

**Abstracts presented at the 29th Annual Conference of
Radiological Society of Pakistan
held on December 13th to 15th 2013, in Rawalpindi, Pakistan**

Venue : Pearl Continental Hotel

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29th Annual Conference 2013 Radiological Society of Pakistan Abstracts

Novel Computed Tomographic Chest Metrics to Detect Pulmonary Hypertension

Shama Aslam, Nosheen Ahmad, Asim Shaukat
Department of Radiology Allied Hospital, Faisalabad, Pakistan.

OBJECTIVE: Early diagnosis of pulmonary hypertension (PH) can potentially improve survival and quality of life. Pre-defined measurements utilizing computed tomography (CT) of the chest may be an alternative non-invasive method of detecting early PH.

METHODS: 40 patients with early pulmonary hypertension diagnosed on right heart cath. (RHC) were included in the study, as RHC is gold standard for diagnosis of pulmonary hypertension. Non-ECG gated CT scans of the chest were performed using 128 slice MDCT in Allied Hospital FSD. Our standard reconstruction protocol utilized helical technique, 5 mm slice every 5 mm with 1.25 mm every 1.25 mm reconstruction as well. The RHC's and chest CT's were performed a mean of 3 days apart. Following parameters were used on CT for diagnosis of pulmonary hypertension main pulmonary artery (PA) diameter ≥ 29 mm, right descending PA diameter ≥ 19 mm, true right descending PA diameter ≥ 16 mm, true left descending PA diameter ≥ 21 mm, rightventricular (RV) free wall ≥ 6 mm, RVwall / leftventricular (LV) wall ratio ≥ 0.32 , RV/LV lumen ratio ≥ 1.28 , main PA / ascending aorta ratio ≥ 0.84 and main PA / descending aorta ratio ≥ 1.29 .

RESULTS: 40 patients (26 women, 14 men) who were diagnosed as having pulmonary hypertension on RHC were included. Their mean age was 61.4 ± 15.6 years (median = 60; range 23 to 91 years). Out of these 40 patients 39 fulfilled criteria for PAH on CT scan.

CONCLUSION: Detecting PH using echocardiography is often insensitive in subjects with lung fibrosis or hyperinflation. Right heart catheterization (RHC) for the diagnosis of PH adds risk and expense due to its invasive nature. This easily measured CT based metrics, aid in the non-invasive detection of PH and hence a valuable, non invasive alternative to RHC.

Accuracy of Contrast Enhanced Computed Tomography in the Diagnosis of Malignant Mediastinal Masses

Farah Naz
Department of Radiology, Liaquat National Post Graduate Medical Centre, Karachi, Pakistan.

INTRODUCTION: The mediastinum is an anatomic portion of the thorax situated between two pleural spaces and contains many important structures. It is affected by various pathologies of primary and secondary nature. It can occur in both genders with peak incidence in third and fourth decade of life. The male to female ratio is 1.9:1.0.⁴⁴ The overall prevalence is 0.77% and the incidence comprise of 0.01%.⁴⁴ The majority of patients presented with chest pain, cough, dyspnea, fever and weight loss. It is becoming a global health problem. Thymic neoplasms are the most common anterosuperior mediastinal lesion (54%). Lymphomas are the second most common lesion (31%). Neurogenic tumors make up approximately 21% of all adult mediastinal tumors and comprises 35% of all pediatric tumors. 20% benign foregut cysts, 10% germ cell tumors, 5% thyroid masses, 5% mesenchymal and 2% pheochromocytoma occur in the mediastinum. The overall mortality rate is 3.8%.

Mediastinal masses are typically detected and localized on frontal and lateral chest radiographs, the initial imaging modality of choice, but it cannot pick small lesions. Chest x-ray can be normal in the presence of mediastinal disease. Further evaluation can be performed with ultrasound, computed tomography and magnetic resonance imaging depending on a combination of clinical presentation, age and location of the mass (i.e. anterior, middle and posterior mediastinum). Mediastinal sonography is used rarely in the united states. It might play a role in the diagnostic workup of mediastinal pathology as an adjunctive examination technique to other imaging studies. Computed tomography

is equal or superior to magnetic resonance imaging in the diagnosis of mediastinal tumors except for thymic cyst with hemorrhage or inflammation which mimic solid tumor despite low enhancement.

Computed tomography is the modality of choice in detecting the size, site, extent and contour of the mediastinal masses. It will differentiate vascular from neoplastic masses and is particularly useful for evaluating regions poorly demonstrated on conventional radiographs. Compared with conventional radiographic technique, transaxial computed tomography provides an unparalleled view of superimposed structures of mediastinum. With the help of computed tomography detection of enlargement of mediastinal components or mass is possible to an earlier stage. The inherent superior contrast sensitivity of computed tomography in chest allows estimation of density of most mediastinal structures and even without intravenous administration of contrast material in most patients airways, lymph nodes, vessels, thymus and esophagus can be distinguished. In some cases computed tomography is accurate in reaching a single diagnosis without a need for histopathological evaluation, Such as substernal goiter or teratoma containing tooth. If differential diagnosis is raised then needle biopsy is helpful in reaching a conclusion. However, in some cases needle biopsy strongly contraindicated such as in vascular pathologies or when the lesion is small and situated in close proximity to great vessels. Distinction is made possible between calcifications, lipomatous and serous fluids from lymphadenopathy, vascular anomalies and soft tissue masses with the help of contrast enhanced computed tomography. In one study, sensitivity of computed tomography is 95% with 95% specificity.⁴⁴ The main goal of this study is to determine a non invasive method for detection of mediastinal pathology.

OBJECTIVES: To determine the frequency of accuracy of contrast enhanced computed tomography in the diagnosis of malignant mediastinal masses.

OPERATIONAL DEFINITION: Accuracy of contrast enhanced computed tomography will be labeled as positive when computed tomography shows malignant mediastinal masses and confirmed by histopathology.

CT Features of Malignant Lesions:

- Malignant lesions are lobulated and solid.
- Shows extension of tumor in to the mediastinum or lung parenchyma, pleural deposits and irregular pericardial thickening suggesting pericardial implants.
- Size of malignant mass is greater than 3 cms.
- Presence of an irregular, hypodense mass with enhancing walls.

Histopathological Features of Malignant Tumors:

Slow to rapid growing tumors showing many mitotic figures, hyperchromatic nuclei, poorly differentiated with atypical architecture, infiltration of abnormal cells in to the surrounding tissue stimulate host reaction; desmoplasia, inflammation and necrosis. Localization of abnormal . Is in sites distant from tumor.

MATERIAL AND METHODS

Study Design: Cross sectional study.

Setting: Radiology department of Liaquat National Postgraduate Medical Centre, Karachi- Pakistan.

Duration of Study: Eight months after approval of synopsis.

Sample Size

Sensitivity = 95% (12)

Specificity = 95% (12)

P = 95% (Proportion of carcinoma of mediastinum)

C.L. = 95% (Confidence level)

D = 4% (margin of error)

N = 115 cases

Total sample size required 115 subjects

Sampling Technique: Purposive sampling.

Sample Selection:

Inclusion Criteria:

- All Patients between 30 to 70 years of age including male and females will be included in the study who came with signs and symptoms for more than six months and x-ray chest showing mediastinal widening by soft tissue mass

compressing the mediastinal structures and making an obtuse angle with adjacent lung and referred for CT scan.

- CT scan will be performed in all such patients and their histopathological reports will be followed.

Exclusion Criteria:

- Patients who will have not gone through histopathological diagnosis.
- Cases which will be lost to follow up.
- Patients who will have normal chest x-ray.
- Patients who will be known and previously treated for mediastinal pathology.
- Patients with post radiation and post chemotherapy.
- Patients having known allergy to contrast media.
- All the above mentioned patients will be excluded from the study in order to avoid bias in study.

Data Collection Procedure: Cases fulfilling the above mentioned criteria will be selected through purposive sampling from the pool of the patients with chest x ray showing mediastinal widening and who will be referred to radiology unit of Liaquat National Hospital Karachi for computed tomography for the diagnosis of mediastinal masses and undergoing biopsy for confirmation of diagnosis. Approval from ethical committee of our institute will be taken. Purpose of study will be explained including the risks and benefits. After taken an informed consent, proforma will be filled for name, sex, age and patient's ID number. Computed tomography in our centre is performed on Toshiba Asteion Multislice CT Scanner before and after I/V contrast administration. Scan will be performed by five year or more experienced technician in axial and coronal planes. Non ionic iodinated contrast will be given at a dose of 1.5 2.0 ml per kg with power injector at 2.0 3.0 ml per second.

Scanning protocols will be 7 mm section thickness from the root of the neck to upper poles of both kidneys. 5mm slices will be taken in small masses i.e. less than 2cm, reconstruction interval 10 mm, 200 mA, 120 KV.

The image interpretation of mediastinal masses will be done by consultant radiologist minimum five years experienced. Computed tomography findings of mediastinal masses will be established. Regardless of scan result suggestive of any diagnosis, histopathological findings of each patient will be followed. All information will be documented with the proforma by the researcher.

Data Analysis Procedure: SPSS 13.0 will be used for analyzing data. Descriptive analysis will be done. Male to female ratio for gender and mean \pm SD forage distribution will be computed. Stratification will be done with regards to age, sex and duration of signs and symptoms to see the effect of these on outcome. Frequency and percentages will be calculated for accuracy of contrast enhanced computed tomography.

Compliance with Joint Commission International Standards in Communicating Critical Findings on CT Chest: Initial Experience from a Tertiary Care Hospital in a Developing Country

Muhammad Awais, Kiran Hilal, Adeel Ahmad
Department of Radiology, Aga Khan University Hospital, Karachi, Pakistan.

PURPOSE: As an integral part of Patient's safety improvement goals, Joint Commission International (JCI) emphasizes timely dissemination of critical radiology findings to the primary team, which if not promptly communicated can cause significant morbidity and mortality. Our radiology department has implemented the policy of reviewing all CT chest within three hours by a resident and communicating critical findings to the primary team, in accordance with JCI's standard. In this study, we assessed the compliance of our department in this regard.

MATERIALS AND METHODS: All CT chest performed during 1st quarter of 2012 and 2013 at our institution were retrospectively reviewed on hospital PACS system. Comparison was made between 2012 and 2013 in terms of total percentage of CT that were timely evaluated, critical findings that were accurately

communicated, discrepancy rate between resident and radiologist's final report, and the mean time for reviewing the CT.

RESULTS: In 2012, a total of 283 (88.92%) out of 316 CT chest were evaluated and 234 (74%) were reviewed within three hours. In 2013, total of 429 (89.37%) out of 480 were reviewed and 373 (77.7%) were reviewed timely. 32 scans (10.1%) had critical findings in 2012 and 20 (62.5%) of these were accurately communicated. Whereas in 2013, out of 51 (10.6%) critical findings, 37 (72.54%) were accurately and timely communicated. The overall discrepancy rate in identification of critical finding between resident and radiologist was 3.8% in 2012 and 2.9% in 2013. The mean time to review the CT scan was 2 hour 12 minutes and 1 hour 55 minutes in 2012 and 2013 respectively.

CONCLUSION: There was overall high compliance to the department's panic protocol in both 2012 and 2013 with low discrepancy rates. We encourage other hospitals to implement their own panic protocols in order to improve timely care and management of patients.

Solitary Pulmonary Nodule

Ahsan Ali, Shabbir A Naeem, Ashfaq Hussain
Department of Radiology, Sindh Institute of Urology and Transplantation (SIUT), Karachi, Pakistan.

Pulmonary nodules are a common incidental finding on imaging studies, particularly MDCT. Advances in CT and PET have improved characterization of nodules, helping to differentiate benign from malignant lesions noninvasively.

There is considerable overlap in the internal characteristics (e.g. attenuation, cavitation, wall thickness) of benign and malignant nodules. Initial evaluation often result in nonspecific findings, in which case nodules are classified as indeterminate and required further evaluation to exclude malignancy.

In this review, we discuss the role of imaging in the detection and characterization of pulmonary nodules, emphasizing the impact of advances in CT technology on management strategies.

Role of CT Angiography as Primary Diagnostic Modality in Post Traumatic Vascular Injuries

Sadia Babar, Muhammad Umar Amin, Ahmed Kamal, Awais Ahmed, Rashid Nazir, Atif Rana, Muhammad Yousaf Chaudhary
Department of Radiology, Shifa International Hospital, Islamabad

OBJECTIVE: The purpose of this study was to retrospectively assess the role of MDCT angiography as initial diagnostic technique to depict arterial injury in patients with trauma.

MATERIALS AND METHODS: The study was performed at Radiology Department of Shifa International Hospital, Islamabad from January, 2011 to June, 2013. 30 patients (Age range, 16/77 years) with clinically suspected arterial injury after trauma underwent multi slice MDCT angiography. In 19 patients, the presence of arterial injury was diagnosed prospectively by radiologist. The arterial lesions were characterized as spasm, stenosis, occlusion, pseudoaneurysm, AV fistula and rupture. The mechanism of injury, site of injury and associated findings were assessed.

RESULTS: CT angiography detected arterial lesions in 19 patients. Out of 19, 5 had arterial spasm, 6 had arterial stenosis, 2 were diagnosed with occlusion, 4 with pseudoaneurysms, one had AV fistula and one had arterial rupture. The mechanism of injury in 18 patients was blunt injuries, while 12 had penetrating injuries. Site of injuries were characterized as intracranial, neck vessels, aortic and peripheral vascular injuries. Associated findings were fractures, hematomas, air in the soft tissues and associated muscular injuries.

CONCLUSION: MDCT angiography is an excellent modality in detection and characterization of traumatic arterial injuries.

CT Findings of Post Chemotherapy Lung Diseases Emerging Challenge for Radiologists

Ummara Siddique

Department of Radiology, Rehman Medical Institute and Rehman Medical College, Peshawar

PURPOSE: To diagnose and characterize different CT patterns of post-chemotherapy lung diseases and to emphasize the fact that by recognizing the relevant findings and providing a complete differential diagnosis, radiologists play important role in patient care.

MATERIALS AND METHODS: A total of 50 patients, age range of 6 to 75 years, were investigated using 128-slice Multidetector Computed tomography (MDCT) scanner in the Radiology department of Rehman Medical Institute Peshawar. 0.5 mm reconstructed images in lung window and 3mm images in mediastinal window were viewed on workstation in axial, coronal and sagittal planes. The data was processed using Microsoft excel 2007.

RESULTS: Post-Chemotherapy lung diseases can manifest as early onset with infiltrates, pulmonary edema, hypersensitivity reaction, or pleural effusions or as late onset, after 2 months or more of therapy, with infiltrates or fibrosis. Five basic radiologic patterns described on CT scan (1) a nonspecific area with ground-glass attenuation, (2) multifocal areas of airspace consolidation, (3) patchy distribution of ground-glass attenuation accompanied by interlobular septal thickening, (4) extensive bilateral ground-glass attenuation or airspace consolidations with traction bronchiectasis and (5) nodules of variable sizes randomly distributed in both lungs. The most common pattern was found to be patchy areas of ground-glass attenuation.

CONCLUSION: Pulmonary diseases that are induced by chemotherapy or atypical infections in immunosuppressed patients represent particular challenges for radiologists due to their nonspecific and atypical imaging features. The radiologist should be aware that patients can be asymptomatic in early stages and that radiologists play instrumental role in reporting post-chemotherapy pulmonary manifestations to referring physicians.

ROLE of MDCT Coronary Angiography with 64 Slice Technology to Detect the Coronary Artery Diseases: A Fast Developing Technology

Waseem

AIMS: The aim of my study was to investigate the accuracy of 64 slice computed tomography (CT) for assessing hemodynamically significant stenoses of coronary arteries.

METHODS AND RESULTS: CT angiography was performed in 62 patients (50 male, 12 female) with suspected coronary artery disease and compared with invasive coronary angiography. All vessels were considered for the assessment of significant coronary artery stenosis. Sixty two patients were identified as having significant coronary stenoses on invasive angiography with 56% (140 / 248) affected segments. CT correctly identified all 7 patients having no significant stenosis on invasive angiography. Overall sensitivity for classifying stenoses was 96%, specificity was 80%, positive predictive value was 98%, and negative predictive value was 67%.

CONCLUSION: Sixty four slice CT provides a high diagnostic accuracy in assessing coronary artery stenoses.

Missed Lung Cancer In Chest X-ray

Muhammad Kashif Khan

Chest X-rays are one of the commonest radiological examination performed and interpreted by almost all the radiologists. Lung cancers are one of the most common cancers, the incidence of which is on the increase. Missed lung cancer is an important medicolegal issue and is the second leading cause for malpractice actions against radiologists.

PURPOSE: Aim of the study is to find the number of missed cancers from the chest X-ray examination of those patients who are diagnosed to have lung cancers.

MATERIAL AND METHOD: No standard or figures available from the radiological societies about acceptable missed lung cancer rate. Literature showed a range of missed lung cancer rates from 20% to 60%. Recent studies revealed a missed cancer rate of 20%. Therefore it was locally agreed to have a target that 80% of chest X-rays should diagnose lung cancer. 334 patients were diagnosed to have lung cancer in the year. 55/306 patients qualified for the study by having one or more chest X-ray performed in the preceding 12 months from the time of their diagnosis. The remainder of 251/ 306 patients did not qualify for the study as they did not have any chest X-ray in the preceding 12 months. The resulting 104 chest X-rays were randomly mixed with 37 non cancer chest X-rays from the same year. Three readers who were blinded to the above read them independently. They marked their observations and graded the abnormal region on a scale of 1 to 5. The resulting observations were added for each chest X-ray, discarding the grading scores for false positive findings. 37/ 50 patients chest X-rays obtained high scores.

