal vessels using MIP images. Therefore it provides a global overview of the abdomen.

**O-96****Clinical applications of MR Spectroscopy (1H-MRS)**

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The role of radiological imaging is well known as a problem solving specialty for years now. Imaging has a pivotal role in diagnosing diseases, differentiating diseases entities and providing a clinical course for the physicians to embark upon, in patient management plan. However, as great degree of overlap exists between pathogenesis of different disease processes, at times these radiological imaging tools reach a deadlock in reaching at a definite diagnosis. To overcome this dilemma, 1H-MRS has emerged as an effective imaging tool in identifying disease processes by measuring the principal biochemical markers at the cellular level. 1H-MRS can be used in assessing the biochemical markers throughout the body which are direct indicators of the underlying disease pathogenesis. The proton MR spectrum comprises a set of resonances (peaks) distributed along the x-axis labeled in parts per million (PPM) the amplitude of the resonance is measured on the y-axis typically using an arbitrary scale.

Brain, prostate gland and breast are important organs in the body each having its own biochemical composition where 1H-MRS has particularly been effective. The sensitivity of detection brain tumors, abscesses, encephalitis, tuberculous infection, demyelinating and white matter disorders has greatly risen with identification and plotting of pertinent neurological markers peaks including choline, creatine lactate, lipid alanine and NAA. Similarly, by measuring citrate creatine, choline spermin peaks within the prostate gland distinction between mitotic and benign patients with breast malignancy distinction between treatment responders and non-responders is another fruitful and yielding domain 1H - MRS.

Although remarkable successes have been recorded in research and practice, MRS use is far from becoming standard. Even staunch advocates agree that it must be used in conjunction with other modalities and techniques. MRS is increasingly referred to as a "Virtual biopsy": however MRS is not a candidate to replace the biopsy needle, at least not in the near term.

**O-97****Acute epiploic appendagitis and its look alikes**

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Acute epiploic appendagitis usually manifests with acute lower quadrant pain. Its clinical features are similar to those of acute diverticulitis or, less commonly,

acute appendicitis. The important differential at computed tomography (CT) includes acute omental infarction, mesenteric panniculitis, fat-containing tumor, and primary and secondary acute inflammatory processes in the large bowel like diverticulitis and appendicitis. Acute omental infarction is typically located in the right lower quadrant and often is mistaken for acute appendicitis. Correct diagnosis is of paramount importance since these conditions may be mistaken for acute abdomen, resulting in unnecessary surgery. The typical CT features of acute epiploic appendagitis include an oval lesion 1.5–3.5 cm in diameter, with fat attenuation and surrounding inflammatory changes, abutting the anterior sigmoid colon wall. The CT features of acute omental infarction include a well-circumscribed heterogeneous fatty mass with a whorled pattern of concentric linear fat stranding between the anterior abdominal wall and the transverse or ascending colon. With increasing employment of CT for the evaluation of acute abdomen, radiologists are likely to see acute epiploic appendagitis and its likes more often.

### **SESSION XII: Interactive Session**

Zia Farooqi  
Najam ud Din

### **SESSION XIII: Breast Imaging**

#### **O-98**

#### **Radiology appearance of chronic granulomatous disease of breast**

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**INTRODUCTION:** Granulomatous disease of breast is a group of disorders which clinically resemble carcinoma and usually requires biopsy and histopathological evaluation. The aim of this study is to describe the radiological findings of granulomatous diseases of breast.

**MATERIAL AND METHODS:** We have retrospectively reviewed the radiological appearances of 27 women histopathological diagnosed of having granulomatous mastitis from March 2014 till July 2016.

**RESULTS:** Of the 27 patients 8 had tuberculous granulomatous infection of breast, 4 were having plasma cell mastitis, 13 had idiopathic granulomatous mastitis, 2 patients have diabetic mastopathy.

**CONCLUSION:** The breast may occasionally be involved by certain inflammatory diseases or by specific infections that usually manifest with radiologic features resembling malignancy. Knowledge of these entities can, in the proper clinical setting, lead the radiologist to consider these entities as possible diagnoses, but likelihood of must be excluded first.

#### **O-99**

#### **Breast elastography: a new paradigm in diagnostic breast imaging**

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Breast elastography is the emerging sonographic imaging technique which provides information on breast lesions in addition to conventional ultrasonography (US) and mammography. Elastography provides a noninvasive evaluation of the stiffness of a lesion. Two technical solutions are available for clinical use: strain elastography and shear wave elastography. Recent studies show that ultrasonographic elastography (USE) provides higher image quality compared with conventional B-mode US or mammography during breast cancer diagnosis, which eventually helps to reduce false-positive results (i.e., increased specificity) and therefore is useful in avoiding breast biopsy. Recently, the US elastographic features of breast masses have been incorporated into the 5th edition of the Breast Imaging Reporting and Data System (BI-RADS) US lexicon as associated findings. This article reviews the basics of elastography, technique, classifications, image interpretation, elastographic BI-RADS US lexicon and clinical applications of elastographic results. Although elastography is easy to perform, training and technical knowledge are required in order to obtain a correct interpretation.

#### **O-100**

#### **Intermediate to highly suspicious microcalcification on mammograms: a radio-pathologic correlation on stereotactic breast biopsies**

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**AIM / OBJECTIVE:** Breast microcalcification is an important feature in the radiological assessment of breast lesions. Breast microcalcifications may be the single early sign of a malignant process, 55% of the suspicious lesions are detected by mammography. There are well established diagnostic criteria and BIRADS categorization basing on the morphology and distribution of the calcifications with different recommendation protocols. The main aim of our study is to establish radio-pathological correlation of the breast microcalcifications classified according to BI-RADS with stereotactic biopsy.

**MATERIALS AND METHODS:** Retrospective study was conducted in Shaukat Khanum Memorial Cancer Hospital & Research Centre from May 2013 to May 2016 in Women Imaging Department. The study included 35 female patients with mean age of 48.2 years age (range of 31 years to 74 years) showing microcalcifications on digital mammograms acquired for diagnostic / screening purposes. The microcalcifications with BIRADS category from 3 to 5 were subjected to stereotactic biopsy. The biopsy was performed using 14G Bard-magnum needle with average of four cores using GE digital mammographic machine. The histopathological results of each stereotactic biopsy were compared with the BI-RADS classification.

**RESULTS:** According to BI-RADS classification category 3 and 4A are considered likely benign radiologically. In our study only 4 patients in BI-RADS 3 & 4A were subjected to biopsy and were benign on histopathology. Out of 31 patient which were categorized in 4B, 4C and 5; 14 were negative on histopathology. Among the 17 patients who were proven to be malignant 6 patients were in category 5. The overall positive predictive value of biopsies was 55%. The individual distribution descriptors of microcalcifications predicted the risk of malignancy were as follows: Clustered 23(74%), regional 5 (16%), Diffuse 1(3%), Linear ductal 1(3%), Segmental 1(3%). The positive predictive value for malignancy according to BI-RADS assessment categories were as follows: 4B :14 (63%), 4C: 11(64%) and Category 5: 6 (100%).

**CONCLUSION:** The stereotactic guided biopsy is a good technique for the anatomopathological study of breast microcalcifications, extracting adequate samples. It is less traumatic and low cost technique as compared to the surgical excision of all such lesion.

#### **O-101**

#### **Multiparametric ultrasound imaging for evaluation of breast lesions**

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Early diagnosis and characterization of breast cancer are of critical importance. Although many modalities have been developed, the differential diagnosis of breast masses remains challenging.

Multiparametric Ultrasound (MPUS) evaluation provide several informations about breast lesions thus improving the diagnostic accuracy. In addition to morphological features using conventional gray scale ultrasound we can get information about stiffness of lesions using Strain Elastography and shear wave Elastography. Lesion Vascularization can be assessed using Color / Power Doppler, Superb Microvascular Imaging (SMI) and Contrast Enhanced Ultrasound (CEUS). The integration of the conventional Gray-scale and Doppler ultrasonography, with Elastasonography and, in particular, with CEUS, has improved the overall diagnostic accuracy of ultrasound examination in the evaluation breast lesions.

**O-102****Significance of mammographic breast density; Local perspective**

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**PURPOSE:** The term breast density refers to the relative amount of radiopaque stromal and epithelial elements in comparison to the radiolucent fatty elements seen at mammography. This term has gained a lot of importance over the past few years especially due to the “Are you dense” in USA. Legislative changes in about 28 states in USA, now require radiologists to notify patients regarding breast density and the need for further supplement screening. In various studies increased breast density has been shown to increase the risk for developing breast cancer by about four to six times. Increased breast density also masks small cancers. In USA about 40 – 44% of women undergoing screening mammographies have dense breasts. In spite of availability of certain softwares for measuring breast density about 90% of breast density assessments in USA are done subjectively using BIRADS system. The purpose of our study was to evaluate prevalence of increased breast density in women coming for mammograms in Gujranwala Division.

**MATERIALS AND METHODS:** About 3000 mammograms reports were reviewed retrospectively. These had been performed at GINUM hospital during the period of 1.1.2014 till 30.6.2016. Diagnostic as well as screening mammograms were included. However, patients with diagnosed breast cancer who were already undergoing treatment were excluded from the study. The density was assessed subjectively using the BIRADS system (latest edition). The mammograms were performed using HOLOGIC I IV unit and digitized by AGFA DXM CR system using needle based IP plates. In case of diagnostic studies, density was assessed using normal contralateral side. Women having C or D density category were labeled as having dense breasts.

**RESULTS:** Even though we evaluated both diagnostic and screening mammograms, the percentage of women with dense breasts was only 18.75%. When only screening mammograms were considered, the percentage of dense breasts dropped to 5.3%. Surprisingly the percentage of dense breasts in newly diagnosed breast cancer patient was also only 6.1%.

**CONCLUSION:** The number of mammograms selected for assessing breast densities in this study is very small. However, it gives a rough idea that prevalence of dense breasts in our region is very low as compared to USA and it is even lower in newly diagnosed breast cancer patients. Thus breast density doesn't seem to be a major risk factor or a limiting factor for mass screening in our part of the world.

**O-103****Impact of radiological guidance on breast interventions**

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Breast imaging is a well-established entity in the diagnosis and management of breast diseases including ultrasound and stereotactic biopsies, clip placements, aspirations and follow-up, with new and upcoming innovations decreasing the morbidity and mortality related to breast cancer.

Breast imaging which is most commonly practiced includes mammography, ultrasound, magnetic resonance imaging and interventional procedures commonly with ultrasound and stereotactic guidance. The range of approaches to perform breast intervention on imaging has also increased markedly from early 90s with hi-technological radiological methods. The image guided percutaneous breast biopsy procedures cause minimal breast damage resulting less scar formation, save management time with quick recovery and relieve the patients of the anxiety of operation room. The aim of this short talk is to describe the different image guided breast intervention techniques dealing with indications, contraindications and related complications.

**O-104****Ultrasound evaluation of breast disease during pregnancy and lactation**

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**BACKGROUND:** Ultrasonographic evaluation of breast is the foremost and appropriate radiological method to evaluate breast disorders in women during pregnancy and lactation.

**PURPOSE:** The aim of this article was to review different breast pathologies occurring in women during pregnancy and lactation.

**METHODS:** A prospective study of one year was done in Dr. Ziauddin University Hospital Karachi. Pregnant or / and lactating females who came for ultrasound breast examination with complain of pain, lump or discharge were included in study. Patients with previous history of incision and drainage, already diagnosed or on medical treatment were excluded from study.

**RESULTS:** During study period, a total of 94 patients with an age range of 17- 42 years were included of them 78.7% were lactating and 21.27% pregnant. Right breast was most commonly involved 58.51% than left 41.48%. Most common complaint was mastalgia 85.1% and most lesions were located in upper outer quadrant. Ultrasound revealed benign breast diseases in 67.02%, of them most were infective / inflammatory accounting for 55.31%. Malignancy was detected in 7.44% and 25.53% showed no sonographic abnormality. Breast abscess was the most common breast disease found 25.53% and were more common in lactating 70.83% than pregnant females 29.16%. 9 breast abscesses, 2 galactoceles underwent aspiration, mastitis and infected sebaceous cysts were managed conservatively. Trucut needle biopsy done in 6 and FNAC in 2 patients for suspicious looking lesions.

**CONCLUSION:** Ultrasound is useful in early detection however, diagnosis is challenging due to physiological changes secondary to hormonal stimulation.

**O-105****Dynamic Contrast enhanced MR manifestations of inflammatory breast cancer**

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**PURPOSE:** We aimed to investigate the MR imaging features of inflammatory breast cancer in order to instruct clinical practice and make differential diagnosis.

**METHODS:** Eighteen cases confirmed by pathology were retrospectively reviewed and the MR imaging features, including conventional MR features, morphology, kinetics of each case were recorded.

**RESULTS:** Eighteen patients had breast erythema and edema. Except one negative case, eleven demonstrated mass-like enhancement among which eight showed irregular, speculated or lobulated margins, six demonstrated nonmass-like enhancement; eleven showed multiplicity and six showed a single lesion. Among the multiplicity cases, five exhibited several grouped patchy or (micro) nodular enhanced lesions, three of which showed linear enhanced connections between some enhanced lesions. As for kinetics, type one curve was obtained in three cases, type two in eight cases and type three in six cases. On MIP images, increased vascularity was detected in six cases.

**CONCLUSION:** Dynamic contrast enhanced MRI is valuable in the diagnosis of inflammatory breast cancer, mostly manifesting as irregular or spiculated mass-like enhancement lesions. The sign of grouped enhanced lesions is highly characteristic.

**SESSION XIV: GIT (2)****O-106****Diagnostic accuracy of magnetic resonance imaging in perianal fistula**

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**BACKGROUND:** Perianal fistula is an inflammatory condition that affects the region around the anal canal, causing significant morbidity. Fistula in Ano affects approximately ten individuals in 100,000. Magnetic resonance (MR) imaging now provides more precise information on the anatomy of the anal canal, the anal sphincter complex, and the relationships of the fistula to the pelvic floor structures and the plane of the levator ani muscle. MR imaging allows precise definition of the fistulous track and identification of secondary fistulas or abscesses. It provides accurate information for appropriate surgical treatment, decreasing the incidence of recurrence. Radiologists should be familiar with the anatomic and pathologic findings of perianal fistulas and classify them using the St James's University Hospital MR imaging-based grading system.

**OBJECTIVE:** To determine the sensitivity of MRI in pre-operative evaluation of fistula in Ano. **METHODS:** A Cross sectional study was conducted in Radiology department of Khyber Teaching Hospital, Peshawar from June, 2014 to June 2016. A total of 50 patients from Radiology department with symptomatic fistula in ano referred for MRI pelvis and were meeting inclusion criteria were included in the study. Informed consent was taken for MRI pelvis. All patients had body-coil MR Imaging examinations including the following sequences for anatomic and pathologic information: T2 sagittal, T1 axial oblique, T2 axial oblique, oblique axial and oblique coronal fat suppressed T1 with gadolinium based contrast medium. Surgical findings were accepted as the gold standard. MRI findings were compared with surgical findings using Park's classification. The data were entered and analysed in to SPSS (version 21).

