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**28th Annual Conference 2013**  
**Radiological Society of Pakistan**  
**Abstracts**

**Differentiation Between Benign and Malignant Thyroid Nodules on the Basis of MRI Diffusion Weighted Imaging and ADC Mapping**

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**PURPOSE:** To reveal the role of diffusion - weighted imaging (DWI) in differentiating benign from malignant thyroid nodules by taking biopsy as the gold standard.

**MATERIALS AND METHODS:** Twenty five patients with thyroid nodules were evaluated with conventional MRI (T1- and T2-WI) as well as Fat suppressed technique, DWI was done on 1.5 T machine using  $b$  values of 0 and 1000s/mm<sup>2</sup>; ADC values were calculated for the thyroid nodules. The ADC values were correlated with the histo-pathological results.

**RESULTS:** The benign nodules showed pattern of facilitated diffusion and malignant nodules were showing restricted diffusion. T test was used to assess the difference in mean ADC values between benign and malignant nodules. The mean ADC of the malignant thyroid nodules ( $0.94 \pm 0.16 \times 10^{-3}$  mm<sup>2</sup>/s) was significantly lower than that of the mean ADC of the benign thyroid nodules ( $1.93 \pm 0.13 \times 10^{-3}$  mm<sup>2</sup>/s) ( $p$  value < 0.0001). ADC value of  $1.6 \times 10^{-3}$  mm<sup>2</sup>/s was used as a cut - off value for differentiation benign from malignant thyroid nodules. The sensitivity, specificity, PPV and NPV of DWI in differentiating benign from malignant thyroid nodules were 94%, 95%, 94% and 95%, respectively.

**CONCLUSION:** DWI is a non-invasive diagnostic modality for characterization and differentiation between benign and malignant thyroid nodules. Thus it not only decreases the burden of unnecessary surgeries when pre-op FNAC and biopsy are inconclusive but is also helpful in reaching a definite diagnosis when a nodule is not amenable for biopsy due to its small size or unsuitable location.

**Role of Proton MR Spectroscopy in Differentiating High Grade Glioma and Solitary Metastasis**

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**PURPOSE:** To determine whether proton MR spectroscopy can be used to differentiate high grade glioma and solitary metastasis on the basis of metabolite levels in peritumoral region.

**METHODS AND MATERIALS:** Total 30 patients with solitary brain tumor (18 with glioma and 12 with metastasis) undergo conventional MR imaging with plain and contrast study before surgical resection or stereotactic biopsy. Peri-tumoral region is defined as area of white matter T2, hyperintensity adjacent to enhancing tumoral component which do not show enhancement on post co.

**RESULTS:** Spectroscopy imaging shows elevated choline level in peritumoral region in high grade glioma and not in metastasis. Choline to Creatinine ratio was  $2.30 \pm 1.30$  in high grade glioma and  $0.80 \pm 0.23$  in metastasis.

**CONCLUSION:** Although Conventional MR imaging characteristic can differentiate high grade glioma and solitary meta-stasis. MR spectroscopy can be problem solving tool and increase confidence in diagnosis.

**Emergency Imaging of the Acute Stroke Patient Review**

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**CONCLUSION:** Patients presenting with suspected acute stroke require rapid diagnosis and treatment. Neuroimaging is critical in determining acute - stroke type and thus appropriate management. A review of various neuro-imaging techniques and their role in the evaluation of both acute ischemic stroke and acute hemorrhagic stroke will be provided.

The benefits of using CTA, CT perfusion over MRA and Diffusion imaging along with MR perfusion will be discussed.

Their role in management with current status of stroke evaluation will be discussed.

**Sensitivity and Specificity of Diffusion Weighted MR Imaging in Grading Cerebral Gliomas**

**PURPOSE:** The purpose of our study was to determine the sensitivity, specificity Negative and positive prediciveness of the threshold values of ADC and ADC ratios in grading of cerebral Gliomas.

**MATERIALS AND METHODS:** A retrospective study was carried out including 60 patients with histopathologically proven primary cerebral gliomas who had undergone conventional MR imaging and Diffusion MR imaging. A blind ended analysis of the imaging findings and diffusion parameters were done. Minimum ADC values were obtained from the area of maximum hypointensity in the tumor and from corresponding white matter of opposite side. Tumor grade determined with this method is compared with histopathology. Receiver operating characteristic analyses were performed to determine optimum thresholds for tumor grading and also to calculate the sensitivity, specificity, PPV, and NPV for identifying high - grade gliomas.

**RESULTS:** Statistical analysis showed an threshold value of 98.3 mm<sup>2</sup>/s for ADC below which the tumors were graded as high grade. A sensitivity, specificity, PPV, and NPV of 90, 88.3, 82.01 and 94.5% respectively, were obtained.

Significant differences were noted between the ADC and ADC ratios of high and low grade gliomas ( $p < 0.0001$ ).

**CONCLUSION:** Increased accuracy was obtained when Diffusin weighted imaging was combined with conventional MR imaging in pre-operative grading of cerebral gliomas. Threshold and absolute values of ADC and ADC ratios can be used in a clinical setting to evaluate tumors preoperatively for histologic grade and provide a means for guiding treatment and predicting postoperative patient outcome.

**Normal Variants of Circle of Willis in Local Population on Time of Flight Magnetic Resonance Angiography**

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**PURPOSE:** Circle of willis is known to have variations in general population and has a lot of implications in incidence of stroke and surgical planning. No previous study is done in our local population to know the frequency of these normal variants. The objective of my study is to determine the frequency of normal variants of circle of willis in local population on time of flight magnetic resonance angiography. Aim is to provide the reference prevalence of various anatomic variants in general population in Pakistan.

**METHODS AND MATERIALS:** A total number of 300 patients from both OPD and IPD undergoing MRI brain with MRA were selected using non-probability consecutive sampling technique. Study was conducted at radiology department of Shifa International Hospital using 1.5 T Toshiba MRI scanner. Retrospective cross sectional survey was done using hospital PACS data base extending from 1st of March 2012 to 31st of August 2012.

**RESULTS:** Initial review of the data showed complete anterior part of the circle of Willis in 44% of the Pakistani population with other important variants being absence of anterior communicating artery and hypo-plastic or absent A1 segment of ACA which were 40% and 12% respectively. Complete posterior part of the circle was seen in almost 43% of the individuals with other important variables being hypoplastic or absent Pcoms and unilateral Pcom which were 32% and 12% respectively. Exact frequency and percentages will be compiled after complete review of the data.

**CONCLUSION:** Normal variants of the circle of Willis are common in Pakistani population. Some of these normal variants may be associated with risks like aneurysmal development or watershed infarcts. They are also correlated with relative contributions of the flow rates of proximal arteries and should therefore be taken into consideration when interpreting MRAs. Further research work should be performed on larger number of population in Pakistani population.

### Typical and Atypical Presentations of Posterior Reversible Encephalopathy Syndrome in Patients Presenting to Nishtar Hospital Multan (A Case Series Study)

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**OBJECTIVE:** The objective of this study is to prevent under diagnosis of patients of PRES and their clear differentiation from simulating conditions like demyelination and ischemia.

**MATERIAL AND METHODS:** This was a case series study carried on patients presenting to Radiology Department Nishtar Hospital Multan during December 2011 to November 2012. Patients were having complaints of headache, seizures, altered conscious and visual disturbance like hemianopias and visual neglect. MRI with Diffusion Weighted images were carried out on these patients. Features such as symmetrical white matter edema in posterior cerebral hemispheres, particularly in parieto-occipital regions (typical PRES) and Basal ganglia, thalami brainstem, Deep white matter: external and internal capsule, corona radiata, splenium of corpus callosum, medulla oblongata and spinal cord (atypical PRES) were noted. Moreover resolution of findings within days to weeks and distribution which is NOT confined to a single vascular territory were reported. On MRI Multi focal T2 and FLAIR hyper-intensities were seen.

**RESULTS:** A total of 26 patients were diagnosed having PRES during Dec 2011 to Nov 2012, among them 16 (61.5%) patients were having altered signals in bilateral parieto occipital lobes and 4 (15%) patients have PRES in cerebellum which are typical locations of this disease process. Atypical PRES was reported in Brainstem, medulla and spinal cord in 3 (11%) patients and 3 (11%) had lesion in basal ganglia and thalami.

**CONCLUSION:** Atypical imaging findings should not dissuade the diagnosis of PRES in the appropriate clinical situation, and knowledge of the varied appearance and atypical findings of PRES allows the radiologist to make this diagnosis to avoid misleading lines of treatment by concerned physicians.

### Role of Modern Neuroimaging in Stroke

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Latest advances in neuro-radiology have revolutionized the management of patients of acute stroke. Diagnostic neuro-imaging has enabled a much earlier, accurate and definite diagnosis of acute stroke, while modern neuro-intervention

now provides a definitive treatment of stroke patients which prior to modern neuro-interventional techniques were provided with only empirical treatment.

Latest and newer MR sequences like diffusion weighted sequences coupled with ADC mapping can accurately and definitively diagnose acute stroke within minutes of onset. Haemorrhagic component, earlier only detected on CT while MRI was a poor modality for early and accurate stroke diagnosis is now equally well picked up by specialised MR sequences like GRE sequences (gradient echo sequence).

So now, in developed neuro centres MR - STROKE PROTOCOL is being employed coupled with non-contrast MR angiographic techniques like time of flight (TOF) MRA for evaluation of acute stroke patients.

Another major development in neuro-imaging is advent of CT - perfusion technique which is not only very helpful for prognostication of acute stroke patients but also separates patients likely to benefit from modern neuro-interventional techniques from those unlikely to benefit.

Latest neuro-interventional techniques like MERCI (Mechanical embolus removal in cerebral ischemia) has revolutionised management of acute stroke patients. Earlier, stroke patients who were just given empirical therapy are now being provided with definitive management by clot removal, re-perfusion of ischemic brain and thus a much better prognosis.

In this talk, all aspects of modern diagnostic and interventional neuro-imaging techniques and their impact on acute stroke management will be highlighted.

### Diagnostic Accuracy of Ultrasonography (US) in Differentiation Between Benign and Malignant Thyroid Nodules by Using Fine Needle Aspiration (FNAC) as Reference Standard

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**PURPOSE:** To evaluate diagnostic accuracy of US in differentiation between benign and malignant thyroid nodules by using FNAC as reference standard.

**METHODS AND MATERIALS:** Prospective study from March 2011 through June 2012 of 205 patients of both genders (age range 15 to 80 years) done at Radiology departments of AKUH Karachi.

A total of 245 thyroid nodules in 205 patients were evaluated for nodule size, shape, echogenicity, margins and presence of micro or macro calcification, followed by FNAC by a consultant radio.

**RESULTS:** Statistically significant ( $P < .05$ ) findings of malignancy were speculated margin (sensitivity, 45.5%; specificity, 92.4%), micro calcification (sensitivity, 44.2%; specificity, 91.3%), a taller - than - wide shape (sensitivity, 42.0%; specificity, 90.4%), marked hypo-echogenicity (sensitivity, 43.1%; specificity, 93.3%). The US findings for benign nodule.

**CONCLUSION:** U/S has a high diagnostic accuracy in detecting malignancy in thyroid nodules on the basis of features like echogenicity, margins, micro calcifications, size and shape. Therefore FNAC should be performed on thyroid nodules classified as positive thus avoiding unnecessary FNAC.

### Multidetector CT Patterns of Peritoneal Involvement in Patients With Abdominopelvic Malignancies

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

**PURPOSE:** To determine patterns of peritoneal involvement in patients with abdominopelvic malignancies and to ascertain the predominant site of

involvement.

**METHODS AND MATERIALS:** Institutional review board approval has been sought. The study was conducted at Radiology Department of Shifa International Hospital, Islamabad (SIH). A total of 7000 patients who have undergone CT scan of abdomen and pelvis were retrospectively reviewed from May 2004 to May 2012. 203 patients with clinically and radiologically proven abdominopelvic malignancies with peritoneal involvement were included in the study. The pattern of peritoneal involvement was ascertained and the primary site of involvement was specified. Other associated findings of ascites, lymph nodes and metastasis were also assessed.

**RESULTS:** Out of 203 patients, 118 patients of ovarian CA were identified with 68 (57%) showing omental caking, 42 (35%) mixed pattern, 8 (7%) nodular deposits. The predominant sites of involvement were greater omentum, small bowel mesentery, pelvis and anterior abdominal wall. Forty five patients with colorectal CA were observed with 19 (42.2%) having nodular pattern, 26 (57.7%) mixed pattern (smudged, omental caking, nodular, cystic). Perirectal and pericolonic mesentery were the commonest site of involvement in colorectal malignancies. Other commonly seen malignancies in order of frequency were pancreatic CA, CA endometrium and cervix, gastric CA, gall bladder and cholangio-carcinoma, hepatocellular CA and transitional cell CA with a total of 40 patients, nodular deposits being in 23 (57.5%), mixed pattern in 17 (27.5%) and rest of 6 (15%) showing omental caking and smudged pattern. Cystic pattern was least commonly encountered. The most common pattern of peritoneal involvement seen in abdominopelvic malignancies was mixed in 79 (38.9%), omental caking in 74 (36.4%) nodular deposits in 50 (24.6). Almost 70% (142) patients had ascites. Fifty five percent (111) had enlarged lymph nodes. Ten percent (20) had bony metastasis. The data is being compiled and changes are expected.

**CONCLUSION:** Peritoneal involvement is seen in majority of abdominopelvic malignancies with ovarian and colorectal carcinoma being commonest. The most frequent pattern in peritoneal carcinomatosis is mixed disease followed by omental caking which was commonly encountered in patients with ovarian CA. The presence of peritoneal carcinomatosis has significant role in the treatment, prognosis and therapeutic management of patients.

### Musculoskeletal MRI of the Wrist And Hand

M. Fiaz

This lecture is based on indications, techniques, interpretive approaches for the musculoskeletal MR examinations of wrist and hand. This lecture also provides physicians with practical approaches to evaluation of the wrist and hand, plus several supplemental titles such as osseous anatomy.

MRI provided clear delineation of osseous and soft tissue abnormalities. MRI studies of multiple patients with various abnormalities of the hand and wrist were analyzed. Studies were performed on scanners with a field strength of 1.5 T open bore Siemens. Imaging parameters included T<sub>1</sub> and T<sub>2</sub> - weighted and STIR sequences in the coronal and transverse planes and contiguous slices 3-5 mm thick. MRI revealed carpal avascular necrosis, tendon abnormalities and, in some cases, abnormalities of inter-osseous ligaments and the triangular fibro-cartilage.

### Imaging Approach for Vascular Malformations with Emphasis on MRI

Mansoor Ghani

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**PURPOSE:** The purpose of our study was to assess the usefulness of MRI in distinguishing and characterizing vascular malformations.

**METHODS AND MATERIALS:** Twenty patients had undergone MRI during a 2 years period in radiology department at Shifa international hospital. MRI

was performed on 1.5 T. After approval from ethical board review committee data will be collected.

**RESULTS:** Results are in process of compiling.

**CONCLUSION:** Magnetic resonance imaging (MRI) provides valuable information for the assessment and treatment of malformations, characterizing the flow pattern and defining the anatomic extent and involvement of various tissue layers (a distinct advantage over ultrasound), and to correlate treatable components of the malformation with patient symptoms.

### Role of Proton Density Fat Saturated Images in Evaluation of Cartilage Injuries of Knee Joint in Comparison with 3D SPGR Images

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**PURPOSE:** Cartilage injuries / cartilage loss are very common finding after knee trauma or secondary to osteoarthritis. The purpose of our study is to evaluate importance of Proton density Fat saturated images in detection and evaluation of cartilage injury and make comparison of sensitivity of Proton density fat saturated images and 3D SPGR images in cartila.

**METHODS AND MATERIALS:** We studied patients of knee trauma or knee pain or patient with x-ray findings of osteoarthritis referred for an MRI of the knee for evaluation of an internal derangement of joint. All patients underwent an MRI study on a 1.5 T GE HDx Signa scanner. Proton density fat saturated images in axial and sagittal planes were obtained. GRE images of knee joint.

**RESULTS:** We enrolled a total of 30 patients with cartilage injury, in which 8 patients has knee trauma due to road traffic accident, 15 patients have x-ray evident changes of Osteoarthritis and 7 patient with knee pain with vague history of knee trauma. We found that 23 patients (69%) has obvious loss of cartilage with sub-chondral bony changes in Proton den.

**CONCLUSION:** In patient with suspected cartilage injuries, Proton density fat saturated images and 3D SPGR images are equally comparable for detection of cartilage loss and sub-chondral bony changes. However 3D SPGR images are relatively better for evaluation of cartilage depression or grade I cartilage injury.