RESULT: At this stage, the missed lung cancer rate for this study was 12.10%. However the high scoring chest X-rays of 37/50 patients were subsequently panel read by the whole team and the original reports concerning each chest X-ray were compared.

CONCLUSION: Missed lung cancer from study was 16 out of 306 patients=5.23%.

Rasmussen's Aneurysm: A Forgotten Entity?: A Case Report

Taha Khalil, Sadaf Shahzeb, Rabiaa Mahmood Ali, Abdul Sattar

Department of Radiology, Nishtar Medical College and Hospital Multan

ABSTRACT: This is a case of a rare entity which is a complication of a disease process Mycobacterium tuberculosis (TB), it is important to recognize complications and sequelae. A rarer etiology of hemoptysis in TB is due to pulmonary arterial bleeding from a Rasmussen's aneurysm. Despite Rasmussen's aneurysms being reported in up to 5% of autopsy series of patients with cavitary lesions, relatively few case reports exist in the literature. This is a case of a female patient aged 60 years who was a diagnosed TB patient and now presented with hemoptysis for 1 month. CT chest post contrast and pulmonary CTA were carried out which showed a dilated vascular structure based on attenuation originating from right pulmonary artery.

An evaluation of risk to benefit ratio in Routine chest radiography of ICU patients. Are we meeting the international standards?

Farah Akram, Iffat Mustafa

Department of Radiology, Shaukat Khanum Memorial Cancer Hospital & Research Centre, Lahore, Pakistan.

OBJECTIVE: To evaluate the significance of daily routine chest radiography in terms of specific findings and the associated radiation hazards in ICU patients.

MATERIALS AND METHODS: A prospective study was conducted in Shaukat Khanum Memorial Cancer Hospital & Research Centre. A total of 523 chest radiographs of ICU patients were included in this study in a duration of 3 months. Any radiography other than daily routine chest radiography were excluded e.g. those ordered for specific clinical conditions such as post procedure or a medical emergency situation. Reports of these radiographs were followed and compared with previous reports to evaluate the risk to benefit ratio of routine chest radiography.

RESULTS: Out of 523 radiographs, 419 radiographs resulted in significant clinical findings out of those, 259 resulted in better medical condition than before and 160 radiographs resulted in new findings that did not appear in previous radiographs, hence chest radiography was justified in these patients. However in 104 patients, there were no significant findings in chest radiography.

CONCLUSION: The study shows that routine chest radiography in ICU patients is significant but it also renders unjustified radiation exposure to a large number of patients. The ACR guidelines also recommend that a portable chest radiograph is appropriate for clinical indications only e.g., after placement of an endotracheal tube, central venous line, nasogastric tube, feeding tube, or chest tube.

ROLE of MDCT coronary Angiography with 64-slice technology to detect the Coronary Artery Diseases: A Fast-Developing Technology

AIMS: The aim of my study was to investigate the accuracy of 64—slice computed tomography (CT) for assessing hemodynamically significant stenoses of coronary arteries.

METHODS AND RESULTS: CT angiography was performed in 62 patients (50 male, 12 female) with suspected coronary artery disease and compared with invasive coronary angiography. All vessels were considered for the assessment of significant coronary artery stenosis. Sixty two patients were identified as having significant coronary stenoses on invasive angiography with 56% (140 / 248) affected segments. CT correctly identified all 7 patients having no significant stenosis on invasive angiography. Overall sensitivity for classifying stenoses was 96%, specificity was 80%, positive predictive value was 98%, and negative predictive value was 67%.

CONCLUSION: Sixty-four-slice CT provides a high diagnostic accuracy in assessing coronary artery stenoses.

Imaging of Perineural Tumor Spread Associated with Head and Neck Malignancies Neuroradiologist at Forefront

M. Umar Amin

Department of Radiology, Shifa International Hospital, Islamabad, Pakistan.

INTRODUCTION: Head and neck malignancies may spread along the neural sheath by a process known as perineural tumor spread (PNS). PNS most commonly occurs in a retrograde direction, toward the central nervous system, but also can occur in an antegrade manner. Because PNS may be asymptomatic, it is critical that radiologists be vigilant in their efforts to detect it prior to the institution of therapy. The finding of PNS may convert a lesion thought to be curable into a noncurable one. PNS may also mean that radiation fields need to be expanded to encompass the tumor spread, or provide indication for some type of focused radiotherapy to nonresected tumor components.

OBJECTIVES: Objective of the study was to identify the most common anatomic locations and tumor histologies associated with PNS.

METHODOLOGY: The study was performed in The Radiology And Imaging

Department, Shifa International Hospital, Islamabad, Pakistan. A total of 235 patients were included in the study. All MRI scans were performed on 1.5 T MRI. Ct scans were performed on 320 slice CT (Toshiba). PNS was evaluated after carefully scrutinizing Ophthalmic Division of the Trigeminal Nerve (V1), Maxillary Division of the Trigeminal Nerve (V2), Mandibular Division of the Trigeminal Nerve (V3) and facial nerves. The branches of these nerves were either directly evaluated as well as the foramina through which these branches supply head and neck. Imaging findings which were specifically evaluated included widening or destruction of neural foramina / canals, excessive enhancement within neural foramina / canals, or excessive enhancement or widening of the cavernous sinus, PPF, or Meckel's cave. In addition, the loss of fat planes immediately adjacent to neural foramina or within the PPF, even in the absence of abnormal enhancement, widening, or bone destruction, were highly suggestive findings of PNS.

RESULTS: 67 patients were found to have perineural spread. Cutaneous malignancies, particularly squamous cell carcinomas, desmoplastic melanomas, minor salivary gland cancers such as adenoid cystic carcinoma, primary tumors in the palate, nasopharyngeal carcinoma, and parotid gland malignancies were associated with highest number of PNS.

CONCLUSION: It is of prime importance for the reporting neuroradiologist to be familiar with the relevant neuroanatomy and a thorough knowledge of pathways of perineural spread so that proper interpretation of PNS can be diagnosed.

To Study the Value of Different MRI Features of Cervical Lymph Nodes in Detecting Cervical Metastasis in Squamous Cell Carcinomas of Head and Neck (HNSCC)

Muhammad Umer Nasir, Ahmed Bilal

Department of Radiology, Shaukat Khanum Memorial Hospital Lahore, Pakistan.

OBJECTIVE: To study the value of different MRI features of cervical lymph nodes in detecting cervical metastasis in squamous cell carcinomas of head and neck (HNSCC).

BACKGROUND: Majority of head and neck tumors spread to cervical nodes as part of their natural history. Accurate evaluation of cervical lymph node metastases in HNSCC is not only an important prognostic indicator but also plays a pivotal role in choice of management. Primary role of imaging is to confirm status and extent of cervical adenopathy along with nodal surveillance for follow-up.

MATERIAL AND METHOD: Two radiologists evaluated 54 patients retrospectively in which lymph node characteristics were assessed with histopathological correlation as gold standard. Assessed criteria were the short axial diameter of ≥ 8 mm, border irregularity of nodes i.e. speculated / indistinct versus smooth / lobulated and homogeneity of signal intensity on T2 weighted images. Specificity, sensitivity and specificity were calculated for each of the morphological features of cervical lymph nodes namely size, shape and signal in predicting nodal metastasis.

CONCLUSION / RESULTS: Sensitivity, specificity and accuracy of short axial diameter (mm) ≥ 8 mm are 75%, 89% and 82%. Sensitivity, specificity and accuracy of border criteria on T2 weighted images are found to be 77%, 89% and 83%. Sensitivity, specificity and accuracy of signal intensity on T1 weighted images are calculated at 73%, 69% and 71%. Morphological criteria in addition to size can significantly improve the detection of cervical lymph node metastases on MRI in patients with HNSCC.

Comparison of Contrast Enhanced Fluid Attenuated Inversion Recovery Sequence and Contrast Enhanced T1 Weighted MRI Sequence in the Diagnosis of Meningitis

Fahd Haroon, Syed Mahmood, Haji Haroon, Anwar Adil
Karachi X-rays, Ultrasound and CT Scan Centre, Karachi, Pakistan.

PURPOSE: Contrast enhanced T1 WI is routinely used in diagnosis of meningitis but recently contrast enhanced FLAIR sequence has been found to be a much better MRI sequence in diagnosis of meningitis. The purpose of our study is to compare frequency of contrast enhanced fluid attenuated inversion recovery sequence (FLAIR) and contrast enhanced T1 weighted MRI sequence in correct diagnosis of meningitis.

MATERIALS AND METHODS: This retrospective study was carried out at Radiology Department of Aga Khan University Hospital. 85 patients of either gender with signs and symptoms of meningitis that were referred for MRI were included by consecutive purposive sampling. Out of these 5 patients were excluded who were diagnosed with meningitis or had taken antibiotics. Remaining 80 patients were enrolled in my study. Frequency of diagnosis of meningitis on contrast enhanced FLAIR and contrast enhanced T1 WI was calculated in each case and McNemar test applied to compare the results.

RESULTS: The mean age were $30.65 \pm SD 21.25$ years ranging from 3 months to 75 years. Out of 80, 77 were positive on contrast enhanced FLAIR images and 65 were positive on contrast enhanced T1W images. Hence, the frequency of diagnosis of meningitis of contrast enhanced FLAIR was 96.25% and that of contrast enhanced T1WI was 81.25%. McNemar test was applied to see statistical significance at 95% confidence interval; which was statistically significant with pvalue of 0.01 ($p = 0.01$).

CONCLUSION: Our study suggests that contrast enhanced FLAIR in MRI examination is a better sequence than T1WI in diagnosis of meningitis.

The Role of Quantitative Neuroimaging Indices in the Differentiation of Ischemia from Demyelination

Nosheen Ahmad, Bushra Riaz, Asim Shaukat
Department of Radiology Allied Hospital, Faisalabad, Pakistan.

BACKGROUND AND PURPOSE: Differentiation of acute and subacute ischemic stroke lesions from acute demyelinating lesions of multiple sclerosis (MS) may not be possible on conventional magnetic resonance imaging (MRI). Both lesion types enhance on T1 with gadolinium (Gd) contrast and both are hyperintense on diffusion-weighted imaging (DWI). This study is an analysis of two quantitative MR indices: (1) calculated apparent diffusion coefficients (ADCs) and (2) T2 relaxation times (T2R) as means toward differentiating acute ischemic lesions from acute demyelinating lesions. Chronic ischemic and demyelinating lesions were evaluated for comparison as well.

METHODS: The MRI of nine patients with both acute and chronic ischemic lesions and six patients with both acute and chronic demyelinating lesions were analyzed for ADC and T2Rs. The indices were measured by manually placing regions of interest (ROIs) at the anatomic center of the acute lesion. Acute ischemic lesions were chosen by their hyperintensity on DWI and hypointensity on ADC mapping. Acute demyelinating lesions were selected by peripheral contrast enhancement after the administration of Gd. Computation of the ADC and T2R was made and analyzed.

RESULTS: Twenty nine acute ischemia, 27 acute demyelination, 28 chronic ischemia, and 43 chronic demyelination image sets were analyzed. The differences between ADC (acute infarct) (0.760) versus ADC (acute plaque) (1.106) were significant ($p < 0.02$). The differences between T2R (acute infarct) (235.5) versus T2R (acute plaque) (170.5) were also significant ($p < 0.02$).

CONCLUSIONS: ADC in combination with T2R is a useful tool to differentiate acute ischemic from acute demyelinating lesions.

Quantitative and Qualitative Hippocampal MRI Assessment in Epileptic Patients

Shamaaslam, Asifa Ahmad, Asim Shaukat
Department of Radiology Allied Hospital, Faisalabad, Pakistan.

OBJECTIVES: To evaluate and compare qualitative and quantitative assessment of hippocampi in patients with epilepsy MRI.

METHODS: MRI analysis was done in 30 nonepileptic controls and 20 epileptic patients on 1.5 T scanner, visual assessment and volumetry were done on oblique coronal IR / T2W and T1W MP RAGE images perpendicular to long axis of hippocampus and measurements of controls compared with the patients.

The patients were divided into extratemporal ($n = 5$) and temporal ($n = 15$) groups based on clinical and EEG findings.

RESULTS: In epileptic patients loss of hippocampal volume was measured and provided maximum concordance with the EEG. Visual assessment of unilateral pathology concurred well with measured quantitative values but poorly in cases with bilateral pathologies. There were no significant difference of mean values between extratemporal group and controls group. Quantitative techniques detected mild abnormalities, undetected on visual assessment.

CONCLUSION: Quantitative techniques are more sensitive to diagnose bilateral and mild unilateral hippocampal abnormalities.

Tailored MRI Sequences in Providing Maximum Anatomic / Diagnostic Detail

Rab Nawaz Baloch, Naveed Ahmed, Tariq Mehmood Kamran Saeed
Usman Ahmed Chaudhary, Imtiaz Laghari
Department of Radiology, Jinnah Post Graduate Medical Centre (JPMC), Karachi, Pakistan.

Stereotactic Radiosurgery is relatively new in this country with Gamma knife. Cyberknife and Synergy S are the only available equipment. With advancement in Imaging especially new fast MRI sequences, the modalities that utilize both MRI and CT for the localization of lesion and planning (Gamma and Cyber Knife), it is very important to be more precise in MR sequences to reduce the imaging time and still achieve the required results. Moreover the planning protocols of SRS are almost similar with thin sections of 1-2 mm with matrix in binary fission (256 x 256 or 512 x 512). There should be no angle in imaging, neither CT nor MRI.

The aim of this presentation is to share our experience regarding MR imaging for Cyberknife treatment planning of intracranial lesions in first 100 cases.

We initially started with BTFE, 3D T1 contrast, thin T2 axial, axial Flair, but later we restricted to one or at most two sequences and that actually saved our imaging time without compromising the goals.

Role of DWI in Early Detection of Ischemic Stroke

Zoya Iaved Khan
Department of Radiology, Sindh Institute of Urology and Transplantation (SIUT), Karachi, Pakistan.

OBJECTIVE: Role of DWI in early detection of ischemic stroke and its correlation with the age of ischemic stroke.

MATERIAL AND METHODS: The patients were selected on a random basis from those at risk for acute cerebral ischemia. Patients, whose clinical presentation was suggestive of acute stroke, underwent a noncontrast CT scan of the head immediately, or within three hours of presentation. Those found negative for acute stroke on computed tomography imaging were subjected to diffusion MR imaging, in addition to conventional T1 W, T2 W, and FLAIR. DW imaging was performed as early as possible, but not later than 12 hours

of symptom onset. DWI and conventional MR imaging was repeated at approximately 30 (subacute stage) and 90 days (chronic stage) in the same patient.

The time course of changes in apparent diffusion coefficient (ADC) and signal intensity on diffusion-weighted magnetic resonance imaging (DW MR) imaging in acute ischemic stroke is a very dynamic event. There is an initial reduction in ADCs with no change on T₂W imaging but signal intensity increase on T₂ weighted takes place about 6-12 hours after onset of stroke. As necrosis begins to set in, there is a gradual reversal of ADC change, and around 3-10 days post-onset, ADC pseudonormalizes.

RESULTS: The mean signal intensity at $b = 0$ s/mm² and at $b = 1000$ s/mm² were significantly higher than control values for all time periods. The ratio of signal intensity at $b = 0$ (rSI $b = 0$) significantly increased from 1.63 ± 0.20 in the acute stage to 2.19 ± 0.24 in the chronic stage ($P < 0.001$). The ratio of signal intensity on DWI (rSIDWI) decreased from 2.54 ± 0.46 to 1.54 ± 0.22. The mean ADC in the lesion was found to be 41% lower than the mean ADC in the contralateral hemisphere.

CONCLUSION: We conclude that the above information could be useful in the management of very early stroke.

Indirect Decompression of the Neural Structures through Disc Space distraction

Hassan Farooq

PURPOSE: Indirect decompression of the neural structures through disc space distraction is feasible, but cage subsidence may limit this mechanism. The main goal of this work is to describe a new grading system, describe when and how the subsidence occurs.

METHODS: Retrospective analysis on prospective clinical study. Seventy-four patients (57.2 ± 14.8 y/o; BMI 24.9 ± 2.5). Standing lateral radiographs were performed preoperatively, postoperatively at 1 and 6 weeks, 3 and 12 months. Clinical outcomes were assessed by ODI and VAS up to 24 months. Standalone short-segment lateral lumbar interbody fusion was investigated. The fused segments were: 3 at L1L2, 7 at L2L3, 22 at L3L4, 66 at L4L5. Radiological measurements were done regarding segmental lumbar lordosis and subsidence occurrence. Subsidence grading followed a method that estimates the percentage of the cage is inside the vertebral body: 0-24% of subsidence-grade 0; 25-49% - grade I; 50-74% - grade II; 75-100% - grade III.

RESULTS: Subsidence was early detected at 6-week and didn't significantly progressed. Major subsidence defined as 50% or more of cage settling (grade II or III) occurred in 22% of all patients based on 12-month radiographs (22 of 98 total levels). Moreover, subsidence was seen to occur predominantly (68% of the cases) in the inferior endplate of the assessed intervertebral disc. VAS and ODI scores improved in the studied group but subsidence was found to influence clinical outcomes, once high-grade subsidence was correlated with transient axial back pain at 6-week follow-up point. In grade 0 and I cases disc height gain was observed in postoperative radiological assessments, in contrast to grade II and III cases. Lordosis gain was better achieved when the cage did not sink into the vertebra. Risk factors for high-grade subsidence were advanced age and female gender.