**RESULTS:** In our study of 50 patients 44 patients were reported to have correct MRI assessment (88%). The sensitivity, specificity, positive predictive value, negative predictive value and accuracy were 91.6%, 85.7%, 97.7%, 60% and 90.9% respectively. 35 (80%) cases had intersphincteric primary tract and 9 (20%) patients had trans sphincteric primary tract. Primary tracts were correctly identified in all patients. In 40 out of 44 patients internal opening were identified while remaining 4 patients showed diffuse trans mural signal abnormality. In 35 patients (80%) external opening were correctly identified. 26 patients (60%) had low fistula in Ano, 11 (26%) had high anal fistula and in 3 (6%) patients low rectal fistula was identified. 4 patients had complex fistula.

**CONCLUSION:** MR imaging provides precise definition of the fistulous track, along with its relationship to pelvic structures, and allows identification of secondary fistulas or abscesses. Accordingly, MR imaging provides accurate information for appropriate surgical treatment, decreasing the incidence of recurrence and allowing side effects such as fecal incontinence to be avoided.

**O-107****Defecating Proctography**

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Defecating Proctography, also referred to as evacuation proctography or voiding proctography, is established as a particularly useful fluoroscopic examination for patients with defecation abnormalities. It enables a functional, real-time assessment of the defecation mechanics in a physiologic setting. Structural and functional alterations can be observed and include rectocele, internal rectal intussusception, external rectal prolapse, enterocele and pelvic floor dysfunction or dyssynergia.

**O-108****Post esophagectomy anastomotic leakage- early radiological detection and outcomes**

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**BACKGROUND:** Esophagectomy is the common method of esophageal carcinoma treatment and various surgical technique options which have early complication of anastomotic leakage which changes outcome of the procedure and affects prognosis. Fluoroscopic examination is first study to look for leakage which can be complemented by immediate CT if necessary. It's not uncommon to witness some degree of aspiration in patients performing barium studies.

**MATERIALS AND METHODS:** The aim was to look for frequency of anastomotic leak and check sensitivity of radiological procedures in early postoperative period. We retrospectively reviewed the electronic records of patients who underwent esophagectomy over a period of 6 months from 01 January 2016 to 30 June 2016 and data was analyzed on SPSS.

**RESULTS:** Out of total 108 patients 68(63%) were female and 40(37%) were male. Age range was between 35 to 72 years. All these patients underwent post esophagectomy imaging during 1st postoperative week to rule out anastomotic leakage. Total 13(12%) patients out of 108 showed evidence of anastomotic leakage on contrast swallow examination which was subsequently confirmed on CT scan. 3(2.7%) patients had contrast leakage picked on CT only and was missed on swallow procedure. 6(5.5%) patients had frank aspiration during swallow.

**CONCLUSION:** Anastomotic leaks can be detected confidently during early postoperative period of esophagogastrectomy by radiological investigations thus helping in decision for surgical intervention.

**O-109****LI-RADS (Liver Imaging Reporting and Data System): A new standardized way of evaluation of liver lesions in cirrhotic patients: an educational exhibit**

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Cirrhosis of liver is a common cause of fatality in developing countries. It is very much prevalent in Pakistan because of the relative higher frequency of chronic viral hepatitis B or C. Cirrhosis is an end stage disease that leads to hepatocellular carcinoma (HCC). Imaging plays a pivotal role in diagnosing the complication of cirrhosis e.g. HCC. To develop standardization and concordance regarding performance, interpreting, and reporting computed tomography (CT) and magnetic resonance imaging (MRI) examinations of the liver in high risk patients for hepatocellular carcinoma (HCC), a system was launched by ACR in March 2011 as LI-RADS (Liver Imaging Reporting and Data System). It is adopted by many clinical practices throughout the world. The purpose of this educational exhibit/ invited talk is to spread knowledge about this system.

**O-110****Biphasic CT with mesenteric angiography in the evaluation of acute mesenteric ischemia**

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**PURPOSE:** To assess the role of biphasic computed tomography (CT) with mesenteric CT angiography in the diagnosis of acute mesenteric ischemia (AMI).

**MATERIALS AND METHODS:** 50 patients with clinically suspected acute abdomen underwent imaging with biphasic multidetector CT. Mesenteric CT angiography was performed starting 25 seconds after 140 mL of intravenous contrast agent was administered, followed by portal venous phase imaging with a 60–70 second delay. CT angiograms were reconstructed with multiplanar, maximum intensity projection, and volume-rendered techniques. All scans were evaluated prospectively by two independent radiologists for CT evidence of Superior mesenteric arterial or venous thrombosis and bowel ischemia. Acute bowel ischemia was confirmed with surgical proof in 10 patients.

**RESULTS:** The CT angiogram depicted arterial disease in 10 patients and venous disease in 20. 20 patients had normal angiograms. A finding of any one of pneumatosis intestinalis, venous gas, superior mesenteric artery occlusion, celiac and inferior mesenteric artery occlusion with distal SMA disease, or arterial embolism was 100% specific. Alternatively, a finding of bowel wall thickening in addition to focal lack of bowel wall enhancement or solid organ infarction was indicator of impending ischemia.

**CONCLUSION:** We conclude from our results that venous thrombosis was more common cause for bowel ischemia. Biphasic CT with mesenteric CT angiography is effective in the diagnosis of acute mesenteric ischemia. This study has to be done in a larger number of patients and at a larger scale including different centers.

## O-111

### The imaging diagnosis of small hepatocellular carcinoma (HCC)

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**PURPOSE:** To introduce the manifestations of sHCC in CT and MRI, to improve the early diagnosis level of sHCC, and the patients suffered from sHCC will can be treated on timely.

**MATERIALS AND METHODS:** To collect the data of the patients suffered from sHCC which performed by pathology, to study the lesions' characters in CT and MR imaging, especially the contrast scanning imaging. To study the differential diagnosis points from the FNH, hemangioma, cholangiocarcinoma, inflammatory granuloma, and so on.

**RESULTS:** The most patients with sHCC suffered from hepatitis, cirrhosis, based on this conditions, developed into regenerative nodule, dysplastic nodule (low and high grade), dysplastic nodule with sub-focus of HCC, and sHCC. Following the pathological changes, the tumors vessels generated, the blood supply of the nodular by portal vein changed into liver artery, this is the foundation of imaging diagnosis. Only small part of patients have no hepatitis or cirrhosis. Plain CT or MRI scanning always cannot evaluate the lesions' character. The most sHCC lesions is hypervascular. In contrast scanning, the lesion was enhanced. Its typical characters was wash in and wash out quickly. On MRI, sHCC have three types manifestation: 1) low intensity in T1WI, hyper intensity in arterial phase, and low intensity in venous phase; 2) low intensity in T1WI, hyper intensity in arterial phase, and iso-intensity in venous phase; 3) iso-intensity in T1WI, hyper intensity in arterial phase, and low intensity in venous phase.

**CONCLUSION:** MRI is superior to CT in showing the sHCC. Promovist is one of the specific contrast medium, on HB phase, sHCC is low intensity, the lesion was showed very clearly, can increase our diagnosis confidence.

## O-112

### Significance of Doppler ultrasound in assessment of complications following living donor liver transplant

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**PURPOSE:** Early detection of postoperative complications is of utmost importance following living donor liver transplant. Doppler ultrasound has been the modality of choice for evaluation of immediate postoperative vascular complications since it is easily available and non-invasive. The purpose of this study is to determine its accuracy keeping post IV contrast multiphase CT as gold standard.

**MATERIALS AND METHODS:** As per hospital protocol, liver Doppler ultrasound was done for first five consecutive post-operative days following living donor liver transplant. Additional scans were performed whenever complications were clinically suspected. There were 7 cases in which CT scan was done following a Doppler ultrasound that reported a vascular complication. The CT scan was done using multidetector row scanner on a multiphase liver dynamic protocol including non-contrast, arterial phase, venous phase and delayed phase image acquisition. Findings were then interpreted by consultant radiologists.

**RESULTS:** Doppler ultrasound revealed sluggish, low velocity flow in hepatic artery with tardus parvus pattern in one patient, no flow in hepatic artery in one patient, portal vein thrombus in one patient, poor flow in middle hepatic vein in 2 patients and no flow in a hepatic venous graft in one patient. The CT scan confirmed hepatic artery thrombosis in first 2 patients, portal vein thrombus in the third case, middle hepatic vein and venous graft thrombosis in the other 3 patients respectively. One case was false positive, attributed to patient obesity and technical difficulty in acquiring a satisfactory Doppler signal.

**CONCLUSION:** Doppler ultrasound has a good sensitivity and specificity in evaluation of complications following living donor liver transplant.

## O-113

### Outcome of Cohort of 160 patient with HCC

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## O-114

### Diagnostic accuracy of MR cholangiopancreatography for the evaluation of postoperative biliary complications in living donor liver transplant recipients

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**PURPOSE:** To determine the accuracy of magnetic resonance cholangiopancreatography (MRCP) for diagnosis of post-operative biliary complications in living donor liver transplant recipients taking endoscopic retrograde cholangiopancreatography (ERCP) or percutaneous cholangioram (PTC) as gold standard.

**MATERIALS AND METHODS:** From January 2013 to September 2016, 355 consecutive patients underwent living donor liver transplant. MRCP was performed on 84 of these recipients (10 females and 74 males; mean age 46.8 years). In all patients MRCP was performed on a 1.5-T whole-body magnet and breath hold half-Fourier acquired single-shot turbo spin echo and rapid acquisition with relaxation enhancement sequences were used. MRCPs were retrospectively reviewed on picture archiving communication system and

independently interpreted by two radiologists for detection of biliary complications (i.e., biliary dilatation, stricture, stones and leak). Diagnostic confirmation was obtained with PTC (n = 48 patients) and ERCP (n = 15 patients). Remaining twenty patients were excluded from statistical analysis because confirmatory ERCP or PTC was not performed in these patients.

**RESULTS:** Incidence of biliary complications was 18 %. The most common biliary complication was anastomotic site stricture (90.47 %), followed by biliary leak (3.17 %), non-anastomotic strictures (3.17 %), vanishing bile duct syndrome (1.58 %) and sclerosing cholangitis (1.58 %). The sensitivity, specificity, accuracy, positive predictive value, and negative predictive value of MRCP for detection of biliary complications was 96.8%, 66 %, 97%, 96.8% and 100 % respectively. Complete inter-observer agreement occurred in the detection of biliary complications with K=1.

**CONCLUSION:** Magnetic resonance cholangiography is an accurate and non-invasive imaging modality in the evaluation of post-living donor liver transplant recipients.

### O-115

#### Role of radiology in early detection and staging of HCC

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Chronic liver disease is one of the commonest chronic infective disorder in Pakistan causing an exponential increasing burden on medical resources and facilities. According to various studies, about 10 million Pakistanis are infected with Hepatitis C virus. Hepatocellular carcinoma is a major cause of morbidity and mortality in health care settings of Pakistan on background of hepatic cirrhosis. It is thus imperative that an early detection and accurate staging of hepatocellular carcinoma is done and for this role of radiology is pivotal. This presentation will provide a guideline for Radiological screening in chronic liver disease and discuss characteristic imaging features of hepatocellular carcinoma on various radiological modalities. Latest modern imaging tools and emerging new specific contrast media for early detection and accurate diagnosis of hepatocellular carcinoma will also be highlighted.

### O-116

#### Peritoneal Tuberculosis versus Carcinomatosis on contrast enhanced CT abdomen taking omental biopsy as a gold standard

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**OBJECTIVE:** To differentiate peritoneal tuberculosis from carcinomatosis on CT abdomen taking omental biopsy as a gold standard.

**MATERIALS AND METHODS:** A retrospective cross sectional review of cases at a tertiary care institution was done, from February 2007 to February 2016. We reviewed patient's medical record files and compared CT scan findings to the diagnosis made on histopathology. We, then, did a multiple logistic regression analysis and applied the Pearson chi square to test for sensitivity and specificity.

**RESULTS:** A total of 102 patients were identified with abdominal disease and finally 98 patients were included. Out of these, 62 came out to be disseminated TB and 36 were diagnosed as malignant on histopathology. CT features were significantly specific to differentiate abdominal TB from carcinomatosis (P=0.004). 4 findings on a CT showed statistical significance: Smooth thickening of the peritoneum (P<0.001), abdominal mass (P=0.03), lymph node necrosis

(P=0.024) and high density ascetic fluid (P<0.001). Out of these, smooth thickening of the peritoneum (Sensitivity=77% and specificity=86.1%) and high density ascetic fluid (Sensitivity=68.9% and specificity=72.2%) were the best findings. Overall, CT scan had a sensitivity and specificity of 88.5 and 83.3, respectively.

**CONCLUSION:** Although no single finding on a CT scan is diagnostic of peritoneal TB, a combination of findings can reliably distinguish between peritoneal TB and carcinomatosis.

### SESSION XV: Radiosurgery

#### O-117

#### Introduction to the stereotactic radiosurgery, history, indications, selection and useful information

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The technique of Stereotaxy is in practice since 1905 amongst the neurosurgeons. The term Stereotactic Radiosurgery (SRS) was coined by the well known Swedish neurosurgeon "Lars Leksell" from Karolinska University Sweden during 1950. He developed the idea of delivering high dose of ablative radiation with stereotactic technique to the specific target to get radiobiologic responses. Since then this technique has been the part and parcel of practice in radiation Oncology as well as Neurosurgery.

In Pakistan first radiosurgery setup was started in May 2008, when gamma knife and Synergy-S two dedicated tools for radiosurgery were commissioned at Neurospinal Cancer Care Institute (formerly known as Neurospinal & Medical Institute) Karachi. Later in December 2012, cyberknife was placed at Jinnah Postgraduate Medical center.

There is need to spread the words about the indications of SRS, selection of patients and its trend towards extra cranial applications as SBRT/ multisession SRS.

This talk is specially designed to introduce the basics of Stereotactic Radiosurgery in terms of its definition, indications, selection criteria and any other associated useful information in Pakistan.

### O-118

#### Operational review of Cyberknife Robotic Radiosurgery and Importance of QA (Quality Assurance) at Cyberknife Robotic Radiosurgery

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**INTRODUCTION:** The Cyberknife is a complex, emerging image guided radiosurgical system. It uses a compact X-band 6-MV linear accelerator mounted on a robotic arm to deliver radiosurgical dose. In its clinical application and quality assurance (QA) approach, the Cyberknife is currently situated somewhere in between stereotactic radiosurgery and radiotherapy. The clinical QA for this image guided treatment delivery system typically follows the vendor's guidance. The tools and techniques for QA of the Cyberknife are under development and will continue to improve with longer clinical experience of the users. The goal of this talk is to discuss the importance of QA at Cyberknife Robotic radiosurgery system.

**OBJECTIVE:** To determine importance of QA at Cyberknife.

**METHOD:** QA procedures recommended by vendor and by experience was performed. E2e test, AQA test, Daily Output, Field size vs Radiation, Image Orientation were done at specific frequency.

**RESULT:** Results were stored in ms office excel files and there were no major difference except some time after PM , In case tests were repeated after problem fixing.

**CONCLUSIONS:** QA is a main part of treatment especially in Radiosurgery where we are dealing with small field size and less number of sessions with no chance of error. QA must be done on regularly basis. And must be done after every up gradation or change in system.

