COMMENTARY - NEURORADIOLOGY

An increasing number of lumbar puncture (LP) procedures are being carried out under image guidance. An essential component of a diagnostic LP is the measurement of opening pressure (OP). The value of the OP may determine future therapy especially in conditions such as Normal Pressure Hydrocephalus and Benign Intracranial Hypertension etc. One of the determinants of the OP is the position in which the measurements are made. Most bedside LPs are done with the patient lying on his side. Lateral Decubitus position is therefore the most widely studied as far as the OP measurements are concerned. Most imaging guided LPs are however done in the prone position. Abela et al writing in American Journal of Neuroradiology point out the considerable variations in the protocols used for image guided LPS and highlight the confounding therefore added to the OP measurements during these procedures. This has implications for clinical practice that all neurologists need to consider when interpreting the OPs.

Tumefactive MS lesions although uncommon, may be extremely confusing especially at first presentation. They mimic high grade gliomas on conventional imaging and often require histopathological confirmation however, the newer MR techniques hold out the promise of being able to make the differentiation noninvasively. This is particularly important in the local context as not only is there a cultural reluctance to get biopsies but the cost of the procedure may put it beyond the reach of a considerable portion of the patient population. Toha et al describe how they have applied Diffusion Tensor Imaging in this context with good results.

Posterior Reversible Encephalopathy Syndrome (PRES) is an entity that is being increasingly recognized and implicated in the pathogenesis of several encephalopathic processes such as hypertensive encephalopathy and HELP syndrome. Presence of haemorrhage is considered a poor prognostic indicator. Susceptibility Weighted Images (SWI) are extremely sensitive to the presence of haem. McKinneva et al show that SWI detect haemorrhages in a higher percentage of patients with PRES, however, reach no conclusion regarding its significance.

We now know that atherosclerosis is a multifactorial disease. The complications arise not only from a simple luminal occlusion due to an obstructive plaque but plaque hemorrhage and inflammation play a significant role in the symptomatology. This understanding has led to interest not only in detecting the plaque but also characterizing it in terms of its content and activity. Saito et al compare the various MR techniques available to try to characterize carotid artery plaques and correlate their findings with endartectomy specimens. Their conclusions will help in devising better protocols for carotid imaging.

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AJNR 2012 33: 823-825

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PRACTICE PATTERNS AND OPENING PRESSURE MEASUREMENTS USING FLUOROSCOPICALLY GUIDED LUMBAR PUNCTURE

BACKGROUND AND PURPOSE: Evidenced-based protocols for fluoroscopically guided LP do not exist. This study analyzed the fluoroscopically guided LP techniques currently used by practicing neuroradiologists. **MATERIALS AND METHODS:** An anonymous Web-based survey was e-mailed to members of ASNR. The results were compiled and tabulated on a spreadsheet. **RESULTS:** A total of 577 neuroradiologists completed the survey. Most neuroradiologists perform fluoroscopically guided LPs with the patient in the prone position by using a 22-ga needle at the L2-L3 or L3-L4 intervertebral space. The OP measurement technique is quite variable. Only a minority of patients are rotated to the left LD position for OP measurement. Most neuroradiologists observe patients for 1–2 hours after the procedure and require strict bed rest. CONCLUSIONS: Most neuroradiologists have similar protocols for thecal sac puncture. Normative adult OP data exist only for the LD position, and the accuracy of prone OP measurements is not known. We found that the OP measurement technique is not consistent and a standard protocol is warranted.

ABBREVIATIONS:
ASNR American Society of Neuroradiology; **GI** gastrointestinal; **IIH** idiopathic intracranial hypertension; **LD** lateral decubitus; **LP** lumbar puncture; **OP** opening pressure

AJNR 2012 33: 846-851

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DIFFERENTIATION OF TUMEFACTIVE DEMYELINATING LESIONS FROM HIGH-GRADE GLIOMAS WITH THE USE OF DIFFUSION TENSOR IMAGING

BACKGROUND AND PURPOSE: TDLs may be indistinguishable from high-grade gliomas on conventional MR imaging. The role of DTI in differentiating TDLs from high-grade gliomas is not clear, and quantitative comparison between the 2 has not been reported. Here we aimed to differentiate TDLs from high-grade gliomas by using DTI. **MATERIALS AND METHODS:** DTI was performed in 8 TDLs and 13 high-grade gliomas. The presence of 3 findings (ie, intralesional hyperintensities on the FA map, restricted diffusion

in the lesion periphery, and a perilesional hyperintense FA rim) was assessed by visual inspection. The FA and MD values were measured in the central nonenhancing portion, peripheral enhancing portion, and perilesional edema for each lesion and compared between the 2 groups respectively. RESULTS: TDLs had a significantly higher incidence of intralesional hyperintensities on FA maps (P = .049) but a lower incidence of a perilesional hyperintense FA rim (P< .001), compared with those of high-grade gliomas on visual inspection. TDLs had significantlyhigher FA (P = .004) and lower MD (P = .001) values in the peripheral enhancing portions of the lesions compared with those of high-grade gliomas. In perilesional edema, FA values were significantly higher in high-grade gliomas (P = .001). CONCLUSIONS: DTI is helpful in differentiating TDLs from high-grade gliomas by using visual inspection and quantitative analysis.