### Comparison of MRI Lumbar Spine Screening with Plain Films of Patients with Non-Specific Lumbar Pain

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**INTRODUCTION / OBJECTIVE:** The role of lumbar spine imaging is an important adjunct to clinical examination. Symptoms such as pain, backache, leg pain, difficulty in walking and stiffness are often reported by patients and can make an accurate diagnosis difficult by clinical examination in isolation. The purpose of the study is to evaluate the efficacy of MRI lumbar spine screening in comparison with plain film of lumbar spine patients pre-senting with non-specific back pain.

**MATERIAL AND METHODS:** This multi-centre study was carried out between Feb 2011 to Jan 2012 in two tertiary care hospitals in Karachi. Retrospective comparison study of MRI lumbar spine with plain radiography of the lumbar spine in patients with non-specific back pain was undertaken. Data were collected from RIS (Radiology information system) Ziauddin university hospital, and Aga Khan University hospital. Karachi Pakistan. We randomly selected 200 patients who presented with non-specific back pain.

All the patients had a standard radiographic examination of the lumbar spine employing antero-posterior and lateral projections and then an MRI examination. The corresponding pair of reports were analyzed and a comparison was made between the two.

**RESULTS:** For the radiographic examination, abnormalities were reported in 30 (15%) cases. The remaining 170 (85%) cases were reported as normal. For the corresponding MRI examinations, abnormalities were reported in 87 (43.5%), out of the 170 patient's they were mainly herniated disc lesions of various types. There was no incident when the radiographic examination revealed an abnormality and the MRI examination did not.

**CONCLUSION:** MRI is the most accurate diagnostic imaging method in patients presenting with back pain. This study has demonstrated that patients with non-specific back pain imaged with plain radiography will have a very high probability of a negative finding and an unnecessary dose of radiation irrespective of any soft-tissue anatomical derangement present.

### Patterns of Stress Related Injuries of Lower Limbs in Military Setup on Skeletal Scintigraphy

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**PURPOSE:** To determine the distribution of stress related injuries in the lower limbs and ascertain the injury prone sites in personnel undergoing training in military institutions.

**STUDY DESIGN:** Retrospective, cross sectional.

**PLACE AND PERIOD OF STUDY:** Nuclear Medical Centre, Armed Forces Institute of Pathology, Rawalpindi. 7 Jul 2004 to 21 Jun 2012.

**MATERIALS AND METHODS:** Two hundred forty positive cases on S-phase skeletal scintigraphy were included in the study during the above mentioned period whereas the negative cases were excluded. Radiotracer, <sup>99m</sup>Tc-MDP (Methylene Diphosphonate), dose of 20 mCi was injected intravenously followed immediately by perfusion and tissue blood pool imaging of the involved site with subsequent delayed imaging after 2 hours. Scanning was done on Siemens E-Cam and Scintrex Gamma Cameras. The uptake of radiotracer in a more localized focal pattern was labeled as stress fracture and uptake in a linear pattern along the periosteum as sub-periosteal reaction or periostitis. Linear uptake in posteromedial distal tibial aspects was diagnosed as medial tibial stress syndrome or shin splints. Radiotracer accumulation at the insertion sites of major lower limb muscles was labeled as activity induced enthesopathy.

**RESULTS:** Out of 240 patients, 79% cases had stress fractures out of which the commonest site was middle third of tibiae. Shin splints and sub-periosteal reactive changes were positive in 25% and 15% of the patients respectively with bilateral tibiae as the commonest site. Activity induced enthesopathy was present in 4% of patients with bilateral quadriceps femoris enthesopathy being more prevalent. Contralateral reactive changes were present in 3% patients.

**CONCLUSION:** Three phase skeletal scintigraphy demonstrated that stress fractures were a common entity in individuals undergoing strenuous physical activity (commonest site is middle third of tibiae) followed by shin splints, sub-periosteal reactive changes and activity induced enthesopathy in descending order.

### MRI Assessment of Anterior Talofibular Ligament (ATFL) in the Prospective of Ankle Stability

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**PURPOSE:** The aim of this article is to review the MRI assessment of anterior talofibular ligament (ATFL) along with clinically and radiologically under diagnosed commonly missed associated injuries based on the findings in athletes and physically active patients at an orthopedic and sports medicine centre in UAE.

**METHODS AND MATERIALS:** Treating athletes is more difficult than treating persons in the general population the special challenge is to return the athlete to sports activity quickly without risking disability. It is vital not only to report the primary injuries but also the associated injuries.

The majority of ankle injuries are inversion and plantar flexion injuries that result in damage to the lateral ligament complex. Most of ankle ligament injuries (85%) occur at the lateral ligamentous complex. The main ligaments of concern is the anterior talofibular ligament (ATFL). This can be associated with other injuries including calcaneofibular ligament (CFL).

These injuries are frequently associated with capsule rupture and joint fluid extra-vasation. Another commonly missed injury is syndesmosis injuries, resulting in ankle instability after some time. All these structures are vital for ankle stability.

A group of patients were studied in this prospective to evaluate the associated injuries which were unexpected clinically and under diagnosed radiologically. This was done in athletes reporting to podiatrist and foot surgeon at an orthopedic and sports medicine centre in UAE. The results of the MRI studies were then compared with the conservative management, surgical findings and clinical outcome.

**RESULTS:** Diagnosis of ATFL complete or partial tear was clinically made and confirmed radiologically. However syndesmosis injury was commonly missed and ended in ankle instability in a large number of patient. Capsular tear was clinically not suspected but was observed on MRI while large number had associated CFL injuries.

**CONCLUSION:** Accurate MRI diagnoses of primary and associated ankle injuries is especially important to determine which problems can be managed conservatively and which ones require operative management. Early and appropriate treatment makes a crucial difference in the chances for success in surgery and reverting to normal sports activities for athletes and physically active patients.

### Diagnostic Accuracy of Modified CT Severity Index in Assessing the Severity of Acute Pancreatitis

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**PURPOSE:** The aim of this study was to find out the diagnostic accuracy of Modified CT severity index in assessing the severity of acute pancreatitis (by keeping APACHE II as gold standard).

**METHODS AND MATERIALS:** This study was conducted at Allied / DHQ hospitals, Faisalabad from March 2012, to September 2012. We recruited 160 patients from emergency deptt with clinical and ultrasonographic evidence of acute pancreatitis with an elevation in serum amylase levels. APACHE II was calculated within 24 hrs of admission and CT scan with I/V contrast was done within 48 hrs of presentation. MCTSI scores were calculated under supervision of consultant radiologist. Severity parameters included mortality, admission to and length of ICU stay, length of hospital stay and need for surgical intervention.

**RESULTS:** For MCTSI, significant relationship was observed between score and each severity parameter ( $p < 0.0001$ ). The mean scores were found to be

2 for 133 uncomplicated cases and 9 for 27 complicated cases. The sensitivity and specificity of MCTSI were calculated to be 71% and 90% respectively. The diagnostic accuracy was calculated to be 92%.

**CONCLUSION:** MCTSI was found to have high diagnostic accuracy in assessment of severity of acute pancreatitis.

### Comparison of MRI Findings of Perianal Fistula with Surgical Findings: A Retrospective Analysis

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**PURPOSE:** Perianal fistula is a serious problem that causes significant morbidity. Medical treatment of perianal fistula is of little help and the patients ultimately have to undergo surgery. The decision of surgery is entirely dependent on pre-operative evaluation. In the recent times, MRI has become the predominant imaging modality for pre-operative evaluation of perianal fistula. The purpose of this study is to see the ability of MRI to detect presence and type of fistula, internal and external openings, secondary ramifications and associated abscesses in our patients and to see how much it can help the surgeons.

**METHODS AND MATERIALS:** We represent a retrospective study performed on a total 30 patients who were referred to Radiology department, Shifa International Hospital, Islamabad for preoperative evaluation of perianal fistula over the past 8 years. Institutional review board approval was sought. Out of these patients, 11 underwent surgery later on. Medical records of these patients were followed and MRI findings were compared with the intra-operative findings.

**RESULTS:** MRI and intra-operative findings showed good agreement (go-to-100%) in all patients regarding presence of fistulous track, supra-levator, infra-levator extent and associated abscess collections. There was some disagreement regarding type of fistula (trans-sphincteric, inter-sphincteric, complex etc) (30 - 50%), external and internal openings (40 - 60%) and secondary ramifications. The exact percentages are yet to be compiled.

**CONCLUSION:** Magnetic resonance imaging is the best modality for pre-operative evaluation of perianal fistula regarding presence of fistulous track and associated abscesses, however, its ability to detect the type of fistula, presence of internal and external openings is sub optimal.

### Role of MDCT in Detecting Sites of Tumor Recurrence After Whipple's Procedure

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**PURPOSE:** The purpose of the study was to evaluate the role of MDCT in detecting sites of tumor recurrence after Whipples Procedure for Pancreatic malignancy.

**METHODS AND MATERIALS:** The study was performed at Radiology and imaging department of Shifa International hospital, Islamabad from Jan, 2010 to October 2012. We reviewed 30 patients with tumor recurrence referred over 33 months period following whipples procedure.

**CT PROTOCOL:** Dynamic Pancreatic CT was performed with Pre contrast, post contrast arterial, venous and delayed phase imaging. Both oral and intravenous contrast material were administered.

**IMAGE EVALUATION:** All image data were evaluated by two radiologists (with 5 - 10 years experience of pancreas imaging) on diagnostic workstations. Disease recurrence was classified into local recurrence, lymph node recurrence, liver, lung and peritoneal metastasis.

**DATA ANALYSIS:** All data were presented as absolute numbers and percentages. Statistical analysis was performed using the paired Student t-test with commercially available software (SPSS 16.0).

**RESULTS:** The predominant site of tumor recurrence was local (63%), followed by lymph node (17%), liver metastasis (11%), peritoneal (4%) and lung (3%).

**CONCLUSION:** MDCT plays important role in the assessment of sites of tumor recurrence after the Whipple procedure. CT follow-up examination is a crucial diagnostic tool to identify local recurrence and lymph node metastasis at an early stage, allowing as many patients as possible to have second, potentially curative, surgical therapy or second line radio/chemotherapy. Specific changes of local and lymph node recurrence can be found in the course of the cardinal peri-pancreatic vessel.

### Magnetic Resonance Cholangiopancreatography(MRCP) Using a Free Breathing, Weighted Turbo Spin Echo Sequence with Navigator Triggered Prospective Acquisition Correction

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**INTRODUCTION/OBJECTIVE:** Magnetic resonance cholangiopancreatography (MRCP) is a dedicated examination that provides detailed information the anatomy and pathology of the biliary tree a pancreatic ductal structures combining cross sectional a projectional techniques. Heavily T<sub>2</sub> weighted (T<sub>2</sub>w) sequences with long echo times clearly depict fluid filled compartments, providing excellent image contrast by almost complete suppression of the background. The objective of this study was to evaluate the image quality of a respiratory - triggered T<sub>2</sub> - weighted (T<sub>2</sub>w) turbo spin echo (TSE) sequence for magnetic resonance cholangiopancreatography (MRCP) using a new method for respiratory triggering by tracking the motion of the right diaphragm [prospective acquisition correction (PACE) technique].

**MATERIAL AND METHODS:** This study was carried out between Jan 2011 to Dec 2011 in MRI Suite Aga Khan University Hospital Karachi. Machine was use 1.5 Tesla Avanto Siemens.

Fifty consecutive patients underwent MRCP imaging applying breath - hold half - Fourier single - shot TSE sequences and the respiratory - triggered T<sub>2</sub>w TSE sequence. Qualitative evaluation grading the depiction of eight segments of the pancreaticobiliary tree and the frequency of artifacts was performed. Quantitative evaluation included calculation of the relative contrast (RC) between fluid - filled ductal structures and organ parenchyma at four segments.

**RESULTS:** A significantly higher RC was measured for the respiratory - triggered T<sub>2</sub>w TSE sequence [maximum intensity projection (MIP)] for all of the four investigated segments (one of four segments for the MIP) of the pancreaticobiliary tree, as well as a significant improvement of visualization of all ductal segments compared with the breath hold sequences. The frequency of artifacts was significantly lower compared with the breath hold sequences.

**CONCLUSION:** Respiratory triggered MRCP using a T<sub>2</sub>w TSE sequence with PACE significantly improves image quality and maybe included into the routine MRCP sequence protocol.

### Presence of Pseudoaneurysm in Hepatocellular Carcinoma (HCC): Important New Finding to Differentiate HCC from other Hypervascular Lesions

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**OBJECTIVE:** To evaluate the presence of hepatic pseudoaneurysm within the hepatocellular carcinoma for those patients undergoing CT scan of hepatic mass work-up with chronic liver disease.

**STUDY DESIGN:** Cross sectional.

**PLACE AND DURATION OF STUDY:** Radiology department, from Aug 2010 to July 2012.

**METHODS:** One hundred thirteen patients (74 males and 39 females) with clinical features of chronic liver disease had a suspicion of hepatocellular carcinoma referred to radiology department for CT evaluation. Those patients, who had CT imaging features typical for hepatoma, were selected randomly and retrospectively evaluated for the presence of pseudoaneurysm.

**RESULTS:** In all 113 patients CT features were showing typical hypervascular mass showing washout with underlying chronic liver disease suggestive of hepatocellular carcinoma. In those patients presence of hepatic pseudo-aneurysm was seen in 22 (19%) patients. There (3) patients have associated hemorrhage at peri-hepatic location. Out of these 22 patient 6 have histopathology confirming the presence of hepatocellular carcinoma, 12 patients have diagnostic increased alpha fetoprotein levels. Four (04) patients have only typical diagnostic features on imaging.

**CONCLUSION:** Imaging features of hepatocellular carcinoma sometimes are equivocal on CT scan. The presence of pseudoaneurysm is a new helpful feature in order to differentiate hepatoma from other hyper-vascular lesions.

### Sonographic Evaluation of Biliary Ascariasis

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**PURPOSE:** Biliary and Intestinal Ascariasis is a common condition in Gilgit Baltistan region of Pakistan. The purpose of my study was to evaluate the sonographic appearances and location of biliary ascariasis, their clinical presentation and to determine the accuracy of sonographic diagnosis of this condition.

**MATERIAL AND METHODS:** A prospective study on 36 Patients was conducted at Combined Military Hospital Skardu from June 2010 to June 2012. Of these 27 were females and 9 were males. Abdominal sonography focusing on the liver and biliary system was performed for all patients referred with upper abdominal pain using 3.5 MHz convex probe on Aloka 3500 - plus ultrasound machine. Patients presenting with different presenting complaints were recorded. Ultrasound diagnosis was based on the finding of long, non-shadowing, solidly echoic cords or centrally hypoechoic tubes in common bile duct (CBD), gallbladder, or intrahepatic biliary channels. Follow-up ultrasounds were performed at successive intervals to assess the management of these patients.

**RESULTS:** A total of 36 patients were diagnosed as biliary ascariasis on ultrasound, of which 27 (75%) are females and 9 (25%) are males. Age ranged from 15 to 65 years, were included in this study.

The most common clinical presentation was upper abdominal pain in 34 (94.4%) patients. Other complaints were nausea (77.7%), vomiting (55.5%), fever (52.7%), right upper quadrant tenderness (50%), obstructive jaundice (8.3%), worms in stool (13.8%), worms in vomitus (11.1%) and features of acute pancreatitis (2.7%). History of previous cholecystectomy was present in 19.4%.

The sonographic appearances of Ascariasis were: Stripe sign (87%) having single, linear or curved echo-genic nonshadowing structure without an inner tube; Inner tube sign (7%) having linear stripe containing central tubular structure with amorphous fragments; Spaghetti sign (6%) having multiple overlapping echo-genic structures due to coiling of worms, located within the CBD, gallbladder or intra-hepatic biliary channels.

Ultrasound revealed that 31 (86%) patients had Ascaris in CBD, 3 (8%) had in Gall bladder, 1 (2.7%) had in intra-hepatic biliary channels and 1 (2.7%) had in Pancreatic duct. Twenty one (58.3%) patients had associated intestinal ascariasis in small intestine. During follow-up, worm re-invasion of the biliary system occurred in 8.3% (three patients).

**CONCLUSION:** Direct, real-time visualization of Ascaris on ultrasound is quick, non-invasive, and definitive investigation of choice for evaluation of patients for Biliary Ascariasis.

### Hepatic Arterial Variations in Our Local Population and its Implications on Hepatobiliary Surgery

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

**PURPOSE:** To assess the variations of hepatic arterial anatomy in our population and their relevant clinical significance in hepatobiliary procedures.

**METHODS AND MATERIALS:** Approval from IRB was sought. A retrospective study was performed in which 1000 post-contrast CT scans of the abdomen were selected that had been performed at department of Radiology, Shifa International hospital between July 2011 and June 2012. Origin of the hepatic arteries were categorized according to Mitchell's classification. Segment IV arterial anatomy was evaluated separately. The presence of median arcuate ligament complex was also noted. Post-surgical cases and cases of vascular thrombosis and arteriovenous malformation were excluded from the study.