CONCLUSIONS: Cage subsidence has the potential to result in loss of disc height, stenosis, sagittal malalignment, and adjacent segment disturbances. Cage subsidence must be carefully evaluated at early follow-up. Methods for subsidence avoidance must be addressed.

Lower radiation dose adaptive statistical iterative reconstruction head CT examinations match quality of prior conventional dose studies

Muhammad Riaz Aamir
University of Lahore.

PURPOSE: Frequency of CT imaging and radiation dose to the population due to medical imaging are increasing. Some models project as many as 15,000 additional deaths due to induced cancers from medical radiation. It should be the goal of radiologists to minimize the radiation dose from a study while still providing images adequate for diagnostic evaluation. Adaptive statistical iterative reconstruction (ASIR) is a recently available reconstruction technique that, compared to filtered back projection (FBP) methods typically used in CT, provides a reduction in image noise and improvement in low contrast detectability.

Fig. 1: The number of CT scans performed per year has increased from 3 million to over 65 millions.

Fig. 2: The per capita effective radiation dose from medical imaging.

METHODS AND MATERIALS: I retrospectively reviewed the head CT examinations performed at our local institution using the ASIR technique between April and October, 2009. I found 42 scans performed with low radiation dose and ASIR on 38 patients. These patients also had 63 additional head CT exams that were performed with conventional radiation doses and FBP. Radiation doses for all exams were determined either from the dose length product recorded at the time of the study or by estimation using ImPACT 0.99x (Impact, London). The ASIR and FBP reconstructed images were quantitatively assessed for noise by measuring the standard deviation of HU in a 1 cm ROI in the right centrum semiovale.

Qualitative assessment of each study for overall quality and grey-white distinction was performed on a 4-point scale by three fellowship-trained neuroradiologists blinded to the reconstruction method.

The same 3 reviewers examined ASIR and FBP exams side-by-side (blinded to the reconstruction method) at W=90, L=40 and were asked which exam had better grey-white distinction.

RESULTS: Average radiation dose was reduced by 29% from 769 mGycm (FBP) to 546 mGycm (ASIR), $p=0.0001$.

Image noise was unchanged between the FBP and the ASIR reconstructed images. Four example comparisons are provided.

There was no statistical difference between the scores given for overall quality (2.1 v. 2.3, $p=0.1$) or for grey-white differentiation (2.1 v. 2.1, $p=1.0$) by the three evaluating neuroradiologists.

When shown the current and prior exams from the same patient side-by-side, blinded to the reconstruction technique, the evaluating neuroradiologists demonstrated no consistent preference for the results provided by one technique versus the other.

CONCLUSION: When compared to prior Head CT examinations performed on the same patient using conventional technique and FBP reconstruction, ASIR permitted a 30% reduction in radiation dose without compromising grey-white distinction or the overall quality of the study.

Early Diagnosis and Therapies for Acute Ischemic Stroke

Sameer Baig

PURPOSE: Rapid Recognition and Reporting of early, subtle signs of Acute Ischemic injury on CT and MRI. Comparison of CT and MRI in early Diagnosis of Acute Ischemic Stroke. Patient Selection for thrombolysis based on Imaging criteria. Patient Selection for endovascular therapies.

MATERIAL AND METHODS: Retrospective study on the response of patients to Intravascular thrombolysis and Endovascular interventions. With

the use of rtPA and novel mechanical devices such as The Concentric Retriever. Evaluation of early ischemic changes on Non-contrast enhanced CT (NCCT) in supine position. FOV: 240mm KV/effective mAS/collimation: 140/ 450/ 1x5.0 Slice thickness: 5mm .

RESULTS: A study by the National Institute of Neurological Disorders and stroke (NINDS) on 624 patients, showed that 50% of tPA-treated patients (within 3 hours of symptom onset) had excellent clinical outcomes (minimal or no deficit) at 3 months after treatment, compared with 38% of controls. However, a higher rate of symptomatic hemorrhage in the tPA group (6.4 vs 0.6%) was observed. The three month mortality rate was not significantly different between the groups. On the basis of the NINDS trial and the previously reported experience, intravenous tPA is the only drug currently approved in the US (by FDA) and its use endorsed in consensus guidelines, for the treatment of acute ischemic stroke.

CONCLUSION: Intravenous administration of rtPA (0.9mg/kg IV, Maximum 90 mg) within the first 3-6 hours, remains the most beneficial proven intervention for acute management of stroke. Several interventions, including intra-arterial administration of thrombolytic agents and mechanical interventions, show promise. Because many of the recommendations are based on limited data, additional research on imaging and treatment of acute ischemic stroke remains an emerging challenge in Vascular and Interventional Radiology.

Evaluation of sciatic nerve compression using MRI

Muhammad Sohaib Shahid

BACKGROUND: Sciatic pain is low backache and pain radiating in the territory of sciatic nerve roots. It causes numbness, tingling, hot, cold sensations and hypersensitivity through the sciatic nerve pathway. There are many causes of sciatica.

OBJECTIVE: To determine the most common cause of sciatic nerve compression using MRI in patients with backache and sciatica.

MATERIAL & METHODS: Ninety-Eight (98) patients presenting with backache and sciatica that may be unilateral or bilateral. Magnetic Resonance Imaging was the modality of choice to determine the most common cause responsible for sciatic nerve compression. The study design that had been adopted was observational descriptive study. The data was taken from the Radiology Department of Sir Ganga Ram Hospital, Lahore from 1st august 2012 to 31st January 2013.

RESULTS: The results shown that 97 (99%) patients had disc prolapse out of which 76 (76.8%) patients had Disc Bulges, 9 (9.1%) had Disc Protrusions whereas 12 (12.1%) had Disc Extrusions whereas it is absent in 1 (1%) patient. Spondylosis was found in 14 (14.1%) patients, Spinal stenosis in 27 (27.3%), Degenerative disease in 23 (23.2%), Thickened Ligamentum flavum in 14 (14.1%), Osteophytes formation in 13 (13.1), Spinal Tumor in 6 (6.1%), Infectious Spine disease in 1 (1%) and other causes in 10 patients (Spondylolisthesis in 5 (5.1%); Retrolisthesis in 1 (1%) ; Straightening of lumbar curve in 19 (19.2%) ; Tarlov Cyst in 3 (3%); limbus vertebra 1 (1%). The mean age of female patients were 42.38 ± 12.172 years and male patients were 45.13 ± 13.751 years.

CONCLUSION: It is concluded that the disc prolapse is the most common pathology responsible for the compression of sciatic nerve compression using MRI where as in disc prolapse disc bulge is the most common pathology.

Brainstem/ Posterior fossa Variant of Posterior Reversible Encephalopathy Syndrome (PRESS)

Syed Naseer Ahmed, Muhammad Anwar Saeed

BACKGROUND: The Posterior Reversible Encephalopathy Syndrome (PRESS), is usually seen in cases of acute and severe hypertension, typically

characterized as bilateral parieto occipital edema but may occur in other distributions with varying imaging appearances. Involvement of brainstem though rare but can be seen.

PATIENTS: We report three patients with severe hypertension, who presented with a combination of headache, visual disturbances and other neurological deficits, along with diffuse abnormalities seen on magnetic resonance imaging in the brainstem and cerebellum.

CONCLUSIONS: We report three cases of PRESS brainstem/ posterior fossa variant and discuss the clinicoradiological features of this variant.

Role of Delayed Phase Tumour Contrast Washout in Patients of Hepatocellular Carcinoma on Computed Tomography

Muhammad Usman Younis

Allied Hospital, Faisalabad, Pakistan.

OBJECTIVES: Our aim was to compare retrospectively hepatic venous and delayed phase images for the detection of tumour washout during multiphase multidetector row CT (MDCT) of the liver in patients with hepatocellular carcinoma (HCC).

METHODS: 30 cirrhotic patients underwent multiphase MDCT in the 90 days before treatment. MDCT was performed before contrast medium administration and during hepatic arterial hepatic venous and delayed phases, images were obtained at 12, 55 and 120 s after trigger threshold. Two radiologists qualitatively evaluated images for lesion attenuation. Tumour washout was evaluated objectively. Tumour to liver contrast (TLC) was measured for all pathologically proven HCCs.

RESULTS: 24 HCCs were detected at MDCT. 23 of the 24 tumours (96%) appeared as either hyper- or isoattenuating during the hepatic arterial phase. Objective washout was present in 15 of the 23 HCCs (65%) during the hepatic venous phase and in 21 of the HCCs (91%) during the delayed phase ($p = 0.001$). The delayed phase yielded significantly higher mean TLC absolute values compared with the hepatic venous phase (-16.1 ± 10.8 HU vs -10.5 ± 10.2 HU; $p < 0.001$).

CONCLUSIONS: The delayed phase is superior to the hepatic venous phase for detection of tumour washout of pathologically proven HCC in cirrhotic patients.

Co-Relation of Air Column in Oesophagus On CT Scan and Symptoms of Gastroesophageal Reflux Disease

Shama Aslam, Asifa Akram, Asim Shaukat

Department of Radiology Allied Hospital, Faisalabad, Pakistan.

OBJECTIVES: During imaging of the normal esophagus, air is often detected. The purpose of this study was to determine the correlation between the appearance of air bubbles on imaging and Gastroesophageal Reflux Disease (GERD) symptoms.

METHODS: The cross sectional imaging on 1z8slice MDCT was conducted at radiology department Allied Hospital FSD. A total of 44 patients underwent computed tomography (CT) scanning; the presence of air in the esophagus and visible on CT imaging was scrutinized. We divided the esophagus into 3 sections including the supra ventricle (SV), ventricle (CV) and ventricle to lower esophageal sphincter (V-LES). The presence of air was characterized by its diameter, quantity, its location in the CT scan, and the presence or absence of ED (oesophageal dilatation).

RESULTS: Patients who were referred for CT scan of their respiratory

symptoms, Forty-four patients who had symptoms of heart burn and were taking PPIs were selected out of them. The average age of the patients was 59.31 ± 15.98 years and the male to female ratio was 0.83 (37 men and 8 women). We found a significant relationship between main upper gastrointestinal symptoms accounting mainly for GERD and the sizes of oesophageal air bubbles, to the extent that they caused ED. Aside from the significant values of the qualitative characteristics, the relationship between heartburn and the appearance of ED > 15 mm in V-LES and also the presence of ED in all segments of the oesophagus were highly significant. Furthermore, a significant correlation was detected between the size of the air pockets in V-LES and heartburn ($p = 0.010$). The mean size of bubbles in patients who had heartburn was 13.67 ± 6.71 mm, and in patients who had no heartburn, it was 8.22 ± 6.62 mm. This confirmed the correlation between heartburn and an increase in the sizes of air pockets in V-LES ($p = 0.010$).

CONCLUSIONS: Air bubbles in the esophagus may be seen frequently on CT scans, but their size and location can vary. There is significant correlation between GERD symptoms and a small diameter air column within the esophagus, especially in the middle and lower parts. This helps patients in early diagnosis and prompt treatment.

The Role of MR Spectroscopy in Diagnosis of Hepatic Steatosis in Obese Patients

Hasan Bokhari, Asim Shaukat
Allied Hospital, Faisalabad, Pakistan.

OBJECTIVE: The objective of study is to evaluate the role of MRS as non invasive technique in the diagnosis of hepatic steatosis in obese patients.

METHOD AND RESULTS: A total of 45 patients included in study having BMI > 30 . MRS used to analyze the distribution of HTGC in all participants as a noninvasive technique. Intake of a high fat meal did not significantly affect the measurements, and values were similar when measurements were made from the right and left hepatic lobes.

To determine the "upper limit of normal" for HTGC, the distribution of HTGC was examined in the 13 subjects who had no identifiable risk factors for hepatic steatosis (non obese, nondiabetic subjects, normal liver function tests, and no known liver disease).

The 95th percentile of HTGC in these subjects was 5.56%, which corresponds to a hepatic triglyceride level of 55.6 mg/ g. we found that if 95th percentile of HTGC value is used as a cutoff, the prevalence of hepatic steatosis was estimated to be 67.6%.

CONCLUSION: MR spectroscopy of the liver is an evolving technology with potential for improving the diagnostic accuracy of tissue characterization when spectra are interpreted in conjunction with MR images.

Thus MRS provides a sensitive, quantitative, noninvasive method to measure HTGC and, when applied to a large population, revealed a strikingly high prevalence of hepatic steatosis

Role of Computed Tomography in Diagnostic and Prognostic Workup of Abdominal Tuberculosis

Faiza Iaved, Imaad-Ur-Rehman, Bilquees Yawar, Sadia Babar Farah Sana, Mohammad Yousuf Chaudhary

PURPOSE: Abdominal tuberculosis remains a diagnostic dilemma due to its wide variety of clinical and radiological features and many closely mimicking conditions including inflammatory bowel diseases, lymphoma and abdominal pelvic malignancies. In this study we describe CT features of abdominal

tuberculosis in our population to assess role of CT in diagnostic and prognostic workup of abdominal tuberculosis.

MATERIALS AND METHODS: Institutional review board approval was taken. Twenty one patients with clinically proven TB between 01.01.2002 to 29.08.2013 who underwent CT abdomen or CT abdomen and pelvis with IV contrast were found through electronic data base system and were included in this study. Their follow up CT's after treatment were also reviewed.

RESULTS: Age of patients ranged between 10 to 76 years. There were 13 female and 8 male patients. Peritoneal involvement was most common feature seen in all 21 patients (100%). Smudged pattern was the most commonly seen pattern of peritoneal involvement. Wet peritonitis (with ascites) was seen in 14 (70%) out of 21 patients while dry peritonitis was seen in 7 (35%) patients. Ascites was high density in all patients ranging between 15-30 HU. Lymph nodal involvement was the second most common feature seen in 13 (62%) out of 21 patients. Enlarged lymph nodes with hypodense centre and enhancing margins were seen most commonly (60%), mixed pattern in (30%) and enlarged nodes with uniform density in 10% of patients. Bowel involvement was demonstrated in 11 (55%) patients. Ileocecal junction was the commonest site of bowel involvement seen in 7 of these 11 patients. Liver lesions were observed in 2 patients and splenic and pancreatic nodules were identified in 1 patient each.

CONCLUSION: CT abdomen can help in narrowing the differential diagnosis but cannot be used as definite diagnostic tool for abdominal TB due to its non specific CT features and many closely resembling diseases, however due to its ability to display the whole range of expected abnormalities and their improvement following treatment, CT abdomen is appropriate for prognostic workup.

Percutaneous Cholecystostomy: is Predicting Clinical Outcome from Radiological Feature Possible?

Raza Sayani
Department of Radiology, Aga Khan University Hospital, Karachi, Pakistan.

INTRODUCTION: Percutaneous cholecystostomy is accepted as an immediate alternative to surgery in elderly high risk patients presenting with acute cholecystitis. Patients usually present with multiple co morbid conditions because of which factor determining the patients condition may be difficult. A few radiological features have been seen to be useful in predicting the source and patients who are likely to benefit from percutaneous cholecystostomy.

OBJECTIVE: To evaluate if clinical outcome can be predicted from radiologic features in whom cholecystostomy was performed for the treatment of acute cholecystitis.

MATERIALS AND METHODS: The clinical records and radiologic reports of patients who underwent percutaneous cholecystostomy for suspected acute cholecystitis between Jan 2008 to May 2010 were retrospectively reviewed. A response to percutaneous cholecystostomy was defined as an improvement in clinical symptoms and signs or reduction WBC within 72 hr of percutaneous cholecystostomy. The patient's clinical presentation, presence of gallstones, gallbladder wall thickening, sludge, distention pericholecystic fluid and perforation was recorded. The clinical and radiologic findings were analyzed for their relationship to response to percutaneous chole-cystostomy.

RESULTS: Sixty four percutaneous cholecystostomies were performed in 33 male and 31 female patients and were technically successful in all. 55 patients had gallstones, 9 did not. 15 were in the intensive care unit or from ER. Catheter placement was successful in all however one patient went into shock in immediate post procedure period but was managed successfully. 54 patients responded to percutaneous cholecystostomy. 6 patients condition remained unstable and they expired during the same admission. In 3 patients deteriorated initially and WBC also raised but later during the admission period they stabilized. 5 patients the patient's general condition became stable however WBC continued to remain slightly high during the 3 day period of data collection. Patients clinical

symptoms and signs and other features as gallstones, pericholecystic fluid, drop in WBC, bile culture are correlated to see their association with patients positive or negative response. Data processing is still in process.

CONCLUSION: Localized symptoms and signs, presence of calculi and pericholecystic collection are predictive of a positive response to percutaneous cholecystostomy however other co morbid conditions and age make it difficult to classically identify the sole indicators for the predictors of the outcome.

Diagnostic Accuracy of Focused Assessment with Sonography for Trauma in Detecting the Hemoperitoneum in Blunt Abdominal Trauma Patients

Noman Torab

Department of Radiology, Ziauddin Medical University Hospital, Karachi, Pakistan.

INTRODUCTION: Blunt abdominal trauma (BAT) has become very common worldwide and it is the commonest cause of abdominal injury. Early evaluation and diagnosis is essential because missed intra abdominal injuries continue to cause preventable deaths. Diagnostic modalities like Diagnostic Peritoneal Lavage (DPL), Computed Tomography (CT) and ultrasonography are commonly used.

CT Scan is the modality of choice in blunt abdominal trauma patients. However, it has several disadvantages as it is relatively expensive, involves the usage of ionizing radiation and requires the shifting of patient to the scanner which may interfere with ongoing resuscitation. Diagnostic peritoneal lavage has disadvantage of being invasive technique, hence it is not suitable for conscious traumatic patients and in pediatric patients.