### O-119

#### **Stereotactic radiosurgery (SRS) and stereotactic body radiotherapy (SBRT)- Operational review of SYNERGY-5**

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**PURPOSE:** Stereotactic Radiosurgery (SRS) is a non-surgical radiation therapy used to treat functional abnormalities and small tumors of the brain. It can deliver precisely-targeted radiation in fewer high-dose treatments than traditional therapy, which can help preserve healthy tissue. When SRS is used to treat body tumors, it's called stereotactic body radiotherapy (SBRT). SRS delivers precisely-targeted radiation at much higher doses, in only a single or few treatments, as compared to traditional radiation therapy. This treatment is only possible due to the development of highly advanced radiation technologies that permit maximum dose delivery within the target while minimizing dose to the surrounding healthy tissue. NCCI have such kind of machines and we have treated a lot of patients with very good results.

**MATERIALS AND METHODS:** For the treatments of patients we used three-dimensional imaging(CT, MRI, PET-CT etc) and localization techniques(EPID, XVI) that determine the exact coordinates of the target within the body, systems to immobilize and maintain the patient position during therapy, highly focused gamma-ray or x-ray beams that converge on a tumor or abnormality.

**RESULT:** Twenty patients were selected. Ten patients treated on LINAC (synergy-s) and ten on Gamma Knife during 15/08/12 to 20/01/13. We get the very good result and tumore size reduced after treatments.

**CONCLUSION:** SRS is a non-surgical procedure that delivers precisely-targeted radiation at much higher doses, in only a single or few treatments, as compared to traditional radiation therapy to treat brain tumors. SBRT are now being applied to the treat the body tumors.

### O-120

#### **Volumetric modulated arc therapy (VMAT) vs. forward intensity modulated arc therapy (FIMRT) of head and neck cancer: a single institutional comparison**

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**OBJECTIVE:** To compare the radiotherapy treatment planning for head and neck cancer of two advanced techniques i.e. VMAT(volumetric Modulated Arc Therapy) and F-IMRT (Forward Intensity Modulated Radiation Therapy) to improve the treatment and verification efficiency and also to improve patient comfort.

**METHODS:** More than Eighty patients of head and neck cancer re-planned by VMAT and FIMRT were studied retrospectively. VMAT plans were made using Ergo++ Planning system and FIMRT plans were made by Precise Planning system. Dose rat varies in VMAT while in FIMRT; a beam is divided into

several beamlets. The VMAT and FIMRT plans were evaluated for homogeneity and conformity of radiation dose to the targets, dose to the organs at risk and the time spent for these techniques.

**RESULTS:** Both treatment planning techniques showed better target coverage and better sparing of organs at risk. The 95% of the tumor was receiving 95%-105% of the prescribed dose. Compared to FIMRT, VMAT showed reduction in beam delivery time by 35% to 45%.

**CONCLUSION:** Compared to FIMRT plans, VMAT was able to reduce treatment time by 35% to 45%. However there was no significant difference in radiation dose to the tumor and organs at risk.

### O-121

#### **Quality assurance tools for basic and advance radiotherapy**

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### O-122

#### **PET based radiosurgery benefits; post radiation necrosis vs residual disease**

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The development of radiological imaging techniques for the evaluation of recurrence brain tumors has progress significantly in recent year. Two modalities that play crucial role in the evaluation of brain tumor recurrence VS radiation necrosis are C.T Scan and MRI (including Diffusion weighted image and MR Spectroscopy).

Despite the new digital radiological technique examination algorithm of brain tumor is inconclusive. In few years' time there is another modality PET CT Scan yield a better technique which provide more detailed characteristics and information.

FDG PET seems to be a valuable diagnostic tool. Imaging challenges to distinguish between recurrent tumor and treatment induce changes such as radiation necrosis.

### O-123

#### **Role of cyberknife robotic radiosurgery inhepatocellular carcinoma: an initial experience**

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**OBJECTIVE:** To study the efficacy of CyberKnife stereotactic body radiotherapy for hepatocellular carcinoma (HCC).

**METHODS:** A total of eight patients with HCC were treated with CyberKnife Radiosurgery in Cyberknife Robotic Radiosurgery Dept. Jinnah Poatgraduate Medical Center Karachi from December 2012 to 2015. Sterotactic Radiosurgery is a technique that delivers high doses of radiation in a single treatment or in a small number of fractions with high precision, thereby minimizing doses to adjacent normal tissues. The mean age of the patients was 50 + 1.4 years, and Male to female ratio was 3 : 1. Treatment response was assessed every three



months with Triphasic CT scan and Serum Alphafetoprotein after Cyber Knife Stereotactic body Radiotherapy.

**RESULTS:** The median follow up was 10 months. A reduction in tumor size and alphafetoprotein seen in 6 lesions, stable disease was noted in 1 lesion, and disease progression in 1 lesion but at the distant site. No Complications were observed in any of the treated patients.

**CONCLUSION:** Cyber Knife Stereotactic body Radiotherapy is a new and promising form of noninvasive feasible treatment modality with minimal side effects in hepatocellular carcinoma (HCC). Small tumors showing good results, though few larger tumors have been successfully treated as well.

### O-124

#### Radiosurgery for oligometastases

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### O-125

#### Cyberknife Robotic Radiosurgery is an emerging treatment approach for organ confined prostate cancer

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**PURPOSE:** Hypofractionated radiotherapy has an intrinsically different normal tissue and tumor radiobiology. The results of single institutions of stereotactic body radiotherapy (SBRT) for prostate cancer with two year toxicity and tumor control rates are presented, along with data of patients treated at our center.

**METHODS AND MATERIALS:** Almost one thousand patients are treated in six different institutes with clinically localized low, intermediate & high-risk prostate cancer. Cyberknife delivers highly accurate high dose of radiation to irregular shaped tumors by non isocentric, non coplanar beams. Highly compact, lightweight 6MV linear accelerator mounted on KUKA robot which gives 6 degrees of freedom enabling the linear accelerator to aim the target from more than 1300 different angles & real time image guidance system which is based on cruise missile technology that continuously tracks moving target during entire treatment. Treatment consisted of 36.25 Gy in majority of patients in 5 fractions. Minimally invasive Gold markers or fiducials are inserted in prostate for tumor tracking. Hormone therapy was given to only high risk group. Patient self-reported bladder, rectal & sexual potency toxicities.

**RESULTS:** Median follow-up was more than 2 years. PSA relapse free survival along with toxicities involving bladder, rectum & sexual potency are presented, PSA relapse free survival was more than 94%. There are very low grade 3 & 4 toxicities observed with Cyberknife treatment.

**CONCLUSION:** PSA relapse-free survival compares favorably with other definitive treatments. Significant bladder and rectal toxicities from SBRT for prostate cancer are infrequent. The current evidence supports consideration of stereotactic body radiotherapy among the therapeutic options for localized prostate cancer

### O-126

#### Five Fractions Stereotactic Radiosurgery (SRS) for Intracranial Meningiomas

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**OBJECTIVE:** To describe the efficacy and toxicity of the five fraction stereotactic radiosurgery (SRS) for intracranial meningiomas.

**HISTORY:** Effectiveness of conventional adjuvant EBRT, affront Single session gamma knife radiosurgery and moderately hypo fractionated radiotherapy for intracranial meningiomas are well studied and proven to have good local controls with minimum side effects.

Five fractions hypo-fractionated radiotherapy (multisession SRS) was used for relatively large tumors and for those closely lying with critical organs and not suitable for gamma knife single session radiosurgery. This schedule might be of benefit equivalent to single session and the protection of critical organ and toxicity of irradiation to large volumes can be minimized. The reason to choose the five fractions is the evidence of good local control and safety of critical organs.

**METHODS:** From 01.01.10 to 30.06.16, 1220 patients were treated on Synergy-S (Linac based radiosurgery system). 100 patients of intracranial meningiomas (including recurrent) were treated with 5 fractions radiosurgery. 40% were male and 60% were female patients. Mean age was 41.74 years (range: 18-67 years). Patients were followed up at 6 weeks, 3 months and then 6 months till 5 years time. Mean volume (PTV) was 46.87 cc (range: 2.20-90.20cc). Prescription dose 2500 cGy was used in five fractions at 500 cGy/day. Mean prescription Isodose line was 80 % (range: 65-100%). Median Maximum Dose was 3119 cGy (range: 2442- 4284 cGy). Median Mean dose was 3070 cGy (range: 2251-3592 cGy). Median Minimum dose was 2321 cGy (range: 1909-2950 cGy). Review of literature by using Pubmed, Medscape and Pubmed Central was carried out to establish the safety and efficacy of 5 fractions SRS.

**RESULTS:** Clinical Improvement was seen in about 90 % of the patients, radiologically most of the tumors were stable around 70 %, 10 % had small residual disease while 10% progressed from original size at about 18 months after SRS. 10% patients were lost to follow-up. Treatment was well tolerated. No acute toxicity was observed, while use of steroids was prolonged in about 10 % of the patients mean duration was 3 months (range 1-6 months).

**CONCLUSION:** This retrospective study revealed high local tumor control rate and minimal toxicity of five fractions radiosurgery for intracranial meningiomas. Further larger studies required to establish its future use.

### SESSION XVI: Interactive Session

Nadeem Ahmad

### SESSION XVII: Radiation Medical Physics Seminar O-127

#### An overview of Radiation Medical Physics in Pakistan

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This paper describes how the field of medical physics evolved in Pakistan. The aim is to show the young medical physicists, radiation oncologists and radiologists about the physicists who kept the foundation of medical physics in the early days of history of Pakistan. The timeline of the establishment of radiotherapy and nuclear medicine centres in the country and the gradual improvement in the education and working environment. Gradual increase in use of newer technology in the field of medical physics, radiation oncology, diagnostic radiology and nuclear medicine is also presented.

**O-128****Photon boost after lumpectomy in breast cancer and acute toxicities in NwGH & RC**

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**PURPOSE:** One of the common methods in radiation therapy of Breast cancer is whole breast irradiation followed by tumor cavity boost (TCB) with electron therapy. The tumor cavity boost following Whole Breast Irradiation (WBI) is well-defined and there are numerous delivery methods of radiation therapy. In our institution we don't have the facility of electron, so our study comprised of experiencing the TCB with photons. Although photon boosts have been discouraged because of excess normal tissue toxicity. In our study we have analyzed acute skin reactions and lung doses for the level at 2Gy.

**METHODS:** Patients (n=19) of post-lumpectomy breast cancer for both left and right sided node negative were scanned for this study. Mean age for the patients was 47 year. All women were planned for 50 Gy for the whole breast irradiation via tangents followed by TCB irradiation of 10 Gy with standard fractionation. Contouring of breast, cavity, lungs and heart were done in all the cases. Mean volume of breast and cavity were 1000 cm<sup>3</sup> and 60 cm<sup>3</sup> respectively. These patients were observed for skin toxicity during radiotherapy as per RTOG skin toxicity criteria.

**RESULTS:** The mean lung volume receiving 2 Gy was 27cm<sup>3</sup> and V20 for lung is 10% volume for 60 Gy plan. Out of total 19 patients, 75 % patients had grade-II skin reaction at treatment completion and 25 % patients had grade-I skin reaction. Mean heart dose for 60 Gy plans were 100 cGy. While dosimetric analysis it has been found that conformality, dose homogeneity index (DHI) and Tumor cavity coverage was significantly covering up to 95%.

**CONCLUSION:** Although electrons can be used for TCB but in our centre electron beam therapy is not available and TCB is done with photon beam following the tangential beams. In the adjuvant treatment of breast cancer therapy, whole breast radiation followed by conformal photon boost seems to be acceptable in focus of the skin toxicity, TCB dose distribution and OAR less excessive doses.

**O-129****Clinical Implementation of Total Skin Electron Irradiation: AKU Experience**

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**PURPOSE:** To commission and implement the Total Skin Electron Irradiation technique using 6 dual beams Stanford Technique at AKUH-Karachi.

**METHODS AND MATERIAL:** The basic dosimetric parameters consists of depth dose curve, beam profile and beam output were measured with 6 dual beams in treatment position on Varian 2100C clinic with 6 MeV, 36x36 cm<sup>2</sup> field size at collimator in HDTSe mode at a SSD of 350 cm with 3 mm beam degrader employed at collimator level. The data were acquired using PTW Farmer and Markus chambers using 30 cm dia cylindrical water phantom and solid water phantom.

**RESULTS:** The most uniform vertical profile was found out to be at gantry angulation of  $\pm 210$  above and below horizontal axis within 10% of the prescribed dose. The depth dose curve shows that the beam penetration is such that the 80% depth dose lies b/w 8-10 mm and the 50% depth dose lies 15-18 mm. The bremsstrahlung contamination is about 2% of the total body. Dose rate found out to be 0.3571 cGy/MU at machine dose rate of 888 MU/Min measured at 3 mm clinical depth with 6 dual beams measured in 30 cm water phantom using Markus Chamber.

**CONCLUSION:** The TSEI technique using six dual beam successfully commissioned. The technique found out to produce uniform dose distribution at the whole patient's surface within 10% of the prescribed dose. The clinical uniform patient irradiation requires considering special precautionary measure for the self-shielding areas and with high difference in curvatures.

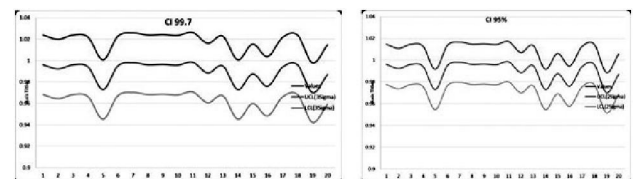
**O-130****Dose Verification of Simultaneous Integrated Boost (SIB) Intensity Modulated Radiotherapy (IMRT) in Head & Neck Cancers Using IMRT Matrix**

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**BACKGROUND & OBJECTIVES:** Before radiation treatment, through verification of planned radiation dose is a pre-requisite of IMRT due to its complexity. Procedures with simultaneous integrated boost-intensity modulated radiotherapy (SIB-IMRT) plans for head & neck cancers may be associated with some limitations and errors which may occur during pre-treatment checks and may be detected and corrected using 2D Array/IMRT Matrix detectors. Quality checks are therefore mandatory, and the current study reveals if these tests are in place, and consistent with International practices. The primary aim of our study is to calculate variation of gamma index (GI) and coefficient factor (CF) during pre-treatment verification.

**MATERIAL & METHODS:** We created SIB-IMRT head & neck plans on 20 patients using Eclipse treatment planning system (TPS) with X6 MV photons. Each plan was optimized and calculated using inverse planning algorithm (DVO) and AAA algorithm (v13.5) respectively. The plan acceptance criteria were 95% of the planning tumor volume (PTV) to receive at least 95% of prescribed dose. After plan acceptance corresponding pre-treatment verification QA plane were generated in Eclipse TPS (v13.5) and calculated using the same AAA. The QA plan setup were at 95 cm SSD, 5cm depth and collimator and gentry' angle were set to "0." QA Procedure for IMRT was executed by IMRT matrix having 7 mm resolution. The Gamma index (GI), CF and standard deviation results of each plan were recorded. The GI evaluates the concurrence of 2D dose distributions using the criteria of 3% dose difference (DD) and 3 mm distance to agreement (DTA). If the value is <1, the criteria values are not exceeded, and if the value is >1, the result lies outside the tolerance range. The analysis was made using gamma evaluation method to compare measured and calculated dose distribution.