**RESULTS:** Out of the 1000 Mitchell's hepatic arterial variations, 9 were seen. Type I was most common and 678 (67%) patients had it. In 178 (17%) patients, left hepatic artery was replaced from left gastric artery, 34 (3.4%) had right hepatic artery replaced from superior mesenteric artery and 25 (2.5%) had accessory left hepatic artery from left gastric artery. Other variants were less frequent. Apart from this, we found 24 rare types in which the most common were common hepatic artery arising directly from aorta (0.7%), right hepatic artery arising from aorta and left hepatic artery arising from left gastric artery (0.6%) and both right and left hepatic arteries arising from celiac axis (0.4%). The segment IV was supplied from left hepatic artery in 759 patients (75%), right hepatic artery in 203 (20%) cases and common hepatic artery in 34 cases (3.4%). Out of 852 patients, the median arcuate ligament complex was seen in 133 cases (15%).

**CONCLUSION:** This is one of the largest studies in this region. Majority of our population has conventional hepatic arterial anatomy but the types of variations noted are more diverse. Of note a greater percentage had type II anatomy which increases complexity of hepatic transplant surgery.

### Peripheral Vascular Disease

Afshan Fayyaz

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Peripheral vascular disease encompasses a spectrum of diseases including. Arterial occlusive diseases, Arterial aneurysms, Arteriovenous malformations, Venous diseases as deep venous thrombosis, Varicose veins etc.

I would be restricting my talk to arterial occlusive disease, its epidemiology, signs and symptoms of the disease, management with focus on radiological management.

Arterial occlusive disease is more prevalent among the caucasians than the south Asians. It affects ten million people in USA. Risk factors of peripheral arterial occlusive disease include obesity, diabetes mellitus, hypertension, hyperlipidemias, and history of smoking. Smoking alone increases the risk of the disease by a factor of seven while diabetes mellitus increases the risk by a factor of three.

Peripheral arterial occlusive disease manifests either as intermittent claudication, rest pain, cold extremities, gangrene or non healing ulcers. Various tests may be used for diagnosis which include taking ankle brachial index, Doppler evaluation of diseased arteries, MR angiography, CT angiography and conventional angiography. Once a diagnosis of peripheral arterial occlusive disease has been established by the tests, the patient has three treatment options. Conservative management, radiological management and surgical management. Conservative management is reserved for patients who have mild disease. These measures include regular exercise program, taking drugs as aspirin and anti-platelet agents, control of hypertension, diabetes and hyperlipidemias. With this approach, improvement is seen in 70% of individuals.

Diseases requiring intervention are classified according to level of severity by

the TASC II classification. TASC I and II lesions are treated radiologically whereas TASC III and IV lesions are generally treated by surgical means. A multidisciplinary approach should be adopted while deciding about management of these lesions.

Radiological management would consist of angioplasty and angioplasty with stent placement. For aorto iliac disease, angioplasty with stent placement is the mainstay of treatment with high patency rates. For infra inguinal disease, angioplasty is the mainstay of treatment. Newer trends include drug eluting balloons with a promising future. Stenting in infra inguinal disease is reserved only for cases with failure of primary angioplasty with residual stenosis of more than 30%, re-stenosis within 90 days of the primary angioplasty and vessel dissection.

Acute thrombosis of peripheral arteries is managed by thrombolytic therapy.

Radiological intervention has a great role to play in peripheral arterial occlusive disease. The results match those of surgery with less morbidity and mortality. Surgery is reserved for cases with chronic long segment occlusions and with repeated failures of angioplasty.

### Complications and Survival Rates of Groshong Catheters; Two Years Experience from a Single Center

Abdur Raheem, Atif Rana, Mubashir Ramzan, Rustam Alam Shah, Ehsan Masud Kiani And Mohammad Yousuf Chaudhary  
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**PURPOSE:** Groshong catheter is a tunnelled central venous catheter that are used for long term venous access. Different centers describe variable survival and complication rates of Groshong catheters. We are conducting this study to find out survival rate and catheter related complications of Groshong catheters that we placed in last two years in order to improve our standard and quality of care.

**METHODS AND MATERIALS:** A retrospective cross sectional study was conducted in a single centre after approval from institutional research board, enrolling 67 patients regardless of their age and sex, in whom Groshong catheters were placed. The hospital data base system and patients' medical record was used for collecting data of those catheters.

**RESULTS:** Preliminary results have been compiled after scrutiny of the medical record of 60 patients (n=30). The majority of patients (90%, n=27) required access for chemotherapy, whereas 9% (n=3) for TPN and other purposes. The duration of catheter insertion averaged 200 days ranging from 14 to 244 days.

Infection was the most common reason for referral for removal (20%, n=6). Bacteremia occurred in 13% (n=4) of which 50% (n=2) were polymicrobial and none (n=0) had positive catheter tip culture grow-hs. Blockage of catheter was documented in 3% (n=1) of patients and similarly late complication of IJ vein occlusion was documented in one patient. Final results to be compiled.

**CONCLUSION:** Our initial experience shows that majority of Groshong catheters are mainly used in oncology patients for chemotherapy. They have favourable rates of survival and complications that have been found to be comparable to international standards. It can provide an ideal route of IV access in different patient groups requiring long term IV access.

### Ozonucleolysis in Cervical Disc Prolapse

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**BACKGROUND AND OBJECTIVES:** Direct injection of ozone has been proven to be effective alternative to surgery for patients suffering from disc herniation in many centres around the world. We report our experience with ozonucleolysis between June 2005 to July 2011 with 1500 patients affected by

pain cervical region (Bracehalga) due to disc herniation including of postoperative recurrence disc prolapsed.

**MATERIAL AND METHODS:** All these cases treated by intradiscal, orparavertabral oxygen ozone injections. Patients age between 20 to 70 years underwent percutaneous ozone nucleolysis. The procedure done under the angio-fluoroscopy with full aspectic technique. The ozone generator, essential component placed close to the patients. Simple 23G needle to 22G spinal needle, (quincke type point) were used to inject ozone under fluoroscopy. No pre-medication or anesthesia were given and the procedures were performed at an outpatient facility with short hospital stay after the treatment.

**RESULTS:** Among 1500 patients 1000 patients were followed up for 5 months, 50% of the treated patients showed complete recovery with disappearance of symptoms. Twenty five percent of cases complaint of occasional episodes of pain neck and arms but no limitations of occupational activities 15% of the cases showed in sufficient improvement 9% cases no improvement and went for surgery 10% of the cases never turned up after the first visit. Most of these patient had no FDA surgical indication. The patients who failed to benefit from ozonucleolysis underwent surgery. In all these cases, the previous O2 O3 gas therapy had no negative effects on the surgical procedure.

**CONCLUSIONS:** In our experience, Ozone Gas Therapy in treatment of herniated disc has revolutionized the percutaneous approach to nerve root disease making it safer cheaper and easier to repeat than treatments currently in use. So oxygen ozone therapy should be 1<sup>st</sup> choice of treatment in cervical disc prolapse.

### Varicocele Embolization

Khair Muhammad Shaikh

**OBJECTIVE:** The purpose of this study was to present our experience with percutaneous treatment of male varicocele considering technical, clinical aspects in adolescent population.

**SETTING:** Radiology department, Sindh Institute of Urology and Transplantation (SIUT) Karachi. Six and half year retrospective cross-sectional study from 01/01/2006 to 30/6/2012.

**METHODS:** Thirty male patients with clinical moderate to severe varicocele associated with scrotal swelling with "bag of worms" or testicular discomfort, such as heaviness or dull ache after standing all day, referred from urology outpatient department to radiology department, where Doppler ultrasound was done which confirms the grade and patient underwent percutaneous varicocele embolization with coil.

**RESULTS:** The technical success rate for spermatic vein occlusion was 93%. Follow-up, obtained of all patients after 6 month in urology outpatient department. Twenty eight patients (93%) reported disappearance of varicocele and as well as pain relief. In two patients percutaneous embolization procedure failed due to internal jugular vein approach and congenital venous abnormality. None of patients reported a recurrence of their varicocele. No complications occurred in 28 patients; none had any 6 month sequelae.

**CONCLUSION:** Percutaneous embolization of varicocele carried out as outpatient procedure under local anesthesia and it offers the potential advantage of shorter recovery to full activity compared to surgical ligation. It has high technical success rates, less recurrence rate, when performed by experience interventional radiologist. We believed embolization is an effective alternative to surgery and should be offered as such or as primary therapy for varicocele treatment.



### Experience with Wide Caliber Percutaneous Gastrostomy Tubes As Compared to Narrow Caliber Gastrostomy Tubes

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**PURPOSE:** The purpose of this article is to compare the radiologically guided percutaneous gastrostomy tubes of wide caliber with narrow caliber tubes.

**MATERIALS AND METHODS:** Approval of IRB and ethics committee has been sought. Retrospective study was performed on 35 patients who were referred to Radiology department, Shifa International Hospital, Islamabad for radiologically guided percutaneous gastrostomy tube placement between 2008 till 2012. Comparison of wide caliber gastrostomy tubes was done with narrow caliber tubes used in these patients.

In many patients, percutaneous endoscopic gastrostomy (PEG) can be limited by digestive tract stenosis. Radiologically guided PEG placement is the safest alternative for this group of patients. Various calibers of tubes are used for this purpose. The aim of the study is to compare the wide caliber tube with narrow caliber tube considering technical success, procedural complications and catheter complications. Statistical analysis is performed.

**RESULTS:** Wide caliber gastrostomy tubes are comparable to narrow caliber gastrostomy tubes and can be safely used. It is superior to narrow caliber gastrostomy tubes in some of the parameters analyzed.

**CONCLUSION:** Radiologically placed wide bore gastrostomy tube is highly feasible, safe and provides improved feeding support as compared to narrow caliber tube, even when percutaneous endoscopic gastrostomy is impossible.

### Are Clinical Audits Enough to Bring About Improvement in the Overall Healthcare Delivery?

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**OBJECTIVE:** Holding world class accreditation like JCI and quality certification like ISO 9001 - 2008, we at the Aga Khan University Hospital wanted to explore if such quality audits are enough to affect the quality improvement in our department of radiology?

**METHODOLOGY:** While assessing agenda of Quality Improvement Committee we found that we are taking various quality improvement initiatives; this includes automated inventory management system; Dash-board, a creative method for constant monitoring and following up on the operational information; Voice Recognition System checks, which enable only credentialed radio logists to do reporting and many more.

**RESULTS:** Dynamic inventory management piloted in VIR (Vascular and Interventional Radiology) helped us achieve 100% fill rate. Radiology Dashboard efficiently provides reliable reports on department's performance; indicators chosen are now used to track performance and identify unpredictable trends to trigger appropriate corrective actions. Automated data capturing mechanisms minimize the risk of misreporting and ensure continuous validation of data sources. Greater patient satisfaction and timely reporting of all Radiological exams is noted because of regular soft reminders. VRS checks have eliminated reporting of radiology procedures by non-credentialed radio logists.

**CONCLUSIONS:** This study shows that only clinical audits are not enough to improve standard of services; but one has to move along the practical continuum of international standards and try to match with the best practices to provide quality service to its valued customers.

### Acute Aortic Syndrome Imaging and Pitfalls

Dinesh Chinchure  
*Singapore*

Acute aortic syndromes are spectrum of life threatening emergencies related to thoracic aorta. They include acute aortic dissection, intramural hematoma, penetrating atheromatous ulcer and unstable aortic aneurysm. They are clinically indistinguishable and typically present with acute chest pain. CT scan plays very important role in diagnosing these conditions and is highly accurate in determining its cause, extent and classifying them. Urgent surgical repair is usually needed for acute aortic dissection and intra mural hematoma in the ascending aorta and aortic arch, unstable or ruptured aortic aneurysm and symptomatic penetrating atherosclerotic ulcer.

This talk deals with imaging of acute aortic dissection, intra mural hematoma, penetrating atheromatous ulcer and unstable aortic aneurysm. Pitfalls in CT imaging and techniques to avoid/minimize them will also be discussed during this lecture.

### Diagnostic Accuracy of Coronary Artery Calcium Scoring in Predicting Coronary Artery Disease

Salman Masood  
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**PURPOSE:** To establish role of coronary calcium scoring as a screening test.

**METHODS AND MATERIALS:** Study was performed at CMH Lahore.

**Duration** was 6 months.

**Sample size** 130.

**RESULTS:** High diagnostic accuracy was obtained.

**CONCLUSION:** Coronary calcium scoring is a cheap, rapidly performed screening test to detect at risk population for coronary artery disease.

### Comparison of Multi-Detector CT Angiography and Doppler Ultrasonography in Evaluation of Carotid Artery Stenosis

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**PURPOSE:** The purpose of this study was to compare the results of carotid DUS and MDCTA in patients with suspected carotid artery stenosis and to evaluate their combined effects on decision making for carotid endarterectomy.

**METHODS AND MATERIALS:** This was an observational study, conducted at Radiology Department, Punjab Institute of Cardiology, Lahore. The study included 25 patients with 50 carotid arteries examined in the period from December 2011 to February 2012.

**RESULTS:** Pearson correlation obtained is 0.906 and 0.922 respectively with P value < 0.05 indicate a significant relationship between them R Sq. linear = 0.821 and 0.85.

**CONCLUSION:** DUS remains the first line non-invasive imaging for Carotid artery stenosis. However, in case where it is inconclusive MDCTA is an excellent, reliable, minimally invasive for patients selection of Carotid endarterectomy.

### Cardiac Magnetic Resonance Imaging in Assessment of Congenital Heart Diseases

Nosheen Ahmad

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**PURPOSE:** To assess the evidence for the use of Operator independent isotropic cardiac Magnetic Resonance Imaging (CMRI) to greatly simplify the assessment of complex morphology in congenital heart diseases.

**METHODS AND MATERIALS:** In 26 adolescent and adult patients (age, 6 to 42 years; median, 16 years) with congenital heart disease, cardiac morphology is determined with free-breathing (navigator-gated), isotropic, 3D steady-state free precession (3D SSFP) CMRI. Cardiac diagnoses and multiple distance measurements are compared with echocardiography 1 cine cardio-angiography or surgery. Of the 26 patients, 20 were having native congenital heart defects as found on echo-cardiography none of these defects was missed by CMRI. Novel diagnostic issues were discovered in 6 of 26, (coronary anomalies, n=3; left juxtaposition of the right atrial appendage in double outlet right ventricle and transposition of the great arteries.

**CONCLUSION:** Cardiac MRI has emerged as a useful technique in evaluation of congenital heart disease. Echo-cardiography, either trans-thoracic or trans-esophageal, has been the first choice for this purpose, and will probably keep that status, at least in a large segment of the CHD spectrum. Magnetic resonance imaging (MRI) is now an established method for high resolution visualization of cardiovascular morphology. It is found that MRI is superior to echocardiography in certain areas of limited echo-cardiographic access, such as the pulmonary artery branches and the aortic arch in adult patients. But MRI has also a unique potential for accurate volumetric analysis of ventricular function and cardiovascular blood flow, without any geometric assumptions.

### Relationship between Aortic Distensibility on MRI with Traditional Cardiovascular Risk Factors

Hassan Bokhari

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**OBJECTIVE:** To determine the relationship between aortic distensibility on MRI with traditional cardiovascular risk factors.

**METHOD AND RESULTS:** Thirty patients were included in the study, different magnetic resonance imaging (MRI) techniques were used to directly measure aortic distensibility (AD) in the ascending and descending thoracic and abdominal aorta of fasting normal (n = 10) and EH (n = 20) subjects.

Aortic distensibility (AD) was measured at the same level using a gradient echo cine sequence. AD was inversely related to age ( $p < 0.01$ ). Compared to normotensive participants, Aortic distensibility in EH was consistently and significantly reduced at all measured sites ( $2.5 \pm 0.4$ ,  $2.2 \pm 0.4$ ,  $2.3 \pm 0.4$  versus  $7.0 \pm 1.6$ ,  $5.1 \pm 0.3$ ,  $7.3 \pm 0.8$  mm Hg  $1 \times 10^{-3}$ ,  $P < .05$ ), ( $0.15$  vs.  $0.2$  mm Hg $^{-1}$ ,  $p < 0.01$ ).

**CONCLUSION:** For over 100 years the measurement of blood pressure has been the most frequently utilized means available to assess the peripheral vasculature. However, other physical properties of the circulation, such as compliance, may be equally relevant to the onset and clinical course of vascular dysfunction associated with aging, as well as with specific disease states such as essential hypertension, coronary heart disease, and / or congestive heart failure."

Arterial stiffness maybe measured using a variety of different techniques, MRI techniques have recently been developed that simplify the acquisition and analysis of data from which compliance and other indices of vascular function such as distensibility maybe determined.

