PJR January - March 2016; 26(1): 59-62

Commentary

With the prevalence of Hepatitis B and C infections in Pakistan being what it is, chronic liver disease (CLD) is an increasing burden on the health systems in Pakistan. The degree of liver fibrosis is an important determinant of long-term morbidity and mortality from the disease. Traditionally this was done histo-pathologically with a core liver biopsy. The incidence of complication following liver biopsy is low but significant. This incidence rises with the presence of CLD with the consequent alteration in liver architecture, derangement of coagulation parameters and paucity of platelets and their dysfunction. There has therefore been and increasing emphasis of the use on non-invasive techniques for the detection and estimation of fibrosis. The first widely used device employed transient elastrography to do this. More recently ShearWave elastrography systems have been introduced. All of these are proprietary technologies and therefore hugely expensive. Davoudi et al remind us that the humble ordinary ultrasound machine found in most (if not all) Radiology departments can also do this with a fair degree of accuracy.

Postgraduate training in Radiology in Pakistan is gradually moving from an apprenticeship model to an educational model. While the radiological findings and exam interpretation is often taught both formally and informally, the basic science behind the image especially patient safety, other than radiation protection, is rarely touched upon. The residents are expected to imbibe this information through experience. Additionally the residents are increasingly turning to web based resources for augmenting their education in all aspects. Swensson et al look at both these aspects of Radiology teaching. They find that (unsurprisingly) when patient safety is taught the resident's knowledge on the subject improved. They also find that web based instructional modules are as good as formal face to face teaching for this purpose. (This will of course depend on the quality of the web module). So residents take heart and teachers take note. If you are saddled with a teacher who won't (or can't) teach there is a web module out there that will.

The simple solutions are the most elegant ones. Pneumothorax is not an uncommon complication of image guided needle biopsies of the lung. Most of the time it is an inconvenience for the patient as it prolongs hospital stay and increases the cost of the procedure. Occasionally it may be life threatening requiring emergency tube thoracostomy. Li et al describe their technique of sealing the track of the biopsy needle with simple saline. They demonstrate that this inexpensive intervention significantly reduces the incidence and the severity of the pneumothorax. Readers should note that it is only possible to employ this when using a coaxial system. The available coaxial systems are again expensive. A low cost alternative is to use a standard 16G spinal needle as your guiding needle. Most 18G core biopsy needles will easily traverse this allowing the coaxial technique to be employed.

Tuberculosis is endemic in our country. Although the CT features of the lung disease are well known, Koa et al describe their correlation with biologically infective disease. This is an important differentiation from an infection control/public health perspective. Their findings that centrilobular nodules, "tree in Bud" and consolidation best correlate with a positive AFB smear should reinforce the practice that patient manifesting these appearances should be isolated from other susceptible individuals.

Lastly a review article that I am highlighting for everybody reading post treatment cases of glioma. Quite often patients are labelled as progressive disease when they actually have pseudoprogression. The review by Abdulla et al not only looks at all the modalities available to investigate these patients and also their relative value in the decision making algorithm.

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Journal of Medical Ultrasound 2015; 23(3): 115-60

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Diagnostic Value of Conventional and Doppler Ultrasound Findings in Liver Fibrosis in Patients with Chronic Viral Hepatitis

BACKGROUND: The main outcome of virus-related hepatitis is progression to liver fibrosis. Therefore, early diagnosis is very important in the treatment and management of patients. Although liver biopsy is the gold standard test for assessment of liver fibrosis, it is expensive and has some disadvantages such as sampling errors, interobserver variability, and a significant mortality and morbidity rate. Moreover, this method is invasive and has side effects, especially if it needs repeated sampling. In order to come up with a reliable noninvasive modality in place of biopsy, we studied the value of grayscale ultrasonography (US) and Doppler ultrasonography (DS) for the diagnosis of liver fibrosis in patients with chronic viral hepatitis.