**RESULTS:** We calculated the mean and standard deviations (SD) for each passing criteria for 3% DD, 3 mm DTA for each SIB H&N IMRT plan, with 1 mm interpolation method for IMRT Matrix. The gamma evaluation criteria were 3% and 3 mm and QA data is being presented in graphical form and gamma index is presented in standard deviation with 99% CI. The coefficient factor mode and median were 0.99 each, mean was 0.989 (SD 0.009; 99%CI 0.984-0.995) and the range was 0.97 to 0.9985 (0.028).



**CONCLUSION:** The present departmental results suggest, the gamma criteria of 3% DD and 3 mm DTA, CF and SD of  $\pm 3$  % criteria, as the most suitable criteria for H& N SIB IMRT QA using IMRT Matrix, and we have achieved the 99% passing results. We found SIB-IMRT head & neck treatment plans quality checks within range and meeting International tolerance and acceptance levels.

**O-131****Evaluation of patient specific IMRT QA using portal dosimetry**

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Radiation Treatment planning is no exception to the above mentioned dictums. Transition of planning concepts from 2-D towards 3-D, Intensity Modulation, Guided imaging, Gating, Stereotactic, Tomo-slicing, etc, the list is long and getting longer as the days go by. Our craft remains the same and that is orthogonal 2-D planning with visualization of structures via simple lead markers, barium, coins placed on surface, etc. No building can be built without a foundation. Our foundation remained conventional simulation for decades. Now we are using more precise conformal planning systems which will prove more beneficial for our patients.

**O-132****Optimization of beam lets and smoothing of beam profile in step and shoot IMRT**

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Discussion on each step of planning is imperative in order to achieve best outcomes of radiation treatment.

KonRad is an inverse planning software for IMRT. Konrad utilizes patient datasets generated by virtual simulation. The system performs inverse planning and leaf sequencing, producing plan files containing leaf sequences for each beam angle. The quantity optimized is an intensity map for each beam direction, comprised of beamlets that are typically square and of side length equal to the width of a MLC leaf. Although the optimization is performed in terms of continuous intensity maps and resulting doses then translated into beam segments using leaf sequence file. No. of beam segments can be varied by intensity level options from  $N=1$  to  $N=15$ . The second parameter that can be set in leaf sequence interface is the option for profile smoothing. This feature aims at reducing the number of segments via smoothing the maps, having the effect of allowing larger field segments because of the larger regions of similar intensity. During this project 3 patients with different types of cancer in which one of Head and Neck, one Abdomen and one of Pelvis region are selected. Patient's plans are optimized and then segmentation is turned on, by varying intensity and smoothing levels all possible leaf sequence files are generated. The combinations of intensity levels and smoothing levels effected the dose coverage to target and OARs. Doses to target volumes and critical organs at risks OARs are noted. By studying the results for head and neck case it is concluded that set of parameters (5, 7) providing well optimized plan and also with doses to OARs at lower ranges. This set produced well optimized deliverable plan with 76 segments and homogeneity 0.10629. By studying results of abdomen case, it is concluded that (5, 10) is best set of combination of intensity and smoothing level providing 76 segments and homogeneity 0.088462. Pelvis results shows (3, 7) as best set of parameters with 64 numbers of segments and homogeneity 0.113269. Although other set of parameters produced homogeneity close to 0.1 or even less, but these plans have higher number of segments. For head and neck case (5, 7), for abdomen (5, 10), and for pelvis (3, 7) provided least possible beam segments that will reduce treatment time of the machine and increase throughput of the machine and propagation of geometrical errors. It is suggested that for using Konrad these set of parameters defined as templates and used as framework.

**O-133****Compatible professional growth of all three disciplines of radiation oncology**

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Radiation Treatment Planning is an evolving science. Day by day new technological advances are knocking at our doors. We are witnessing a team work, comprising of all "THREE" disciplines aiming for Compatible Professional Growth & Development. Doctors, Medical Physicists & RT Technologists have their own training needs and they all go through their own Learning Curves. We, in Pakistan are working together in the form of Carer's teams where we wish to act together for our Pakistani Cancer patients. We strongly believe in "PEER REVIEWED" practices learn from each other as per international standards.

## POSTER PRESENTATIONS (P)

### P-01

#### Hepatic epithelioid hemangioendothelioma; a challenging diagnosis: case report

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Hepatic epithelioid hemangioendothelioma is a rare tumor of vascular origin. It usually affects lung, liver and bones, breast, lymph nodes, mediastinum, brain and meninges, the spine, skin, abdomen and many other sites. Here we report a case of a female patient who was suffering from HEHE and the initial diagnosis was made of calcified metastasis on CT scan..

A 62 year old female patient presented to us with chest pain for 3 months. Her primary physician had query of costochondritis for which her chest xray and baseline investigations were done which turned out to be normal. MRI revealed, normal lungfields and costochondral junctions. Incidental note was made of two lesions in liver, which were diagnosed as metastasis with other possibility of HCC. Abdominal ultrasound showed two hypoechoic soft tissue lesions, in both liver lobes, with irregular specks of calcifications. Trucut biopsy and histopathology was done which revealed HEHE.

HEHE is a rare vascular tumor which originates from endothelial cells. The etiology of the disease process remains unclear although several risk factors have been proposed (eg, oral contraceptives, vinyl chloride, asbestos, alcohol, thorotrast, liver trauma, hepatitis virus, alcohol, and chronic liver disease). Regarding the imaging modalities, this disease can be divided in two subtypes. The imaging findings of early stages is characterized by multifocal nodules known as the nodular subtype.

Hepatic epithelioid hemangioendothelioma represents less than 1% of all the vascular tumors, because of its very heterogenous presentation, it is often misdiagnosed and not treated accordingly, leading sometimes to a poor prognosis.

### P-02

#### Bilateral pneumothorax complicating septic pulmonary emboli in a child with osteomyelitis: a case report

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Septic pulmonary emboli is rare complication of osteomyelitis. Numerous pulmonary complications of septic pulmonary embolism have been described, but only a few have reported spontaneous pneumothorax. Here we present a rare case of bilateral pneumothorax complicating septic pulmonary emboli in a child with biopsy proven osteomyelitis.

A 9 year old boy with biopsy proven osteomyelitis of right tibia presented to us with severe respiratory distress resulted in hypoxemia. Immediate chest radiograph demonstrated bilateral pneumothorax. CT Scan chest was done which showed bilateral pneumothorax along with multiple pulmonary nodules of varying sizes scattered throughout both lung fields. These are predominantly peripherally distributed with feeding vessel sign. Few of the nodules were showing cavitation. Findings were consistent with septic pulmonary emboli resulting in bilateral pneumothorax. Patient's clinical condition improved after insertion of an intercostal chest tube.

Spontaneous bilateral pneumothorax secondary to septic pulmonary emboli is a rare complication in patients with osteomyelitis. High clinical suspicion should be raised in patients with osteomyelitis presenting with shortness of

breath for prompt diagnosis and treatment. CT Scan Chest is the imaging modality of choice in the diagnosis of septic pulmonary emboli and to rule out other causes of spontaneous pneumothorax.

### P-03

#### Different patterns of coronary artery variation in adult Pakistani population- single center experience using 64-slice computed tomography.

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**BACKGROUND:** The knowledge of the variant coronary arterial anatomy is essential in the assessment of cardiac CT examination. Although most of the variations are benign, however, few might have clinical significance such as malignant inter-arterial course of RCA arising from left aortic sinus which can be potential cause of sudden death in young individuals. Moreover, pre-operative knowledge of the aberrant/anomalous coronary circulation can be handy for cardiac interventionist to avoid potential inadvertent morbidity/mortality.

**OBJECTIVE:** The study was aimed to determine different pattern of coronary arteries variations in the Pakistani population.

**MATERIAL AND METHODS:** Hospital electronic record was retrospectively reviewed of 1000 patient who had CT Angiography from 2006 to 2016. On CT angiography, the coronary artery variations/anomalies were observed and analyzed in SPSS 20.

**RESULTS:** The overall prevalence of coronary arterial variations in sample population of 1000 patients was around 5.4%. The most frequently observed variation was myocardial bridging. The rare type of coronary anomaly such as RCA arising from the left aortic sinus and coursing between ascending aorta and pulmonary aorta was also seen in three patients (0.3%). Other patterns observed in our study population briefly include anomalous origin of LCX from RCA, fusiform aneurysm of RCA, hypo plastic RCA and absent Left main trunk etc.

**CONCLUSION:** Cardiovascular CT is valuable non-invasive imaging technique to assess coronary arterial anatomy. The reporting radiologist and cardiologist should be aware of different patterns of coronary arterial variations/ anomalies to better evaluate the cardiac CT examination and prevent possible complications during cardiac intervention.

### P-04

#### Tension pneumoperitoneum: an unusual presentation of megacystis microcolon intestinal hypoperistalsis syndrome

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Megacystis microcolon intestinal hypoperistalsis syndrome (MMIHS) also known as Berdon syndrome is a rare autosomal recessive disorder characterized by enlarged urinary bladder, small colon and reduced or absent intestinal peristalsis. We report a case of a 4 days old female presenting with tension pneumoperitoneum. She underwent emergent decompression of the pneumoperitoneum followed by laparotomy which showed a sigmoid perforation. Her per-operative findings, antenatal and postnatal imaging were consistent with a diagnosis of MMIHS. She was treated with a palliative colostomy, vesicostomy and parenteral nutrition. To the best of our knowledge, this is the first reported case of Berdon syndrome presenting atypically with tension pneumoperitoneum.

**P-05****Meconium pseudocyst: a case report**

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A meconium pseudocyst consists of a thin muscular wall which is continuous with the intestine but has no epithelium due to inflammation. It is a rare occurrence and could lead to the death of the neonate. Therefore, it should readily be distinguished from the cystic-type meconium peritonitis, which on the contrary, is a sterile chemical peritonitis caused by bowel perforation leading to intraperitoneal extravasation of meconium in utero. The inflamed intestinal loops become fixed and forms a cystic cavity with a fibrous wall. Both entities should be distinguished from each other due to differences in the treatment strategies. In this report, we present the CT findings of a premature, 5 days old female, who presented to our department with a palpable abdominal mass and abdominal distention. The CT showed a large hypodense cystic lesion in the abdominal cavity, with marginal calcifications, communicating with the adjacent bowel loops and compressing them to the posterior peritoneal cavity. The case was successfully treated by the resection of the involved small bowel followed by primary end to end anastomosis, as opposed to the treatment of meconium peritonitis which requires drainage and a subsequent elective surgery.

**P-06****Role of diffusion tensor imaging in neuroradiology**

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Diffusion tensor imaging (DTI) is a promising method for characterizing microstructural changes or differences with neuropathology and treatment. The diffusion tensor may be used to characterize the magnitude, anisotropy and orientation of the diffusion tensor.

DTI measures various white matter pathologic features (ischemia, myelination, axonal damage, inflammation, and edema) etc. DTI used widely as an application for tissue characterization in various neurotherapeutic applications. The interpretations of common DTI measures are – mean diffusivity (MD), fractional anisotropy (FA), radial diffusivity (Dr) and axial diffusivity (Da).

In particular, FA is highly sensitive to microstructural changes, but not very specific to the type of changes (e.g., radial or axial). In order to maximize the specificity, it is recommended that future studies use multiple diffusion tensor measures (e.g., MD and FA, or Da and Dr) to better characterize the tissue microstructure.

**P-07****Scar endometriosis mimicking carcinoma- MRI findings: a case report:**

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**INTRODUCTION:** Endometriosis is occurrence of ectopic endometrial tissue outside uterus. It has an incidence of 0.03-0.4%. We presented a case of 35 year old women with history of lower abdominal pain associated with dysuria for last 1 year. On further inquiring the patient interrelated the severity of pain with her menstruation prior to hysterectomy. In this study scar endometrioma involved the urinary bladder mimicking neoplastic lesion/ desmoid tumor with its variable imaging findings and diagnosis on histopathology. Proper clinical history and the association of pain with menstruation really assist in reaching the diagnosis.

**DISCUSSION:** Endometriosis is defined as the ectopic growth of endometrial tissues outside the uterus. In premenopausal women 15%–44% have been reported to develop the disease after surgical procedures (1). Common site of involvements are abdominal wall, ovaries, fallopian tubes, uterine ligaments, bladder and rectosigmoid. This rare entity can be immensely distressing for patients physical and mental well-being. In this study abdominal wall endometrioma involved the urinary bladder mimicking neoplastic lesion/ desmoid tumor with its variable imaging findings and diagnosis on histopathology.

**CONCLUSION:** This case report illustrated a rare case of scar endometriosis. Although the diagnosis can only be accomplished after histopathology but the proper clinical history and the association of pain with menstruation really assist in reaching the diagnosis.

**P-08****Unilateral renal agenesis with sacrococcygeal teratoma : a case report**

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**INTRODUCTION:** Unilateral renal agenesis (URA) is a rare condition with reported incidence of 0.93–1.8 per 1000 autopsies. It is frequently associated with other genitourinary anomalies. Different associations have been described in both males and females, but to our knowledge it has not been reported with subseptate uterus (SSU) and sacrococcygeal teratoma (SCT) in a same individual. Here, we present a unique case of unilateral renal agenesis with combined presentation of subseptate uterus and SCT.

**CASE PRESENTATION:** A 1.6 year old female child presented in our radiology department with a palpable mass at lower back with nocturnal enuresis and recurrent urinary tract infections (UTI). On examination, a large mass was present at the lower back. CT scan abdomen and pelvis showed a large heterogeneously enhancing soft tissue density mass centered in presacral space measuring 12.1 x 9.0 x 7.5cm. The uterus showed dilated fluid filled endometrial cavity with a midline partial septum representing a sub-septate uterus. Right kidney was not present in right renal bed and also not seen elsewhere in the abdomen. Biopsy of the mass confirmed Sacrococcygeal Teratoma of yolk sac variety.

**CONCLUSION:** We report an unusual presentation of unilateral renal agenesis with subseptate uterus and sacrococcygeal teratoma (SCT). Further exploration of this manifestation needs to be done in future to understand this unusual presentation and association

**P-09****Can FDG PET / CT replace bone scan in detection of bone metastasis in patients of nasopharyngeal carcinoma**

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**INTRODUCTION:** Nasopharyngeal cancer is quite a rare malignancy worldwide. Literature has shown that there is a marked variation in the prevalence of nasopharyngeal carcinoma in different regions of the world. It has an incidence of 0.5–2 per 100,000 in Europe and the United States.

Majority of the nasopharyngeal carcinomas are epithelial in origin and have a strong association with Epstein-Barr virus. Due to the rich submucosal lymphatic system of nasopharynx, more than 70% of patients have clinically involved lymph nodes at initial diagnosis. The risk of distant metastasis is not related to tumor stage, but correlates strongly with clinical lymph-node stage. Bone metastasis from nasopharyngeal carcinoma represents the most common

type of distant metastasis, followed closely by lung and liver. Skeleton metastatic sites are usually multifocal and commonly cause pain, resulting in immobility, anxiety and depression and this condition severely affects patient's quality of life.

We report a case of a 17-year-old young man who developed solitary metastasis to the spine.