Focused assessment with sonography for trauma (FAST) has been used as the primary imaging modality in patients with blunt abdominal trauma in many developed countries. It is rapid, economical, non-invasive and easily repeatable tool in the triage of blunt abdominal trauma patients and can be done on bed side.

OBJECTIVE: To determine the accuracy of focused assessment with sonography for trauma (FAST) in detecting the hemoperitoneum in blunt abdominal trauma patients.

MATERIALS AND METHODS:

Setting: Radiology department of Dr. Ziauddin University Hospital, North Nazimabad Karachi.

Duration of Study: From March 2010 to September 2010.

Sample Size: Estimated sample size = 140.

Study Design: Cross sectional study.

Subject and Methods: All the 140 patients who were referred to the Radiology department of Dr. Ziauddin Hospital with complaints of acute blunt abdominal trauma were evaluated.

Focused assessment with sonography for trauma was performed. Presence of intra-abdominal fluid was taken as positive finding for hemoperitoneum. Then all the patients underwent computed tomography of abdomino-pelvic region. Focused assessment with sonography for trauma findings were compared with computed tomography results.

RESULTS: In 83 patients, the FAST showed free intra abdominal fluid and was taken as 'positive'. Out of these 83 cases 80 (96%) were 'true positive' while the remaining 3 (4%) were 'false positive' when compared with results of CT scan.

Similarly, in 57 patients, no free intra abdominal fluid was detected on FAST and they were considered 'negative'. From these 57 patients, 50 (88%) patients were 'true negative' and 7 (12%) were 'false negative' because intra abdominal free fluid was seen in them on subsequent CT scan.

Thus the sensitivity and specificity of FAST in detecting intra abdominal free fluid was calculated to be 91.9% and 94.34% respectively.

CONCLUSION: FAST scan is moderately sensitive in detecting intra abdominal free fluid when compared with the results of CT scan.

Role of Segment IV Hepatic Artery in Evaluation of Liver Transplantation

Awais Ahmed, Rashed Nazir, Sadia Babar, Atif Rana, Umar Amin, M. Yousaf Chaudary

Department of Radio10gy, Shifa International Hospital, Islamabad, Pakistan.

PURPOSE: A variant origin of the artery to the medial segment of the left hepatic lobe (segment IV) is extremely relevant in liver donor because the hepatectomy plane would cut the arterial supply of this segment. The purpose of the study is to access the segment IV hepatic arterial supply and its relevant clinical significance in liver transplantation.

MATERIALS AND METHODS: After approval from Institutional Review Board and Ethics committee, a retrospective study was done in which the CT of 78 potential liver transplant candidates between January 2012 and March 2013 were reviewed. The arterial phase imaging was reviewed in all cases and 3 dimensional reconstructions were performed. Postsurgical cases and cases of vascular thrombosis and arteriovenous malformation were excluded from the study.

RESULTS: Out of 78 patients, the segment IV was supplied by left hepatic artery in 41 (52%) patients, right hepatic artery in 22 (28%) and common hepatic artery in 12 (15%) patients. The gastroduodenal artery supplied segment IV in 1 (1%) patient. Replaced left hepatic artery from left gastric artery supplied the segment in 1 (1%) patient. There were two arteries supplying segment IV in one (1%) patient, the larger was accessory left gastric artery and smaller one, the right hepatic artery.

CONCLUSION: Assessment of segment IV hepatic artery is crucial in the preoperative evaluation of liver transplantation.

Uncommon sites of a Common disease Hydatid

Shahjehan Alam

Assistant Professor, Department of Radiology, Rahman Medical Institute, Peshawar.

PURPOSE: Hydatid disease most often involves liver and lungs having characteristic imaging features. However, diagnosing hydatid disease at unusual locations may be challenging because of variable imaging appearances. In this article we have reviewed sonographic and CT features of hydatid disease in head, neck, thorax, abdomen and spine.

MATERIAL AND METHODS: Retrospective review of the 42 cases of hydatid disease attended at Radiology department of Rehman Medical Institute, Peshawar between October 2012 and Sep. 2013 to determine the incidence and imaging presentations of atypical localization of the disease.

RESULTS: The cysts were present in pleural cavity (7.1%), peritoneal cavity (9.5%), spleen (2.4%), kidney (4.7%), ovary (7.1%), pericardial cavity (2.4%), heart (2.4%), neck (2.4%), spine (4.7%) and brain (7.1%). Isolated hepatic involvement was seen in 10 patients (23.8%) and pulmonary involvement in 4.7% cases. Involvement of liver along with other viscera were seen in 17 cases (40%).

CONCLUSION: Hydatid disease may occur anywhere, from the big toe to the crown of the head. Hydatid cyst should be kept in mind when a cystic lesion is encountered anywhere in the body especially in endemic areas.

CT Biphasic Pancreatic Protocol The Evaluation of Pancreatic Malignancy with Biphasic Contrast Enhanced Helical CT

Iffat Mustafa, Farah Akram

Shaukat Khanum Memorial Cancer Hospital and Research Centre, Lahore, Pakistan.

The CT biphasic pancreatic protocol scan is performed in patients suspected of having resectable pancreatic adenocarcinoma underwent dual-phase multidetector row CT. The purpose of this study is to evaluate the importance of pancreatic and hepatic phase in CT biphasic for the estimation of pancreatic malignancy.

OBJECTIVE: The study is designed with following objective. To evaluate the significance of pancreatic and hepatic phase imaging at multidetector row CT of pancreas for the detection of pancreatic malignancy using subjective and objective approach.

SETTINGS: Patient referred to the Radiology department of Shaukat Khanum Memorial Cancer Hospital from the WIN Clinic and other departments that fulfill inclusion criteria will fulfill the study after taking history of patient. Images obtained during each phase were interpreted by one radiologist who evaluated presence of tumor and vascular invasion.

STUDY DESIGN: Observational study design.

PATIENTS: 36 Patients without specification of gender will be used in the duration of 8 months.

RESULTS: 36 patients that were selected for CT biphasic pancreatic protocol scan showed that there were 34 pancreatic tumors in 36 patients: 20 were pancreatic ductal adenocarcinomas involving head, body and tail of pancreas, one was an invasive ampullary carcinoma, seven were having pancreatic mass with liver Mets and six had pancreatic mass of T-4 lesion with vascular encasement, two patients had normal glands. Images obtained in both the pancreatic and hepatic phases failed to demonstrate an ampullary tumor in any patient.

For vascular invasion detection, sensitivity of images obtained in the hepatic phase was better than that of those obtained in the pancreatic.

For tumor detection, sensitivity of the images obtained in pancreatic and hepatic phases was superior.

These results showed that CT biphasic pancreatic protocol scan 'is a good modality for detecting the pancreatic malignancy.

CONCLUSION: Review of literature and experience has suggested the following conclusions to the study that routine acquisition of images in the pancreatic and hepatic phase is helpful for detection of pancreatic adenocarcinoma. Images of the pancreas obtained in the hepatic phase with multidetector row CT most accurately display vascular invasion.

Histological Changes In Gastric Mucosa In Patients With Liver Cirrhosis

Aftab Abbasi

PURPOSE: To determine the histological changes in gastric mucosa of body.

1. To determine the histological changes in gastric mucosa of antrum.
2. To correlate these histological changes to Child Pugh Class of liver cirrhosis A, B, and C.

MATERIALS & METHODS: Cross sectional.

Used Light Microscope.

Analyzed by statistical package for social sciences (SPSS) version 16.

RESULTS: A total of 85 participants were included in this study. Among them frequency of male participants was more than female participants 84.71% and 15.29%, respectively. Most of the study participants were belonged to Child class B, 47 (55.3%) and mild gastropathy was observed more common than others (52.94%). Infiltration of lamina propria in the antral part of the stomach was significantly higher in Child Pugh Class of liver cirrhosis A, B, and C (p-value <0.001, <0.001, 0.01. respectively).

Significant change in the number of gastric glands was observed in the Child Pugh Class B and C but not in patients with Child Pugh Class A and the Fisher exact test shows p value statistically significant (p-value 0.01 and 0.02, respectively).

CONCLUSION: This study shows presence of histological changes in mucosa of the stomach in most cases of the liver cirrhosis, but they do not proportionate with the severity of the liver cirrhosis as there was no significant difference in the histological changes in mucosa of the stomach among different Child Pugh Class of liver cirrhosis that is A, B and C.

Hepatic Arterial Anatomy Revisited: IR And Surgical Paradigm

Muhammad Usman Afzal

Shaikh Zayed Hospital, Lahore.

PURPOSE: The knowledge of patient's hepatic arterial anatomy is of great importance in hepatobiliary surgical procedures, particularly liver transplants, which is the treatment of choice for patients with liver disease in final stage. It is also very helpful in increasing the effectiveness and safety of TACE which is the mainstay of treatment for patients with unresectable HCC. The purpose of the study was to determine variations of hepatic arterial anatomy in our population as no previous local data is available. Nonetheless, and uncomplicated operation, as preoperative assessment of hepatic vasculature anatomy is of paramount importance for both hepatobiliary surgeries and TACE as well.

MATERIALS AND METHODS: A total number of 216 patients of both genders and multiple ethnicities undergoing contrast enhanced CT scan of abdomen were included in the study using non-probability consecutive sampling technique. Study was conducted at Radiology Department, Shaikh Zayed Hospital Lahore using 64 slice Multi Detector CT scanner (LightSpeed VCT, General Electric Medical Systems,). After acquiring CT Scan images, arterial angiography of mesenteric and hepatic vasculature bed was obtained with a standard reconstruction algorithm on AW 4.4_04 VolumeShare 2. The different feeding arteries of hepatic vasculature bed were evaluated in terms of being normal, replaced or accessory. Collected data was analyzed using statistical software SPSS version 20.

RESULTS: Among 216 patients, 135 (62.5%) individuals had normal hepatic arterial anatomy. The Right Hepatic Artery was replaced to SMA in 28 (12.96%) patients, whereas there was accessory Right Hepatic Artery (RHA) in 3 patients (1.39%) originating from SMA. 16 cases (7.41%) demonstrated to have accessory branches of Left Hepatic Artery (LHA) originating from Left Gastric Artery. LHA was replaced to LGA in 15 (6.94%) cases, in 3 cases (1.39%) it was replaced to Celiac Trunk and in 2 cases (0.93%) LHA was replaced to Common Hepatic Artery. 2 individuals (0.93%) were recorded to have a combined variation of RHA replaced to SMA and LHA replaced to LGA. Another 2 patients (0.93%) exhibited to have a combined variant of RHA replaced to SMA and accessory LHA originating from LGA as well. A complete replacement of hepatic arterial system (Common Hepatic Artery) to SMA was observed in 7 (3.24%) individuals. In 2 patients (0.93%), we found a common origin of Celiac Trunk and Superior Mesenteric Artery (SMA) from Aorta just above the origin of Renal Arteries.

CONCLUSION: About 37.5% of all individuals were found to have hepatic artery anatomic variants. Thus a fair knowledge of hepatic vascular anatomy is considerably significant while deciding the modality of treatment whether to be surgical, interventional radiological or palliative.

Role of Computed Tomography In Diagnostic Work Up of Abdominal Tuberculosis

Faiza Iaved, Imaad-Ur-Rehman, Bilquees Yawar, Sadia Babar, Farah Sana, Mohammad Yousuf Chaudhary.

PURPOSE: Abdominal tuberculosis remains a diagnostic dilemma due to its wide variety of clinical and radiological features and many closely mimicking conditions including inflammatory bowel diseases, lymphoma and abdomino pelvic malignancies. In this study we describe CT features of abdominal tuberculosis in our population to assess role of CT in diagnostic workup of abdominal tuberculosis.

MATERIALS AND METHODS: Institutional review board approval was taken. Twenty one patients with clinically proven TB between 01.01.2002 to 29.08.2013 who underwent CT abdomen or CT abdomen and pelvis with IV contrast were found through electronic data base system and were included in this study. Age of patients ranged between 10 to 76 years. There were 13 female and 8 male patients. Peritoneal involvement was most common feature seen in all 21 patients (100%). Smudged pattern was the most commonly seen pattern of peritoneal involvement. Wet peritonitis (peritonitis with ascites) was seen in 14 (70%) out of 21 patients while dry peritonitis was seen in 7 (35%) patients. Ascites was high density in all patients ranging between 15-30 HU. Lymph nodal involvement was the second most common feature seen in 13 (62%) out of 21 patients. Enlarged lymph nodes with hypodense centre and enhancing margins were seen most commonly (60%), mixed pattern in (30%) and enlarged nodes with uniform density in 10% of patients. Bowel involvement was demonstrated in 11 (55%) patients. Ileocecal junction was the commonest site of bowel involvement seen in 7 of these 11 patients. Liver lesions were observed in 2 patients and splenic and pancreatic lesions were identified in 1 patient each.

CONCLUSION: Smudgy pattern of peritoneal involvement, enlarged necrotic abdominal lymph nodes, high density ascites and ileocecal involvement are the most common abnormalities seen in patients of abdominal tuberculosis in our population. CT scan is an excellent modality for assessing abdominal tuberculosis due to its ability to display the whole range of expected abnormalities in this condition.

Pineapple Juice As A Negative Oral Contrast Agent In MRCP

Fatima Batool Zaidi
Department of Radiology, Sindh Institute of Urology and Transplantation (SIUT), Karachi, Pakistan.

PURPOSE: The quality of magnetic resonance cholangiopancreatography (MRCP) images is frequently degraded by high signals from gastrointestinal tract on heavily T2W images. The purpose of this study is to evaluate pineapple juice (PJ) as a negative oral contrast in MRCP.

MATERIALS AND METHODS: It was a prospective study. Total number of patients was 20 referred to our department for the diagnosis of any pancreaticobiliary disorder. Patients were required to fast for 6 to 8 hours before the examination, to permit gall bladder filling and promote gastric emptying. MRCP was subsequently performed with technique using a heavily T2W turbo spin echo (TSE) sequence which is currently one of the most widely used multilane 3-D MR technique, having high spatial resolution and fast imaging capacity in patients before and at 15 min following ingestion of 400 ml of PJ. Images were assessed by experienced Consultant Radiologist using a standard grading technique.

RESULTS: MRCP results after ingestion of Pineapple juice shows statistically significant improvement when compared to images that were acquired without ingestion of Pineapple juice.

CONCLUSION: Our results demonstrate that Pineapple juice should be used as a negative oral contrast agent in MRCP.

CT biphasic pancreatic protocol The evaluation of pancreatic malignancy with biphasic contrast enhanced helical c

Iffat Mustafa, Farah Akram
Shaukat Khanum Memorial Cancer Hospital and Research Centre, Lahore, Pakistan.

The CT biphasic pancreatic protocol scan is performed in patients suspected of having resectable pancreatic adenocarcinoma underwent dual-phase multidetector row CT. The purpose of this study is to evaluate the importance of pancreatic and hepatic phase in CT biphasic for the estimation of pancreatic malignancy.

OBJECTIVE: The study is designed with following objective. To evaluate the significance of pancreatic and hepatic phase imaging at multidetector row CT of pancreas for the detection of pancreatic malignancy using subjective and objective approach.

SETTINGS: Patient referred to the Radiology department of Shaukat Khanum Memorial Cancer Hospital from the WIN Clinic and other departments that fulfill inclusion criteria will fulfill the study after taking history of patient. Images obtained during each phase were interpreted by one radiologist who evaluated presence of tumor and vascular invasion.

STUDY DESIGN: Observational study design.

PATIENTS: 36 Patients without specification of gender will be used in the duration of 8 months.

RESULTS: 36 patients that were selected for CT biphasic pancreatic protocol scan showed that there were 34 pancreatic tumors in 36 patients: 20 were pancreatic ductal adenocarcinomas involving head, body and tail of pancreas, one was an invasive ampullary carcinoma, seven were having pancreatic mass with liver Mets and six had pancreatic mass of T-4 lesion with vascular encasement, two patients had normal glands. Images obtained in both the pancreatic and hepatic phases failed to demonstrate an ampullary tumor in any patient.

For vascular invasion detection, sensitivity of images obtained in the hepatic phase was better than that of those obtained in the pancreatic.

For tumor detection, sensitivity of the images obtained in pancreatic and hepatic phases was superior.

These results showed that CT biphasic pancreatic protocol scan is a good modality for detecting the pancreatic malignancy.

CONCLUSION: Review of literature and experience has suggested the following conclusions to the study that routine acquisition of images in the pancreatic and hepatic phase is helpful for detection of pancreatic adenocarcinoma. Images of the pancreas obtained in the hepatic phase with multidetector row CT most accurately display vascular invasion.

Correlating Relative Renal Function with Renal Parenchymal Thickness in Chronic Unilateral Obstructive Uropathy

Owais Qadeer Gill, Asim Shaukat
Department of Radiology Allied Hospital, Faisalabad, Pakistan.

OBJECTIVE: To correlate relative renal function on diuretic DTPA renal scan with renal parenchymal thickness on unenhanced computed tomography in chronic unilateral obstructive uropathy.

METHOD AND RESULTS: 30 patients with chronic unilateral obstructive uropathy were included in the study. Each patient underwent diuretic DTPA renal scan followed by unenhanced CT scan of Kidneys. Diuretic DTPA renal

scan was done on a single head gamma camera equipped with low energy high resolution (LEHR), parallel hole collimator. And CT scan was performed on multislice CT with 5mm slice thickness focusing the renal area only. Time interval between diuretic DTPA renal scan and CT scan was less than 1 week. A mean relative renal function of 39% was found in obstructed kidneys and 61% in non-obstructed kidneys. While mean renal parenchymal thickness of 1.8cm was found for obstructed kidneys and 2.25cm for non-obstructed kidneys. Linear regression analysis comparing renal function to renal parenchymal thickness ratio revealed a correlation coefficient of 0.48.