As changes can be detected before the appearance of clinically apparent vascular disease, arterial stiffness may act either as a marker for the development of future atherosclerotic disease, or may be more directly involved in the process

of atherosclerosis. Arterial stiffening has been particularly implicated in the development of isolated systolic hypertension, a disease mainly affecting the elderly population and associated with considerable excess morbidity and mortality.

### Transcatheter Closure of a Traumatic Ventricular Septal Defect Using an Amplatzer Tmatrial Septal Occluder Device

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A relatively rare occurrence, the incidence of a ventricular septal defect (VSD) complicating penetrating cardiac trauma has been reported at 4.5%. Closing such defects may be challenging, especially in an unstable patient where institution of cardiopulmonary bypass may exponentially increase the surgical risk. In such patients, catheter based device closure is a reliable and an effective alternative. We describe a case of a 50 year old man who presented with a stab wound to his anterior mediastinum. His injuries involved laceration to the right and left ventricles and a VSD. The lacerations were repaired on a beating heart and the VSD was not addressed given the patient's hemodynamic instability and the high risk of prosthesis infection in an open wound. As the patient demonstrated significant left to right shunt on follow-up echocardiogram, the VSD was semi-electively closed using an Amplatzer TM ASD closure device. The usage of the ASD occluder in place of a VSD occluder was on the basis of its more accurate size for the defect and its adherence to the landing zone. Post device closure, the patient developed hemolysis attributed to an intra-device residual leak which resolved without any complications by conservative medical management. The patient recovered remarkably and at latest follow-up is in NYHA functional class I II. This case discusses the importance of delaying the closure of VSDs following penetrating cardiac trauma, if the patient shows clinical improvement or a predisposition to infection. However in a case of poor clinical status i.e. inability to wean off ventilator or inotropes, immediate surgical intervention should be considered.

### CTPA in Suspected Pulmonary Embolism - Are We Overdoing It? Do Audit

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**PURPOSE:** Pulmonary embolism is the embolic occlusion of the pulmonary arterial system. Malignancy is one of the most commonly encountered causative factors in our practice. It has been reported that the risk of PE with malignancy increases up-to 6-fold. Early diagnosis and treatment are important in better prognosis. This study was done to compare our local practice for the referral of patients with suspected PE for CT pulmonary angiography with recommended criteria.

**MATERIALS AND METHODS:** The study included 100 consecutive patients who were referred to the department of Radiology, SKMCH & RC with suspicion of PE from Oct. 2011 to August 2012. Referral details were assessed of all these patients. ACR Appropriateness Criteria and PCR Criteria were used as the standard tool.

**RESULTS:** Out of the 100 patients, 29% had PE while 14% got an alternate diagnosis while rest were negative. Chest radiograph was normal in 7% while 52% had an abnormal chest radiograph. D-Dimer was done in only 24 patients, out of which 21 patients had deranged D-Dimers. Only 16 patients were hypoxemic. Adequate history was provided in 32 patients while pre-test probability was calculated in none.

**CONCLUSION AND RECOMMENDATIONS:** The result of our study showed that we are not adequately following standard referral criteria's for CTPA as according to PCR criteria 37% of the patients undergoing CTPA should have PE while an alternative diagnosis should be provided in 56%. We need to review our local practice regarding.

### Evaluation of Solitary Thyroid Nodule Using Technetium - 99m Scintigraphy Thyroid Pertechetate

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**PURPOSE:** In this study the objective was to evaluate the solitary thyroid nodule using technetium partechetate thyroid Scintigraphy and correlate the scan findings with the clinical and histological findings.

**METHODS AND MATERIALS:** A simple of 100 patients was recruited in this study from Institute of Nuclear Medicine and Oncology Lahore, INMOL. Thyroid Scintigraphy was performed in 100 patients who presented with solitary thyroid nodule.

**RESULTS:** Thyroid scan showed cold nodule in 64 patients and 36 patients with hot nodule. Sensitivity of Scintigraphy scan was 100%. Then FNA was done in these patients and FNA showed that 7 cold nodules were malignant. Fifty five cold nodules and 21 hot nodules were benign but no malignancy was found in hot nodules.

**CONCLUSIONS:** It is concluded that Scintigraphy may be considered as first line diagnostic test for screening purpose in palpable solitary thyroid nodule. The nature of nodule whether hot or cold on thyroid scans helps to further evaluation and management in the patients. FNA cannot be considered as a first line tool because of its inability to detect which patient requires it. Thyroid scan may be helpful to isolate patients who would require FNA due to the presence of cold nodule and exclude the patients with hot nodules from invasive test.

### Radio iodine Uptake Estimation in Thyroid Remnants in Pre-Therapy Scans of Thyroid Cancer Patients

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**PURPOSE:** To evaluate the uptake of diagnostic dose of  $^{131}\text{I}$  in thyroid remnants in post surgical patients of well differentiated thyroid cancer, using subjective and objective approach.

**METHODS AND MATERIALS:** Patient referred to the Nuclear medicine department of INMOL hospital. They were scanned 72 hours after an oral dose of Iodine and were analyzed through subjective evaluation for showing any degree of Iodine in the neck or other body sites. The objective evaluation was done by drawing region of interest on the remnants in the neck showing some uptake.

**RESULTS:** The patient that underwent  $^{131}\text{I}$  whole body scans showed that 60% had no uptake of iodine in the neck, so they were not treated. In 40% patients, some activity was seen in the neck representing functioning thyroid remnant and were treated by therapeutic dose. That showed that diagnostic scan is a good modality for detecting the thyroid remnant.

**CONCLUSION:** Review of literature and experience in our study has suggested that  $^{131}\text{I}$  uptake can be measured in diagnostic whole body scan. It is a useful diagnostic tool as an adjunct to the therapeutic management of patients who present with some uptake in thyroid remnants.

### Comparison of Delayed Planar with SPECT for the Detection of Parathyroid Adenoma

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**PURPOSE:** Purpose of this study is to compare the rate of detection of parathyroid adenoma on delayed planar dual phase imaging against early SPECT imaging.

**MATERIAL AND METHODS:** Patients referred for parathyroid imaging were enrolled in the study without discrimination of gender. Radiopharmaceutical used for this study was Tc - 99 m MIBI injected intravenously with the dose of 15 - 20 mCi to each patient performed at SIEMENS-E-CAM gamma camera dual head. Routine planar Imaging was performed at 30 min, 1 hr, 2 hr. Additional SPECT as a part of study protocol was performed between 4g min and 1 hr after the administration of Tc-99m MIBI. 360 degree neck SPECT was done with matrix size of 128 x 128 using low energy all purpose collimator and frame interval of 15 - 20 sec. Data was analyzed in software SPSS 17.

**RESULTS:** Among 24 patients there was equal distribution of two gender. Forty six percent were above 40 years and 34% below. On planar imaging 9 patients showed presence of parathyroid adenoma while on SPECT images 12 patients showed presence of parathyroid adenoma. 33% did not show parathyroid adenoma both on planar and SPECT. In total 17% patients showed presence of parathyroid adenoma which did not show parathyroid adenoma on planar images.

**CONCLUSION:** By comparing planar and SPECT images it is concluded that SPECT shows better detection rate than planar image in terms of early detection at 1 hour. The SPECT also has better detection capability than planar images at one hour as well as 2 hours. Based on the study results we may suggest that SPECT study at one hour maybe used routinely as part of standard protocol.

### Role of 18 Fluorodeoxyglucose Positron Emission Tomography for Differentiated Thyroid Carcinoma with Postablation Elevated Serum Thyroglobulin Levels and Negative Iodine Whole Body Scans

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**PURPOSE:** We aimed to evaluate the sensitivity of 18-fluorodeoxyglucose (FDG) positron emission tomography / computed tomography (PET/CT) in patients with differentiated thyroid cancer (DTC) who had a suspicious persistent or recurrent disease based on an elevated serum thyroglobulin (Tg) or Tg antibodies (TgAb) levels and Iodine - 131 whole body scan (WBS) were normal or inconclusive.

**METHODS AND MATERIALS:** Ten consecutive patients with DTC (stage T<sub>2-3</sub>, N<sub>0</sub>, N<sub>1</sub>, M<sub>0</sub>) after radioactive iodine ablation with elevated TG and TgAb levels, with normal WBS underwent FDG PET/CT. 7 patients had elevated Tg levels observed during follow-up after they initially became under 1 ng/mL, and 3 had appearance of TgAb during followup. Post-ablation WBS and FDG PET / CT were analyzed by two physicians.

**RESULTS:** A total of 35 lesions were found in 8 patients, distribution location of lesions were, the neck (13), lungs (12), mediastinum (6), and bones (4). The sensitivities for the detection of individual lesions and for the diagnosis of metastatic organs were 85% and 95% for PET / CT and 20% and 40% for WBS, respectively (p < 0.01). PET/ CT was abnormal in 8 patients. Two patients had normal PET / CT and had abnormal WBS. One patient Based on results of CT / PET, patients were either treated with surgery, or classified as radioactive iodine refractory and treated with levothyroxine suppressive therapy or TKIs.

**CONCLUSION:** In patients with suspicious recurrence based on the Tg level after a normal postablation WBS, FDG PET / CT is the preferred diagnostic method to localize disease, which may alter the treatment management and impact of survival.

### Serial Chest Radiographs: Avoiding Repeat Examinations due to Inappropriate Exposure Factors by Documenting Exposure Factors

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**AIM:** To identify and quantify the appropriate documentation of exposure factors in recurring clinical examinations. In brief it aims to promote best radiation protection practice.

**BACKGROUND:** Many patients in Intensive Care Unit (ICU) require multiple chest radiographs on multiple occasions. Documentation of cumulative radiation dose to these patients may serve as a source to generate awareness among radiation workers. This may in turn reduce the number of undue examinations performed in this particular subset of patients.

**METHOD AND MATERIALS:** A prospective quantitative study was conducted to critically assess radiation doses given to ICU patients. Questionnaire was being filled during data collection to tabulate responses and analyze statistics. Film to Focus Distance (FFD), mA and kVp of all first chest radiographs performed were documented. All subsequent examinations in addition were performed with the documented exposure factors. Review of previous prior to subsequent exposure was also documented. Percentages of examinations with documented exposure.

### Higher Scrotal Uptake Ratio of <sup>99m</sup>Tc- methylene diphosphonate (MDP) on Bone Scans in Newly Diagnosed Prostate Cancer: A Reliable Indicator of Pelvic Node Metastasis

Maseeh uz Zaman

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**PURPOSE:** The aim of this study was to find out correlation between higher scrotal uptake ratio (SUR) of <sup>99m</sup>Tc- methylene diphosphonate (MDP) on bone scan and pelvic node metastasis in patients with PC at high risk for nodal metastasis.

**METHODS AND MATERIALS:** This was a retrospective study which included 68 biopsy proven newly diagnosed PC patients who had bone scan from January 2008 till January 2012. MRI pelvis, prostate specific antigen (PSA) and Gleason's score was available in all patients. Whole body bone scan was performed in all patients and SUR was calculated by dividing mean counts over scrota.

**RESULTS:** Mean age of studied males was 71 ± 07 years with a mean PSA level of 65 ± 162 ng/ml. Prostate biopsy revealed adenocarcinoma in all patients with mean Gleason's score 7 ± 1. Mean SUR was 2.786 ± 0.496. MRI was positive for pelvic lymphadenopathy in 32/68 (47%). PLND revealed evidence of nodal metastasis in 16/68 (24%) patients. Receiver operating.

**CONCLUSION:** We conclude that in newly diagnosed PC patients, higher SUR on bone scan has a high diagnostic accuracy for pelvic node metastasis. Furthermore, a bone scan with a SUR < 2.99 and negative for bone metastasis can stratify newly diagnosed PC patients as low risk.

### Radiation Doses and Possible Risks in Computed Tomography

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**PURPOSE:** Clinical applications of computed tomography (CT) have increased significantly over the past two decades and improved health care dramatically. However, CT delivers substantially higher radiation doses than conventional diagnostic x-rays which may elevate a person's lifetime risk of developing cancer. It is important to consider the benefits of these medical imaging exams while minimizing the risks. This article reviews radiation dose associated with common CT studies in clinical practice, estimation of cancer risk with these examinations, parameters contributing the radiation dose and describe techniques for reducing the radiation dose. Radiation doses varied considerably between the different types of CT examinations. The understanding of dose delivered to a patient with a given CT examination would help the radiologist to make thoughtful decisions to have balance between dose and image quality. It is better to evaluate the risks and benefits of imaging exams, and forms the foundation for the development of standards for dose and image quality assessment for medical imaging. Dose reduction in computed tomography is based on the principles of ALARA and its judicious use is essential to foster the safest possible care of patients. Radiation doses from commonly performed diagnostic CT examinations are higher and more variable, and need the standardization among the institutions. Evaluation of the risks and benefits of imaging exams, it is up to individual radiologists and radiology departments to control the radiation dose and image quality assessment in CT.

### Role of MRI Kinematics in Joint Anomalies

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**OBJECTIVE OF STUDY:** The purpose of our study was to access the usefulness of MRI Kinematics in different joints for their functional deficits. Most of the time pathology cannot be seen on a static view MRI. To show real time motion of joint for quality diagnosis study was done.

**MATERIAL AND METHODS:** Total number of patients was 10; their MRIs were performed on 1.5T Toshiba Titan wide bore. Dedicated surface coils. Gradient Recall Echo (GRE) pulse sequence is used to reduce time and optimization of image. Patients were practiced before procedure to keep his / her joint moving in different stations during the scan. Technique was applied on Temporomandibular Joint (TMJ), Shoulder Joint, Cervical Spine and Lumbar Spine. Scan was completed in five different position of a joint at the same level. After Scan completion of scan, images were run in cine mode to view real time joint movement.

**RESULTS:** It was observed Kinematic MRI procedures enhance the ability to evaluate joints because they provide functional information that is not provided using standard, staticview MRI examinations.

**CONCLUSION:** Kinematic MRI studies should be used on a routine basis whenever the pertinent indications are present. To effectively accomplish this, specialized training is required for MRI technologists and radiologists so that the kinematic MRI procedures are performed in a technically acceptable manner and interpreted properly.

### CT / MRI Fusion Percentage Difference of GTV Delineation in Brain Gliomas

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**PURPOSE:** Practices in radiation therapy required high doses of radiation to be delivered with increased accuracy. Treatment planning tasks are exercised till an optimum dose distribution in target volume is achieved. Delineation of Gross tumor volume (GTV) is most important step for conformal radiotherapy treatment planning in Brain tumors by using CT and MRI. However, there is significant difference in delineating GTV using CT and CT / MRI fused image data sets. This study presents a comprehensive comparison of GTV delineated on CT and CT / MRI fused image data sets separately.

**MATERIALS AND METHODS:** Twenty five patients were considered for this study. All the patients have histopathologically proven brain Gliomas. GTV was delineated separately on contrast enhanced CT and CT / MRI fused images by a single radiation oncologist. Registration method of match points is used for the fusion of CT and MRI image data sets.

**RESULTS:** CT / MRI fused images GTV was larger as compared to CT images with mean volume of (Mean  $\pm$  SD: 85.85  $\pm$  57.45cc) and 75.96  $\pm$  50cc respectively. Difference observed for GTV is 9.87  $\pm$  10.09cc (p = 0.004). After taking CT / MRI fused image as reference calculated mean percentage difference in volumes was about 12%.

**CONCLUSION:** It was found that GTV was larger on CT / MRI image for brain Gliomas than CT image volume. Therefore, fusion of two modalities for brain tumor is recommended for treatment planning radiotherapy.

### Significance of Radiographer Awareness in Pneumothorax Detection

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**OBJECTIVE:** The purpose of the study is to aware and educated a radiographer of certain pathological conditions seen on chest x-ray specifically we are dealing with types and severity of pneumothorax and the quality of information a radiographer communicate to his primary team for evaluation.

**INTRODUCTION:** Radiographer can identify or detect pneumothorax by taking x-rays in three positions i.e. upright, supine or decubitus with complete awareness of diverse conditions of pneumothorax. For suitable imaging radiographer should know about position, safety of the patient and the techniques of Breath holding during exposure. Whereas ALARA (as low as reasonably achievable) should be kept standard. In our study mostly cases were of tension pneumothorax in which immediate decompression of thorax is mandatory and it requires instant action as on x-ray film as lung marking diminishes in this condition.

**METHODOLOGY:** According to radiological policy for panic conditions the chest x-rays were observed through PACS after every two hours. We evaluated the role of radiographer in observing pneumothorax and how it is his / her utmost responsibility to inform their primary team or the concerned radiologist urgently.

**RESULT:** We observed 36 panic pneumothorax out of 2865 portable chest x-rays of admitted patients from May 2012 till November 2012. Out of these 36 cases radiographers correctly identified 28 cases while 6 were missed when compared with radiologists detection.