**CASE REPORT:** We present a case of a 17 year old young caucasian man who had neck pain and swelling and for the last 7-8 months and nasal bleeding for 5 days. He underwent CT head and neck for the evaluation of his symptoms. His CT scan showed an enhancing soft tissue density mass in the nasopharynx with multiple cervical and parapharyngeal lymphadenopathy. Subsequently, his nasopharyngeal biopsy was performed. The histological examination revealed an undifferentiated non-keratinizing carcinoma of the nasopharynx (WHO type III) in may 2015. Upon the diagnosis, his metastatic workup was initiated which included MRI head and neck and bone scan. His MRI demonstrated an abnormal signal intensity lesion in the left half of nasopharynx with parapharyngeal extension. The bone scan showed increased uptake in the nasal and maxillary region with no evidence of bone metastasis. The initial scan was negative for pulmonary, hepatic or bone metastasis.

He received 6 cisplatin-based chemotherapy and 35 sessions of radiotherapy in November 2015.

During his chemotherapy, he presented in the emergency room twice due to excessive sweating, fever, sore throat and nausea. There he was managed and was sent home in stable condition.

A follow up CT scan of the head and neck was performed to evaluate the response of chemoradiation. It showed complete resolution of nasopharyngeal soft tissue mass with marked reduction in the size of cervical lymph nodes indicating significant disease improvement.

By the end of radiochemotherapy, the patient was clinically complete responder and was followed by a FDG PET/CT in January 2016 which showed an well defined sclerotic FDG avid lesion with SUV max of 5.03 in the vertebral body of L4 consistent with bony metastases.

**DISCUSSION:** In recent decades, NPC has attracted world-wide attention because of complex interactions of genetic, viral, environmental and dietary risk factors.

Owing to the anatomical location, the symptoms of NPC can be obscured. These may include nasal, aural, and neurologic symptoms like sore throat, stuffed nose, nose bleed, blurred or double vision, headache, hearing loss, which becomes a challenge in establishing a diagnosis.

Conventional imaging is quite useful in the management of patients with NPC. MRI has become an integral part in the management of NPC due to its excellent spatial and soft tissue contrast resolution. The role of CT is limited predominantly to staging and radiotherapy planning. MRI has a utility in diagnosis, staging, treatment planning, and prognosis. MRI has been found to have high sensitivity, specificity, and accuracy of 100%, 93%, and 95%, respectively, in diagnosing NPC.

MRI aids in the accurate staging of NPC by detecting primary tumor spread; parapharyngeal, orbital, and paranasal involvement; and spread to lymph nodes, especially the retropharyngeal nodes.

Bone metastasis from nasopharyngeal carcinoma represents the most common type of distant metastasis, followed by lung and liver. Skeleton metastatic sites are usually multifocal and commonly cause pain, resulting in immobility, anxiety and depression and this condition severely affects patient's quality of life.

The literature has confirmed that the axial skeleton is the most common site of distant bone metastasis, with most frequently involved site being the spine and pelvis. The first region of involvement was lumbar spine (28.4%), then

dorsal spine (27.7%), sacrum and pelvis (16.3%), femur (9.9%), and rib and sternum (7.8%). Although the sites of distant metastases to the bone are clearly established, it is quite rare to see a solitary bone metastases in nasopharyngeal carcinoma.

F-18 FDG PET/CT and bone scans, both are widely utilized in the detection of suspected skeletal metastatic disease and in assessment of treatment response in patients with known skeletal metastatic disease. Overall, PET/CT is shown to be more specific for metastatic disease than bone scan.

Damle et al compared the role of (18)F-fluoride PET/CT, FDG PET/CT and (99m)Tc-MDP bone scans in the detection of bone metastases in patients with lung, breast and prostate carcinoma. They concluded that in cases of high index of suspicion, (18)F-fluoride PET/CT is the most reliable investigation and (18)F-fluoride PET/CT has the potential to replace the (99m)Tc-MDP bone scan for the detection of bone metastases.

Therefore we can conclude that 18F-FDG-PET/CT is more sensitive than bone scan in detecting bone metastasis in oncology patients. It is also important in detecting unknown primary cancers and visceral metastases besides bone metastases.

## P-10

### Fibrodysplasia ossificans progressiva

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Fibrodysplasia ossificans progressiva is a very rare inherited connective tissue disorder, which is characterized by progressive heterotopic ossifications in soft tissues of trunk and the extremities with congenital malformations of the great toes and thumbs. Episodic soft tissue pre osseous swellings usually begin during early childhood and progress throughout life resulting in progressive ankylosis of the joints and severe disability. So far, more than 600 cases have been reported worldwide and presently there is no effective treatment or prevention. We present a case of a 2-year-old male with extensive heterotopic ossification. Cross sectional imaging plays a key role in diagnosing extent of heterotopic ossification especially multidetector computed tomography (MDCT) with its high quality bone detail. MRI is helpful in diagnosing pre-ossification stage.

## P-11

### Diffuse hemorrhage in Trigeminal Schwannoma : a rare entity

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**INTRODUCTION:** Schwannomas are tumor arising from schwann cells in the axon myelin sheaths. Trigeminal schwannoma is a rare tumor accounting for 0.2% of all intracranial tumors. Patients usually presents with symptoms of trigeminal nerve dysfunction, the most common symptoms being facial pain. MRI is the imaging modality of choice and is usually diagnostic in the appropriate clinical setting. Even rarer are instances of hemorrhage within these tumors. We present such rare case of diffuse intratumoral hemorrhage in trigeminal schwannoma.

**CASE REPORT:** This report describes a case of a 7 year old female child presenting with altered level of consciousness, severe headache, diplopia, ptosis and numbness of face. Magnetic resonance imaging shows a large bilobed extra-axial mass lesion with diffuse hemorrhage in it as confirmed on heme sequence. Associated subdural hemorrhage is also noted. Keeping with the dumbbell shaped, location of the mass along preganglionic and ganglionic segments of trigeminal nerve and its enhancement pattern, the provisional diagnosis of trigeminal schwannoma was made with rare differential of

angiosarcoma. The patient underwent surgery. Histopathology confirmed the diagnosis.

**CONCLUSION:** Intracranial trigeminal schwannoma are extremely rare tumors. Patients characteristically present clinically with trigeminal neuralgia. MRI is the imaging modality of choice in diagnosis and pre-surgical planning.

#### P-12

### Synchronous Double Primary Malignancies of the Liver and Kidney: A Case Report

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The occurrence of multiple primary malignant tumors in a single patient is particularly rare, with a literature review of 1,104,269 patients with cancer reporting the incidence of multiple primary malignancies as 0.73–11.70%. The following diagnostic criteria have been proposed for the accurate diagnosis of multiple primary malignancies: i) Each tumor must be distinct; ii) each tumor must exhibit marked features of malignancy; and iii) the probability of one lesion being a metastasis of the other must be excluded[2]. The tumors were pathologically established as different types of cancer and had developed within different systems, with the tumor in the kidney confirmed as moderately-differentiated RCC and the tumor in the liver confirmed as poorly-differentiated HCC. These findings support the notion that these two types of cancer occurred in a random and synchronous manner. HCC is understood to be pathogenically associated with chronic hepatitis virus infection, abuse of alcohol and liver cirrhosis.

Although the mechanisms underlying the occurrence of multiple primary malignancies are not fully understood, certain factors have been implicated, including genetic factors, carcinogenic viruses, immunological and environmental factors, and chemical and radiological treatments.

With regards to the current case, chronic hepatitis B virus infection may have served a crucial role in the development of HCC. The prognosis of patients with multiple primary malignancies may be determined independently by the stage of each malignancy. In the present case, the treatment of choice was curative resection of each lesion. We report a case of 61 years old male patient presented with complaints of hematuria, right hypochondrial and bilateral lumbar pain with jaundice and vomiting. His CT scan shows malignant looking lesion in kidney and liver.

#### P-13

### Madelung Disease

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**INTRODUCTION:** Madelung disease is a rare condition characterized by the symmetric growth of fatty tumors (lipomas) around the neck, shoulders, upper arms and/or upper trunk. It most often affects men of Mediterranean ancestry between the ages of 30 and 70 who have a history of alcohol abuse. Treatment is sought due to cosmetic deformity as well as restriction in neck movement. We are reporting a case of Madelung disease due to rarity of the condition.

**CASE REPORT:** Our patient is a middle age alcoholic who presented with progressively enlarging soft tissue masses involving his neck and chest. On MRI symmetrical accumulation of fat was seen in subcutaneous tissue of anterior and posterior triangles of neck deep to sternocleidomastoid muscles and the trapezius. The fat appeared hyperintense on T1W and hypointense on fat suppressed images. On post contrast images it showed no enhancement. The patient was told to refrain from alcohol. He was advised a controlled diet with restriction on fat and carbohydrates. For cosmetic deformity he was referred for liposuction.

**CONCLUSION:** Madelung disease is a very rare condition for the diagnosis of which MRI has an important role. Absolute diagnosis is possible on MRI without resorting to invasive tests, with the disease showing typical MRI features.

#### P-14

### Case series on radiological manifestations of spontaneous intracranial hypotension

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Spontaneous intracranial hypotension (SIH) is a rare neurological disorder characterized by postural headaches, nausea, vomiting, neck pain, visual, hearing disturbances, vertigo, decreased level of consciousness and coma. Important CT & MRI findings are subdural collections, dural venous distention, tonsillar herniation, drooping of splenium, enlargement of pituitary gland, pachymeningeal thickening and enhancement. We report three cases with typical symptoms of SIH. In two patients MRI brain images showed bilateral subdural collections, sagging of brainstem, upwards elevation of tentorium, drooping splenium of corpus callosum, tonsillar herniation and pachymeningeal enhancement. In the third patient MRI images revealed subdural hygromas with flattening and drooping of splenium of corpus callosum, effacement of quadrigeminal plate cistern and pachymeningeal enhancement. His MRI spine demonstrated CSF leak, which was treated with epidural blood patch (EBP) resulting in significant improvement of symptoms. SIH is an important etiology of persistent headaches, which is relatively easy to diagnose on imaging studies and if recognized early, is effectively treatable.

#### P-15

### Congenital IVC stricture with femoral vein thrombosis; a case report

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Congenital stenosis of the IVC is a rare event. They are rare cause of DVT. The causes of DVT are multifactorial and are associated with both environmental and genetic factors that alter the coagulability or flow of blood. When the major risk factors for DVT are absent, in the younger age group presenting with DVT, a search for a genetic or congenital cause is sought. Here, we present a case of a late presentation of DVT with an underlying aetiology of an absent IVC. The present case report describes a young man with extensive ilio-caval and femoral vein thrombosis with suprarenal inferior vena cava stricture.

#### P-16

### Isolated subarachnoid hemorrhage: a rare presentation of dural venous sinus thrombosis

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Dural venous sinus thrombosis (DST) can be difficult to diagnose because of its wide spectrum of clinical as well as radiological manifestations. It may present as intraparenchymal hematomas, infarcts or normal CT scans. Its diagnosis may be further complicated when patients initially present with isolated acute subarachnoid hemorrhage (SAH). We report on six patients (5 females and 1 male) with SAH revealing a DST and discuss the role of imaging for diagnostic workup. Clinical presentations included loss of consciousness (n =2), headache with new onset seizures (n=2) and headache with limb

weakness (n=2). In all six patients imaging initially suggested SAH with no associated parenchymal bleeding. SAH involved the sulci of convexities and spared the basal cisterns. These cases highlight the fact that DST may present as SAH, especially when the basal cisterns are not involved and should be kept in the diagnostic consideration.

### P-17

#### A case of spinal arachnoid cyst at our set up of CMH Rawalpindi

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Spinal arachnoid cysts are rather uncommon entities which may present as intra spinal or extra spinal lesions. They may be congenital or acquired and remain asymptomatic, being discovered as an incidental finding during work up for other pathologies or may cause symptoms due to cord compression including pain, weakness, sensory deficits or bladder or bowel incontinence. We report a case of 32years old male patient presenting to our set up with complaints of pain and weakness of both lower limbs following lumbar puncture done 2 years ago. The patient was referred to radiology department for MRI of whole spine. An extra spinal lobulated, elongated CSF signal intensity mass was noted in lower thoracic and upper lumbar regions extending from DV7 till LV2 displacing the spinal cord anteriorly and abutting the posterior aspect of vertebral column on sagittal imaging. Axial imaging also showed thoracic and lumbar cord displaced anteriorly by the CSF signal intensity lesion with the lesion demonstrating a higher, more homogenous signal than normally seen CSF. A diagnosis of spinal arachnoid cyst was given and patient was referred to neurosurgical OPD for further management.

### P-18

#### Adenoid cystic carcinoma of the base of tongue; a rare case report

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**INTRODUCTION:** Adenoid cystic carcinoma (ACC) is a malignant neoplasm that accounting for about 1-2% of the head and neck malignancies altogether and 10-15% of all salivary gland malignancies. It is more common in the salivary glands than on the tongue. Parotid gland is the most common site in the head and neck region. The most distinguishing feature of ACC is that it is aggressive locally, with a high risk of recurrence. Metastatic potential is quite established in literature especially to the lungs and bones. The present case is about its presence on the tongue, which is a rare.

**CASE FINDINGS:** A 41-year-old female presented to us with complaints of ear ache and pain on swallowing. She also complained of off and on fever and generalized body aches with significant weight loss. Intra-oral examination revealed a diffuse swelling at the base of the tongue. Extra-orally, there was no palpable cervical lymph node. On palpation, the swelling was tender and firm in consistency and moved along with the tongue movements. Magnetic resonance imaging (MRI) with contrast revealed heterogeneous T2/STIR high signal intensity centered in the base of the tongue involving its posterior 1/3rd and showed heterogeneous enhancement on post contrast sequences. Excision biopsy was done from the mass at the base of the tongue which revealed adenoid cystic carcinoma on histopathology.

**CONCLUSION:** Tongue lesions remain challenging for diagnosis and surgical treatment because of their anatomical location and their association with blood vessels and nerves. Only few cases of ACC have been reported in the literature involving the tongue thus making this case a rare one.

### P-19

#### Adrenal myelolipoma discovered incidentally on CE CT abdomen performed for ureteric colic

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Adrenal myelolipomas are rare benign neoplasms which are mostly asymptomatic and discovered incidentally during imaging studies performed for other reasons. They are mostly unilateral and diagnosis is difficult to make on basis of CT or MRI examination alone as well differentiated liposarcoma stands a strong differential therefore histo pathological correlation is mandatory for making a definite diagnosis. We reported a case of a 35years old female patient presenting with left ureteric colic. Ultrasound abdomen was advised which showed mild fullness of left pelvicalyceal system. However on right side, a heterogeneous mass with mixed hyper and hypoechoic components was noted in supra renal area and CECT was advised for its further evaluation. CT showed a well circumscribed, fat containing mass with internal soft tissue density component. However no calcification or hemorrhage was demonstrated in it. Right adrenal gland was not visualized separately, right kidney was normal. A differential diagnosis of adrenal myelolipoma and liposarcoma was given and patient was followed for histo pathological findings which confirmed the diagnosis was right adrenal myelolipoma.