CONCLUSION: CT scan is the most effective modality to diagnose the etiology of obstructive uropathy. It is widely available and gives a clear detail of renal anatomy. Renal parenchymal thickness (RPT) measured on unenhanced CT scan gives valuable information regarding renal function, which is comparable to relative renal function calculated on DTPA renal scan.

Renal Cell Carcinoma: Accuracy of CT Scan in Pre-Operative Staging Workup

Tehreem Raza, Javed Mehboob, Amir, Akhtar Ahmed
Karachi Institute of Radiotherapy and Nuclear Medicine (KIRAN), Hospital, Karachi, Pakistan.

AIMS AND OBJECTIVES: CT scan is most frequently used in staging of patients with ovarian cancer. Our aim was to observe to determine the diagnostic accuracy of CT scan in staging renal cell carcinoma by taking histopathological finding as gold standard.

MATERIALS AND METHODS: This was a cross sectional descriptive study conducted at department of Radiology, Karachi Institute of Radiotherapy and Nuclear Medicine from June 2010 to June 2012. A total of 206 patients with biopsy proven renal cell carcinoma were included in the study. A detailed history was taken from the patient. CT scan of selected patients was performed. After CT scan, patients were sent for surgery and their surgical specimen was sent for histopathology. Patients having stage I and IV were excluded from the study.

RESULTS: The sensitivity, specificity, positive predictive value, negative predictive value and accuracy of CT scan for renal parenchyma involvement (stage I) were 74.2%, 75%, 79.3%, 69.2% and 75%, for peri-nephric fat of renal cell carcinoma were 77.5%, 75.9%, 81.6%, 71% and 77% for detecting stage 3 A were 76.9%, 73.7%, 80%, 70%, 76% and for 3B, 80%, 82.4%, 84.2%, 77.8% and 81% respectively. Mean age of these patients was 53 ± 14 years.

CONCLUSION: CT is an excellent imaging technique for the evaluation of solid renal masses and the preoperative staging of renal cell carcinomas.

CT KUB as Emergency Imaging Modality in Evaluation of Patients with Acute Renal Colic

Saerah Iffat Zafar
PAF Hospital, Islamabad, Pakistan.

PURPOSE: Aim of this study is to determine the efficacy of CT KUB as a first line investigation for acute renal colic and to evaluate its efficacy, keeping in view the radiation dosage involved compared to conventional radiographs and ultrasound of the renal tract. Bowel preparation for plain X-rays, indeterminate opacities, and ultrasound assessment can cause delay in management of such patients. A one step quick investigation can expedite timely referral of patient to Urologist and commencement of early treatment.

MATERIALS AND METHODS: All patients referred for assessment of acute renal colic by the surgeon- both indoor and outdoor- were included in the study, from March 2013 to date (ongoing study). A total of 76 patients having an

acute renal colic underwent CT KUB, on Multidetector Spiral CT. Images were assessed for presence of renal tract calculi, hydronephrosis / hydroureter or both; peri-ureteric or perinephric inflammation, mass in the urinary bladder or other ancillary finding as a cause of pain.

RESULTS: Out of 76 patients scanned, 62% were male and 38% females. Males had more positive scans for renal tract abnormality than females (78% versus 59% respectively), who were found to have other causes such as gynaecological cause of their pain. All patients with haematuria (09%) were found to have renal tract abnormality-calculi or mass urinary bladder.

CONCLUSION: CT KUB is a quick and sensitive modality as a first line emergency imaging for suspected acute renal pain or haematuria. This study showed higher negative scans for females due to additional pathology other than renal tract abnormality, hence it is mandatory to take proper history and consider ultrasound as alternative first line imaging method in females to avoid unnecessary radiation exposure.

Role of Imaging Techniques in Ovarian Cancer

Nasira Sultana
Armed Forces Institute of Radiology & Imaging (AFIRI), Rawalpindi, Pakistan.

Ovarian cancer is a silent killer; however, improved imaging techniques, increase the likelihood of early detection and improved survival rates. Evaluation of adnexal masses has been performed by several methods. Notable among these are the noninvasive diagnostic radiologic modalities such as transabdominal and transvaginal gray scale sonography, color and power Doppler sonography, computed tomography (CT), magnetic resonance imaging, and positron emission tomography (PET).

Ultrasound if performed by an experienced sonologist is an ideal diagnostic method in differential diagnosis between benign and malignant ovarian tumors. The experienced examiner is also able to detect extra ovarian tumor spread and to assess tumor operability. Magnetic resonance imaging (MRI) is used only to complement ultrasound in cases when high tissue resolution is needed. Computed tomography (CT) is a useful method for detection of extra ovarian spread, in assessing treatment response and recurrence of disease. Similarly, fusion of positron emission tomography with CT (PET / CT) is a highly accurate method for the detection of abdominal and extra abdominal tumor spread, but its use is limited by cost, low availability, lower sensitivity in comparison to ultrasound and its high false positive rates as well.

Preoperative T Staging of Urinary Bladder Cancer: Role of Diffusion Weighted MRI

Zonaira Shabbir, R. Amna Rehan, Asim Shaukat
Allied Hospital, Faisalabad, Pakistan.

OBJECTIVE: The objective of our study was to evaluate whether diffusion weighted MRI has supplementary value in the preoperative T staging of urinary bladder cancer.

MATERIALS AND METHODS: Nineteen consecutive patients (18 men and one woman; age range, 50-75 years) known to have or suspected of having urinary bladder cancer underwent MRI at our institution. Urinary bladder cancer was pathologically proven in 18 patients. The pathologic stages were T1 in 14 patients, T2 in two, T3 in one, and T4 in one. Three separate MR image sets were retrospectively reviewed by two independent radiologists: unenhanced T1-weighted images and T2 weighted images; unenhanced T1 weighted, T2 weighted, and gadolinium-enhanced images; and unenhanced T1 weighted, T2 weighted, and diffusion weighted images. The radiologists, who were blinded to the pathology findings, assigned T stages and confidence levels for tumors of stage T2 or greater. We used pathologic stages documented in the official

pathologic reports as the standard of reference.

RESULTS: The correlation between the radiologic and pathologic stages was greater with the diffusion sequence ($Q = 0.66$) than with the unenhanced (0.62) or gadolinium enhanced (0.62) sequence ($p = 0.34$). The sensitivity, specificity, accuracy, and area under the ROC curve for tumors of stage T2 or greater were 80%, 79%, 79%, and 0.71 for the unenhanced sequence; 80%, 79%, 79%, and 0.77 for the gadolinium sequence; and 40%, 93%, 79%, and 0.56 for the diffusion weighted sequence, respectively ($p > 0.05$).

CONCLUSION: Our results suggest that diffusion-weighted MRI might have high specificity for the detection of invasive urinary bladder tumors. Patients with suspected urinary bladder carcinomas may well be evaluated by MRI including diffusion-weighted imaging for better preoperative T staging.

Diagnostic Performance of Breast MRI in the Evaluation of Contralateral Breast in Patients with Diagnosed Breast Cancer

Shaista Afzal, Imrana Masroor

Department of Radiology, Aga Khan University Hospital, Karachi, Pakistan.

OBJECTIVE: The purpose of our study was to evaluate the diagnostic performance of breast MRI in the evaluation of contralateral breast in patients with diagnosed breast cancer. The second objective was to evaluate the presence of multi focal / multicentric lesions in the ipsilateral breast.

METHODS: MRI breast done during the period of January 2008 till June 2013 were evaluated. MRI of patients with diagnosed breast cancer was included. MRI breast done for other indications like for assessment of BIRADS 3 lesions, implant evaluations, screening, neoadjuvant response evaluation etc. were excluded. Patient's mammography and ultrasound done at the time of breast cancer diagnosis were also assessed. The MRI findings were correlated with histopathology. In addition follow-up imaging i.e. mammography and ultrasound was also assessed for stability of negative findings and for benign lesions detected. Data was entered using SPSS version 19. Diagnostic accuracy of breast MRI was calculated.

RESULTS: Out of the 157 MRI breast, 49 were done in patients with diagnosed breast cancer. All patients were females with age range from 29 to 71 years. The patient follow-up imaging was available for a period of 1.5 years.

Role of FDG PET / CT in Staging of Recurrent Ovarian Cancer

Fozia Naz

Shaikat Khanam Cancer Hospital, Lahore, Pakistan.

Ovarian cancer is the fifth leading cause of cancer death among women in the United States and has a high likelihood of recurrence despite aggressive treatment strategies. Detection and exact localization of recurrent lesions are critical for guiding management and determining the proper therapeutic approach, which may prolong survival. Because of its high sensitivity and specificity compared with those of conventional techniques such as computed tomography (CT) and magnetic resonance (MR) imaging, fluorine 18 fluorodeoxyglucose positron emission tomography (PET) combined with CT is useful for detection of recurrent or residual ovarian cancer and for monitoring response to therapy. However, PET / CT may yield false-negative results in patients with small, necrotic, mucinous, cystic, or low grade tumors. In addition, in the posttherapy setting, inflammatory and infectious processes may lead to false-positive PET / CT results. Despite these drawbacks, PET / CT is superior to CT and MR imaging for depiction of recurrent disease.

To Compare the Sensitivity and Specificity of X-Ray KUB, Ultrasound and UHCT for the Diagnosis of Ureteral Colic in Patients with Acute Flank Pain

Nazish Naz

Department of Radiology, Sindh Institute of Urology and Transplantation (SIUT), Karachi, Pakistan.

PURPOSE: The aim of this study was to compare the sensitivity and specificity of X-ray KUB, ultrasound and UHCT for the diagnosis of ureteral colic in patients with acute flank pain.

MATERIALS AND METHODS: During a 4-month period, 200 patients (mean age 35 years) with acute flank pain were prospectively studied by means of X-ray KUB, US, and unenhanced CT. The presences of lithiasis and of obstructive uropathy signs were determined. The X-ray KUB was only used as a guide for the US exam. Clinical follow-up of all patients was obtained.

RESULT: Ureteral lithiasis was confirmed in 190 patients. The CT had a greater sensitivity (98%) and negative predictive value (30.5%) for the detection of lithiasis. The lithiasis signs showed a sensitivity and a specificity of 100% for CT and 94%, respectively, for US and 89.5% for X-ray KUB. The 12 lithiasis not detected by US were passed spontaneously (10 were <5 mm) and 20 lithiasis not detected by X-ray KUB due to bowel gases and some were small and 4 lithiasis not detected by CT.

CONCLUSION: Computed tomography is the most accurate technique for the detection of ureteral lithiasis; however, the combination of plain film and US is an alternative to UHCT with a lower sensitivity and radiation dose that has a good practical value.

Critical Review Of The Obstetric Ultrasound Dating Scan For The Pitfalls In Technique, Image Optimization And Patient Management- Case Study

Saima Shaffaque, Annum Dawood, Zia Suleman Faruqi, Najam Ud Din.

Department of Radiology, Shaikat Khanum Memorial Cancer Hospital and Research Centre, Lahore, Pakistan.

AIM: The purpose of this case study is to critically evaluate the obstetric ultrasound dating scan (11th to 18th weeks) and find out any pitfalls that exist in this technique. In addition, issues such as patient care safety and confidentiality specifically for this scan will be highlighted. It aims to discuss the clinical indications and justification of this examination and its role in the management of the patients. Furthermore, to analyse the technical aspects to acquire best image including image acquisition, production, evaluation and optimization.

METHOD: For this case study, 15 days rotation was done in ultrasound modality in the month of March, 2012. A number of patients were observed and twenty three pregnant women were selected to study. The interesting cases, for example; twin pregnancy, were chosen and kept the record of those images for future purpose. Manipulations of different parameters were done to see its impact on scan and for patient's safety as well. Literature's help was taken to critique the clinical practice of the imaging technique used. Specific findings and pitfalls of the technique were identified. Patients' management in regards to their safety and care were also considered. Patients' psychological needs were noted such as confidentiality, good communication between sonographer and the patient.

RESULT: Different parameters were helpful to optimise the image within safe indices. Different parameters suggested different features regarding fetus, which helped to predict gestation age and cardiac activity of the fetus. Moreover, operators were competent to perform the examination and communicate appropriately with the patient to sort out their worry. Patients' reports were also recorded and collected for image interpretation and evaluation.

CONCLUSION: It is concluded that the choice of equipment is important to perform safe examinations. Some system shows the safety indices and other

parameters during the scan only while others display all parameters even in print out image for future use, i.e., audits. Although, ultrasound imaging is considered safest in radiology even then adherence to As Low As Reasonably Achievable (ALARA) principle is important to be implemented especially in case of obstetric scans to avoid any harm to the fetus. Thus, fetus morphology is easily measured with this non-ionising and non-invasive technique. My co-authors and I give permission to publish this abstract in PJR Conference Issue and conference abstract book.

To compare the sensitivity and specificity of X-ray KUB, ultrasound and UHCT for the diagnosis of ureteral colic in patients with acute flank pain

Nazish Naz

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CONCLUSION: Computed tomography is the most accurate technique for the detection of ureteral lithiasis; however, the combination of plain film and US is an alternative to UHCT with a lower sensitivity and radiation dose that has a good practical value.

To Determine Diagnostic Accuracy of MRI In Differentiating Non- muscle Invasive From Muscle Invasive Bladder Carcinoma

Khuiasta Mehtab

Department of Radiology, Sindh Institute of Urology and Transplantation (SIUT), Karachi, Pakistan.

OBJECTIVE: To determine diagnostic accuracy of MRI in differentiating non-muscle invasive from muscle invasive bladder carcinoma, taking Histopathological staging as a gold standard.

PATIENTS AND METHODS: The data of 53 patients with bladder tumor who previously confirmed by cystoscopy, were examined at 1.5 T, images were obtained and analyzed by radiologist without knowledge of the tumor stage. T2-weighted spin-echo or turbo-spin-echo, and dynamic T1 weighted fast gradient-echo sequences were used. Histopathological grading served as standard of reference.

RESULT: Sensitivity and specificity were calculated which resulted in sensitivity of 91% and specificity of 85%.

CONCLUSION: This data confirms the under-staging of the bladder tumor invasion done histopathologically while MR is a promising, non-invasive technique for the detection of bladder lesions with a high diagnostic performance.

Determination of number of renal arteries in the preoperative investigation of live related renal donors

Mustafa Akhtar

OBJECTIVE: This study was performed to determine the number of renal arteries in the preoperative investigation of live related renal donors provide sufficient information whether noninvasive imaging with CT angiography and invasive Conventional angiography.

MATERIALS AND METHODS: Thirty consecutive potential living kidney donors were investigated by both modalities CT angiography and Conventional angiography. CT was performed using 3-mm collimation with a pitch of 1.6 after the injection of 90 mL of nonionic contrast medium. The axial data, multiplanar reconstructions, and maximum intensity projections were reviewed. Conventional angiography was performed using a standard angiographic technique with 80ml Ultravist 370 injected via a 5F pigtail catheter at 8mls into the aorta just above the origin of the renal vessels. Imaging was carried out. A femoral approach was used.

RESULTS: nnnnCT angiography visualized 37 of the 40 arteries identified at surgery, for a detection rate of 93%. Conventional angiography visualized 18 of the 20 arteries identified at surgery, a detection rate of 90%.

CONCLUSION: Conventional angiography is superior in detecting vascular anomalies, better depicts parenchyma of kidney, and lead to significantly preoperative decisions rather than CT angiography.

Endovascular Embolization of Intracranial Arteriovenous Malformation, Over Ten Year Experience at Tertiary Care Hospital

Raza Sayani, Tanveer-ul-Haq, Nauman Al Qamari

Radiology Department, Aga Khan University Hospital, Stadium Road, Karachi Pakistan.

OBJECTIVE: To evaluate the technical success, safety and outcome of endovascular embolization for intracranial arteriovenous malformation.

METHODS: Advances in superselective microcatheterization techniques established superselective endovascular exploration as an integral and indispensable tool in the pretherapeutic evaluation of brain AVMs. Presurgical embolization of AVM has been seen to improve surgical outcomes significantly. We share our experience of over ten year from April 2002 to December 2012 where we performed angio embolization of AVMs. 51 patients (32 males and 19 females) with age range from 9 to 76 years, (mean age 29.2 years). Underwent 70 sessions of embolization. Some of them were performed in stages with 9 undergoing 2 sessions and 5 undergoing 3 sessions. We describe in detail the material used for embolization which included Histoacryl glue, Onyx, coils and in certain cases with feeders from extracranial supply PVA particles were used. Surgery was performed in a number of cases. We describe in-detail the presenting features, type, location and size of AVM, their grading according to Spetzler Martin system, the outcome of embolization and later surgery, complications related to over embolizing in a single session as well as venous spill over resulting in vascular disturbance and hypertension.

CONCLUSION: Results of endovascular aneurysm coiling at our center showed high technical success rate which combined with surgery has good overall results.

Interventional Radiology in the Management of Biliary Complications in Liver Transplant Recipients

Shaista Riaz, Atif Rana, Ehsan Masood, Sanam Soomro
Department of Radiology, Shifa International Hospital, Islamabad, Pakistan.