**CONCLUSION:** We concluded that 77% of radiographers are aware of panic conditions detected on chest x-ray but we find it very necessary to aware and educate radiographers more particularly to detect pneumothorax and related pathologies on chest x-rays in order to improve proper patient care in health care system and maintain required standards.

### Barriers in Conducting Research in the Field of Radiology: Perceptions of Health Care Professionals from A Developing Nation

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 Muhammad Awais

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**PURPOSE:** To identify proportion of radiology Health care professionals' opinions regarding level of difficulty in conducting research in radiology and to ascertain barriers associated in conducting research activities in the field of radiology.

**MATERIAL AND METHODS:** A Cross sectional analytical study was conducted during International Conference organized by Radiological Society of Pakistan in November 2009 at Sheraton Hotel, Karachi. Data were collected using a structured, self administered questionnaire from participants willing to participate in research registered for Annual Radiology Research Workshop piloted during conference via non-probability convenience technique. Data were analyzed using SPSS versions 19.0. Means  $\pm$  SD were computed for quantitative and proportions calculated for qualitative variables. Chi square and Fisher Exact tests applied for categorical variables.

**RESULTS:** Response rate was 76% (n = 78/103), 65.4% agreed that conducting research in the field of radiology is difficult. Most of the participants (69.2%) who had not published papers believed that research in radiology is difficult as compared to those who had published a paper (30.8%) (p = 0.026). However, age, sex, attending conferences and presenting papers did not significantly influence response of participants. The top three barriers in conducting research in field of radiology were time required to provide clinical services (92.3%), lack of dedicated time for research (91.0%) and diminished income in research (88.3%). Although similar responses were observed among residents and consultants regarding barriers in conducting research, more residents than consultants believed that lack of support from dean (p = 0.037) and diminished income in research activities (p = 0.003) were significant barriers.

**CONCLUSION:** Most of the participants' opinion was that conducting research in the field of radiology is difficult. Time required providing clinical services, lack of dedicated time for research and diminished income in research activities were identified as most important barriers in conducting research. Similar responses were observed among residents and consultants regarding barriers in conducting research.

### Interobserver Variability among Residents for Initial Interpretation of Pediatric CT Fact

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**PURPOSE:** Acute Appendicitis is a very common cause of acute abdominal pain in children which can result in surgical management, therefore early diagnosis is very crucial for the patient's management especially during on call hours. Senior resident (year 3-5) are mostly responsible for initial interpretation of CT FACT during on call hours.

**METHODS AND MATERIALS:** This was a retrospective cross sectional study which included all patients below 17 years of age referred to the Aga Khan hospital Radiology Department for CT FACT with query of Acute Appendicitis from January 2012 to October 2012. The CT scans were interpreted separately by two radiology residents. Inter observer variability was assessed by Kappa.

**RESULTS:** Total 97 patients were included in the study who underwent CT FACT for the query of acute appendicitis, the age range was 4-17 years with mean age of 12.3 years. 48 of 97 patients were reported as having acute appendicitis by the radiologist. Inter observer agreement between the two radiology residents was 0.66.

**CONCLUSION:** Good inter observer variability was found between the two radiology residents in accordance with the final report which is very important for the initial interpretation of CT FACT in pediatric population.

### Hypoxic Ischemic Lesions in Neonatal Brains

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**PURPOSE:** Neonatal mortality is high in developing countries like Pakistan. Two main reasons are premature delivery and second poor hygienic atmosphere and lack of labor room facilities in villages resulting in hypoxia and asphyxia. Objective of study was to evaluate neonatal lesions in premature and full term babies and their sequel.

**MATERIAL AND METHODS:** This study is done in small private clinic and OMI hospital. It is done to evaluate the difference of ischemic patterns in premature and full term neonates. Most of the neonates with ischemia were brought in portable incubator. In the hospital Ultrasound examination was done in NICU. Machines used were ALOKA 4000 and Nemio. Ultrasound of neonatal brains done by placing the probe over the anterior fontanelle and taking coronal, sagittal and axial images.

**RESULTS:** Presentation of ischemic lesions were different in premature and full term neonates. We had total 50 newborn babies with history of hypoxia and asphyxia from 2002-2011, Forty were full term babies. Only 10 were premature probably because moving premature babies was not advisable. Ultrasound of brains revealed intra-cranial hemorrhages, periventricular leukomalacia, brain edema and brain atrophy. Follow-up was possible only in 20% of cases as most had neonatal death and some disappeared.

**CONCLUSION:** Ultrasound is a safe diagnostic modality for evaluation of neonatal brain. Coronal, sagittal and axial sections of brain are taken with free angling of the probe according to movements of the baby. The equipment can be shifted to NICU and examination can be done while baby is in the incubator. Only few minutes are required to evaluate brain without any ionic radiation, sedation or injections. It is cost effective specially for our population. Then why there is need of CT Scan for non-affording neonates. At least it should be first line of investigation in hypoxia and brain ischemia of neonates.

### Diagnostic Accuracy of MDCT in Diagnosis of Tracheo-Bronchial Foreign Body Aspiration in Pediatric Patients

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**OBJECTIVE:** To evaluate the diagnostic value of Multidetector Computed Tomography (MDCT) in tracheo-bronchial foreign body aspiration in children taking conventional Bronchoscopy as reference standard.

**MATERIAL AND METHODS:** This Cross sectional analytic study was carried out in Department of Radiology Nishtar Medical College and Hospital and Children Hospital complex, Multan from January 2011 to June 2012. Chest CT was performed in 45 consecutive children with suspected foreign body aspiration, and plain chest X-ray was evaluated at the same time. Multi-planar reformatting and virtual bronchoscopy of acquired images was done at workstation. Findings on plain X-Ray and CT scan chest were noted in each patient. Results of Bronchoscopy were obtained from patient's clinical data after foreign body removal.

**RESULTS:** Forty two patients with tracheobronchial foreign bodies were identified by chest CT. Three patients were commented as having negative CT scan for foreign body with alternate diagnosis. Right main stem bronchus was the most common location of foreign body 20 (47.6%) and air trapping was the most common associated finding (28.5%). Sixteen (35.5%) patients had no abnormalities on plain X-Ray. The difference between Multi-detector CT and plain X-Ray results was statistically significant ( $P < 0.001$ ). The sensitivity, specificity and accuracy of MDCT in this study were 100% each respectively.

**CONCLUSION:** MDCT is highly sensitive and accurate in detection of tracheo-bronchial foreign body in pediatric patients. So, any patient with clinical suspicion of tracheo-bronchial foreign body should undergo CT scan chest with multi-planar reconstruction and virtual bronchoscopy even with normal chest X-ray.

### Frequency of Visualization and Thickness of Normal Appendix at Non-enhanced Helical Computed Tomography by using Multiplanar Reformation Display

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**PURPOSE:** To evaluate the frequency of visualization, thickness and morphological features of the normal appendix in adults on un-enhanced helical computed tomography (CT) by using multi-planar reformation images.

**METHODS AND MATERIALS:** A retrospective study of 167 patients (92 men, 75 women; mean age, 41.86 years  $\pm$  15.43 SD) who were sent for un-enhanced CT examination for the assessment of renal colic,<sup>1</sup> was conducted. The scans were interpreted by a radiologist who reviewed the scans in axial, coronal and sagittal sections and was blinded to patient's previous surgical history. The frequency of the visualization, location, presence of appendicoliths was determined.<sup>2</sup> In addition, the maximum outer diameter and two walls thickness of the visualized appendices<sup>3</sup> were also measured.

**RESULTS:** Out of a total of 167 cases, normal appendix was visualized in 150 patients. Two patients had a history of appendectomy. The mean thickness of normal appendix if no luminal content was visualized was 6.25 mm  $\pm$  5.8 SD (range 4 - 8 mm). The mean thickness, excluding the visualized intraluminal content was 4.57 mm  $\pm$  1.06 SD (range 3 - 7 mm). Regarding the location of appendiceal tip, the most common location, as identified by the reviewer was retrocaecal in 89 (59.3%) of 150 appendices. The appendiceal tip was midline in 34 (22.6%), paracolic in 16 (10.6%) and pelvic in 14 (9.3%) of 150 visualized appendices.

**CONCLUSION:** Unenhanced CT examinations are quite useful for the assessment of normal appendices. The normal appendix varies in its location, thickness and diameter. This variation should be kept in mind while making the diagnosis of acute appendicitis if other signs are not convincing.

### Comparison of Greulich Pyle and Golden Girtlany Methods: which Method should be Employed for the Estimation of Skeletal Age in Pakistani Children?

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**OBJECTIVE:** To compare the Greulich Pyle (GP) and Golden Girdany (GG) methods in the estimation of skeletal age (SA) in children referred to a tertiary care hospital in Karachi, Pakistan.

**MATERIALS AND METHODS:** A retrospective cross sectional study was conducted in Aga Khan University Hospital, Karachi. Children up to age 20 years undergoing X-ray for the determination of SA from 1<sup>st</sup> May, 2011 to 31

May, 2012 were included. Each X-ray was interpreted using both methods by two consultant pediatric radiologists with at least 10 years experience, who were blinded to the actual chronologic age (CA) of children.

**Results:** A total of 283 children were included. There was no significant difference in the mean SA estimated by GP method and the mean CA for female children ( $p = 0.434$ ). However, a significant difference was noted between the mean CA and the mean SA estimated by GG method for females ( $p = 0.005$ ). In male children, a statistically significant difference existed between the mean CA and the mean SA estimated by both GP ( $p < 0.001$ ) and GG ( $p < 0.001$ ) methods respectively. There was a stronger correlation between the mean CA and the mean SA estimated by GP method ( $r = 0.938$  for girls,  $r = 0.916$  for boys) as compared to that estimated by GG method ( $r = 0.907$  for girls,  $r = 0.867$  for boys) respectively.

**CONCLUSION:** GP method was accurate in estimation of SA in female children as compared to GG method. However, both methods were inaccurate in estimation of SA in boys. Overall, there was a better correlation between GP and CA as compared to GG method. As GG method was not accurate in estimation of SA in children of either sex and had a weaker correlation with CA than GP method, therefore it should not be used for the estimation of SA in Pakistani children.

### The Correlation of Preoperative CT, MRI Findings with Intra-operative Findings in Primary Gynaecological Cancers

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**PURPOSE:** To compare the preoperative findings of abdomino-pelvic CT and MRI with the intra-operative findings in patients with primary gynaecological cancers.

**METHODS AND MATERIALS:** Study was done at Radiology dept. and MCH centre P.I.M.S, Islamabad from 1st Jan to 31st Jul 2012 Thirty six patients with gynaecological cancers were included. Presence and extent of tumour, involvement of gut, bladder, rectum, omental deposits, abdominal wall, and ascites were looked for radiologically pre and intra-operatively. Comparison was then done.

**RESULTS:** Out of 34 patients, 19 patients were diagnosed to have cancer ovary while 15 patients had cancer cervix. Cancer endometrium was diagnosed in 06 patients. All the parameters were rightly diagnosed at the time of preoperative imaging (CT or MRI). However, omental and peritoneal deposits were not detected radiologically in 13 patients ( $p$ value = 0.017).

**CONCLUSION:** The study highlighted the fact that the presence of omental / peritoneal deposits was missed in pre operative CT / MRI scans and was subsequently identified intra-operatively.

### Accuracy of Magnetic Resonance Imaging in Diagnosing Placenta Accreta in Patients with Previous Cesarean Scar

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**PURPOSE:** The aim of this study was to determine the diagnostic accuracy of magnetic resonance imaging in early prenatal diagnosis of placenta accreta (PA) being a life threatening and potentially morbid condition. Placenta previa and previous cesarean sections are the two most important known risk factors for it.

**METHODS AND MATERIALS:** One hundred forty one patients after history and ultrasound underwent MRI without intravenous contrast at Radiology department of ALLIED hospital Faisalabad. With 1.5-T(Philips) MR imaging

unit axial, coronal, and sagittal T<sub>1</sub>WI and, axial and sagittal T<sub>2</sub>W fat suppressed images were acquired. The MR images were interpreted by me for reporting under supervision of my supervisor. The patients with positive placenta accreta on MRI were operated by senior gynaecologist and histopathology was done from histopathology lab PMC / Allied Hospital Faisalabad. Finally the data was collected for my study on especially designed Proforma by me. Sensitivity, specificity, PPV and NPV were calculated.

**RESULTS:** One hundred forty one patients at risk of placenta accreta underwent MRI. Fifty six of these patients had placenta accreta. With MRI, placenta accreta was correctly identified in 56 of 141 patients (sensitivity 76%) which were also positive on histopathology and the absence of accreta in 50 of 141 patients (specificity 75%) being negative on histopathology as well. The PPV = 76 and NPV = 74 and diagnostic accuracy of MRI was found to be 75.

**CONCLUSION:** MRI is a complementary technique that should be considered when ultrasound is inconclusive or incomplete as accurate prenatal identification of PA will allow optimal management because timing and site of delivery, availability of blood products, recruitment of a skilled anesthesia and surgical team can be arranged in advance and pregnant patients can safely depend on MRI for a successful maternal outcome.

### Identification of Prostatic Cancer with Combined Diffusion Weighted MR Imaging and 3D 1H MR Spectroscopic Imaging Correlation with Pathologic Findings

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**PURPOSE:** To retrospectively measure the mean apparent diffusion coefficient (ADC) with diffusion weighted magnetic resonance (MR) imaging and the mean metabolic ratio (MET) with three dimensional (3D) hydrogen 1 (1H) MR spectroscopic imaging in regions of interest (ROIs) drawn over benign and malignant peripheral zone (PZ) prostatic tissue and to assess ADC, MET, and combined ADC and MET for identifying malignant ROIs, with whole mount histopathologic examination as the reference standard.

**METHODS AND MATERIALS:** The institutional review board approved this HIPAA compliant retrospective study and issued a waiver of informed consent. From among 30 consecutive patients with prostate cancer, (median age, 61 years; range, 42 - 72 years) who underwent 1.5 - T Pelvic MR imaging before radical prostatectomy and who fulfilled all inclusion criteria of no prior hormonal or radiation treatment and at least one PZ lesion (volume, 0.1 cm<sup>3</sup>) at whole mount pathologic examination were included. ADC maps were generated from diffusion - weighted MR - imaging data, and MET maps of (choline plus creatine) / citrate were calculated from 3D 1H MR spectroscopic imaging data. ROIs in the PZ identified by matching pathologic slides with T<sub>2</sub> - weighted images were overlaid on MET and ADC maps. Areas under the receiver operating characteristic curves (AUCs) were used to evaluate accuracy.

**Results:** The mean ADC standard deviation, (1.39 0.23) 103 mm<sup>2</sup> / sec, and mean MET (0.92 0.32) for malignant ROIs differed significantly from the mean ADC, (1.69 0.2) 103 mm<sup>2</sup> / sec, and mean MET (0.73 0.85) for benign ROIs ( $P < 0.001$  for both). In distinguishing malignant ROIs, combined ADC and MET (AUC 0.85) performed significantly better than MET alone (AUC 0.74;  $P < 0.005$ ) and was also better than ADC alone (AUC 0.81), although the difference was not statistically significant ( $P > 0.09$ ).

**CONCLUSION:** The combination of ADC and MET performs significantly better than MET for differentiating between benign and malignant ROIs in the PZ.

### To Determine the Diagnostic Accuracy of Diffusion Weighted Magnetic Resonance Imaging in Detection of Myometrial Invasion in Endometrial Cancer Taking Histopathology as Gold Standard

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**PURPOSE:** The purpose of this study is to determine the diagnostic accuracy of DWI in the preoperative assessment of myometrial tumor invasion using postoperative histopathological findings as the gold standard. Data regarding our part of world is limited and it is a relatively new topic for research in local environment and especially after recent advances in imaging techniques and availability of MRI equipment. No study pertaining to my topic is available in local literature and the available inter-national values in regards to the assessment of deep tumor invasion, sensitivity, specificity, positive and negative predictive values of DWI are 84.6%, 70.6%, 52.4% and 92.3%<sup>2</sup> respectively.

#### METHODS AND MATERIALS:

**Study Design:** Cross sectional validation study.

**Study Setting:** Department of Radiology, Aga Khan University Hospital, Karachi.

**Period of Study:** From Jan 2011 to Dec 2011 (One year) .

**Sampling Technique:** Purposive non probability sampling.

**SUBJECTS AND METHODS:** DW MRI (b value = 50,400 and 800 s/mm<sup>2</sup>) was performed in 85 patients of biopsy proven endo-metrial carcinoma before hysterectomy using body and spine coil at 1.5 tesla. DWI was evaluated for presence of myometrial invasion by tumor. Histopathology was taken as gold standard. The data was collected on the Performa and analyzed on SPSS version i6 assessing sensitivity, specificity, the negative predictive value and positive predictive values and accuracy of DWI against the gold standard.