### P-20

#### Smart fusion ultrasound imaging: emerging new technology

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Smart fusion technology in ultrasound imaging is an emerging new technology for better clinical accuracy. Smart Fusion presents volume-to-volume fusion of two different imaging modalities, using previously acquired images with real-time ultrasound to provide safer, faster exams with better diagnostic accuracy. CT is the most commonly used modality for ultrasound fusion with the other option being MRI. This new technology is valuable in numerous clinical applications and expands the use of ultrasound. Integrating diagnostic procedures with Smart Fusion improves patient care and safety with more effective use of imaging.

### P-21

#### Sclerosing encapsulated peritonitis: a case report

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Sclerosing encapsulated peritonitis, previously known as abdominal cocoon, is a rare entity characterized by subacute small bowel obstruction secondary to encasement by a thick fibro collagenous membrane. In most of the cases, etiology is unknown, however factors such as peritoneal dialysis, ventriculo peritoneal shunts, abdominal tuberculosis, sarcoidosis, gastrointestinal and ovarian malignancy and liver transplantation have been attributed as secondary causes leading to this pathology. We reported a case of a 40 years old male patient presenting to our set up with complaints of abdominal pain and distention. Ultrasound abdomen was advised as an initial investigation which showed multiple dilated small bowel loops clumped together in central abdomen with moderate to gross abdominal ascites. Contrast enhanced CT scan was suggested which confirmed the ultrasound findings. In addition, thick enhancing membrane was seen encasing the dilated loops along with thick walled fixed bowel walls and reactive abdominal lymphadenopathy. A diagnosis of idiopathic, abdominal cocoon was made as patient had no significant previous history. Later the findings were confirmed per operatively.



**P-22****Fetal oropharyngeal teratoma: a rare entity diagnosed antenatally on ultrasound**

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**INTRODUCTION:** Teratoma is a true neoplasia containing cells of all the three germ layers and represent 25-30% of all neonatal tumors. Oropharyngeal teratomas are extremely rare congenital tumors and have an incidence rate of one in 35,000-200,000 newborns. Oropharyngeal teratomas may cause life threatening airway obstruction to a newborn.

**CASE REPORT:** Here, we present a rare case of oropharyngeal teratoma diagnosed with ultrasound antenatally in a fetus at 26 weeks of gestation in a 30-year-old female who presented to labour room with labour pains. antenatal ultrasound revealed presence of a large solid vascular mass in facial region of fetus. Polyhydramnios was present. After delivery a preterm newborn baby has a large soft tissue mass in facial region protruding from oral cavity and was attached to hard palate. Histopathology confirmed the evidence of all three germinal layers representing oropharyngeal teratoma.

**CONCLUSION:** Early diagnosis with ultrasound and magnetic resonance imaging (MRI) is essential to plan management.

**P-23****Perception of newly enrolling students regarding undergraduate program of medical imaging technology in Khyber Pakhtunkhwa**

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**OBJECTIVE:** In this study, perception of newly enrolling students are analysed regarding undergraduate study in newly introduced medical imaging technology programs in Khyber Pakhtoonkhwa. To explore the basic know how and expectations of the students about the field.

**METHODS:** Cross sectional survey was conducted on a stratified random sample of 100 undergraduate medical imaging technology students during the induction period of new students that are to be enrolled. A questionnaire was designed, conducted and data gathered for further analysis.

**RESULTS:** 70% of the students responded to the questions asked. Over all 100% of the students chose MIT program as their primary study of choice. 50% responded that they need subject counseling. Moreover, 30% said that use of radiation is quite worrisome because of its harmful effects. One third of them want to pursue their career overseas. Most of the students claim that they want to carry prospect their career in medical imaging technology. All of them suggested that there is a bright future for them after studying degree in radiography.

**CONCLUSION:** This research serves as a source of valuable information for academics and government that the students want to prospect their career in the field of MIT. Although there is less awareness about the field of radiography in Khyber Pakhtoonkhwa but still student are fascinated by this field due to its newness. Students are expecting that the government will provide good opportunities in coming years. The association of radiation to radiology was worrisome for some due to its harmful effects but counseling regarding radiation protection proved helpful.

**P-24****Five versus six fractions of radiotherapy per week for squamous-cell carcinoma of the head and neck (IAEA-ACC study): a randomised, multicentre trial**

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**INTRODUCTION:** Worldwide approximately 7% of all cancers are squamous cell carcinoma of the head and neck. Characteristically HNSCC is a loco-regional disease confined to primary site and regional lymph nodes, whereas distant metastases are rarely seen at the time of diagnosis. Radiotherapy alone has long been the standard nonsurgical therapy for locally advanced disease. Several large randomised studies from Western Europe and the USA have shown that accelerated fractionation of radiotherapy might be beneficial in the treatment of squamous cell carcinoma of the head and neck. The rationale for accelerated fractionation is that reduction in overall treatment time decreases the opportunity for tumor cell regeneration during treatment and therefore increases the probability of tumor control.

**METHODS:** Between Jan 6, 1999, to March 31, 2004, nine centres from Asia, Europe, the Middle East, Africa, and South America recruited 908 patients with HNSCC of the larynx, pharynx, and oral cavity. 124 patients were recruited from NORI, Islamabad. Patients were randomly assigned to receive an accelerated regimen of six fractions of radiotherapy per week or to receive a conventional radiotherapy regimen of five fractions per week, receiving a total dose of 66–70 Gy in 33–35 fractions. The primary endpoint of the study was locoregional control.

**RESULTS:** The planned total radiotherapy dose was received by 92% of the patients in the accelerated radiotherapy group and 92% of the patients in the conventional radiotherapy group. The 5-year locoregional control was 42% in the accelerated group versus 30% in the conventional group. Acute morbidity in the form of confluent mucositis was noted in 45 patients in the accelerated group and 22 patients in the conventional group, severe skin reactions were noted in 87 patients in the accelerated group and 50 patients in the conventional group. There were no significant differences in late radiation side-effects.

**INTERPRETATION:** An accelerated schedule of radiotherapy was more effective than conventional fractionation.

**P-25****Hughes-Stovin Syndrome: an incomplete Behcet's disease**

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Hughes Stovin syndrome is very uncommon condition characterized by deep vein thrombosis (DVT) and pulmonary artery aneurysm. The etiology of this syndrome is unknown but it is considered to be manifestation of systemic vasculitis. It shares many clinical signs and symptoms with Behcets disease and that is why it is also called incomplete Behcets disease or variant of it. Here we report a case of male patient who presented to our hospital with DVT and pulmonary artery aneurysm. CT angiography showed aneurysmal dilatations of segmental and sub segmental pulmonary arteries. He was successfully treated with steroids and immunosuppressant.

**P-26****Frequency of various branch pulmonary artery abnormalities in children with unrepaired tetralogy of Fallot**

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**INTRODUCTION:** Tetralogy of Fallot (TOF) is the most common congenital heart defect with incidence of 0.5/1000 live births. Surgical outcomes depend on degree of anatomical aberrations requiring correction. One of major determinants includes branch pulmonary arteries anatomy. This study was designed to assess various branch pulmonary artery abnormalities and their frequencies using Cineangiography.

**MATERIALS AND METHODS:** This observational study was conducted at the Children's Hospital, Institute of Child Health, Lahore from September, 2013 to December, 2013. Hundred consecutive patients with Tetralogy of Fallot underwent cardiac catheterization to investigate branch pulmonary arteries abnormalities. Pulmonary artery sizing for adequacy of branch PAs was done by calculating Z-score, McGoon ratio & Nakata Index. Frequencies were calculated for various branch pulmonary artery abnormalities.

**RESULTS:** Among 100 patients of TOF, 58% were male & 42% female. Age of patients was divided into four groups, <5 years of age group (n = 46, 46%), 5-10 years of age group (n = 42, 42%), 10-15 years of age group (n = 10, 10%) & >15 years of age group (n = 2, 2%). Out of 100 patients, 97 (97%) had confluent pulmonary artery anatomy & 3 (3%) had non confluent branch pulmonary arteries. Branch PA abnormalities were found in 55% patients. LPA abnormalities were more common (42%), LPA origin stenosis being the most common abnormality (17%). Bilateral proximal, diffuse & discrete stenosis was present in 5%, 2% & 1% respectively.

**CONCLUSION:** Branch PA size is mostly adequate for surgical repair in TOF. Focal branch PA abnormalities (55%) were frequently found in TOF which need to be addressed while performing surgical repair of these patients for a better outcome.

**P-27****Pulmonary arteriovenous malformation – an rare vascular anomaly with common clinical presentation**

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**INTRODUCTION:** Pulmonary arteriovenous malformations (PAVMs) are abnormal communications between the pulmonary artery and vein forming right-to-left shunt. These rare vascular malformations are usually congenital in origin. Their incidence is 2–3 per 100 000 population. These may be single or multiple in distribution. Most solitary PAVMs are seen in bilateral lower lobes, the left lower lobe being the most common location. PAVMs may be classified as simple or complex depending on the number of feeding and draining vessels. Most patients remain asymptomatic but dyspnea, fatigue, cyanosis, orthodeoxia and embolic events have all been reported. Most serious complications include potentially fatal hemoptysis, hemothorax and brain abscess.

**CASE REPORT:** We report a case of 30-years-old-female textile factory worker who presented with progressively increasing dyspnea and chronic cough. On clinical grounds, she was diagnosed with chronic bronchitis which was refractory to treatment. On examination, she had clubbing of all limbs without cyanosis. Her CXR revealed few tubular shadows and pulmonary nodules with ill-defined margins in right lower zone. Contrast enhanced CT Chest was performed which showed dilated right lower lobe pulmonary artery along with dilatation of right pulmonary vein. CT Pulmonary angiography revealed multiple

dilated, serpiginous, tortuous vessels in basal segments of right lower lobe receiving arterial supply from dilated right descending pulmonary artery and draining into dilated right inferior pulmonary vein. Findings were suggestive of a large pulmonary arteriovenous malformation. Our patient was offered embolotherapy which she denied. She was discharged on symptomatic treatment and long-term follow up.

**CONCLUSION:** Although a rare finding, PAVMs are important differential of common pulmonary problems such as dyspnea, hypoxemia, orthopnea and pulmonary nodules. Pulmonary nodules must undergo biopsy to exclude malignancy, a procedure that could be catastrophic for patient with PAVM. Therefore, suspected patients should always undergo CT pulmonary angiography to exclude underlying vascular malformation.

**P-28****Ruptured abdominal dermoid in a postpartum patient with chemical peritonitis simulating puerperal sepsis: a case report**

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**INTRODUCTION:** Dermoid cyst or mature cystic teratoma is the most common neoplasm in young patients, however, its spontaneous rupture is an extremely rare phenomenon (0.3-0.7%). It is a benign tumor that originates from totipotent germ cells lined by epithelium containing mature solid tissues. It can present at any age but there is a clear predilection during reproductive years. Dermoids are mostly asymptomatic. Complicated cases may present with acute abdomen. Complications include torsion (16%), malignant transformation (1-2%), infection (1%), invasion into adjacent viscera and rupture (0.3-0.7%). CT scan is the imaging modality of choice because it can detect both fat and calcifications which are its pathognomonic finding.

**CASE REPORT:** We present a case of a 26-year-old-female who came to our Radiology Department on her 36th postpartum day with abdominal pain and distension. On examination, patient looked toxic with markedly distended and tender abdomen. Ultrasonography revealed moderate ascites with large cystic mass of 14.0x14.0cms in her lower abdomen. On CT Scan, a cystic mass with calcific foci and pockets of fat was identified. Multiple dispersed fat locules at non-dependent portions, large collections and peritoneal thickening were also noted. Findings were suggestive of a ruptured dermoid cyst with chemical peritonitis. Patient underwent urgent laparotomy which revealed a ruptured large cystic mass measuring 20.0x15.0cms adherent to rectum and lateral pelvic walls. Cyst was found to be twisted upon its pedicle. Approximately, 600ml of cheesy, jelly-like material was drained from cyst and peritoneal cavity. Multiple tuft of hair and teeth were also isolated. Histopathology confirmed the radiological diagnosis. Patient was symptom-free postoperatively without any further treatment.

**DISCUSSION:** We describe the imaging and surgical findings of a ruptured abdominal dermoid cyst causing chemical peritonitis that was successfully treated with laparotomy. Spontaneous rupture of dermoid is extremely rare because of its thick wall. Nonetheless, it should always be considered in the differentials of a ruptured cyst in women of reproductive age group.

**P-29****Portal biliopathy in patients with chronic liver disease**

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**PURPOSE:** The purpose of our study was to determine the incidence and CT features of portal biliopathy in patients with chronic portal hypertension.

**MATERIALS AND METHODS:** This is a retrospective descriptive study. The data was compiled with institutional review board approval for a retrospective

review, with waiver of informed consent. The authors reviewed all imaging and clinical information for this study. The radiology reports between January 1, 2015, and 30 May, 2016, were queried for the terms portal vein thrombosis, portal hypertension, cavernous transformation or cirrhosis. We identified 100 patients fitting our search criteria over the time period. Three patients with acute porto-mesenteric venous thrombosis were excluded. This left 97 patients with chronic portal vein thrombosis and cirrhosis. To obtain a sample of patients with portal biliopathy as the sole reason for biliary obstruction, we excluded patients with confounding causes of biliary occlusion, such as patients with hepatic or pancreatic head malignancy, those with sclerosing cholangitis, or those with biliary stones. Two patients with a history of percutaneous or surgical portosystemic shunt were also excluded owing to the iatrogenic disruption of venous collateral pathways. In the final group of 60 patients, 19 patients had intra and extrahepatic biliary dilatation caused purely by obstructing periportal venous collaterals and we labelled it as portal biliopathy group. Portal biliopathy was thus defined as biliary dilatation with an abrupt caliber change of the bile duct at the level of dilated periportal collateral veins in the absence of a main portal vein (chronic PV thrombosis) or chronic portal hypertension.

**RESULTS:** Portal biliopathy was seen in 19% (19 of 100) of all cases of portal hypertension during the study period. The remaining 41% (41 of 100) had either cavernous transformation of the portal vein or numerous periportal collaterals but no biliary dilatation.

**CONCLUSION:** We conclude from our results that portal biliopathy developed in 19 % of cases with chronic portal hypertension, non-cirrhotic patients with hypercoagulable states also tend to develop PB when thrombosis extends to the splenomesenteric veins.

### P-30

#### Conservative management of cornual pregnancy with KCl injection: Case report .

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**BACKGROUND:** Interstitial (cornual) ectopic pregnancy is an important type of ectopic pregnancy with higher risks of rupture and hemorrhage compared to usual tubal ectopic pregnancies. There are different medical and surgical therapies in order the treatment and reserve of fertility. The aim of this report is to discuss a case of cornual pregnancy which was successfully treated with kcl injection into fetal cardiac cavity under ultrasound guidance.

**CASE:** The patient was presented with amenorrhea of 7 weeks. Transvaginal ultrasound shows empty endometrial and G sac with live fetus is present at right cornue. Hemodynamic situation was stable. 0.5cc KCL 10% was injected to the fetal heart. We evaluated the effects of this treatment by measuring serial human chorionic gonadotropin (hCG) titers. Serum B-HCG declined gradually and was negative after 41 days.

**CONCLUSION:** The beneficial outcomes of this kind of treatment suggest that local injection of KCL as a low invasive, cost effective treatment can be the choice treatment for alive and progressed cornual ectopic pregnancy it does not require any anesthesia. Because of rarity of this management and successful intrauterine we reported the usefulness of local KCL injection for the successful conservative treatment of alive ectopic pregnancy in Pakistan.

