COMMENTARY - NEURORADIOLOGY

There is a strong flavor of stroke imaging in the current selection of abstracts. Management of ischemic stroke has come a long way from the time of rehabilitation and secondary prevention to active intervention. Thrombolytic agents have made a significant impact on the outcomes of acute ischaemic stroke. The wide spread use of thrombolytics is however not possible as most patients present late and have a large established infarction at the time of presentation. This is a contraindication to thrombolytic therapy as there is a significant risk hemorrhagic conversion. In the same context there is a consideration of missing Recent Silent Cerebral Infarction (RSCI), which are not detectable on non-contrast CT, in this population will increase the risk of haemorrhagic transformation (HT). Although Gaillarda et al have a small number of patients (n=86) in their study their findings are reassuring in as much as they did not find an increased risk of HT in patients with RSCI.

Staying with thrombolysis, Puiga et al present an interesting concept – measuring the density of the clot to determine its response to thrombolytic agents. Again the data is in its infancy but if the concept can be validated this will be a significant step forward in the appropriate selection of patients for thrombolysis.

To map the penumbra using current technology requires injection of contrast. This takes time and exposes the patient to risks of contrast reactions. Although arterial spin labeling (ASL) has been used to get perfusion data it also takes a considerable length of time. Suceptibility Weighted Injuries (SWI) offers a short acquisition time with a robust data set that may be substituted for the perfusion data set to map out the penumbra. This may allow rapid evaluation of the stroke patient and make the selection of the therapy quicker.

Mistakes may be made everywhere, even by experienced academic neuroradiologists. The reported rates vary. The paper from Johns Hokins Hospital in Baltimore, suggests a rate of 2.0%. The rates are difficult to determine accurately but the main thing here is to recognize that mistakes are going to be made and put in systems to detect them and rectify them. Clinical meeting and rapport between radiologists and clinicians is vital in this process.

The final abstract yet again confirms that subtracted computerized tomographic angiography is both sensitive and specific for the detection of intracranial aneurysms.

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Gaillard N, Schmidt C, Costalat V, Bousquet JP, Heroum C, Milhaud D, Bonafe A, Arquizan C.
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HEMORRHAGIC RISK OF RECENT SILENT CEREBRAL INFARCT ON PRETHROMBOLYSIS MR IMAGING IN ACUTE STROKE

Background and purpose: EIH is a rare complication after thrombolysis in patients with acute stroke, occurring in brain regions without visible ischemic change on pretreatment imaging. RSCIs can be detected by multimodal MR imaging and might be associated with an increased risk of HT postthrombolysis, related to BBBD. We aimed to assess the incidence of RSCI on pretreatment MR imaging and the subsequent risk of HT within RSCI areas on follow-up CT performed <36 hours after rtPA administration and on additional cerebral imaging before patient discharge. **Materials and methods:** Pretreatment MR imaging was retrospectively analyzed from consecutive patients with stroke who received intravenous or intra-arterial rtPA for 2 years. RSCI was defined on MR imaging as a parenchymal area markedly hyperintense on FLAIR, different from the hyperacute infarct, and mildly-to-markedly hyperintense on DWI or enhanced on postgadolinium T1WI imaging. the hyperacute infarct, and mildly-to-markedly hyperintense on DWI or enhanced on postgadolinium T1WI imaging. **Results:** Eighty-six patients with a median age of 66 years and a median NIHSS score on admission of 15 were studied; 66.3% received rtPA intravenously. The presence of RSCI was identified in 10 patients (11.6%) and was associated with large-vessel-disease etiology (40% versus 5.3%, P < .001) on univariate analysis. No HT was identified within the RSCI areas on any follow-up cerebral imaging. **Conclusions:** These preliminary results require validation but suggest that small RSCIs are rather frequent and might not pose a higher risk of postthrombolysis HT.