**RESULTS:** On DWI, superficial myometrial invasion was found in 4z patients and deep myometrial invasion in 43. At histopathological examination, superficial myometrial invasion was found in 53 patients and deep myometrial invasion in 32. With MRI, deep myometrial invasion was correctly identified in 29 of 32 patients (90%) and the superficial myometrial invasion in 39 of 53 patients (73%).

Hence according to our study, in the assessment of myometrial invasion by endometrial tumor, sensitivity, specificity, positive predictive value, negative predictive value and accuracy for DW images are 90%, 73%, 67%, 92% and 80% respectively.

DWI prove to be highly accurate in assessing myometrial invasion and it should be used as an adjunct to routine MRI for preoperative evaluation of myometrial invasion of endometrial cancer.

**CONCLUSION:** Diagnostic accuracy of diffusion - weighted magnetic resonance imaging in detection of myometrial invasion in endometrial cancer is 80% taking histopathology as gold standard.

### MR Imaging of Uterus: The Spectrum from Congenital to Neoplastic

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**OBJECTIVE:** To assess the accuracy of MRI in the evaluation of uterine abnormalities ranging from congenital to neo-plastic.

**MATERIAL AND METHODS:** The retrospective descriptive study was conducted In the Radiology department of Aga Khan University Hospital. The MRI of female pelvis that were done from Jan. 2011 to Nov. 2012 were reviewed

for the clinical indications, any other prior - imaging available, MRI findings, surgical findings or follow up in cases when surgery was not performed. The classic imaging features leading to the diagnosis were reported.

**RESULTS:** The study included the MRI of female pelvis done during the period. The examinations done for assessment of extra uterine abnormalities and follow up repeat MR examinations for uterine neoplastic lesions were excluded. The remaining MRI examinations were done for staging of endometrial / cervical cancer, myometrial abnormalities like fibroids, sarcoma s, adenomyosis and mullerian duct abnormalities.

MRI was found to be consistent in predicting the cervical extension, myometrial invasion and lymph node metastasis in staging of end ometrial cancer. Identification of parametrial extension and recurrence in cervical cancer was detected with reliable accuracy. The location of fibroids and its relation to endometrium was depicted however the presence of fibroids obscured the mullerian duct anomalies. Mullerian duct abnormalities ranging from agenesis, hypoplasia, unicornuate, bicornuate and septate uterus were detected with high accuracy.

**CONCLUSION:** The superb soft tissue contrast and multi-planar capabilities makes MRI a modality of choice in detection and characterization of focal and diffuse uterine abnormalities.

### Critical Evaluation of the Role of Imaging in Decision Pathway of an Invasive Ductal Carcinoma Patient

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**AIM:** To evaluate the role of diagnostic imaging investigations in management of an Invasive Ductal Carcinoma (IDC) patient. The significance of working in a multi-disciplinary working environment and its impact on clinical decision making will also be discussed.

**METHODS AND MATERIAL:** Patient having Invasive Ductal Carcinoma (IDC) was selected for the case study during Multi Disciplinary Team (MDT) meetings and followed prospectively. Patient's clinical notes and images were accessed by the permission of radiology head of department and the primary physician. Formal verbal consent was also taken from the patient to assess radiological images. Patient data was accessed from Hospital Information System (HIS) and Picture Archiving and Communication System (PACS) . Patient confidentiality was maintained by removing patient identification from all images. Critical review of all the concerned modalities was done and a summary of diagnosis was given.

**RESULTS AND CONCLUSION:** Imaging examinations are imperative in the work-up and staging of breast cancer. This case study high-lighted the significance of imaging investigations in providing best possible patient outcome. The key to efficient patient diagnosis and management is proper utilisation of these imaging modalities by adhering to guidelines. Furthermore, analysis of the case study provided an insight.

### Sixty Four Section Multi-detector CT Angiography of Carotid Arteries: A Systematic Analysis of Image Quality and Artifacts

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**BACKGROUND / OBJECTIVE:** Sixty four section CT scanners have recently been introduced for vascular imaging. Before such scanners reach widespread use, scanning protocol should be optimized and image quality assessed. The goals of this study were to systematically measure image quality and determine the prevalence of various types of artifacts produced by a 64-section scanner.



**MATERIALS AND METHODS:** We retrospectively reviewed CT angiography (CTA) scans obtained on a 64-section CT scanner in 100 consecutive patients presenting to the emergency department during a last 06-month period with a suspected acute cerebrovascular event. We evaluated scan quality by using z different methods: First, we quantitatively assessed arterial opacification by measuring attenuation values at distal carotid artery, by using a threshold of 150 HU as an indicator of good opacification. Second, we assessed image contrast between arteries and veins by measuring attenuation within venous segments. In addition, we recorded the prevalence of the following artifacts: metallic hardware streak, contrast material streak from slowflowing contrast material in adjacent large veins, streak artifacts from shoulders, contrast material reflux into veins of the neck, motion artifacts, and artifacts causing miss representation of flow dynamics simulating arterial dissection or occlusion. These results were compared with other 113 patient' s data that received from 16 - section CT scanner at Ziauddin University Hospital. Who were imaged with the same technical parameters.

**RESULTS:** The quantitative assessment of arterial opacification showed arterial segments (96.5%) had good opacification. Image contrast between artery and vein segments was good, (85.6%) having > 50 HU difference. Artifacts obscuring arterial evaluation included streak from contrast material in the subclavian / brachiocephalic vein (32% of patients), attenuation of the x-ray beam between the shoulders (28%), beam hardening from metallic hardware (26%), and contrast material reflux into neck veins (16%). The most clinically relevant artifacts were flow artifacts, mimicking dissection or vascular occlusion; they were seen in 14% of patients. None of the patients in our other data that received from 16 section CT had flow artifacts on their CTA studies; the incidence of the other types of artifacts in this group was similar to that in patients imaged with 64-section CT.

**CONCLUSION:** The 64 - section CTA imaging protocol for carotid arteries yields high-quality studies in > 95% of cases. It best for assess coronary artery stenosis.

### Comparison of MRI Lumbar Spine Screening with Plain Films of Patients with Non-Specific Lumbar Pain

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**INTRODUCTION / OBJECTIVE:** The role of lumbar spine imaging is an important adjunct to clinical examination. Symptoms such as pain, backache, leg pain, difficulty in walking and stiffness are often reported by patients and can make an accurate diagnosis difficult by clinical examination in isolation. The purpose of the study is to evaluate the efficacy of MRI lumbar spine screening in comparison with plain film of lumbar spine patients presenting with nonspecific back pain.

**MATERIAL AND METHODS:** This multi-centre study was carried out between Feb 2011 to Jan 2012 in two tertiary care hospitals in Karachi. Retrospective comparison study of MRI lumbar spine with plain radiography of the lumbar spine in patients with non-specific back pain was undertaken. Data were collected from RIS (Radiology information system) Ziauddin university hospital, and Aga khan University hospital. Karachi Pakistan. We randomly selected 200 patients who presented with non-specific back pain. All the patients had a standard radiographic examination of the lumbar spine employing antero-posterior and lateral projections and then an MRI examination. The corresponding pair of reports were analyzed and a comparison was made between the two.

**RESULTS:** For the radiographic examination, abnormalities were reported in 30 (15%) cases. The remaining 170 (85%) cases were reported as normal. For the corresponding MRI examinations, abnormalities were reported in 87 (43.5%), out of the ryo patient's they were mainly herniated disc lesions of various types, There was no incident when the radiographic examination revealed an abnormality and the MRI examination did not.

**CONCLUSION:** MRI is the most accurate diagnostic imaging method in patients presenting with back pain. This study has demonstrated that patients with nonspecific back pain imaged with plain radiography will have a very high probability of a negative finding and an unnecessary dose of radiation irrespective of any soft tissue anatomical derangement present.

### Improving the Print Quality of Archived Images in General Radiography as a Pre-requisite for Filmless Environment Eventually leading to Cost Rationalization

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**OBJECTIVE:** In order to embark upon a filmless environment, after PACS implementation, it is necessary that quality of film printing is same before and after archiving a study in PACS. The objective of this quality project is to improve the print quality of archived images, in general radiography, in order to move towards filmless environment and achieve cost rationalization.

**METHODS:** Today filmless and paperless environment is envisioned by all who implement PACS. In early zou, while striving to establish a similar environment at the department of Radiology, The Aga Khan University Hospital, Karachi, Pakistan, we encountered a problem related to the quality of printed radiographs of the archived images. It was noted that the prints from the archived images, of General Radiography, were not of sufficient quality which could give optimum clinical information. This was because of lower optical densities and smaller image sizes which could lead to mis-diagnosis and wrong reporting.

A team comprising of the Physician, Medical Physicist, Radiographers, Information Technology and Picture Archiving and Communication System (PACS) experts was established to address the issue. The image quality parameters including Contrast, Resolution, Magnification and Distortion were compared for the prints before and after archiving of the radiological exams and it was noted that all prints made from the archived data were found unacceptable. In order to get to the core of issue, BioMedical Engineers along with relevant manufacturer were involved in the diagnostic journey and entire process was checked including Computed Radiography (CR) system, the dry printer and PACS. The root causes were identified with the coding of the printer's "Look up Tables" which translate the DICOM data for the printer and with the improper configuration of PACS printing options. Secondly, a reference scale was also set which appear on each radiograph and that scale helps in estimating the right size of the printed objects. The radiographic prints after these interventions were shared with the Radiologists and were found to be of desired clinical quality.

**RESULTS:** All components of the imaging system including CR, Printer and PACS are now synchronized and thus producing images of diagnostically acceptable quality from archived images. This project has set the stage in moving forward on the institutional goal of having a filmless environment resulting in cost rationalization. The following table clearly shows the impact of cost rationalization and potential savings that would occur when the institution moves towards a filmless environment.

**CONCLUSIONS:** To establish a filmless environment in any health care setup, the image quality before and after the archiving should be compared and all components of the imaging system should be properly intergrated to produce images of diagnostically acceptable quality.

### Reducing Image Retake for All Patients Undergoing General Radiographic Examinations Resulting in Lesser Radiation Expo- sure in A Tertiary Care Teaching Hospital in the Developing World

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**OBJECTIVE:** The key objective of this quality initiative is to ensure high quality radiology examination (general radiology procedures) with maximum

patient safety. This is achieved by reducing the repetition of images in the CR (Computed Radiography) system resulting in reduction of radiation dose to the patients, improved throughput and reduced load on the equipment.

**METHODOLOGY:** This Quality Improvement Project was undertaken at the department of Radiology at the Aga Khan University Hospital in Karachi, Pakistan with a focus on establishing patient safety systems in our Radiology set-up. Prior to the installation of PACS (Picture Archiving and Communication System), we used to have a quality indicator namely "Film Reject Analysis", which was an indirect measure of un-necessary radiation dose exposure. This indicator became redundant after implementation of PACS; however, due to the newly installed CR (Computed Radiography) system, a more direct measure of un-necessary radiation exposure became available, which is "Image Retake". The literature search also showed that this indicator became popular internationally with the installation of CR systems.

The total numbers of the exposures, per study, are recorded by the QC (Quality Control) Supervisor on CR system and the radiographer registers the repeat exposure along with the appropriate reasons for example positioning error, Exposure error, Artifacts, Wrong Patients ID / Marker etc. Based on the specific information, the retrospective data was collected in 2010, which showed a very high retake rate of 8%. Our analysis revealed a number of factors contributing towards this very high percentage, which included improper positioning, improper marker placement, under or over exposure factors etc. After identification of the reasons, remedial journey was planned which included, didactic and practical teaching sessions for staff performing general radiography as well as efforts were made to associate junior radiographers with experienced radiographers in order to gain direct and under observation training. Radiography workshops on specific topics also contributed towards enhancement of understanding.

**RESULTS:** In 2011, data was again gathered from January to December. The measures taken bore fruit. We noted a considerable reduction in retake rate which dropped down from 8% in 2010 to 4.98% by the end of 2011. While we all cherish this huge accomplishment, we also realize this is just the beginning of a long journey and we hope this will further reduce in the years to come.

**CONCLUSION:** There are two important lessons learnt from this quality initiative. One is "Quality" is a journey and not the destination and all achievements are like milestones in this journey. The second lesson being the fact that with changing technology, new tools and methods should be explored to achieve objectives in a better way, which in our case was the movement from "Film Reject Analysis" indicator to "Image Retake" indicator; the former is an indirect measure of unnecessary radiation exposure, whereas, the latter is a direct measure of unnecessary radiation exposure.

### **Shrinking distances and Broadening Horizons Via Teleradiology: A Success Story of Reaching Out to the Under Privileged using Innovative technology in the Third World**

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**OBJECTIVE:** Tele - Radiology has opened new avenues to enhance the domain of service and impart quality service to remote areas where there is lack of expertise and resources. The objective of this study is to analyze the impact of Tele - Radiology on the healthcare delivery of remote area hospital in Afghanistan in terms of reporting of specialized procedures of CT Scan (Computed Tomography) and MRI (Magnetic Resonance Imaging).

**METHODS:** In line with the institution's mission to provide accessibility and continue to innovate the Radiology department of The Aga Khan University Hospital (AKUH) in Karachi, Pakistan took the initiative of extending radiological examinations' reporting of CT Scan and MRI to French Medical Institute for Children (FMIC) in Kabul, Afghanistan. Along with online reporting, we also used technology in building capacity via video conferencing, E-learning, online education sessions as well as hiring interviews and executive meetings.

To analyze the impact, it was necessary to collect the data from both the service providers; management of FMIC was requested to share the total number and

types of procedures carried out by them from 2008 till 2011. From our AKUH set up we acquired the data from 2008 regarding the number of CT and MRI procedures being reported by credentialed radiologists. Analysis of annual data was carried out to determine the trend in terms of volume and type of procedures and services. In the initial phase online reporting service started with CT scan only and subsequently MRI reporting was also added.

**RESULTS:** Based on the retrospective data analysis, it was observed that FMIC usually sends selected (complex) CT and MRI studies requiring expertise that is currently not available with them. Over the period of four years almost 650 CT scan cases were referred for reporting online, which makes an average of 165 cases per year. Similarly for MRI, in the first two years' time almost 400 cases have been referred for reporting. Additionally, significant amount of financial and human resources have been saved / optimized by conducting online continuous medical education sessions and interviews for hiring of professional. Cross functional training are also imparted and operational oversight is done via video - conferencing.

**CONCLUSIONS:** It is heartening to note that the development made in medical technology and its benefits are made accessible to one of the most under - privileged society via Tele - radiology.

### **Ultrasonographic Assessment of Kidney Sizes in Healthy Children**

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**PURPOSE:** To determine the normal standards of normal kidney dimensions in healthy children analyzing the variables that have a good correlation with it.

**METHODS AND MATERIALS:** An observational hospital based study was done on 100 children of age 6 to 10 years. They were selected for this study without any previous history and sign and symptoms of renal disease and with discrimination of gender. Sex, age, weight, height were determined for each case. The children were separated into 2 groups according to age. Study was un.

**RESULTS:** There was no significant difference in right and left organ dimensions. There is slight difference in organ dimensions with respect to gender. Body weight, height and age showed good correlation with kidney dimensions.

**CONCLUSION:** The normal limits of kidney dimensions are important parameters during an USG examination. This study revealed that organ dimensions have not much difference than the reference values used currently and they showed good correlation with both body weight and height.

### **Dilemmas and Diagnostic Difficulties in Meningioma**

Fatima Mubarak  
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**OBJECTIVES:** This poster will highlight several examples of atypical locations and morphology of meningiomas.

**BACKGROUND:** Characteristic imaging features have been described. However, there are several important variants of meningioma with unusual and potentially misleading radiological features. It is well known that surgical resection is the definitive treatment for meningiomas, potential atypical locations are important to recognise as this may affect surgical accessibility.

**IMAGING FINDINGS:** Uncommon locations and mimics will be demonstrated at the cerebello-pontine angle, pineal, optic, intra-ventricular and intra-diploic

regions. Unusual imaging features such as cysts, meta-platic changes and peritumoural oedema will also be demonstrated in conjunction with important diagnostic mimics.

**CONCLUSION:** Meningiomas are the most common extra-axial, intracranial neoplasms. When the lesion is in a typical location with characteristic radiological findings the diagnosis is relatively straightforward. However, a spectrum of atypical locations and morphological features exist. Given the common nature of these neoplasms it is important to be aware of these misleading features in order to avoid mis-diagnosis.

### Accuracy and Constancy Tests of Dose Calibrator at AKUH, Karachi: "Safety is Quality"

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**PURPOSE:** Aim of this clinical audit was to perform constancy and accuracy of DC to ensure safe radiation practice.

**METHODS AND MATERIALS:** This clinical audit was conducted at Nuclear Medicine Section, Department of Radiology, AKUH, Karachi from April 2, 2012 till June 15, 2012. Constancy and accuracy of DC (Veenstra Instruments and model VDC 404) was measured as a part of routine QC of nuclear pharmacy using Cobalt-57 (Co-57; photopeak: 122 KeV, Physical half life: 122 days) and C.