### P-31

#### Radiofrequency ablation for osteoid osteoma: a case report

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**BACKGROUND:** Osteoid osteoma is an osteogenic benign tumor which usually occurs in long bones of young males. It's most significant finding is

severe pain caused by nidus, increasing during nights relieved by taking NSAIDS. Complete surgical resection has historically been the treatment of choice which consists of en- bloc excision or curettage. The radiofrequency ablation (RFA) is becoming a widespread treatment method for osteoid osteoma. In this case report , the aim is to discuss the use of CT guided radiofrequency ablation to treat osteoid osteoma.

**CASE REPORT:** Eighteen-year-old female patient had a history of left knee pain for 2 years, pain became severe at night and on/off relieved by taking NSAID. She referred to our department for radiological assessments. With clinical and radiological findings, the patient was diagnosed with osteoid osteoma and successfully treated by radiofrequency ablation.

**CONCLUSION:** CT guided percutaneous radiofrequency ablation replaces open surgery in treating osteoid osteoma as it has a lower risk of relapse, faster recovery, shorter hospitalization time and faster ambulation.

### P-32

#### Subclavian steal syndrome from ipsilateral vertebral artery treated with percutaneous transluminal angioplasty and stenting

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Subclavian steal syndrome is a vascular disorder in which stenosis or occlusion of the subclavian artery proximal to the vertebral artery origin causes neurological symptoms related to vertebrobasilar insufficiency.

**CASE:** A 62 year old male who presented to us with a 6 month history of claudication and vertigo on exertion of left upper limb. He had past history of coronary artery bypass graft. His neurologic examination revealed pressure difference between the right arm (185/100 mm Hg), and left arm (150/85 mm Hg), ataxia and gait disturbance. Then He underwent CT scan which showed a Right parietal infarct and multiple lacunar infarcts. Color Doppler sonography of VAs revealed a hypoplastic right VA and normal left VA with antegrade flow and normal flow pattern. He was then convinced for diagnostic angiography &/ therapeutic endovascular treatment. Angiography showed stenosis at the origin of subclavian artery. And then treated with percutaneous transluminal angioplasty and stenting.

**DISCUSSION:** SS syndrome is the association of stenotic/occlusive disease of the SCA and cerebrovascular episodes. The typical symptoms of Subclavian steal syndrome include dizziness, dysarthria, diplopia, nausea, gait and visual disturbances. When presented with such symptoms treatment with angioplasty and stent placement has been recommended.

**CONCLUSION:** The definitive diagnosis of subclavian steal syndrome was demonstrated by the reversal of blood flow in the vertebral artery at invasive angiography and also by occlusion or stenosis of the subclavian artery. The aim of this case report was to enlighten the importance of angiographic data and successful endovascular treatment in such rare situations with good clinical results.

### P-33

#### Trilateral retinoblastoma

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**INTRODUCTION:** Trilateral retinoblastoma is a rare, but well recognized syndrome. The intracranial tumor arises most often in the pineal region but can also be a suprasellar or parasellar tumor, and is considered to be an isolated independent primary focus without evidence of retinal disease. These intracranial tumor usually occur several years after successful management of ocular

retinoblastomas without evidence of direct extension or distant metastasis. It is caused by inactivation of both copies of the tumour suppressor gene Rb1, located on chromosome 13q14.1 Rb may be hereditary or non-hereditary, familial or sporadic, unifocal or multifocal, and unilateral, bilateral or trilateral (TRb).<sup>2</sup> Children with hereditary type usually have bilateral and multifocal disease, while unilateral Rb is generally sporadic and non-hereditary with unifocal presentation.

**CASE REPORT:** A 3 year old female infant with advanced unilateral RB was admitted to the Tertiary Care Hospital, (Rawalpindi). She had no family history of RB. The child had pain in her left eye. The left eye was greatly destructed. Computed tomography (CT) scan showed a huge, highly dense, partially calcified, extrascleral progressive mass in her left eyeball. CT scan also revealed a highly dense mass in the suprasellar intracranial midline region. The left eyeball was enucleated under general anesthesia and histological examination showed RB with extrascleral deposits, but the distal optic nerve was not involved. Histological features included viable tumor cells around blood vessels and small foci of necrotic cells between larger masses of the cells. Incompletely formed Flexner-Wintersteiner or Homer Wright rosettes and calcification were also observed. Because of the opposition from her parents, the infant had not received chemotherapy or external beam radiotherapy after the operation.

**CONCLUSION:** TRB is a well-recognized syndrome that is characterized by unilateral or bilateral hereditary RB in association with a morphologically similar intracranial neoplasm localized in the pineal gland or the sella or suprasella regions. This case demonstrated TRB with a sellar and suprasellar mass as well as unilateral retinoblastoma.

### P-34

#### Role of cyberknife robotic radiosurgery in hepatocellular carcinoma: an initial experience

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**OBJECTIVE:** To study the efficacy of CyberKnife stereotactic body radiotherapy for hepatocellular carcinoma (HCC).

**METHODS:** A total of eight patients with HCC were treated with CyberKnife Radiosurgery in Cyberknife Robotic Radiosurgery Dept. Jinnah Postgraduate Medical Center Karachi from December 2012 to 2015. Stereotactic Radiosurgery is a technique that delivers high doses of radiation in a single treatment or in a small number of fractions with high precision, thereby minimizing doses to adjacent normal tissues. The mean age of the patients was 50 + 1.4 years, and Male to female ratio was 3 : 1. Treatment response was assessed every three months with Triphasic CT scan and Serum Alpha-fetoprotein after CyberKnife Stereotactic body Radiotherapy.

**RESULTS:** The median follow up was 10 months. A reduction in tumor size and alpha-fetoprotein seen in 6 lesions, stable disease was noted in 1 lesion, and disease progression in 1 lesion but at the distant site. No complications were observed in any of the treated patients.

**CONCLUSION:** CyberKnife Stereotactic body Radiotherapy is a new and promising form of noninvasive feasible treatment modality with minimal side effects in hepatocellular carcinoma (HCC). Small tumors showing good results, though few larger tumors have been successfully treated as well.

### P-35

#### Automatic identification and classification of characteristic kinetic curves of breast lesions on DCE-MRI

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Dynamic contrast-enhanced magnetic resonance imaging (DCE-MRI) of the breast is being used increasingly in the detection and diagnosis of breast cancer as a complementary modality to mammography and sonography. Although the potential diagnostic value of kinetic curves in DCE-MRI is established, the method for generating kinetic curves is not standardized. The inherent reason that curve identification is needed is that the uptake of contrast agent in a breast lesion is often heterogeneous, especially in malignant lesions. Manually, region of interest was selected in magnetic resonance (MR) images to generate the kinetic curves. Different curves were obtained at various sites of the lesion. Dynamic contrast-enhanced MR images were obtained using a T1-weighted 3D spoiled gradient echo sequence. Four features were then extracted from each characteristic kinetic curve to depict the maximum contrast enhancement, time to peak, uptake rate, and washout rate of the lesion kinetics. The performance of the kinetic features in the task of distinguishing between benign and malignant lesions was assessed. Manually obtained various site individual curves were found to be better than that from the curves obtained by averaging over the entire lesion.

### P-36

#### Superior vena cava syndrome as the preliminary manifestation of Hodgkin's disease: a case report

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Superior vena cava syndrome (SVCS) is a medical emergency frequently associated with malignancy especially lung cancer and Non Hodgkin's lymphoma. It is a constellation of signs and symptoms resulting from intrinsic or extrinsic obstruction of the superior vena cava. Hodgkin's Lymphoma despite its common presentation with marked mediastinal lymphadenopathy infrequently causes SVCS. This case report highlights one of the atypical presentations of Hodgkin's lymphoma in a 54 year old male patient who presented with classical features of superior vena cava syndrome. He significantly improved following therapy with oxygen, intra venous steroids and radiotherapy.

Clinicians in emergency care units should have a high index of suspicion of superior vena cava syndrome so that timely treatment is instituted promptly. Diagnostic radiological investigations are very helpful in diagnosing SVCS. Chest radiography may reveal a widened mediastinum or a mass in the right side of the chest. A CT scan of the chest is the initial test of choice to determine whether an obstruction is due to external compression or due to thrombosis. Gallium single-photon emission CT (SPECT) may be of value in select cases.

### P-37

#### CT measurement of visceral fat: an index of measuring lean vs. body fat ratio

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**INTRODUCTION:** BMI, ratio of height versus weight, has long been used as a measure of obesity but ignores the contribution of lean body mass to the overall weight. An increase in lean body mass is not a poor prognostic indicator as compared to an increase in total body fat but it does contribute to an increase in total body weight. Thus it becomes essential to differentiate the two. Body fat is of two types, subcutaneous and visceral. Visceral fat is more harmful than subcutaneous fat and is associated with a theoretically increased risk of

heart diseases, hypertension and insulin resistance type II diabetes mellitus. A CT based software helps in the estimation of both types of fat separately.

**METHODS:** In our study we enrolled 100 patients and assessed their BMI. All of them underwent a non contrast CT abdomen and the visceral fat was calculated. The patients were then grouped according to gender and age. It was found that the BMI did not accurately predict the amount of visceral fat. A linear trend was also seen with regards to the visceral fat and increasing age. Age for age the amount of visceral fat was more in males as compared to females.

**CONCLUSION:** Thus CT based assessment of visceral fat can be used as a predictor of increased risk for cardiovascular diseases, hypertension and diabetes.

### P-38

#### **Synchronous bilateral intracystic papillary and invasive ductal breast carcinoma in a young female: a rare entity**

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Intracystic Papillary breast carcinoma is a rare entity of invasive breast cancer accounting for approximately 0.5%. It is most frequently seen in elderly postmenopausal women with age range between 55- 76 years. It also occurs in males and is the second most common cause of breast carcinoma in males. Only few cases of intracystic papillary carcinoma of breast has been reported in women less than 40 years of age. This article reports a case of synchronous bilateral intracystic papillary carcinoma and invasive ductal carcinoma of breast in a 34 year old female. Its occurrence in a young female is a novelty. This case is also unique due to synchronous and bilateral involvement. Furthermore, it was co-existent with invasive ductal carcinoma which has been associated with it in only 40% of the cases.

### P-39

#### **Tuberculous arthritis of hip joint presented as bilateral asymmetrical joint involvement: a rare entity**

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Tuberculosis (TB) commonly affects the pulmonary system, but it can affect virtually any organ system of the body. Extra-pulmonary involvement is noted in approximately 14% of patients, with 1% to 8% having osseous disease. Since the bone and joint TB is secondary to primary pathology somewhere else in the body, investigations should aim to find the primary site of lesion, like lungs, lymph nodes, etc. Usually TB arthritis is a monoarticular disease but in our case patient has TB arthritis in bilateral hip joints.

**CASE:** A 26-year-old male patient came to our hospital with pain in both hip joints which he had on and off for 3 years, now he developed severe backache and difficulty in walking, the pain was more in right hip joint and radiating to right lower limb. He had no history of fever or weight loss. His MRI revealed mild periarticular erosions along both hip joints with reduced joint space. Synovial proliferation/thickening noted bilaterally with minimal joint effusion, furthermore a large psoas collection was appreciated on left side which led the radiologist towards diagnosis of tuberculous arthritis. The patient underwent u/s guided abscess aspiration, gram staining and C/S was done the results was positive for TB.

**CONCLUSION:** Early diagnosis and effective chemotherapy are vital to save the joint. In view of the nonspecific findings early in the course of the disease,

failure to consider TB can lead to devastating outcomes. Although tuberculous arthritis is a monoarticular disease but in our case it presented as bilateral asymmetrical involvement where presence of psoas abscess led to the diagnosis.

### P-40

#### **Extraskelatal Ewing's sarcoma of labia majora with cranial metastasis: a case report**

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**INTRODUCTION:** Sarcomas account for about 2% of all cancers and only 1-3% of all malignant neoplasms with vulvar location. Ewing family of tumours (EFTs) are extremely rare in the vulva and vagina, with only 17 previously reported cases. EFTs along with metastasis are even more rare. We here report Primary Ewing's sarcoma of labia majora in a 12 year old girl and its first constellation with cranial metastasis.

**CASE REPORT:** A 12 year old girl with no significant medical history presented with a large painless vulvar mass involving the right labia majora. Initially, it was treated as a large bartholin cyst. As the size increases MRI Pelvis was done. A large exophytic lobulated soft tissue lesion was seen arising from right labia majora crossing the midline and causing pressure effect over the left labia majora. Multiple enlarged lymph nodes were also present involving bilateral inguinal and right external iliac chain. Radiological findings were suspicious of a neoplastic mass lesion and biopsy of the lesion was recommended that confirmed Extraskelatal Ewing's Sarcoma of vulva. 3 months later she developed a large infiltrating mass lesion involving right frontal bone with intracranial extraxial and extracranial soft tissue component representing metastasis.

**CONCLUSION:** Sarcomas of the vulva are rare malignant neoplasms which often lead to misdiagnosis. They are characterized by non-specific clinical manifestations, aggressive behavior, high metastatic potential, and mortality. It is important to consider vulvar sarcomas in the differential diagnosis of non-specific vulvar lesions in order to establish an early accurate diagnosis and appropriate treatment.

### P-41

#### **Extraskelatal Ewing's sarcoma of ethmoid with orbital extension: a rare case report**

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**INTRODUCTION:** Ewing sarcoma is a malignant, small round cell bone tumor, presenting predominantly in children and adolescents. Primary Ewing's sarcoma arising from head and neck region is rare, representing 1-4% of all cases.

**CASE REPORT:** 2 year old boy presented with unilateral proptosis for 3-4 months which progressively increased with duration. Initially, computed tomography (CT) of head was done which demonstrated a non-enhancing soft tissue mass involving right orbit. Subsequent magnetic resonance imaging (MRI) of the brain revealed a well-defined extraconal soft tissue mass lesion (2.3x1.8x3.3cm) in right orbit. It was compressing extra and intraconal fat with lateral displacement of eye along with proptosis. Medially, it was abutting the right lamina papyracea. Histopathology of the lesion confirmed extra skeletal Ewing's sarcoma of Ethmoid with positive Mic-2 CD99.

**CONCLUSION:** To the best of our knowledge, the availability of literature regarding extra skeletal Ewing's sarcoma of ethmoid with orbital extension is limited. However its involvement with extension of disease process is important to determine the treatment modality for achieving fairly good outcome.

**P-42****Non-alcoholic Wernicke's encephalopathy and MRI brain; Can neuroimaging help in decision making and troubleshooting**

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Wernicke's encephalopathy (WE) is an acute encephalopathy primarily caused by acute thiamine deficiency. It is a neurological emergency and thiamine replacement can prevent permanent neurological damage and even death. Chronic alcoholism is the most common cause worldwide. Other causes are prolonged starvation, systemic malignancy, prolonged parenteral nutrition, hyperemesis gravidarum, bariatric and bowel surgeries. Despite over a century of reports about this condition, diagnosis is not uncommonly delayed, if not missed altogether.