PATIENTS AND METHODS: Sixty patients, 43 with chronic hepatitis B and 17 with chronic hepatitis C, were enrolled in this study. Grayscale US and DS were performed for all patients in the week prior to liver biopsy. Ultrasonographic findings were recorded according to a US scoring system, and they were compared with histological findings after liver biopsy.

RESULTS: A total of 35 male (mean age: 36.1 ± 10.1 years) and 25 female (mean age: 36.1 ± 10.4 years) patients were studied. Forty-three patients had chronic hepatitis B and the others had chronic hepatitis C. The overall grayscale US score was abnormal (ranged from 1 to 7) in 63.3% of patients and normal (0) in the other patients. The mean portal vein velocity ranged from 8.1 cm/s to 31.7 cm/s (mean: 17.1 ± 5.1 cm/s). The right hepatic vein diameter ranged from 2.8 mm to 8 mm (mean: 5.1 ± 1.2 mm). The total DS score was abnormal (1 or 2) in 66.7% of patients. Quantitative US parameters that were related more significantly to the histopathological staging scores of liver fibrosis were mean portal vein velocity, right hepatic vein diameter, and gallbladder wall thickness. The total grayscale US score, DS score, and accumulation of US and DS scores (US-DS score) were significantly different between patients with liver fibrosis and those without fibrosis ($p = 0.03$, $p = 0.03$, and $p < 0.001$, respectively). We found that the total grayscale US score, DS score, and US-DS score are significantly correlated with liver fibrosis stages.

CONCLUSION: Based on these findings, one can conclude that US may be an accurate, noninvasive alternative modality for the diagnosis of liver fibrosis, with fewer side effects than biopsy. It may be especially useful for repetitive follow-up of patients.

Journal of American College of Radiology 2015; 12(10): 1093-6

Jordan Swensson, Lane McMahan, Ben Rase, Bilal Tahir

Curricula for Teaching MRI Safety, and MRI and CT Contrast Safety to Residents: How Effective Are Live Lectures and Online Modules?

PURPOSE: The advent of the diagnostic radiology core examination and the new ACGME "milestone" evaluation system for radiology residents places new emphasis on topics in MRI and CT safety, and MRI and CT contrast agents. We evaluated whether either lecture-based teaching or online modules would improve baseline resident knowledge in these areas, and assessed which intervention was more effective.

METHODS: Before didactic intervention, 2 cohorts were created from 57 radiology residents, with equal numbers and a matched level of training. The residents were tested on their baseline knowledge of MRI, MRI contrast safety, and CT contrast safety, using a multiple-choice examination. One group attended a live, 1-hour lecture on the preceding topics. The other engaged in 3 short online educational modules. After 6 weeks, the residents were again tested with the same questions to assess for improvement in their understanding.

RESULTS: Both the module and lecture cohorts demonstrated a statistically significant increase in questions answered correctly on CT contrast safety (13.1%, P < .001, and 19.1%, P < .001, respectively), and on MRI and MRI contrast safety (12.9%, P < .001, and 14.4%, P <.001). The preintervention and post-intervention scores, and degree of improvement post-intervention, were similar for the module versus lecture groups, without a statistically significant difference (P = .70). Resident confidence improved in both groups, for both modalities.

CONCLUSIONS: Focused didactic intervention improves resident knowledge of MRI and CT safety, and MRI and CT contrast agents. Live lectures and online modules can be equally effective, allowing residency programs flexibility.

Clinical Radiology 2015; 70(11): 1192-7

Y. Li, Y. Du, T.Y. Luo, H.F. Yang, J.H. Yu, X.X. Xu, H.J. Zheng and B. Li

Usefulness of normal saline for sealing the needle track after CT-guided lung biopsy

AIM: To determine whether the use of normal saline for sealing the needle track can reduce the incidence of pneumothorax and chest tube placement after computed tomography (CT)-guided lung biopsy.