PURPOSE: Major advances in the field of liver transplantation have led to an increase in both graft and patient survival rates. Despite increased graft survival rate, biliary complications lead to significant postoperative morbidity and even mortality. A multidisciplinary approach to these complications is critical. As part of the team approach, less invasive techniques used by the interventional radiologist such as Percutaneous Transhepatic Biliary Drainage and Cholangioplasty have an increasing role in the management of complications after liver transplantation. The aim of the study is to review the current role of the Interventionist in management of biliary complications.

MATERIALS AND METHODS: Approval of IRB and ethics committee has been sought. Retrospective study was performed on a total of 15 patients who were status post liver transplant and underwent interventional radiology procedures for management of postoperative biliary complications such as bile leaks, anastomotic and non-anastomotic strictures and biliaryomas.

RESULTS: Interventional radiology has a major role in minimally invasive management of biliary complications after liver transplantation.

CONCLUSION: As the demand for liver transplantation increases and nonsurgical interventions become the first-line treatment in biliary complications, interventional radiologists are playing an increasingly vital role in the long-term care of transplant recipients. Interventional radiological procedures are safer in the management of early and late biliary complication of liver transplant patients.

Hepatic Parenchymal and Vascular Angioembolization. A Departmental Review

Raza Sayani, Muhammad Azeemuddin, Muhammad Anwar, Tanveer-ul-Haq
Department of Radiology, Aga Khan University Hospital, Karachi, Pakistan.

OBJECTIVE: To review the indications, success rate, complications, outcome of cases after angio-embolization of liver parenchymal and vascular injuries performed in our department.

MATERIALS AND METHODS: A retrospective review of cases of hepatic arterial angioembolization performed in our department during 6 year period was performed. Forty nine vascular angiographies were performed in 45 patients (35 males and 10 females, age range 12/66 years) who were referred with hemorrhagic hepatic and vascular emergencies to Aga Khan University hospital's angiography suite from July 2006 to June 2012. Data on clinical indication, technique, site and type of bleeding lesions was obtained from a retrospective review of medical records. Success rate, clinical outcome and complications of the procedure were analyzed.

RESULTS: Forty nine patients underwent angioembolization in our department during this period. Most of them had computerized axial tomographic (CT) scan followed by HA. Active extravasation and pseudoaneurysm formation was seen in most with a few showing arteriovenous malformation, tumoral blush or laceration.

CONCLUSION: Hepatic arterial angioembolization is a safe, effective and life saving therapeutic tool for managing liver parenchymal and related vascular emergencies in hemodynamically stable patients.

Effect of Operator's Experience or Gauge of Needle in Occurrence of Pneumothorax Following Ultrasound Guided Pleural Tap

Mobeen Ahmed, Sadia Saeed Chaudhary, Imaad ur Rehman, Abdur Raheem, Atif Iqbal Rana, Ahmed Kamal Nasir Khan

Department of Diagnostic and Interventional Radiology Shifa International Hospital (SIH), Islamabad, Pakistan.

OBJECTIVE: To determine the frequency of pneumothorax following ultrasound guided thora-centesis in our department and its association with operator's experience and gauge of needle in causation of pneumothorax.

STUDY DESIGN: Descriptive cross sectional study.

PLACE AND DURATION OF STUDY: The study was conducted at the Department of Diagnostic and Interventional Radiology, Shifa International Hospital (SIH), Islamabad from January 2010 to April, 2012.

METHADODOLOGY: A total of 362 ultrasound guided thoracentesis were performed followed by a chest radiograph between January 2010 and April, 2012 fulfilling the inclusion criteria. All procedures were performed by radiology consultants and residents. Generally 18 and 16 G cannulas were used. A few were done with 16 and 18 G spinal needle and 21G syringe needle. Relevant data was collected from hospital data base system on the performa and was analyzed for demographic variables, frequency of pneumothorax, and its association with operator's experience (residents or consultants) and gauge of needle by applying chi square test. P value of < 0.05 was considered significant.

RESULTS: 309 patients had thoracocentesis while performed by residents and 53 by consultants. Pneumothorax occurred in 22 of these 362 cases with an overall frequency of 6%. Of these 22 cases of pneumothorax, 19 had undergone thoracocentesis by residents (6.1%) and 3 by consultants (5.7%). No significant difference was observed in occurrence of pneumothorax between these two groups ($p = 0.59$). In 221 patients 18 G cannula was used and 8 of these developed pneumothorax (3.6%). In 95 patients 16 G cannula was used. Pneumothorax occurred in 11 (11.6%). Statistical analysis confirmed that the frequency of pneumothorax was significantly increased following use of 16G as compared to 18G ($p = 0.02$).

CONCLUSION: The frequency of pneumothorax following ultrasound guided thoracentesis increases significantly with use of 16G as compared to 18G ($p = 0.02$). Experience of operator does not have any significant effect on frequency of pneumothorax ($p = 0.59$).

Endovascular Embolisation of Visceral Artery Pseudoaneurysms: Experience from a Tertiary Care Center from a Developing Country

Yasir Jamil Khattak

Department of Radiology, Aga Khan University Hospital, Karachi, Pakistan.

OBJECTIVE: To evaluate the technical success, safety and outcome of endovascular embolization procedure in management of visceral artery pseudoaneurysms.

DESIGN: Cross-sectional study.

PLACE AND DURATION: From 2008 to 2011 at Vascular and Interventional Radiology section, Department of Radiology, Aga Khan University Hospital Karachi, Pakistan.

PATIENTS AND METHODS: 30 patients were treated for 33 visceral pseudoaneurysms at our institution. Preliminary diagnostic workup in all cases was performed by contrast enhanced abdominal CT scan and / or duplex ultrasound. In all patients, embolization was performed as per the standard

departmental protocol. For data collection, medical records and radiology reports of all patients were retrospectively reviewed. Technical success, safety and outcome of the procedure were analyzed.

RESULTS: Out of 30 patients, 12 were female and 18 were male. Mean patient age was 48.97 ± 14.9 years and mean pseudoaneurysm size was 32 ± 21.3 mm. Technical success rate for endovascular visceral pseudoaneurysm coiling was 93.3% (n = 28). Complication rate was 6.6% (n = 2). Follow-up was done for a mean duration of 4.3 ± 1.8 months (0.5-6 months). Complete resolution of symptoms or improvement in clinical condition was seen in 24 patients (85.7%) out of those 28 in whom procedure was technically successful.

CONCLUSION: Results of embolization of visceral artery pseudoaneurysms with coils at our center showed high success rate and good short-term outcome.

Evaluation of Utility of Complete Trauma Series Radiographs in Adult Trauma Patients

Hira Waheed

PURPOSE: To find out the utility of a complete trauma series radiographs (X-ray cervical spine, chest and pelvis) in patients suffering from traumatic injury. Furthermore, by doing this study we aim to test the hypothesis that spinal, pelvic and chest radiographs without associated clinical complaints are unnecessary for some of these patients.

BACKGROUND: According to ACG guidelines trauma series radiographs are recommended in the patients presenting with major trauma. In our experience and also mentioned in few international studies majority of these X-rays which are not associated with clinical symptoms appear negative. This results in undue radiation exposure.

MATERIALS AND METHODS: Blunt trauma patients above the age of 16 years presenting in ER were taken in whom trauma series radiographs according to ACS Guidelines apart from other radio-graphs were performed as an initial radiological evaluation of major trauma. Radiographs were reviewed on PACS system by a radiologist having more than 5yrs experience in general radiology. The radiologist was kept blinded to the clinical findings and radiograph reports.

RESULTS: A total of 285 radiographs were reviewed general radiologist among whom 250 were trauma series radiographs and 35 additional radiographs on the basis of positive clinical examination. In a total of 250 trauma series radiograph, 17 (6.9%) were considered positive on the basis of findings related to trauma, remaining 233 (93%) were negative. Out of 35 additional radiographs done on the basis of positive clinical examination, 28 (80%) were considered positive and remaining 7 (20%) negative.

CONCLUSION: We concluded that in alert adult trauma patients in whom clinical examination is possible, localizing signs and symptoms can better guide us for further radiological workup rather than entire trauma series radiographs. This will reduce the radiation exposure, minimize the time and will reduce burden on resources.

Role of High Resolution Ultrasound in the Assessment of Musculoskeletal Diseases

Umar Amin, Umar Riaz, Asim Umar

Shifa International Hospital Islamabad, Pakistan.

INTRODUCTION: The wide availability and recent improvement in technology coupled with portability, low cost and safety makes ultrasound the first choice imaging investigation for the evaluation of musculoskeletal diseases. Diagnostic use of ultrasound findings is greatly enhanced by knowledge of the clinical presentation. Conversely, ultrasound skills with its prerequisite anatomical knowledge make the clinical diagnosis more precise and reduce uncertainty in the choice of therapy. Therefore, it is essential for radiologists and sonologists to acquire ultrasonography skills necessary to perform and interpret msk ultrasounds.

OBJECTIVES: Objective of the study was to assess the role of high resolution sonography is evolving into an applicable modality for several areas of the musculoskeletal system.

METHODOLOGY: The study was performed in The Radiology And Imaging Department, Shifa International Hospital, Islamabad, Pakistan. A total of 78 patients were included in the study. All ultrasound scans were performed on TOSHIBA Xario (7.5 and 10 mhz probes).

RESULTS: Tenosynovitis, tendon injuries and ganglion cysts were most common lesions that were diagnosed with high resolution ultrasound. In addition ultrasound was also found reliable in diagnosing neurogenic tumors, plantar fasciitis, hematomas and abscesses.

CONCLUSION: Ultrasound provides a safe, cost effective and rapid means of assessing MSK abnormalities. This review has emphasized the role of ultrasound examination as the primary imaging investigation in initial evaluation of MSK Diseases. In most aspects of assessment of MSK diseases US is comparable to or even better than the expensive imaging techniques such as MRI. The combination of high frequency probes and improved power Doppler technology provides a great opportunity to study image aspects of inflammatory conditions such as tenosynovitis and enthesitis that were traditionally considered difficult to image. Recent advances in technology such as three dimensional ultrasound and contrast agents have potential to play a major role in early detection and monitoring of inflammatory arthritis in the future. The long learning curve remains an important limiting factor to widespread use of US in routine clinical practice.

Early Detection of Avascular Necrosis of the Femoral Head by MRI

Muhammad Fiaz

Alrazi Healthcare

Avascular necrosis (AVN) is characterized by death of both trabecular bone as well as bone marrow elements. Weight bearing bone becomes mechanically weakened and may eventually collapse, secondarily leading to osteoarthritis and debilitating pain. The most common indication for MRI of the hip is to evaluate for possible avascular necrosis (AVN) of the femoral head. Avascular necrosis, also known as osteonecrosis or aseptic necrosis, is defined as necrosis of the subchondral bone secondary to diminished or disrupted blood supply. Early diagnosis and treatment of this entity are crucial because it affects relatively young individuals, and treatment options for advanced disease are limited.

Trauma involving the proximal femur or acetabulum may lead to unilateral AVN. Non-traumatic AVN, however, is bilateral in 50-80% of cases. It is important to identify AVN early, prior to the onset of femoral head collapse and fragmentation which requires total hip arthroplasty.

Magnetic resonance imaging (MRI) has emerged as the modality of choice for the evaluation of avascular necrosis of bone. We will discuss applications of MRI for early diagnosis, for monitoring therapy, and for its potential role in assessing individuals at risk of AVN.

The Role of MRI in Diagnosis of Knee Joint Diseases

Yasma Ashraf, Irum Iqbal, Shazia F. Khan
Department of Radiology, PIMS, Islamabad.

INTRODUCTION: MRI is used for the diagnosis of various knee joint pathologies, meniscal injuries ligament injuries, bone fracture, tumours, cartilage, effusion and osteoarthritic changes. In many cases, MRI results lead to changes in the proposed management. One study determined that about one third of all diagnostic arthroscopies need not to be performed if MR is used and so morbidity associated with arthroscopy was avoided.

OBJECTIVE: The aim of the study was to know the extent of correlation of clinical and MRI features and whether MRI could be justifiably used to deny an arthroscopy.

To analyse the knee pathologies on MRI and to avoid unnecessary arthroscopies and hospitalization in order to reduce patients morbidity.

STUDY DESIGN: Retrospective study.

SETTINGS: This study was conducted in Radiology department of PIMS, Islamabad.

STUDY DURATION AND DATE: Duration of study was 6 months (01.03.2013 to 31.08.2013).

MATERIAL AND METHODS: We retrospectively studied 52 knee MRIs done between March August 2013, with various knee pathologies, evaluated clinically and then MRI. The aim of the study was to know the extent of correlation of clinical and MRI features and whether MRI could be justifiably used to deny an arthroscopy.

All patients with a strongly suggestive history were examined in PIMS OPD by orthopaedic surgeons and MRI were reported by radiology consultants. Results: We observed that 52 patients were subjected to MRI in 06 months out of which 33 were males and 19 were females. Only one MRI was normal. Most common injury was tear of posterior horn of medial meniscus found in 23 (44%) patients and lateral meniscus injuries in 12 (23%) patients. 33 patients (63%) had joint effusion. 23 patients (44%) had ACL and 4 patients (7%) had PCL tears. OA changes were found in 07 (13%) patients and 05 patients (10%) presented with tumours. Fracture of tibia, femur and fibula were found in 2, 1 and 1 patients respectively (4%, 2% and 2%).

CONCLUSION: We conclude that an accurately performed MRI allow arthroscopy to be targeted to those patients who likely to obtain therapeutic benefit. Reliance upon clinical judgment alone would have resulted in increase in arthroscopic procedures. Investigations such as MRI are effective and accurate methods of avoiding unnecessary hospitalizations, morbidity and waste of limited resources.

Determination of the Mean Thickness of Plantar Fascia in Asymptomatic Healthy Local Population using High Resolution Ultrasound

Mina Mariam, Umar Amin, Imaad-ur-Rehman
Department of Radiology, Shifa International Hospital, Islamabad, Pakistan.

PURPOSE: This study is mainly aiming to collect data of mean thickness of plantar fascia for our local population as our physical built is different from

people of West. Plantar fascia diseases are commonly encountered e.g plantar fasciitis for which very expensive MRI study is advised. This study will determine the normal range of plantar fascia thickness for our population and it would be easier to assess disease process at early stage by using a cheaper modality of ultrasound. Once a normal range is available it would be not difficult to compare pre and post-treatment values of plantar fascia thickness.

MATERIALS AND METHODS: Thickness of plantar fascia will be measured at 1 cm proximal to its insertion in midline sagittal plane using 5/7 Mega Hertz linear transducer.

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

INCLUSION CRITERIA: Age 18-40 years, either gender, asymptomatic healthy individuals.

EXCLUSION CRITERIA: Congenital anomalies of foot, history of foot surgery or arthritis.

RESULTS: Initial results have shown mean thickness of 2.94 mm \pm 0.67. In males thickness of plantar fascia is greater than 3 mm and in females less than 3 mm.

CONCLUSION: Thickness of plantar fascia at insertion is influenced by sex however height and age are independent variables.

Critical Evaluation of the Role of Imaging in Decision Pathways of Osteosarcoma

Fara Hashmi
Department of Clinical Radiology and Medical Imaging, Quaid e Azam International Hospital, Islamabad, Pakistan.

AIM: This study aims to evaluate the role of diagnostic imaging investigations in management of osteosarcoma. It will also provide an insight of the role of multidisciplinary teams in clinical decision making process for the appropriate choice of imaging investigation and its influence on patient management. Recommendations from guidelines and international standards for the diagnostic pathway of osteosarcoma will also be discussed.

MATERIALS AND METHODS: Patients diagnosed with osteosarcoma were selected during multi-disciplinary team meetings and followed prospectively. Patients' clinical notes and details of medical investigations were accessed from the hospital information system (HIS) and Picture Archiving and Communication System (PACS). Patients' personal information i.e. name medical record number and images of medical investigations were anonymised following the PCR standards for patient confidentiality and PACS (2008). Informed consent was obtained from patient before using patients' case notes. A critical review of all the imaging investigations was done comparing with the international standards.

CONCLUSION: Imaging examinations are essential in the work-up and staging of osteosarcoma. The critical role of diagnostic imaging modalities in detecting, staging and treatment planning was reviewed. This case study highlighted unjustified imaging examinations and the decision making process at every step of patient management. The key to efficient patient diagnosis and management is proper utilization of these imaging modalities by adhering to guidelines. Analysis of this case study provided an insight to achieve best patient outcomes.

Role of Dynamic Scanning In Hirayama Disease

Shumaila Arooj, Fatima Mubarak, Zafar Sajjad, Muhammad Azeemuddin, Wasay Jilani
Department of Radiology, Aga Khan University Hospital, Karachi, Pakistan.

OBJECTIVE: Show the importance of dynamic scanning in symptomatic patients with progressive upper limb weakness and with no obvious cause of the cord changes on routine MR images.

Hirayama Disease is an extremely uncommon disease of young adults lying in the age group between twenty to thirty years.

- Its other synonyms are juvenile muscular atrophy of the distal upper extremity (JMADUE) or monomelic amyotrophy (MMA) and juvenile asymmetric segmental spinal atrophy.
- Although the cause of cervical myelopathy remains unclear, neuropathologic and neuroradiologic findings suggest an abnormal compression or flattening of the anterior cord against the vertebral bodies during neck flexion, causing compression of the cervical cord, and resulting in atrophic and ischemic changes in the anterior horn.