**RESULTS:** For accuracy measurement with Co 57, the measured activity had an average deviation of  $0.76\% \pm 0.09\%$  from the expected (actual activity) and for Cs 137 it was  $0.52\% \pm 0.91$ . For constancy measurement with Co 57, the measured activity had an average deviation of  $-0.046\% \pm 1.07\%$  from the expected (actual activity) and for Cs 137 it was  $0.67\% \pm 1.77$ .

**CONCLUSION:** This clinical audit of constancy and accuracy of dose calibrator at Nuclear Medicine Section of AKUH ensures precise and safe delivery of doses of radio-pharmaceutical to patients having nuclear medicine procedure at our facility.

### Comparison of Fetal Umbilical Artery Doppler Indices between Normal and Hypertensive Pregnant Women in the Second Trimester of Pregnancy

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**PURPOSE:** To compare Doppler indices in fetal umbilical artery between normal and hypertensive pregnant women in the second trimester of pregnancy.

**METHODS AND MATERIALS:** Ninety five patients both normotensive and hypertensive were included with the criteria for normal pregnancy being no history of maternal renal disease and other disorders affecting patients hemodynamics. The diagnostic criteria for hypertensive pregnancies required two readings of diastolic pressure of more than 90 mm Hg at least 4 hours apart. In pregnant women singleton pregnancy and gestational age (20 - 24 weeks) was confirmed by history and Ultrasonography. All pregnant women were examined by grey scale and Doppler ultrasound in supine position. The umbilical blood vessels; various indices were recorded at mid cord level. To minimize bias all recordings were taken by me without prior knowledge of maternal blood pressure levels. All data was collected in a pre-designed proforma and analyzed.

**RESULTS:** The three dependant variables were analyzed individually. Mean and standard deviations were calculated for these indices and comparison made between normotensive and hypertensive subjects. Mean and standard deviations for the pulsatility index were  $1.478 (\pm 0.355)$  and  $1.218 (\pm 0.0218)$ , for the

resistivity index were  $0.684 (\pm 0.0973)$  and  $0.640 (\pm 0.699)$ . For the S/D ratio these were  $5.010 (\pm 1.368)$  and  $3.480 (\pm 0.570)$  in hypertensive and normotensive respectively.

**CONCLUSION:** Amongst the Doppler indices, the resistivity index proved to be significant. In hypertensive pregnancies Doppler ultrasound should be used for evaluating the degree of feto-placental blood flow in order to detect the risk of pregnancy complications.

### Naegleria Infection of the Central Nervous System, CT Scan Findings: A Case Series

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**INTRODUCTION:** The free living amoebae *Naegleria fowleri* cause CNS infections termed as primary amoebic meningo-encephalitis (PAM). It occurs generally with a history of swimming and diving in fresh water and contaminated swimming pools. The portal of entry is via the olfactory mucosa and neuro-epithelium. These infections are fatal with only seven survivors of PAM reported in western literature.

**CASE REPORT:** The imaging findings in four cases of a rare infection of the central nervous system caused by amoebae, *Naegleria fowleri* are presented. They cause primary amoebic meningo-encephalitis (PAM). The CT scan brain findings in case i showed mild diffuse brain edema, however on post contrast images no abnormal paren-chymal or meningeal enhancement. In case z CT scan brain was normal. Case 3 showed edema in bilateral cerebral convexities and posterior fossa. There was also moderate hydrocephalus with lacunar infarction in right peri-ventricular region. Case 4 showed diffuse edema in bilateral cerebral hemispheres, there was also moderate hydrocephalus, post contrast images showed abnormal meningeal enhancement throughout brain parenchyma, however no definite focal enhancing lesion was seen.

**DISCUSSION:** Pathologic changes in cases of PAM are extensive damage to brain parenchyma, ependyma and meninges. Congestion of meningeal vessels, edematous cortex with herniation of uncus and cere-bellum are other features. The imaging modalities i.e. Computed Tomography and Magnetic Resonance Imaging may show non-specific positive findings. CT scans may show obliteration of the cisterns surrounding the midbrain and the sub-arachnoid space. MRI is usually suggestive of cerebral edema with meningeal enhancement.

**CONCLUSION:** In conclusion the brain CT findings in this case series of primary amoebic meningo-encephalitis are non-specific, which are cerebral edema, hydrocephalus or normal brain. Therefore PAM should be considered in any patient whenever these non specific findings are accompanied by relevant clinical history of meningitis and exposure to freshwater pools.

### Correlation between Serum Prolactin Level and MRI Findings in a Pituitary Gland

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**OBJECTIVE:** The aim of this study is to assess the MRI findings of pituitary gland with reference to serum pro-lactin level and to see if there is any correlation between the two.

**METHODS:** This is a retrospective study. Seventy patients underwent MRI brain for pituitary gland during this period at our centre. Inclusion criteria were all patients referred to radiology department with relevant clinical symptoms and / or deranged serum pro-lactin level. Patients who were claustrophobic or had a pacemaker, aneurysm clip, metallic foreign body in the orbit or with no laboratory investigation were excluded from the study. MRI examinations were performed on a SIEMENS AVANTO (1.5 Tesla) MRI scanner.

**RESULTS:** Total number of cases included 90 patients. Normal MRI examination was noted in 29 (41.4%) patients. Out of these, 18 patients had normal serum pro-lactin level and 11 had raised serum prolactin level. We found micro-adenomas in 23 (32.8%) patients. Out of these 10 had normal pro-lactin level and 13 had raised pro-lactin level. Macro-adenomas in 16 (22.8%). Out of these 8 had normal pro-lactin level and 8 had raised pro-lactin level. Pituitary cyst in 2 (2.8%) patients. Out of these 1 had normal pro-lactin level and 1 with raised serum pro-lactin level.

In this study, no correlation is found between tumor and serum pro-lactin value.

**CONCLUSION:** Baseline levels and regular monitoring of serum pro-lactin and MRI for the assessment of pituitary gland is recommended in adolescents who presented with relevant clinical signs and symptoms. Results of the study raise the question about the use of MRI for the identification of micro-adenomas as a screening tool. Secondly the results of this study show that in a tertiary care hospital, functioning pituitary tumors are more often seen than non-functioning tumors.

### Departmental Audit to Review Diagnostic Yield of Ultrasound Guided FNA

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**OBJECTIVE:** To review the diagnostic yield of FNA histo-pathologies. To see the repetition frequency and outcomes.

**METHODS:** We retrospectively reviewed data of patients who underwent FNA for diagnostic evaluation of any type of lesion. As per departmental protocol initial slides were sent to histo-pathology for confirmation of adequacy of material. If the material was declared as inadequate a repeat attempt was performed on the same day. We reviewed the number of repetition in first go and then in the final report and also review the diagnosis and frequency of abnormalities found in our data.

**RESULTS:** A total of 140 patients underwent FNA in 12 months period. 93 had FNA of thyroid lesions. 71 were declared adequate and 22 were not adequate and repeated. The final histo-pathologic breakdown showed 7 results to be inconclusive. Other 47 lesions were from lymph nodes, Salivary glands, pancreas etc. Amongst these 36 were declared adequate in first instance and repeat FNA performed for 11. Final results showed 4 to be non diagnostic.

**CONCLUSIONS:** We observed a 23% repeat rate which improved to 7% in thyroid lesions and similar rates of 24% and 8% in other lesions. Explaining this limitation to patient from beginning help increase patients satisfaction and understanding.

### Endovascular Coiling in Vertebral Artery Transaction Case Series

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Transaction of vertebral artery due to trauma is infrequently seen. Patients generally present in unstable condition and require immediate management. Diagnosis is often made on CT scan with fractures, pseudo-aneurysm, and active extra-vascular. We present 5 cases of patients with vertebral artery transaction either from gunshot injury or other trauma. Successful coil embolization was performed in these cases as stenting was not an option due to complete transaction. We present their clinical presentation, CT appearance as well as their outcome. We also discuss the material used in different cases. Patients with vertebral artery stenting are not discussed in this series.

### Ultrasound Guided Fine Needle Aspiration Biopsy of Thyroid Nodules: Our Experience at Singapore General Hospital

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**INTRODUCTION:** Fine Needle Aspiration Biopsy (FNAB) is the technique of choice for exclusion of malignancy in a thyroid nodule.

Ultrasound (US) guided FNAB has an advantage over palpation guided FNAB, as up to 20% of these yield non-diagnostic cytology results.<sup>1</sup> We retrospectively reviewed the results of US guided FNAB of thyroid lesions performed without a cytotechnician on site, over a period of five years. The diagnostic efficacy for diagnosis and exclusion of thyroid malignancies was assessed.

**MATERIALS AND METHODS:** patients who had undergone US guided thyroid FNAB between January 2003 and June 2008 were identified. US guided FNAB of thyroid nodules were performed under real-time sonography guidance (using a 7.5 MHz ultrasound probe) and a 21G needle. FNAB specimens collected were smeared on 2 - 4 slides (air dried and fixed in ethanol) and any residual aspirates were placed in a preservative solution. The nodules were categorized into the following categories by the cyto-pathologist benign, suspicious for papillary thyroid carcinoma, malignant, indeterminate, and non-diagnostic.

**RESULTS:** Four hundred eighty seven patients (79 males and 408 females) with 603 nodules and a mean age of 51.3 years were analysed. Outcomes of all patients. The diagnostic yield of initial FNAB was 82.6% (n = 498), with 2 out of 13 indeterminate lesions confirmed to be malignant (15.4%). Sixteen patients with non-diagnostic yield underwent either ultrasound follow-up or further FNAB / excision. Sensitivity, specificity, positive predictive value and negative predictive value were 82.3%, 99.7%, 93.3% and 99.3% respectively.

**DISCUSSION:** US is used to screen thyroid nodules for possible FNAB and followup of benign nodules. Patients referred for FNAB are based on suspicious sonographic features. These include microcalcifications, marked hypoechogenicity (more hypoechoic than strap muscles), taller than wide, irregular margins, and intrinsic hypervascularity. Review of the literature shows a higher false negative rates with palpation guided FNAB compared to US guided FNAB.<sup>2</sup> Hatada et al. reported a higher diagnostic accuracy of US guided FNAB compared to palpation guided FNA (68% vs 48%, p < 0.05), particularly for nodules < 2 cm, cystic, or in deep locations.<sup>3</sup> Our diagnostic yield of 82.6% is comparable to studies published.<sup>4</sup>

**CONCLUSION:** Our diagnostic yield of 82.6% is comparable to elsewhere. Cytologically "indeterminate" nodules needs appropriate follow-up as approximately 15% may be malignant.

### Does Dual Energy Flat Panel Detector Radiography Can Serve As an Ideal Imaging Modality in Detection of Vocal Cord Paralysis?

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**INTRODUCTION:** Vocal Cord paralysis (VCP) is the second most common cause of stridor in infants and frequently occurring pathology of the laryngeal nerve deformity, mostly reported to occur in proximal nerve pathways. It is reported that almost 10% congenital anomalies of the larynx are resulted from VCP. VCP is also considered to occur due to neoplasm, infection, inflammation and idiopathic conditions. Therefore, it is clinically important to diagnose the primary disease in cases of VCP because many of its potential causes, such as symptom free malignant tumors especially chest malignancy, can be fatal or cause serious morbidity if detected at a later stage. A number of modalities are used for the detection of VCP; these are Laryngeal Electromyography, High Speed Imaging, Video-stroboscopy, Video Digital Kymography, Laryngoscopy and also radiological imaging i.e. Flat Panel Detector Radiography, 3-Dimensional or Phonation Computed Tomography (CT), Magnetic Resonance Imaging and neck Ultrasonography.

**OBJECTIVE:** The objective of conducting this literature review was to evaluate the best modality for the detection of VCP.

**MATERIAL AND METHODS:** A literature review performed on relevant studies by searching the famous search engines which included Science Direct, Google Scholar, PubMed, EBESCO, Cochrane library, Sage pub etc. A total of 87 related Articles were found from which is studies were finally reviewed for this purpose by including both supportive and contra-dictive. The studies were assessed by using CASP tool.

**RESULTS:** The radiological evaluation is more useful for detection of VCP; especially Flat Panel Detector Radio-graphy was identified with higher sensitivity of 75% and specificity of 96% for the detection of VCP, keeping ( $p < 0.0001$ ) and diagnostic accuracy of ( $k = 0.60$  and  $AUC = 0.852$ ) with ( $p = 0.038$ ). CT Phonation suggesting good results but involving more radiation hazards, expensiveness and phonation sound is critical to consider. Moreover, Ultrasonography is helpful in the evaluation in pediatrics as to observe in immobility. MRI provides better tissue contrast as well as sufficient spatial resolution for visualization of vocal cords but having a high cost.

**CONCLUSION:** Flat Panel Detector Radiography was identified as an ideal, non-invasive, cost - effective, less time consuming and accurate diagnostic modality for the detection of VCP with higher sensitivity and specificity. Therefore, it can replace other imaging modalities and can be opted as the ideal imaging modality for VCP.

### A Prospective Study Evaluating the Radiographer's Knowledge about Radiation Protection in Mobile Radiography

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**BACKGROUND:** Mobile radiography plays a significant role in providing better imaging care to the patients who are often in very critical situation and moving them to radiology department can be perilous. Mobile radiography serves as a first modality of choice for imaging such patients. A radiographer faces many challenges different from those encountered in radiology department due to variety of potential obstacles and variables during mobile radio-graphy. During a mobile examination, the radiographer brings radiation hazard into an area not designed for routine radiography for example; no lead barriers, more scattered radiation etc. Mobile radiography is one of the areas in which the radiographer may receive a high radiation exposure. Therefore, professional responsibility for ensuring radiation protection becomes a fundamental requirement during all mobile radiography.

**OBJECTIVE:** The purpose of this study was to assess the level of knowledge that the radiographers must have related to their personal protection during mobile radiography. As a result, it was essential to have some standard protocol written to improve the gap in knowledge.

**MATERIAL AND METHODS:** A prospective study was conducted in a renowned Cancer Hospital. The sample of 37 radiographers was recruited having different qualifications Diploma and Graduates along with 2 years of experience in the field. Each radiographer was given a questionnaire to evaluate the knowledge about radiation protection rules needed in mobile radiography.

**RESULTS:** The 23 (62.1%) out of 37 total radiographers responded to the questionnaire. By taking p value of 0.05 and CI of 95% the arithmetic mean of the graduate radiographers who answered the questions correctly were 69.2%, while 48.5% correct answers were given by the diploma holders. Most of the diploma radiographers were unaware of Time, Distance, Shielding principle and scatter reduction strategies.

**CONCLUSION:** It has been concluded that knowledge of radiation protection for the radiographers is very important. A written protocol based on the Questionnaire survey has been proposed that should be followed by the radiographers to ensure probability of keeping radiation morbidity from mobile radiography to minimum.

### Assay for Molybdenum 99 Breakthrough in PAKGEN, PINSTECH Generators: A Clinical audit at AKUH, Karachi

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**PURPOSE:** The purpose of this clinical audit was to measure the Mo-99 concentration in eluate of PAKGEN before administering to patients as a part of Good Medical Practice (GMP).

**METHODS AND MATERIALS:** This clinical audit was conducted at Nuclear Medicine Section Department of Radiology and Department of Nuclear Cardiology, Aga Khan University Hospital, Karachi from January 2012 till May 2012. We receive two PAKGEN (540 mCi each) on a weekly basis from Isotope Production Group of PINSTECH, Nilore Islamabad. Each elution was checked for Mo 99 brea.

**RESULTS:** From Jan 1, 2012 till 30 May, 2012 we received 44 PAKGEN IPD, PINSTECH, Islamabad. Total 369 elutions were done which included 264 primary and 105 secondary elutions on same day after 6 hr. The reference activity of each generator was 20 GBq (540 mCi). The median Mo-99/Tc-99m ratio was 0.01 uCi Mo-99/mCi of Tc-99m (range: 0.0 - 0.06) which was well.

**CONCLUSION:** This clinical audit proves that PAKGEN generators supplied by IPD, PINSTECH had good performance and proved generally to be a reliable source of 99m Tc-pertechnetate. The application was safe and fulfilled the requirements for good medical practice.

### Accuracy of CT Angiography in the Evaluation of Peripheral Vasculature

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**OBJECTIVE:** CTA is relatively new procedure that provides high resolution vascular images and detailed images of the adjacent bone and soft tissue. This study was done to evaluate the efficacy of multi-slice Computerized Tomography in imaging the lower limb arterial tree in trauma and suspected peripheral vascular diseases.

**MATERIAL AND METHOD:** From October 2011 to July 2012, 25 patients had under gone peripheral CTA in our institute, of whom 08 patients had a history of trauma, 11 patients has suspected peripheral vascular disease while remaining come for evaluation for their infected wounds. Of these 25 patients 18 were male and 07 were female, 20 were admitted in LNH while 05 deals on OPD basis.