MATERIALS AND METHODS: A prospective, randomised, controlled trial enrolling 322 patients was conducted. All patients were randomly assigned to one of two groups: those in whom the needle track was not sealed with normal saline (n =161, Group A) and those who did receive normal saline (n =161, Group B). CT-guided biopsy was performed with coaxial technique. Normal saline, which ranged from 1–3 ml, was injected while the trocar needle was being withdrawn. Patient characteristics, lesion, and procedure variables were analysed as potential risk variables for occurrence of pneumothorax and chest tube placement.

RESULTS: The incidence of pneumothorax was 26.1% in Group A and 6.2% in Group B (p <0.001). Nine patients in Group A and one patient in Group B required chest tube placement (p =0.010). Using multiple logistic regression analysis, smaller lesion size, greater needle–pleural angle, longer lesion–pleural distance, presence of emphysema, and no sealing the needle track with normal saline were significantly associated with an increased risk of pneumothorax, and that the latter three factors were also associated with an increased risk of pneumothorax requiring chest tube placement.

CONLUSION: Normal saline for sealing the needle track significantly reduces the incidence of pneumothorax and prevents subsequent chest tube placement after CT-guided lung biopsy.

European Journal of Radiology 2015; 84(11): 2339-44

Jeong Min Koa, Hyun Jin Parka, Chi Hong Kimb, Sun Wha Songa

The relation between CT findings and sputum microbiology studies in active pulmonary tuberculosis

PURPOSE: To evaluate whether CT findings suggesting active pulmonary tuberculosis correlate with sputum microbiological studies, and to determine whether CT could predict infectivity.

MATERIALS AND METHODS: Total 108 patients with active pulmonary tuberculosis were enrolled. We reviewed CT findings and sputum microbiological studies. Then, we analyzed the statistical difference in CT findings between the positive and negative groups of each sputum microbiological study (AFB smear, PCR, and culture). Also, we divided the patients into five groups according to sputum AFB smear grade and analyzed linear trends of CT findings between the five groups.

RESULTS: Both frequencies and extents of centrilobular micronodules (63% vs 38%, p = 0.011 for frequency; 1.6 ± 1.6 vs 0.6 ± 1.1, p = 0.001 for extent), tree-in-bud opacities (63% vs 33%, p = 0.002; 1.6 ± 1.6 vs 0.5 ± 0.9, p < 0.001, respectively), consolidation (98% vs 81%, p = 0.003; 2.7 ± 1.5 vs 1.3 ± 1.1, p < 0.001, respectively), and cavitation (86% vs 33%, p < 0.001; 1.5 ± 1.2 vs 0.4 ± 0.7, p < 0.001, respectively), were significantly increased in the sputum AFB-positive group than in the negative group. These four CT findings were increase in frequency and extent in the sputum PCR-positive group with or without statistical significance. They did not show significant differences between the sputum culture-positive and negative groups. As the AFB smear grade increased, frequencies and extents of centrilobular micronodules, tree-in-bud, consolidation, and cavitation also increased.

CONCLUSION: CT features representing active tuberculosis - centrilobular nodules, tree-in-bud, consolidation, and, cavitation - strongly correlate with the positivity and grading of AFB smear.

Clinical Radiology 2015; 70(11): 1299-312

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Tumour progression or pseudoprogression? A review of post-treatment radiological appearances of glioblastoma

Glioblastoma (GBM) is a common brain tumour in adults, which, despite multimodality treatment, has a poor median survival. Efficacy of therapy is assessed by clinical examination and magnetic resonance imaging (MRI) features. There is now a recognised subset of treated patients with imaging features that indicate "progressive disease" according to Macdonald's criteria, but subsequently, show stabilisation or resolution without a change in treatment. In these cases of "pseudoprogression", it is believed that non-tumoural causes lead to increased contrast enhancement and conventional MRI is inadequate in distinguishing this from true tumour progression. Incorrect diagnosis is important, as failure to identify pseudoprogression could lead to an inappropriate change of effective therapy. The purpose of this review is to outline the current research into radiological assessment with MRI and molecular imaging of post-treatment GBMs, specifically the differentiation between pseudoprogression and tumour progression.