In countries like Pakistan where alcohol is prohibited and majority of the population is non-alcoholic the clinical suspicion of Wernicke's encephalopathy is usually low which leads to delay in diagnosis or even death if remain undiagnosed. Usually clinical history and neurological examination are sufficient to make the diagnosis of as it remains a clinical diagnosis. Non-alcoholic Wernicke's encephalopathy always remain a diagnostic challenge to the physician in our part of the world because of lack of awareness and less number of cases. The real challenge comes which patient has multiple co morbidities and admitted in intensive care receiving total parenteral nutrition or chemotherapy secondary to bowel surgeries or treatment of malignancy. Furthermore, in drowsy and comatose patients one cannot perform clinical examination per se. In this case series we have included 5 patients after taking informed consents. All were non-alcoholic and presented with multiple co morbidities (2 cases have disseminated malignancies and 3 cases have post-laparotomy status). During hospital stay, in addition to their primary complains, these patients developed altered mental status and drowsiness. All the patients received total parenteral nutrition (TPN) during hospital stay. Initial neurological examination and baseline metabolic workup was unremarkable. We have highlighted the lifesaving role of Magnetic resonance imaging in Wernicke's encephalopathy as all the case in this case series were diagnosed on the basis of magnetic resonance imaging findings and were given thiamine replacement and rapid clinical response was documented. Unfortunately 2 out of 5 patients succumb to death due to delayed in diagnosis and other co morbidities. Taking this into consideration we can conclude that non-alcoholic Wernicke's encephalopathy has high mortality when there is delay in diagnosis or left untreated or vice versa it has least mortality and morbidity if diagnosed early and promptly treated.

**CONCLUSION:** Early diagnosis of Wernicke's encephalopathy in nonalcoholic population is difficult but lifesaving because it prevents fatality and rapid recovery is indispensable with thiamine administration.

**P-43****Fibroscan experience at RMI in patients with chronic liver disease**

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Establishing the presence of fibrosis or cirrhosis in patients with chronic liver disease is important for assessment of prognosis and for evidence of progressive fibrosis in disorders such as hepatitis C virus infection or nonalcoholic fatty liver disease. Currently, liver histology obtained by percutaneous liver biopsy is the "gold standard" for the presence of fibrosis or cirrhosis. Liver biopsy carries a small risk for the patient, may be associated with procedure discomfort, and interpretation can be affected by sampling error and interpreter variability.

There is a relatively newer noninvasive radiologic technique to assess hepatic fibrosis, which relies on assessment of the effect of liver stiffness (fibrosis) on the velocity of transmission of a shear wave through the liver. 150 patients have

been evaluated in RMI with average of 20 patients having cirrhosis on ultrasound showed positive result on fibro scan. Ultrasound elastography, commercially known as Fibro Scan, uses a modified ultrasound probe to measure the velocity of a shear wave created by a vibratory source. Estimates of stiffness of the liver by ultrasound correlate with fibrosis stage. Ultrasound elastography can be performed in approximately 95% of patients, although older patients and patients who are obese can be more difficult to study. This technique has been evaluated most consistently in patients with chronic HCV disease.

Ultrasound elastography will separate patients with minimal or no fibrosis from those with advanced fibrosis or cirrhosis, although it may occasionally underestimate fibrosis in some patients with advanced fibrosis or macronodular cirrhosis.

**P-44****Thrombolysis and recanalization of acute portal vein thrombosis: review and case presentation**

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**P-45****Arteriovenous hemangioma of foot**

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**INTRODUCTION:** Arteriovenous malformation is a rare condition and spontaneous regression is also rare. Arteriovenous malformations may be present throughout a person's life with the origin time spanning from congenital abnormalities to manifestations thereafter from various stimuli such as trauma. The most common manifestations occur in the brain, lungs and lower extremity. One of the distinctive signs indicating the presence of an AVM is an auditory bruit, which one can assess during physical examination.

**CASE DISCUSSION:** 30-year-old female patient presented with complain of progressive painful swelling on planter aspect of right heel. He denied recent or remote trauma with unremarkable medical history. On physical exam, a tender cutaneous ulcerated wound was noted on plantar aspect of the foot. Further magnetic resonance (MR) imaging was subsequently performed for characterization of lesion. Concomitant ultrasound and x-ray was also done.

**CONCLUSION:** This case was reported as arterio-venous hemangioma / soft tissue vascular malformation. Histopathology report also confirmed the diagnosis (arterio-venous hemangioma). An extensive literature search yielded only few reports that have reported as arterio-venous hemangioma in foot.

**P-46****Primary Burkitt's lymphoma of gallbladder in young child; a very rare case entity**

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**INTRODUCTION:** Gall bladder is a rare location for primary lymphoma, even more rare presenting at younger age. The majority of cases involve secondary infiltration of the gallbladder consequent to widespread disease. Only around 50 cases reported in the medical literature and only single case of Burkitt's lymphoma. Here we report the very rare case of primary Burkitt's lymphoma of the gallbladder in a young patient.

**CASE REPORT:** A 12-year-old boy presented with right hypochondrial pain at some peripheral hospital. Abdominal sonography revealed edematous, mildly distended gallbladder filled with isoechoic mass with internal vascularity. CT shows a soft-tissue density mass in the gallbladder fossa. No focal liver pathology and lymphadenopathy was observed. Small and large bowel was normal. Surgery was performed and histopathological analysis, including immunohistochemical profiling, confirmed the diagnosis of Burkitt's lymphoma.

**DISCUSSION:** Primary malignant lymphoma of the gallbladder is extremely rare. Among malignant tumors of the gallbladder 98% are adenocarcinomas, while only 0.1-0.2% represents lymphomas. Low-grade MALT lymphomas and high-grade diffuse large B-cell lymphomas (DLBCL) are the commonest histological types encountered in the gallbladder lymphoma. We found only one series of 19 patients. Most of them were elderly (>50 years). Burkitt's lymphoma is a subtype of NHL. It constitutes about 40% of childhood NHL cases. It is endemic, non-endemic, or HIV-related. Unlike other forms of NHL, Burkitt's lymphoma presents as an extranodal disease. **CONCLUSION:** In case of incidental diagnosis of primary gallbladder lymphoma all patients should undergo a complete staging workup in order to determine the extent of the disease, as well as a follow-up surveillance. If the lesion is localized in the gallbladder (as in our case) cholecystectomy is considered to be sufficient. Otherwise, patients should undergo neoadjuvant therapy.

#### P-47

##### Role of MRI in the evaluation and management of female urogenital tract anomalies

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MR imaging continues to be an integral problem-solving modality in the evaluation of congenital anomalies of the female urogenital tract organs and provides effective clinical information for further appropriate management to the practicing gynecologist in those patients in whom sonography is technically suboptimal or the results are equivocal. MRI is considered the standard technique for imaging uterine anomalies. MRI provides high resolution images of the uterine body, fundus and internal structure. In addition, it can help to evaluate the urinary tract for concomitant anomalies. Most types of uterine anomalies can be diagnosed confidently using pelvic MRI.

Purpose of this poster presentation is to share our departmental experience of last 6 months in usefulness of MRI pelvis in evaluation of congenital urogenital abnormalities in females.

#### P-48

##### An exceptionally rare case report of iatrogenic intra-spinal subdural hematoma: MR imaging features

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**PURPOSE:** To present the imaging findings observed in iatrogenic intraspinal subarachnoid hematoma following lumbar puncture.

**BACKGROUND:** Spinal subdural hematoma is very rare but potentially life debilitating condition. Spinal subdural hematoma often developed acutely and may require immediate evacuation to prevent potential harm to the spinal cord. Predisposing factors includes trauma, lumbar puncture, bleeding diathesis, post spinal surgery and vascular malformations.

**CLINICAL PRESENTATION:** We present a case report of 4-year-old girl, on treatment for pre B Acute lymphoblastic leukemia. Patient underwent routine

intra-thecal chemotherapy via lumbar puncture. After two days, she presented to emergency with fever, severe pain at Lumbar puncture site and progressive paraplegia.

**IMAGING FINDINGS:** MRI whole spine was performed with IV gadolinium contrast demonstrated subdural and sub-arachnoid spinal hematoma in lower thoracic and lumbar spinal canal along with abnormal high cord signal extending up to the T6 vertebral level, likely representing cord edema.

**CONCLUSION:** Post lumbar puncture subdural/sub-arachnoid hematoma is rare complication and MR Imaging findings are highly sensitive for accurate diagnoses of this pathology.

#### P-49

##### Uterine artery embolization for the treatment of uterine fibroids; Initial experience of 4 patients at RMI

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**PURPOSE:** To evaluate the initial results of uterine artery embolization for the treatment of symptomatic uterine fibroids in 04 patients at our local population.

**MATERIALS AND METHODS:** Medical records and radiological images of 03 patients undergoing uterine artery embolization (UAE) in Rehman Medical Institute Peshawar (RMI) between 1st Jan 2016 to 27th September 2016 were prospectively analyzed with Age range of 28-50 years. All patients had sonographic diagnosis of uterine fibroids associated with menorrhagia and/or pelvic pain, who underwent MRI pelvis and uterine artery embolization with use of polyvinyl alcohol (PVA) particles. Single femoral access technique was used in all patients. Clinical improvement was assessed by detailed questionnaire for symptomatic improvement and follow up MRI.

**RESULTS:** All 4 patients had symptomatic fibroids. They were seen by Gynaecologist and interventional radiologists. After counselling they opted for embolization as preferred treatment. All 4 patients underwent technically successful embolization with foam coated PVA particles (500 microns). All 4 patients were discharged within 24 hrs of procedure. No immediate complications were observed in the treated patients, other than pain. So far we have clinical follow up of patients that show resolution of symptoms. Our protocol include MR follow up after 9 months.

**CONCLUSION:** Uterine artery embolization for fibroids is an alternate method for treating symptomatic fibroids. We aim to analyze our follow up data with larger number of patients in future.

#### P-50

##### Lipoma arborescens: A rare cause of knee swelling

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**INTRODUCTION:** Lipoma arborescens is a very rare synovial disease of unknown etiology involving the large joints. So far less than 100 cases of lipoma arborescens have been reported in literature. Knee joint is the most commonly effected joint with predominant involvement of the suprapatellar pouch. It is well known to be a monoarticular process, but polyarticular cases have also been reported. It is characterized by transformation of synovium due to infiltration of synovial tissue by adipocytes, giving rise to frond-like / tree-like villous synovial proliferation. It is believed to be a non-specific reaction to inflammatory or traumatic insult. There is strong association with trauma, chronic rheumatoid arthritis, osteoarthritis, psoriasis and baker's cyst. It

presents in 5<sup>th</sup> to 7<sup>th</sup> decade of life with male predominance. Clinically, it presents with atypical symptoms such as intermittent pain, swelling and movement restriction of the knee joint.

**CASE REPORT:** We are presenting a case of a 50-year old woman who came to our radiology department with gradually increasing pain and swelling of her left knee over the period of past 5 years. On physical examination, there was painful and doughy swelling in the suprapatellar pouch with limited range of movements. All laboratory tests were normal. Sonography of the knee revealed fluid collection within the suprapatellar bursa with thickening of the synovium and hyperechoic frond-like projections within. Plain radiograph showed evidence of osteoarthritis with marginal osteophytes, reduced joint space, erosion of articular margins and suprapatellar bursa fullness. No bony erosion was noted. Contrast enhanced MRI demonstrated frond-like synovial proliferations returning fat intensity signals on all pulse sequences within the suprapatellar, posterior intercondylar and popliteal regions. Diffuse enhancement of the synovium was also noted on T1W FAT SAT sequence. All these findings were highly in favor of lipoma arborescens with underlying arthritis of the knee joint. Patient was offered synovial biopsy. The histopathological findings reconfirmed the radiological diagnosis of lipoma arborescens.

**DISCUSSION:** MRI is the diagnostic modality of choice demonstrating hyperintense signals of fat on all pulse sequences. Differential diagnosis includes synovial lipoma, pigmented villonodular synovitis and synovial hemangioma. Synovectomy is the definitive treatment. Both open or arthroscopic synovectomy can be done with a favorable outcome. Postoperative recurrence is uncommon. In our case, patient refused surgery and is under observation.

**LEARNING POINTS:** Lipoma arborescence should be considered in the differential diagnosis of unexplained knee joint swelling. MRI provides definitive diagnosis for lipoma arborescens. Hyperintense synovial fluid on T2W and STIR images, with intra-articular frond-like villi of fat returning hyperintense signals on T1W image and hypointense signals on fat-suppressed images are the characteristic findings.

## P-51

### Temporal bone fractures in patients with head trauma: a retrospective one year review

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**INTRODUCTION:** Head trauma is a common injury to which all of us are susceptible because of high speed travel. Skull fracture affects 23-66% of patients with head trauma and approximately 4-30% of head injuries involve fracture of cranial base, including 18-75% of temporal bone.

**MATERIALS AND METHODS:** This is a retrospective one year review of 585 cases of head injury treated in Patel Hospital's Emergency Department and sent to the Radiology Department for CT Scan of Head from September 2014- August 2015. The study was done to evaluate the incidence and types of temporal bone fractures associated with head injury and to analyze these fractures by age, gender distribution, cause of injury, clinical presentation, site of involvement and outcome.

**RESULTS:** Out of 585 patients, 71 patients were diagnosed to have temporal bone fracture. The incidence in this study was 12.1%. Majority of the patients were male 87.32% and were between 30-40 years of age 50.7%. The major cause of injury was found to be Motor vehicle accidents (MVA) 84.5%. The right side was involved more than the left side 63.38% of the cases. Most of the patients clinically present with otorrhea 53.52%. and the next common presentations were otalgia and otorhinorrhea 14.08%. Longitudinal type of fracture was most frequent accounts for about 63.38% of the cases. The most commonly involved part was petromastoid portion of the temporal bone 81.69%. 21.12% patients died due to severe traumatic brain injury associated with temporal bone fractures.

**CONCLUSION:** The temporal bone fracture is frequently associated with severe traumatic brain injury leading to serious long term morbidity and sequelae. These injuries are frequently overlooked while treating more life threatening injuries in emergency departments. Computerized tomography of high resolution in temporal bones is helpful in early detection of the fracture and its extensions

## P-52

### Outcome of RFA for HCC in RMI - 3 patients

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**PURPOSE:** To evaluate the initial results of radiofrequency ablation (RFA) for the treatment of hepatocellular carcinoma in 03 patients at our center.

**MATERIALS AND METHODS:** 3 patients underwent radiofrequency ablation (RFA) in radiology department of Rehman Medical Institute Peshawar (RMI) between July 2015 to July 2016 under general anesthesia with age range of 19-50 years. All patients had confirmed radiological and biochemical diagnosis of HCC. Procedure was performed under general anaesthesia with fluoroscopy / ultrasound guidance. Clinical response was assessed by follow up with dynamic CT liver on 128 slice Toshiba MDCT scanner.

**RESULTS:** All 3 patients underwent technically successful procedure with complete ablation of the lesion with a 1 cm margin. On follow up imaging no residual vascularity/tumour was demonstrated. All patients were discharged next day after the procedure. Majority of patients experienced post procedure pain of various intensities which was treated conservatively. No other procedure related significant complications were seen. No recurrent or new tumor was demonstrated on follow up till date.

**CONCLUSION:** We conclude from our results that hepatomas responded to RFA with no recurrence or residual disease till 12 months follow up. Recommendation: Further studies with larger patient population should be done for definitive results.