DISCUSSION: The purpose of this case report is to show the importance of dynamic scan in symptomatic patients especially in their second or third decade with progressive upper limb weakness. Mostly the scanning in neutral posture does not reveal any significant cord compression. Similarly a normal looking thecal sac with preserved anterior and posterior thecal sleeves without disc disease dramatically changes on change of posture. In Hirayama Disease there is predominant involvement of C7, C8 and T1 with sparing of brachioradialis which is supplied by radial nerve (C5>C6). This disease has a postural connection and especially related to neck flexion. Application of cervical collar is recommended in early stages.

CLINICAL PRESENTATION: We report a case of a 25 years old boy who presented to radiology services through neurology clinic with gradual increase in bilateral upper limb weakness over a period of few years. He also had fasciculations and numbness both arms and hands. There were no symptoms in lower limbs. There was no history of trauma or positive family history of neuromuscular diseases. Cervical collar with posture modification was advised.

1.5T MR arthrography versus High-resolution 1.5T MRI of the shoulder for the detection of glenoid labral tears: A retrospective comparison at a single center.

Muhammad Fiaz, Muhammad Tahir

OBJECTIVE: This study serves to retrospectively assess the diagnostic accuracy of conventional direct MR arthrography at 1.5T for the assessment of tears involving the glenoid labrum, compared to high-resolution unenhanced MRI of the shoulder at 1.5T. Arthroscopy findings served as the gold standard.

MATERIALS AND METHODS: Data collection was performed through retrospective review of the institution's radiology information system. Consecutive patients with diagnosed labral pathologies on MRI who subsequently underwent surgery were identified, and correlation of the MRI report findings was made with intra-operative results. Patients who underwent operations for non-labral pathologies, e.g. rotator cuff tears or tumors were excluded.

MR ARTHROGRAPHY OF THE SHOULDER: We reviewed reports between Jan 2011 to June 2013. Technique: 10 to 15 mls of diluted gadolinium contrast (0.1mls of gadoversetamide [Optimark] in 10mls of normal saline) was injected into the shoulder joint via the standard anterior approach under fluoroscopic guidance using a 22G spinal needle. Patients were scanned within 40 minutes of intra-articular injection.

UNENHANCED MR SHOULDER: High-resolution unenhanced shoulder MRI was performed routinely for the same purpose.

In article comparing unenhanced 3T MR shoulder with 3T MR arthrography, Magee found that MR arthrography showed a statistical improvement in sensitivity for the detection anterior labral tears and SLAP tears compared to unenhanced MR shoulder.

CONCLUSION: Our results show that for the detection of anterior glenoid labral tears, conventional MR arthrography at 1.5T was statistically more accurate than high-resolution 1.5T unenhanced MR shoulder. We find that MR arthrography, with its inherent advantages as compared to high-resolution unenhanced MR shoulder at 1.5T, is accurate and effective in the detection of labral lesions in our study population.

Assessment of Regional Cerebral Blood Flow in Major Depressive Illness (with / without Suicidal Behavior) by Radionuclide Brain Perfusion SPECT

Riaz S,¹ Hussain F,² Waqar A.,² Ali MK.,² Minhas F³

¹ *Shaukat Khanum Memorial Cancer Hospital and Research Centre, Lahore, Pakistan.*

² *Nuclear Medical Centre, Armed Forces Institute of Pathology (AFIP), Rawalpindi, Pakistan.*

³ *Department of Psychiatry, Rawalpindi General Hospital, Rawalpindi, Pakistan.*

To assess the regional cerebral perfusion changes in patients with major depressive illness, with or without suicidal behavior by Tc-99m HMPAO brain perfusion SPECT.

METHODOLOGY: The study was conducted at Nuclear Medical Centre, Armed Forces Institute of Pathology, Rawalpindi from September 2006 to February 2007. Tc 99m HMPAO SPECT was performed in 40 subjects including 10 controls as Group A. The diseased sample included 30 patients with Major Depression meeting the DSM IV criteria (The Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition), scoring > 17 on the Hamilton Rating Scale. The patients were sub classified as Group B including patients with major depression (N = 16) and the Group C including patients of major depression with attempted suicide (N = 14), having moderate to severe suicidal risk as assessed by Intent Score Scale. Semi quantitative analysis was done for cerebral perfusion assessment by applying brain quantification program. Coronal slices were selected for the processing. The cortex to cerebellum ratios were calculated in 16 ROIs in all the patients.

RESULTS: The scintigraphic evaluation of the cerebral perfusion in the Group B (Non-suicidal) showed significant hypo perfusion in the pre frontal (p < 0.001), orbitofrontal (p < 0.01), frontal motor (p < 0.01) and the temporal lobes (p < 0.01). In the Group C (Suicidal), significant hypo-perfusion was noticed in the pre frontal (p < 0.001), orbitofrontal (p < 0.01) and frontal motor areas (p < 0.001). The temporal lobe showed hyperperfusion (p < 0.001).

CONCLUSIONS: In major depressive illness the pre frontal, the orbitofrontal and the frontal motor areas are markedly hypoperfused. The severe depression not associated with any suicidal behavior demonstrates the hypoperfusion in the temporal lobes, while hyperperfusion is observed in the temporal lobes in suicidal behavior depending on the severity of the suicidal behavior.

Breaking Dawn: Novel Anticancer Radiopharmaceuticals 5-fu and MTX for Imaging and Staging of Breast Cancer

Rashid Rasheed

Nuclear Medicine Physician

PURPOSE: To use prepare kits of Tc99m labeled anticancer agents as imaging and staging agents for carcinoma breast.

MATERIALS AND METHODS: Methotrexate (MTX) and 5Flourouracil (5-FU) are anticancer agents used in the treatment of various cancers. Here we prepared the ^{99m}Tc-MTX and ^{99m}Tc 5 FU kits by direct labeling method and studied its biodistribution in volunteer subjects and patients with carcinoma breast as well. After publishing animal trials we started our clinical study.

RESULTS: Normal biodistribution in humans showed that ^{99m}Tc MTX and ^{99m}Tc 5 FU has no nonspecific uptake in any part of the body. It behaved like a blood pool agent with kidneys as main routes of excretion and to a lesser extent liver as well. Biodistribution data of patient with carcinoma breast showed excellent tracer uptake in the tumor and showed no other nonspecific tracer uptake.

CONCLUSIONS: This initial clinical trial showed that ^{99m}Tc labeled anticancer drugs can be successfully used for tumor scintigraphy which is a major breakthrough in the history of oncology as this method of labeling and scanning may be useful in future tumor staging, calculating sensitivity of tumor to certain anticancer agent and response evaluation during chemotherapy.

“SPECT / CT Imaging: Spectrum of Clinical Utility in Local Settings”

Mohammad Saadullah, Saleem Sajid, Younas Khan, Owais Ashraf and Sabir Hussain

Department Nuclear Medicine and Molecular Imaging, Northwest General Hospital and Research Center, Peshawar Pakistan

PURPOSE: Use of hybrid imaging to answer clinical query has gain tremendous interest by the referring physicians in the last few decades. PET / CT has shown it's significant from the day first of its availability in our country. SPECT / CT has been in clinical use international and for the last few years in a small number of nuclear medicine centers of Pakistan. Objective of this study is to highlight the clinical applications of this hybrid modality by personal experience at our institution.

MATERIAL AND METHODS: All patients presented to department from 15th April 2013 till 15th October 2013 and had SPECT / CT performed were included in the study. SPECT / CT was performed according to the August 2008 guidelines of IAEA using 4 slices low dose non-contrast enhance CT.

RESULTS: SPECT / CT showed its clinical significant in bone scans, infection imaging, DMSA scans, myocardial scans, coronary artery calcium scoring, liver hemangioma scans and parathyroid scans.

CONCLUSION: Hybrid imaging had great impact on answering clinical queries, providing additional clinically significant information and improving image quality. Cost, high dose CT imaging and use of intravenous contrast are the questions to be answered for more extensive clinical application.

Patterns of Outflow Abnormalities on Dynamic Renal Scan in Paediatric Patients and Correlation with causes

Maryam Shahzad

PURPOSE: The aim of this study was to correlate the calculated half clearance time on Dynamic renal scan with underlying diagnosis in pediatric patients with suspected renal obstruction.

MATERIALS AND METHODS: 100 pediatric patients were included in this study with suspicion of obstructed kidney who consented to be part of this study, consecutively without any discrimination of gender. Patients underwent Dynamic Diuresis Renography using F+zo protocol with ^{99m}Tc-DTPA. E-Cam Gamma Camera SIEMENS was used. A dose of 180 MBq ^{99m}Tc-DTPA and 1 mg/kg diuretic was used in all patients. SPSS 17 was used in statistical analysis.

RESULTS: A total of 100 pediatric patients were included in this study. Out of these patients 24% were between the age group of 10-17 years, 40% were between 5-10 years, 26% were between 1-4 years and only 10% were between less than 1 year. 66% of male population and 34% female population was included. Patients who came with the suspicion of obstructed kidney, of these 41% showed left kidney obstruction and 39% showed right kidney obstruction. Half clearance activity of kidneys was correlated separately with underlying diagnosis. In left kidney 30% showed normal, 7% showed delayed and 34% showed markedly low functioning kidney. Similarly in right kidney, 39% showed normal, 3% showed delayed and 36% showed markedly delayed functions. Of the total 22% Right and 2.9% Left Kidneys were either poor or non-functioning for which half peak activity was not achieved.

CONCLUSION: This Study shows that left kidney obstruction is more common and half clearance activity on a dynamic diuresis renography shows accurate detection of obstructed and non-obstructed kidneys. The information contained on renograms regarding half peak activity may be considered useful for treatment decisions.

Tc 99m MIBI Scintigraphy to Differentiate Malignant from Benign Lesions, Detected on Planar Bone Scan

Aniqa Iabeen, Bashir, Shahid Kamal, Mohammad Ali, Shaheen, Hassan, Minhaj, Sumaira

AEMC, Jinnah Postgraduate Medical Institute, Karachi, Pakistan.

PURPOSE: The aim of this study was to evaluate the effectiveness of Tc-99m MIBI scintigraphy to distinguish malignancies from benign lesion, which were detected on planar bone scans.

MATERIALS AND METHODS: 59 patients with bone lesions were enrolled in the study. The scintigraphic findings were compared with the clinical, radiological and the histological findings. Each patient initially underwent a three phase bone scan with Tc 99m MDP and if evidence of lesion found, the patient then underwent a dynamic and static MIBI scintigraphy after three to four days. The MDP and MIBI scans were evaluated visually and quantitatively. For quantitative analysis count ratios of lesion and contra lateral normal side (L/C) were taken by region of interests drawn on scans. The Student T test was applied to assess the significant difference between benign and malignant lesions p value < 0.05 was considered significant.

RESULT: The MDP scans showed increase tracer uptake but there was no significant difference between benign and malignant uptake of radiotracer. However significant difference (p-value 0.015), in uptake was seen in malignant (L/C = 3.51 ± 1.02) and benign lesion (L/C = 2.50 ± 0.42) on MIBI scan. Three of thirty benign lesions did not show significant MIBI uptake. Seven malignant appeared as false negatives. Specificity of the scan was 86.66% and its Negative Predictive Value (NPV) was 81.25% whereas the sensitivity of scan was 79.31%.

In excluding the axial metastasis from the lesions the sensitivity of MIBI scan increased to 91.66% and the NPV also increased to 92.85%.

CONCLUSION: MIBI scintigraphy provides its usefulness by distinguishing malignant from benign lesions. MIBI also correctly identifies metastatic lesions. The negative predictive value of the scan points towards its ability to correctly diagnose the normal (benign) cases. However biopsy still remains the gold standard and a definitive diagnostic modality in musculoskeletal tumors. MIBI scan provides good information in preoperative assessment and in distinguishing between malignant and benign lesions.

Predictive Value of Body Mass Index (BMI) and Waist Circumference (WC) for Coronary Artery Disease (CAD) and Clinical Outcomes using Gated Myocardial Perfusion Imaging

Nosheen Fatima,^{1,2} Maseeh-uz-Zaman,^{1,3} Unaiza Zaman,⁴ M. Ishaq,¹ Rehan Omar,¹ Dad J Baloch,¹ Iaveria Bano,¹ Kawish Rehman,¹ Asif Wali¹, Imran Ali Shah¹

¹ Department of Nuclear Cardiology, Karachi Institute of Heart Diseases (KIHD), Karachi, Pakistan.

² Department of Nuclear Medicine, Dr. Ziauddin Medical University, Karachi, Pakistan.

³ Department of Radiology, Aga Khan University Hospital (AKUH), Karachi, Pakistan.

⁴ 2nd year MBBS, Dow University of Health Sciences (DUHS), Karachi, Pakistan.

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

MATERIAL AND METHODS: This was a prospective study conducted at Nuclear Cardiology Department of Karachi Institute of Heart Diseases (KIHD), Karachi, Pakistan from August 2011 till May 2013. 400 patients who qualified study criteria were included and were divided in (a) to Obese (BMI ≥ 30 Kg/m²) and Non-obese (BMI < 30 Kg/m²) and (b) Low-WC group (male < 90 cm and female < 80 cm) and High WC group (male ≥ 90 cm and female ≥ 80 cm). Rest and stress GMPI using Tc-99m MIBI was performed in all patients and abnormal GMPI was followed by coronary angiogram. These patients were followed for 12-18 months regarding fatal and non-fatal events.

RESULTS: Non-Obese group included 281 patients (Male: Female = 131:150) with a mean age of 58 ± 12 years and mean WC 100 ± 15 cm. Obese group included 119 patients (Male: Female = 36:83) with a mean age of 55.11 years and mean WC 101 ± 13 cm. Normal GMPI was found in 172 non-obese and 85 obese patients ($p < 0.05$). GMPI was abnormal in 109 non-obese and 34 obese patients ($p < 0.05$). WC was not found independent predictor of abnormal GMPI but high WC was found to a significant predictor of CAD in non-obese females (Odds ratio 8.04; 1.041-62.127). At 18 months event-free survival in normal GMPI group for non-fatal MI was 99.4% in non-obese group and 94.1% for obese (significant P value). For fatal MI, event-free survival was 99.4% in non-obese and 100% for obese (non-significant P value). In patients with abnormal GMPI event free survival for non-fatal events was 95.4% in non-obese group and 82.3% in obese group (significant P value). While event free survival for fatal MI was 96.3% in non-obese group and 98.1% for obese (significant P-value).

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

Positive Predictive Value of PET / CT for Detecting Recurrent Disease in the Lymphoma Patients Taking Histopathology as Gold Standard

M. I. Ahmad, Z. S. Faruqi, A. Murtaza

Department of Radiology, Shaukat Khanum Memorial Cancer Hospital and Research Center, Lahore, Pakistan.

AIM: Lymphoma includes histologically heterogeneous group of cancers which are derived from the cells of the immune system. The overall incidence of lymphoma in Asian population is 17.8 per 100,000 men and 12 per 100,000 women. FDG PET / CT is extremely useful for therapy response assessment as it has the ability to distinguish between residual metabolically active tumor and areas of necrosis and fibrosis without any metabolic activity. The aim of this study was to determine the positive predictive value of PET / CT in detecting recurrent / residual disease in lymphoma patients by taking histopathology as gold standard. It was likely to produce different results than inter-national standards due to high incidence of granulomatous diseases in Pakistan.

MATERIAL AND METHODS: This is cross sectional survey and was conducted in SKMCH and RC Lahore. Data was collected retrospectively from September 2009 to December 2011. The data was collected using non-probability and purposive sampling method. Patients were scanned using Brilliance 16 slice multi detector PET / CT unit with onsite cyclotron. The radiological criteria to suggest relapse was FDG uptake of more than 3. Retrospective chart review of patients was performed regarding nature of clinical course, type of treatment received, and clinical suspicion of relapse.

RESULTS: Total 109 patients were studied out of which 40 patients were included according to inclusion criteria. Out of these 40, 23 patients were true positive confirming recurrent disease on histopathology while 17 were false positive with histopathology of reactive tissue or granulomatous infection. So the PPV of PET CT was calculated to be 57% as compared to international documented value of 85%.

CONCLUSION: The PPV of PET CT in documenting recurrent disease is lower in our clinical setup due high prevalence of infective disease particularly granulomatous infection, so biopsy should be performed before documenting recurrent disease.

Tc^{99m} Mibi Spect, Single Injection Dual Screening of Ihd (silent Myocardial Infarction) And Peripheral Arterial Disease (pad) In Diabetes Mellitus

Rashid Rasheed

Gujranwala Institute of Nuclear Medicine and Radiotherapy (GINUM) Cancer Hospital, Gujranwala, Pakistan.

BACKGROUND: Pakistan is among top ten countries with patients suffering from diabetes mellitus. Incidence of Silent Myocardial Infarction (SMI) is high in diabetics along with incidence of peripheral arterial disease (PAD) i.e. gangrene and diabetic foot. Late diagnosis of both SMI and PAD leads to the significant mortality and morbidity. This study was done to evaluate a new technique using Tc99m MIBI SPECT as single injection dual screening of arterial disease for early diagnosis of onset of arterial disease so as to prevent morbidity.

METHODOLOGY: Known patients with diabetes mellitus were selected for the study. Myocardial perfusion study was done on the treadmill using modified Bruce protocol. Same stress was used to give stress to the lower limb calf muscles. On the peak stress 20 mCi of Tc99m MIBI was injected and SPECT study of heart and both legs was performed. Normal perfusion curves were generated from data of normal subject n=36 and patient data n=22 was compared with these curves with P value of < 0.05 was taken as significant. Myocardial perfusion study was analyzed for ischemic defects on conventional protocols

and defects were graded a mild, moderate and severe. For lower limbs, perfusion data was divided into 20 segments and %age of total counts in all that leg was plotted graphically to develop normal perfusion curves.