ABBREVIATIONS:

FA fractional anisotropy **MD** mean diffusivity **TDL** tumefactive demyelinating lesion

MPRAGE magnetization-prepared rapid acquisition of gradient echo

AJNR 2012 33: 896-903

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DETECTION OF MICROHEMORRHAGE IN POSTERIOR REVERSIBLE ENCEPHALOPATHY SYNDROME USING SUSCEPTIBILITY-WEIGHTED IMAGING

BACKGROUND AND PURPOSE: PRES-related vasogenic edema is potentially reversible while hemorrhage occurs in only 15.2%–17.3% of patients. However, the true incidence of hemorrhage could be higher when SWI is considered. Thus, we set out to determine the incidence of MH, SAH, and IPH in PRES by using SWI and to particularly evaluate whether such MHs are reversible. **MATERIALS AND METHODS:** Thirty-one patients with PRES and SWI were included, 17 having follow-up SWI. Two neuroradiologists reviewed SWI, FLAIR, DWI, and CE-T1WI. The presence and number of MHs (<5 mm) on SWI, SAH, and IPH (>5 mm) were recorded at presentation and follow-up. We evaluated associations between the presence of MH on SWI and DWI lesions, SAH, IPH, contrast enhancement, and MR imaging severity. RESULTS: Hemorrhage was present in 20/31 patients (64.5%), with MHs on SWI in 18/31 (58.1%) at presentation and in 11/17 (64.7%) at follow-up. SAH was present in 3/31 on SWI and 4/31 on FLAIR, while 2/31 had IPH. At follow-up, no patients had acquired new MHs; 2/5 MHs in 1 patient resolved. Four patients with available SWI before PRES developed MHs after PRES onset. No association was found between the presence of MHs on SWI and DWI, SAH, IPH, enhancement, and MR imaging severity (all P > .05). **CONCLUSIONS:** SWI showed a higher rate of MH than previously described, underscoring the potential of SWI in evaluating PRES. Such MHs typically persist and may develop after PRES onset. However, the clinical relevance of MHs in PRES is yet to be determined. We propose that MHs in PRES relate to endothelial cell dysfunction.

ABBREVIATIONS:

CE contrast-enhanced; **INR** international normalized ratio; **IPH** intraparenchymal hemorrhage; **MH** microhemorrhage; **PRES** posterior reversible encephalopathy syndrome; **T2* GRE** T2* gradient-recalled echo

Neuroradiology. 2012 Mar 17.

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CAROTID PLAQUE SIGNAL DIFFERENCES AMONG FOUR KINDS OF T1-WEIGHTED MAGNETIC RESONANCE IMAGING TECHNIQUES: A HISTOPATHOLOGICAL CORRELATION STUDY

Introduction: Several magnetic resonance (MR) imaging techniques are used to examine atherosclerotic plaque of carotid arteries; however, the best technique for visualizing intraplaque characteristics has yet to be determined. Here, we directly compared four kinds of T1-weighted (T1W) imaging techniques with pathological findings in patients with carotid stenosis. **Methods:** A total of 31 patients who were candidates for carotid endarterectomy were prospectively examined using a 1.5-T MRI scanner, which produced four kinds of T1W images, including non-gated spin echo (SE), cardiac-gated black-blood (BB) fast-SE (FSE), magnetization-prepared rapid acquisition with gradient echo (MPRAGE), and source image of three-dimensional time-of-flight MR angiography (SI-MRA). The signal intensity of the carotid plaque was manually measured, and the contrast ratio (CR) against the adjacent muscle was calculated. CRs from the four imaging techniques were compared to each other and correlated with histopathological specimens. **Results:** CRs of the carotid plaques mainly containing fibrous tissue, lipid/necrosis, and hemorrhage were significantly different with little overlaps (range: 0.92–1.15, 1.22–1.52, and 1.55–2.30, respectively) on non-gated SE. However, BB-FSE showed remarkable overlaps among the three groups (0.89–1.10, 1.07–1.23, and 1.01–1.42, respectively). MPRAGE could discriminate fibrous plaques from hemorrhagic plaques but not from lipid/necrosis-rich plaques: (0.77–1.07, 1.45–2.43, and 0.85–1.42, respectively). SI-MRA showed the same tendencies (1.01–1.39, 1.45–2.57, and 1.12–1.39, respectively). **Conclusion:** Among T1W MR imaging techniques, non-gated SE images can more accurately characterize intraplaque components in patients who underwent CEA when compared with cardiac-gated BB-FSE, MPRAGE, and SI-MRA images.