**TECHNIQUE:** All patients were scan on Toshiba activation, in supine position with feet first CTA. Scan direction was cau-docranial with the range from the level of infra renal aorta to pedal arch 130 to 150 cc of water based iodinated contrast was injected at the rate of 3 cc per second VIA power injector through 18 to 20G Angiocath. The images were acquired with the slice thickness of 2 mm, with pitch of 1.5 to 2. Scan time varied from 30 to 40 second. Optimum delayed was calculated by sure shot technique where in the machine automatically start scanning once the level of contrast en-cashment in the aorta reaches a pre set value (160 180 HU). The acquired images where transfer to work station in various 3D technique like maximum intensity projection (MIP), surface shaded display (SST) and volume rendered images.

**RESULTS:** In all our patients, there has been no technical failure. The procedure has been well tolerated and in no study was there image degradation due to motion artifact. Of these 25 patients, 8 had history of trauma. CTA was normal in two patients (25%). An obvious vessel contusion was seen in 3 patients (37.5%), which result in complete block and failure of opacification of distal vessel. In 3 patients (37.5%) there was compression of the vessel seen due to fracture segments, pressing on the vessels or mass effect from the surrounding soft tissue edema or hematoma or traumatic pseudo aneurysm. The patient of vascular compression were explored and operated of the cause of compression. Surgical findings were comparing with the CTA results.

**CONCLUSION:** CTA with multi-slicer scanner has shown that it is a promising, new, fast, accurate and noninvasive imaging modality that can be utilized effectively in the evaluation of peripheral vasculature it has given near 100% intra operative correlation in patients of trauma. The contrast and radiation dose well tolerated by all patients and image quality obtained was comparable to intra arterial DSA. Thus "CTA is clearly emerging as a screening tool in patients of PVD, while in trauma patients with suspected vascular injury it is the imaging modality of choice.

### Is Plain Radiography Necessary in Today's Era of Highly Advance Techniques? (A Retrospective Study Comparing CT Scan 3D Pelvis and Plain X-ray Pelvis in Trauma Patient)

**OBJECT:** To evaluate the usefulness of X-Ray pelvis in trauma patient and to compare it with CT Scan pelvis volumetric 3D images.

**MATERIAL AND METHODS:** This was a retrospective study. The study was conducted from May 2012 to Nov. 2012 in a period of 6 months. 80 trauma patients were admitted through the ER department of Liaquat National Hospital Karachi. Routine radiographs of the pelvis were obtained for trauma series. Out of these 50 patients underwent multislice CT scan with sagittal and coronal multiplanner reconstruction. A senior radiologist with an experience of approximately 20 years reviewed both the CT scan and the X-Rays.

**RESULTS:** The multislice CT and 3D reconstruction excluded suspected fractures in 10 patients. (20%). In the remaining 40 patients, 13 anterior pelvic rim fractures (32.5%), 20 (50%) anterior and posterior pelvic rim fractures, 13 (32.5%) acetabular fractures and 6(15%) sacral fractures were diagnosed. All multi-slice CT Diagnosis were made initially from the axial images and later they were reconfirmed on the 3D pelvic images. In 7 patients multi-slice CT detected additional fractures (2 acetabular and 5 posterior pelvic rim fractures). These were not picked-upon conventional radiographs.

**CONCLUSION:** Multi-slice CT of the pelvis with 3D reconstruction is the modality of choice for fracture and detection and also for their further classification. The question to be raised is that should X-Ray pelvis AP view be replaced by CT scan pelvis. This study further need to be validated by other studies having larger sample size.

### Dialysis Access: An Asian Perspective

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**INTRODUCTION:** Prevalence of end stage renal disease (ESRD) in Singapore is high and on an upward trend. Incidence is 213.2 per million population (PMP) 1999 to 295.3 PMP 2006 (crude rates). Renal transplant program limited by the availability of organs (cadaveric transplant). Mainstay of renal replacement therapy is dialysis with hemo-dialysis accounting for 81.2%.

**MATERIALS AND METHODS:** This is a single centre retrospective analysis of 217 patients who underwent AVF angioplasty from January 2009 to May 2009 in our institution. Followed up for 1 year. The angioplasty images, reports and case notes were reviewed.

**INCLUSION CRITERIA:** Dysfunctional native AVFs. Low transonic flow rates (< 300 mls / min for RC and < 600 mls / min for upper arm AVFs).

**EXCLUSION CRITERIA:** Thrombosed AVF or Arteriove nous grafts.

**RESULTS:** In this cohort of 217 patients, 142 (65.4%) male and 75 (34.6%) female, with a mean age of 58 years. The left upper limb was the preferred limb for access (81%). 40% of patients had multi focal stenoses which were

more common in the upper arm BC and BBTAVFs. The juxta - anastomotic segment including the AV anastomosis was the most common site for stenosis in the RC AVFs (68%) with affection of the central vein seen only in 8% of the cohort. Mid arm swing point stenosis (41%) were found to be peculiar to BC and BBT AVFs respectively.

**DISCUSSION:** Distribution consistent with those of western studies by Rajan et al<sup>1</sup> and Lay et al.<sup>2</sup> Rajan et al<sup>1</sup> cohort of 151 AVFs: Single lesions - 112 AVFs Two or more lesions 39 AVFs. In our cohort of 217 AVFs: Single lesions 132 AVFs Two or more lesions 85 AVFs. In our cohort 447 interventions were performed in one dialysis year, accounting for 2.05 intervention s per patient.

**CONCLUSION:** Although the vessels are small at the wrist, the RC AVF appears to be the preferred site for fistula creation in the Asian population. Distribution of stenotic lesions in the various types of fistulas does not differ from that seen in a Western population with the exception that there is a higher incidence of multi-plicityof lesion.

### Good Clinical Practice; Education as a Necessitate for Radiology

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A good clinical practice (GCP) is an ethical and scientific quality act from oldest enduring customs in the olden times of medicine. As the guiding ethical code it is primarily known for its edict to do no harm to the tolerant. However, the complexities of modern medicine research necessitate a more elaborate set of guidelines that address a physician's ethical and scientific responsibilities such as obtaining informed consent or disclosing risks of these biohazards. The radiologists are important escort in the healing journey of any patient. our country in last decades excel so much in terms of offering training programmes for these professional to bridge the gap between the therapeutic interventions and knowledge of these working individuals. We have done a survey on both male and female working in specifically hospitals in Karachi. They were interviewed about their skills, duties and knowledge about standards of clinical practice. with reference to the patient care and conditions they were inquired about the medical background, awareness of the sufferer's ailment and ethical concerns like patient safety IIt rights. We have found nearly disappointing results as most of these workers were ignorant of the fact that they lack basic knowledge of related responsibilities of concerned patients. Rest of the data also gave the evidence for a huge breach among the awareness, education and realistic approach in this selected workforce. We suggest that caregivers must be aware of indications and have strong medical founda-tion of the concerned departments where they are serving. We propose the medical education and clinical workshops of this set of serving individuals at ground levels along with the technical fine tuning with the help of case studies and good clinical practice.

### Typical and Atypical Presentations of Posterior Reversible Encephalopathy Syndrome in Patients Presenting to Nishtar Hospital Multan (A Case Series Study)

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**OBJECTIVE:** The objective of this study is to prevent under diagnosis of patients of PRES and their clear differentiation from simulating conditions like demyelination and ischemia.

**MATERIAL AND METHODS:** This was a case series study carried on patients presenting to Radiology Department Nishtar Hospital Multan during

December zon to November zoiz. Patients were having complaints of headache, seizures, alte-red conscious and visual disturbance like hemianopias and visual neglect. MRI with Diffusion Weighted ima-ges were carried out on these patients. Features such as symmetrical white matter edema in pos-terior cerebral hemispheres, particularly in parieto-occipital regions (typical PRES) and Basal ganglia, thalami brainstem, Deep white matter: external and internal capsule, corona radiata, splenium of corpus callosum, medulla oblongata and spinal cord (atypical PRES) were noted. Moreover resolution of findings within days to weeks and distribution which is NOT confined to a single vascular territory were reported. On MRI Multifocal T<sub>2</sub> and FLAIR hyper-intensities were seen.

**RESULTS:** A total of 26 patients were diagnosed having PRES during Dec 2011 to Nov 2012, among them 16 (61.5%) patients were having altered signals in bilateral parieto occipital lobes and 4 (15%) patients have PRES in cerebellum which are typical locations of this disease process. Atypical PRES was reported in Brainstem, medulla and spinal cord in 3(11%) patients and 3 (11%) had lesion in basal ganglia and thalami.

**CONCLUSION:** Atypical imaging findings should not dissuade the diagnosis of PRES in the appropriate clinical situation, and knowledge of the varied appearance and atypical findings of PRES allows the radiologist to make this diagnosis to avoid misleading lines of treatment by concerned physicians.

### CT / MRI Fusion Percentage Difference of GTV Delineation in Brain Gliomas

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**PURPOSE:** Practices in radiation therapy required high doses of radiation to be delivered with increased accuracy. Treatment planning tasks are exercised till an optimum dose distribution in target volume is achieved. Deli-neation of Gross tumor volume (GTV) is most important step for conformal radiotherapy treatment planning in Brain tumors by using CT and MRI. However, there is significant difference in delineating GTV using CT and CT / MRI fused image data sets. This study presents a comprehensive comparison of GTV delineated on CT and CT / MRI fused image data sets separately.

**METHODS AND MATERIALS:** Twenty five patients were considered for this study. All the patients have histo-pathologically proven brain Gliomas. GTV was delineated separately on contrast enhanced CT and CT / MRI fused images by a single radi-ation oncologist. Registration method of match points is used for the fusion of CT and MRI images data sets.

**RESULTS:** CT / MRI fused images GTVwas larger as compared to CT images with mean volume of (Mean SD: 85.85 57.45cc) and 75.96 50cc respectively. Difference observed for GTV is 9.87 10.09cc (p = 0.004). After taking CT / MRI fused image as reference calculated mean percentage difference in volumes was about 12%.

**CONCLUSION:** It was found that GTVwas larger on CT/M RI image for brain Gliomas than CT image volume. Therefore, fusion of two modalities for brain tumor is recommended for treatment planning radiotherapy.

### In Symptoms of Acute Stroke: Influence of Imaging Modality and Post processing, Multi Section CT and MR Imaging

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**BACKGROUND / OBJECTIVE:** We prospectively evaluated the influence of different imaging techniques (time of flight MR angiography (TOF MRA), multi-section CT angiography (CTA) and post processing methods (maximum intensity projection (MIP), multi-planar reformation (MPR) on acute stroke.

To determine the worth of MR angiography of the circle of Willis as a supplement to routine MR in the examination of patients with symptoms of acute stroke in terms of its depiction of the number and distribution of arterial ste-noses orocclusions. We also sought to compare the accuracy of MR angio-graphy with CT angio-graphy.

**MATERIALS AND METHODS:** Thirty patients (22 men, 08 women) with symptoms of acute stroke were examined with routine MR Head with MR angiography. CT angiography was also performed that 30 patients. CT and MR angiograms for stenoses or occlusions involving the vessels about the circle of Willis. MR and CT angiograms were also evaluated for image quality, and the corresponding routine CT and MR studies were evaluated for the presence of arterial infarction. In MRI 3D-TOF technique were applied for MRA, MIP was used for post processing, and CT used intra-cranial arteries protocol with IV bolus contrast injected.

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

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

### Utility of Doppler Ultrasound in Evaluation of Portal Vein Thrombosis in Patients Presenting with Cirrhosis Liver

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**PURPOSE:** To determine frequency of Portal vein thrombosis on ultrasound in patients with cirrhosis liver.

**METHODS AND MATERIALS:** A total of 140 patients with clinical and radiological suspicion of cirrhosis, age range of 6 to 74 years, were investigated using Doppler ultrasound in the Radiology department of Khyber Teaching Hospital, Peshawar. The findings of the data was processed using SPSS version 10 Duration of study was 6 months (August 2010 to 1st February 2011).

**RESULTS:** In this study mean age was 50 years with standard deviation  $\pm$  1.27.58% patients were male while 42% patients were female. Portal vein thrombosis on Doppler ultrasound was found in 14% patients while in 86% patients the portal vein thrombosis was not found. The incidence of portal vein thrombosis was found more in male as compare to female patient.

**CONCLUSION:** The detection of Portal vein thrombosis by Ultrasound in cirrhotics is a moderately sensitive but highly specific sign. The lower cost, absence of ionizing radiations, and greater safety for patients make it an attractive tool for diagnosing portal vein thrombosis. Major limitation of Doppler Ultrasound is operator dependence.

### Sonographic Imaging of Children with Blunt Abdominal Trauma and its Limitations

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**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 32 children presenting to PIMS with abdominal trauma were prospectively analyzed from Nov 2012 onwards.

**RESULTS:** Sonography detected free fluid in 12 patients. Ten patients had solid organ injury but no free fluid and, thus, were not detected by ultrasound. The sensitivity of sonography was only 0.55 and the negative predictive value was only 0.50.

**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.

### Computed Tomography Findings in Acute Pancreatitis

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**Purpose:** To determine the role of computed tomography in the diagnosis of acute pancreatitis and to determine the presence of its complications.

**METHODS AND MATERIALS:** A prospective descriptive study was carried out at Radiology Dept, HMC Peshawar from Jan 2006 to June 2007. 180 consecutive patients with suspected or known acute pancreatitis underwent contrast enhanced CT scan. Scans were observed and the pancreatic findings on CT were classified in into five categories on the basis of Balthazar score.

**RESULTS:** Out of 180 patients, 110(61%) were males and 70(39%) were females. The pancreatic CT findings were grade A in 30 patients (17%); grade B in 34 (19%); grade C in 55 (30%); grade D in 29 (16%); and grade E in 32 (18%) patients. 25 pseudocysts were detected while abscesses were seen only in three patients. Adjacent organ involvement was noted in 6 cases.

**CONCLUSION:** Abdominal CT scan plays an important role in the quick and accurate diagnosis and staging of pancreatitis. CT can assess the degree of pancreatic involvement by the disease process and enables detection of complications.

### The Diagnostic Accuracy of Trans Abdominal Ultrasound in Detection of Extra Hepatic Causes of Obstructive Jaundice

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**PURPOSE OF THE STUDY:** Ultrasound is most commonly used in evaluation of obstructive jaundice. The purpose of my study was to determine the diagnostic accuracy of trans-abdominal ultrasound in detection of extra hepatic cause of obstructive jaundice keeping ERCP as a gold standard.

**MATERIALS AND METHODS:** This was a cross sectional based study completed in one year (Nov 2011-Nov 2012) at Karachi Institute of Radiotherapy and Nuclear Medicine (KIRAN), Hospital. The final number of patients comprising the study was 100. Out of these 100 patients, 55 patients were females and 45 patients were males. The age ranges from 17 to 75 years and the mean age was  $46 \pm 1$ . After ultrasound examination all patients undergone ERCP to confirm the cause of obstructive jaundice.

**RESULTS:** Ultrasound examination of cholidocolithiasis showed a diagnostic accuracy of 77%, with a sensitivity of 67.16% and a specificity of 96.96%. Ultrasound of the benign stenoses showed a diagnostic accuracy of 80%, with a sensitivity of 18.18% and a specificity of 97.43%. The diagnostic accuracy

of ultrasound of the malignant stenoses was 94%, with a sensitivity of 72.72% and a specificity of 98.87%.

**CONCLUSION:** In conclusion the ultrasound is considered the first choice opinion in the diagnostic imaging of obstructive biliary disease due to its accessibility, ease of performance, speed and low cost. In capable hands, modern high resolution ultrasound equipment with colored Doppler imaging capability is highly sensitive in the detection, characterization and determination of the cause of obstructive jaundice. Thus use of ultrasound may considerably restricted diagnostic role of invasive procedures like ERCP and helps in selecting candidates for therapeutic ERCP.

### Ultrasonographic Assessment of Kidney Sizes in Healthy Children

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**PURPOSE:** To determine the normal standards of normal kidney dimensions in healthy children analyzing the variables that have a good correlation with it.

**METHODS AND MATERIALS:** An observational hospital based study was done on 100 children of age 3 to 10 years. They were selected for this study without any previous history and sign and symptoms of renal disease and with discrimination of gender. Sex, age, weight, height were determined for each case. The children were separated into groups according to age. Study was un-

**RESULTS:** There was no significant difference in right and left organ dimensions. There is slight difference in organ dimensions with respect to gender. Body weight, height and age showed good correlation with kidney dimensions.

**CONCLUSION:** The normal limits of kidney dimensions are important parameters during an USG examination. This study revealed that organ dimensions have not much difference than the reference values used currently and they showed good correlation with both body weight and height.