RESULTS: Data showed that 3/22 (13 %) showed reversible ischemia involving inferior and lateral myocardial walls. For lower limbs perfusion study normal data was developed using 36 normal subjects and same 22 patients were evaluated for PAD as well. 7/22. (31%) showed perfusion defects / low perfusion as compared to the normal perfusion curves of the lower limbs. The results were compared with Doppler ultrasound of lower limbs which showed diffuse atherosclerotic changes in these patients and significant PAD.

CONCLUSION: Tc99m MIBI SPECT as single injection dual screening is a valuable tool for screening of IHD and PAD at the same time. As this technique can predict the disease before its critical stage therefore can save million of diabetic from developing morbidity and thus can save the patients from unwanted procedures and expenditures of amputations, disability and cardiac procedures as well.

Comparison of findings of Planar Bone Scan with SPECT Bone Scan for evaluation of Backache

Nadia Mehmood, Muhammad Numair Younis, Tariq Manzoor, Muhammad Ibrahim

ABSTRACT: Backache is pain that is felt in the back and originates either from nerves, bones, muscles, joints, or other structures in the spine. Numbers of modalities are used for evaluation of backache. The choice among various imaging methods in the evaluation of lower back pain usually depends on the suspected abnormality. In patients with a suspected bone abnormality, planar and SPECT bone scan is used.

AIM: The objective is to compare findings of Planar Bone Scan with SPECT Bone Scan for evaluation of Backache.

MATERIAL AND METHODS: 15 patients with backache problem were investigated.

Following injection of 20 mCi ^{99m}Tc-MDP (^{99m}Tc methylene diphosphonate), planar and SPECT images were performed in all patients.

RESULTS: Out of total 15 patients with spinal lesions, SPECT detected 13/15 (86.66%) lesions and that lesions were missed on planar bone scan. 2/15 (3.33%) lesions were detected on both planar and SPECT bone scan with same information on both.

CONCLUSION: In our study, SPECT provided superior information compared to planar bone scan in patients with backache. SPECT give three dimensional information that's why it better localize disease and hence has better sensitivity than planar bone scan.

“Christmas Tree Sign”: Paraspinal Cerebrospinal leak on ^{99m}Tc-DTPA radionuclide cisternography

Nosheen Fatima,¹ Maseehuz Zaman,² Atta ulAleem Bhatti,³ Imtiazul Haque Khurshaidi,¹ Ali Iawaid Siddiqui,¹ Aitadal Moin Shaikh¹

¹ Nuclear Medicine Department; Dr. Ziauddin Medical University Hospital Karachi, Pakistan

² Nuclear Medicine Section, Department of Radiology; Aga Khan University Hospital Karachi, Pakistan

³ Neurosurgery Department; Dr. Ziauddin Medical University Hospital Karachi, Pakistan

Radionuclide cisternography (RC) is an underutilized but sensitive modality used to differentiate between normal pressure and non-communicating

hydrocephalus and can also detect cerebrospinal fluid (CSF) leakage. We present a case of intracranial tuberculosis with severe headache and hydrocephalus. RC was performed with Tc-99m labeled DTPA showing communicating hydrocephalus with characteristic Christmas tree sign and early appearance of renal activity due to spinal CSF leak into systemic circulation. This patient responded well to ventriculo-peritoneal shunt (VP shunt).

Diagnostic Performance of Diffusion Weighted MRI in the Detection of Nonpalpable Undescended Testes

Maria Afzal Bodla, Madeha Ishaq, Sadia Anjum, Abdul Sattar
Department of Radiology, Nishtar Hospital, Multan, Pakistan.

OBJECTIVE: The aim of this feasibility study was to evaluate the role of diffusion-weighted MRI in the evaluation of nonpalpable undescended testes.

MATERIAL AND METHODS: 21 boys with undescended testes underwent preoperative abdominal and pelvic MRI to identify the location of the testes. MRI sequences included free breathing diffusion weighted imaging (DWI) with b values of 50, 400, and 800 s/mm, T1 weighted turbo spin echo sequence and T2 weighted fat suppressed turbo spin echo sequence. Signals and location of undescended testis were noted. We followed our patients and compared our findings with post surgical findings.

RESULTS: On DW images undescended testis were seen in all these patients and location was in inguinal canal (16 patients), femoral canal (2 patients), retoperitoneum (2 patients) and in 1 patient it was hypoplastic.

CONCLUSION: Use of DWI with a high b value yields information that complements conventional MRI findings, improving identification and location of nonpalpable undescended testes. We recommend the use of DWI in addition to conventional MRI to increase the preoperative sensitivity and accuracy of identifying and locating nonpalpable testes.

Disorders of Sex Development

Ahsan Ali, Shabbir A. Naeem, Ashfaq Hussain
Department of Radiology, SIUT, Karachi, Pakistan.

INTRODUCTION: Disorders of sex development (DSDs) are congenital conditions in which the development of chromosomal, gonadal, or anatomic sex is atypical. This may result in birth of a baby with ambiguous genitalia.

Imaging plays an important role in demonstrating the anatomy and associated anomalies. Early and appropriate gender assignment is necessary for healthy physical and psychologic development of children with ambiguous genitalia.

Gender assignment can be facilitated with a team approach that involves a pediatric endo-crinologist, geneticist, urologist, psychiatrist, social worker, neonatologist, nurse, and radiologist, allowing timely diagnosis and proper management.

In this literature review, we discuss and illustrate DSDs in terms of embryologic features; nomenclature and classification; and imaging findings at ultrasound, Magnetic Resonance (MR) imaging.

Sonographic Imaging of Children with Blunt Abdominal Trauma and its Limitations

Umairah Kalim, Aliya Ahmed, Mujahid Raza, Shazia F Khan, Zia Ullah
Department of Radiology, Pakistan Institute of Medical Sciences PIMS, Islamabad, Pakistan.

PURPOSE: Trauma is a leading cause of morbidity and mortality in children. The abdomen is the second most common site of injury. The purpose of this study is to evaluate the benefits and limitations of ultrasound imaging in abdominal trauma of children.

METHODS AND MATERIALS: Around 50 children presenting to PIMS with abdominal trauma were prospectively analyzed from 1st Jan 2013 to 31st July 2013.

RESULTS: Sonography detected free fluid in 21 patients. 13 patients had solid organ injury but no free fluid and, thus, were not detected by ultrasound. The sensitivity of sonography was only 0.61 and the negative predictive value was only 0.44.

CONCLUSION: Sonography has limited utility in the assessment of pediatric abdominal trauma. Its primarily useful in the detection of hemoperitoneum in trauma patients but has insufficient sensitivity and negative predictive value to be used as a screening imaging test in hemodynamically stable children with blunt abdominal trauma.

Radiology Research in Pakistan A Perspective from Radiologists in the Developing World

Yousuf Husen

OBJECTIVE: To determine the factors that affect radiology research in Pakistan. It is important to assess the research activities in Pakistani institutes with the available set of resources as well as to analyze interest of the radiologists in research and the factors that limit their research activities.

MATERIALS AND METHODS: A survey was conducted at the Annual Radiological Meeting of Pakistan in October 2010. 261 questionnaires were distributed among the participants that came from different institutes of Pakistan both Government and Private and included radiology trainees as well as practicing consultants. The questionnaire was focused towards assessment of factors resulting in reduced radiology research in Pakistan.

RESULTS: 241 questionnaires were received corresponding to a response rate of 92%. Participating radiologists had radiology experience ranging from 01 to 17 years. Formal research training was received by 30% of respondents. 32% of radiologists stated that they do not carry out research. 41% respondents had at least one publication in the last five years. Very few (07%) radiologists had done a funded research project in last 05 years. Ultrasound was the commonest modality of research (42%). 70% of the respondents said that they do not get dedicated time for research.

CONCLUSIONS: The main factors culminating in reduced research in radiology are lack of time, resources, funding, research training and patient records.

To be Aware of Existence of Various Misleading MR Artifacts on a 3T MR Scanner

Shumaila Arooj, Muhammad Azeemuddin, Sana Nizam
Department of Radiology, The Aga Khan University Hospital, Karachi, Pakistan.

PURPOSE: It is well known that although the increase in strength of magnetic field improves the image quality significantly, it leads to generation of more artifacts on 3T MR machines than on 1.5T machines. That is why it is important

to be aware of the presence of such artifacts and their difference of appearance as compared to that on 1.5 T machine.

MATERIAL AND METHODS: We will work on a 3-T vantage titan Toshiba machine for 03 months with observing and noting various artifacts in our ongoing patients.

RESULTS: We will observe and divide our findings in various groups like susceptibility artifacts, pulsation, motion truncation and artifacts due to inadequate technique. We will compare them with our 1.5 T machine and will figure out methods to reduce them.

CONCLUSION: High field imaging makes acquisition of thinner slice selection and use of specialized techniques like MRS, DTI, etc easy with reduction in table time but at the stake of multiple artifacts. These can be reduced and their knowledge is mandatory so one does not confuse it with pathology.

Adequacy of Clinical Information from the Accident and Emergency Department: An Audit to Improve the Management Pathway of Service Users

Humaira Shakir
Department of Clinical Radiology and Medical Imaging, Quaid e Azam International Hospital, Islamabad, Pakistan.

AIM: To identify and quantify the appropriate provision of clinical information by the Accident and Emergency (A&E) practitioners. It aims to improve the management pathway of traumatic patients.

BACKGROUND: There is evidence that inadequate clinical information is associated with an increased level of inaccurate reports. Accurate clinical information is more likely to assist the radiologist in constructing a report which in turn will help the referring practitioner with the management of the patient. Moreover, health care professionals from different disciplines work with each other in a collaborative manner to provide best possible treatment to service users. Keeping in mind the importance of inter-professional working, an audit was conducted to assess the local practice.

METHODS AND MATERIALS: An audit was conducted prospectively to assess the local practice regarding A&E services. Permission was taken from the radiology head of department prior to conducting study. Percentages of request forms containing adequate clinical information were assessed and collected during the period of one month. Request forms were assessed on a simple proforma completed at the time of reporting. Each request form was assessed if it includes; a brief clinical history, the clinical signs, precise site of injury and identifier for the person making the request. Reports were then compared on the basis of set protocols regarding clinical information.

RESULTS: Adequate clinical information was documented in 35% of request forms. 60% of request forms were deprived of the above mentioned clinical information. Reports of the patients having adequate clinical information were effective as those having incomplete information.

CONCLUSION: This study has helped to understand errors related to lack of adequate clinical information. It has ruled out the gap of communication among emergency staff and radiology. This factor corresponds to the late reporting issue encountered by A&E Staff. Formal instruction on how to complete request forms was given and regular meeting between A&E staff was planned to discuss the areas in which improvement is required.

Parameters for Radiation Protection and Patient, Occupational Dose Management

Maryam Abbasi, Yumna Anwar and Syed Ialal Haider
Rawalpindi Medical College, Rawalpindi, Pakistan.

PURPOSE: Health physics is concerned with providing occupational radiation protection and minimizing radiation dose to the public. This article reviews radiation dose protection associated with common X-rays and CT scan examinations, parameters contributing radiation dose reduction and describes techniques for reducing radiation dose. Most of the institutes practice ALARA because of Linear non-threshold radiation dose response relationship (LNT) for stochastic effects like cancer, leukemia and genetic effects.

MATERIALS AND METHODS: Radiation dose management in diagnostic radiology is considered to be a critical factor for optimizing radiation protection to the health care practitioners, the patient and the public. Keeping in view the importance of radiation protection in diagnostic X-ray centers, it has been observed that radiographers working in radiology are not trained to apply proper radiation protection procedures and use of personal dosimeters. The observation was made during personal visits in diagnostic radiology departments and interactions with radiographers.

RESULTS: Radiographers working in diagnostic X-rays facilities are not properly trained to apply radiation protection principles and procedures. Education and training issues are not being addressed during their professional careers. In this regard the role of Pakistan Nuclear Regulatory Authority (PNRA) and work of medical physicist in these facilities is important. It is also mentioned here that most of the workers in diagnostic radiology are willing to participate in the radiation protection courses and to learn basic physics principles related to radiology.

CONCLUSION: This study suggests that awareness of radiation protection among public is generally low and need proper training of radiology personnels in radiation safety. Use of personal dosimeters, role of Pakistan Nuclear Regulatory Authority and work of medical physicist in these facilities is recommended.

A Review of Radiation Safety Culture, Education and Training of Radiographer in Diagnostic Radiology

Saeed-ur-Rahman, Muhammad Faheem and Ivaaid Irfan
Nuclear Medicine, Oncology and Radiotherapy Institute (NORI), Islamabad, Pakistan.

PURPOSE: The paper presents an overview of radiation protection and safety principles followed by the hospital staff in medical imaging. Education and training issues of radiographers, use of personal dosimeters and radiation measuring equipment available in these facilities are discussed.

MATERIAL AND METHODS: Radiation dose measurement in diagnostic radiology is considered to be a critical factor for optimizing radiation protection to the health care practitioners, the patient and the public. Keeping in view the importance of radiation protection in diagnostic X-ray centers, it has been observed that radiographers working in radiology are not trained to apply proper radiation protection procedures and use of personal dosimeters. The observation was made during personal visits in diagnostic radiology departments and interactions with radiographers.

RESULTS: Radiographers working in diagnostic X rays facilities are not properly trained to apply radiation protection principles and procedures. Education and training issues are not being addressed during their professional careers. In this regard the role of Pakistan Nuclear Regulatory Authority (PNRA) and work of medical physicist in these facilities is important. It is also mentioned here that most of the workers in diagnostic radiology are willing to participate

in the radiation protection courses and to learn basic physics principles related to radiology.

CONCLUSION: This study suggests that awareness of radiation protection among radiographers is generally low and need proper training in radiation safety. Use of personal dosimeters, role of Pakistan Nuclear Regulatory Authority and work of medical physicist in these facilities is recommended.

The continuous professional development (CPD) requirements of radiographers in Pakistan

Farah Akram, Iffat Mustafa
Shaukat Khanum Memorial Cancer Hospital & Research Centre, Lahore, Pakistan.

PURPOSE: In Pakistan, awareness of CPD participation has not been created among healthcare practitioners to enable them engage in effective CPD activities in order to improve their knowledge and skills. An understanding of radiographers attitudes and opinions towards CPD will assist in providing a CPD programme that meets the needs of radiographers. The aim of this study is to determine Pakistani radiographers' attitudes and opinions towards CPD that will help improving professional knowledge and individual competency for the provision of better services.

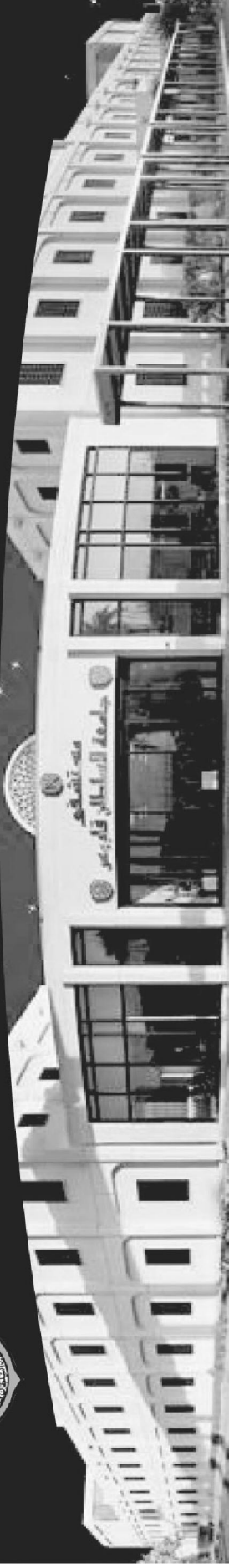
METHODS: One hundred and twenty-seven questionnaires about CPD were distributed among radiographers and medical imaging technologists in different setups. Results: A total of 98 questionnaires were returned. Among all respondents, 10% were currently engaged in CPD and a high percentage (78.1%) of respondents believed CPD to be very important. Updating professional knowledge (79%) and maintaining professional competence (75%) were the most popular reasons for participating in CPD. Participants reported that time constraints and workload are barriers to CPD participation. Employer initiated CPD was most favoured; with in-house education and workplace seminars as suggested methods to increase CPD participation.

RESULTS AND CONCLUSION: This study demonstrated that decreased participation rates in CPD were mainly due to time constraints and workloads. CPD was important to most radiographers, although a higher percentage of diploma holder radiographers assigned less importance to CPD. Four to six hours monthly devoted to CPD was the preferred amount of study, with 5 hours per month being the mean time radiographers were prepared to devote to CPD. A mixture of paper, e-learning and internet based materials in the native language of the radiographer would be the most popular method for CPD delivery. English was the most popular language for CPD materials. Cross sectional imaging (CT and MRI) was the most popular area for CPD training although training in digital imaging and trauma were also much sought after. Special attention is to be given to promote CPD programme to improve professional competencies and update professional knowledge.



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- The applicant should be a graduate of recognized structured Radiology Residency Training Program. Certificates Requirements below or equivalent:
 - American Board certified
 - FRCR UK, Irish,
 - FRCS Canadian, New Zealand or Australian
- Fellowship in radiology subspecialties (preferred):
 - Neuroradiology
 - Minimum 7 years post radiology board certification
 - or 3 years post fellowship experience.

SENIOR SPECIALIST

Qualification/Experience:

- The applicant should be a graduate of recognized structured Radiology Residency Training Program. Certificates Requirements below or equivalent:
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 - FRCS Canadian, New Zealand or Australian
- Fellowship in radiology subspecialties (preferred):
 - Neuroradiology
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