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Puig J, Pedraza S, Demchuk A, Daunis-I-Estadella J, Termes H, Blasco G, Soria G, Boada I, Remollo S, Ba os J, Serena J, Castellanos M.
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QUANTIFICATION OF THROMBUS HOUNSFIELD UNITS ON NONCONTRAST CT PREDICTS STROKE SUBTYPEAND EARLY RECANALIZATION AFTER INTRAVENOUS RECOMBINANT TISSUE PLASMINOGEN ACTIVATOR

Background and purpose: Little is known about the factors that determine recanalization after intravenous thrombolysis. We assessed the value of thrombus Hounsfield unit quantification as a predictive marker of stroke subtype and MCA recanalization after intravenous rtPA treatment. **Materials and methods:** NCCT scans and CTA were performed on patients with MCA acute stroke within 4.5 hours of symptom onset. Demographics, stroke severity, vessel hyperattenuation, occlusion site, thrombus length, and time to thrombolysis were recorded. Stroke origin was categorized as LAA, cardioembolic, or indeterminate according to TOAST criteria. Two blinded neuroradiologists calculated the hounsfield unit values for the thrombus and contralateral MCA segment. We used ROC curves to

determine the rHU cutoff point to discriminate patients with successful recanalization from those without. We assessed the accuracy (sensitivity, specificity, and positive and negative predictive values) of rHU in the prediction of recanalization. Results: Of 87 consecutive patients, 45 received intravenous rtPA and only 15 (33.3%) patients had acute recanalization. rHU values andstroke mechanism were the highest predictive factors of recanalization. The Matthews correlation coefficient was highest for rHU (0.901). The sensitivity, specificity, and positive and negative predictive values for lack of recanalization after intravenous rtPA for rHU ≤ 1.382 were 100%, 86.67%, 93.75%, and 100%, respectively. LAA thrombi had lower rHU than cardioembolic and indeterminate stroke thrombi (P = .004). CONCLUSIONS: The Hounsfield unit thrombus measurement ratio can predict recanalization with intravenous rTPA and may have clinical utility for endovascular treatment decision making.

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PREDICTING STROKE EVOLUTION: COMPARISON OF SUSCEPTIBILITY-WEIGHTED MR IMAGING WITH MR PERFUSION

Objectives: To investigate the ability of susceptibility-weighted imaging (SWI) to predict stroke evolution in comparison with perfusion-weighted imaging (PWI). **Methods:** In a retrospective analysis of 15 patients with non-lacunar ischaemic stroke studied no later than 24 h after symptom onset, we used the Alberta Stroke Program Early CT Score (ASPECTS) to compare lesions on initial diffusion-weighted images (DWI), SWI, PWI and follow-up studies obtained at least 5 days after symptom onset. The National Institutes of Health Stroke Scale scores at entry and stroke risk factors were documented. The clinical-DWI, SWI-DWI and PWI-DWI mismatches were calculated. **Results:** SWI-DWI and mean transit time (MTT)-DWI mismatches were significantly associated with higher incidence of infarct growth (P = 0.007 and 0.028) and had similar ability to predict stroke evolution (P = 1.0). ASPECTS values on initial DWI, SWI and PWI were significantly correlated with those on follow-up studies (P ≤ 0.026) but not associated with infarct growth. The SWI ASPECTS values were best correlated with MTT ones (ρ=0.8, P<0.001). **Conclusions:** SWI is an alternative to PWI to assess penumbra and predict stroke evolution. Further prospective studies are needed to evaluate the role of SWI in guiding thrombolytic therapy. Key Points • SWI can provide perfusion information comparable to MTT • SWI-DWI mismatch can indicate ischaemic penumbra • SWI-DWI mismatch can be a predictor for stroke evolution.

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QUALITY CONTROL IN NEURORADIOLOGY: DISCREPANCIES IN IMAGE INTERPRETATION AMONG ACADEMIC NEURORADIOLOGISTS

Prior studies have found a 3%-6% clinically significant error rate in radiology practice. We set out to assess discrepancy rates between subspecialty-trained university-based neuroradiologists. Over 17 months, university neuroradiologists randomly reviewed 1000 studies and reports of previously read examinations of patients in whom follow-up studies were read. The discrepancies between the original and "second opinion" reports were scored according to a 5-point scale: 1, no change; 2, clinically insignificant detection discrepancy; 3, clinically insignificant interpretation discrepancy; 4, clinically significant detection discrepancy; and 5, clinically significant interpretation discrepancy. Of the 1000 studies, 876 (87.6%) showed agreements with the original report. The neuroradiology division had a 2.0% (20/1000; 95% CI, 1.1%-2.9%) rate of clinically significant discrepancies involving 8 CTs and 12 MR images. Discrepancies were classified as vascular (n = 7), neoplastic (n = 9), congenital (n = 2), and artifacts (n = 2). Individual neuroradiologist's scores ranged from 0% to 7.7% ± 2.3% (n = 18). Both CT and MR imaging studies had a discrepancy rate of 2.0%. Our quality assessment study could serve as initial data before intervention as part of a PQI project.