

Table: Sensitivity and specificity estimates for the simple and complex hedges

Neurological condition (total number of articles)	Sensitivity (95% CI)			Specificity (95% CI)		
	Simple hedge	Complex hedge	p-value	Simple hedge	Complex hedge	p-value
Migraine (n=321)	86.6 (82.4, 89.9)	88.5 (84.5, 91.5)	0.0313	99.9 (99.8, 100.0)	99.9 (99.8, 99.9)	0.1250
Stroke (n=1848)	70.9 (68.8, 73.0)	89.4 (87.9, 90.7)	< 0.0001	98.9 (98.6, 99.1)	97.0 (96.7, 97.4)	< 0.0001
Dementia (n=1401)	48.4 (45.8, 51.0)	83.4 (81.4, 85.3)	< 0.0001	99.2 (99.0, 99.1)	97.3 (96.9, 97.6)	< 0.0001
Epileptic seizures (n=1028)	63.8 (60.8, 66.7)	83.9 (81.6, 86.1)	< 0.0001	99.3 (99.1, 99.5)	99.2 (99.0, 99.4)	< 0.0001
Parkinson's disease (n=1002)	60.8 (57.7, 63.8)	92.3 (90.5, 93.8)	< 0.0001	99.7 (99.6, 99.8)	98.6 (98.4, 98.9)	< 0.0001
Multiple sclerosis (n=1000)	93.7 (92.2, 95.0)	95.2 (93.7, 96.4)	0.0001	99.7 (99.5, 99.8)	98.1 (97.8, 98.3)	< 0.0001

P.004

Diagnostic evaluation of cerebral fat embolism: single center retrospective review

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Background: Cerebral Fat Embolism (CFE) is a rare though potentially devastating complication of orthopedic injury which can present with neurologic deterioration. Although specific findings have been described, definitive diagnosis of CFE remains challenging. **Methods:** Retrospective chart review from a major U.S. trauma hospital. **Results:** Of 33 patients with CFE, all had long bone fractures, 15 had rib fractures, and 16 occurred following orthopedic surgery for long bone fracture. Cutaneous petechiae were documented in 21%. Diagnostic brain MRI was performed in 26 patients. MRI revealed diffusion-restricting lesions in 24 (92%), with 17 (65%) demonstrating the classic "starfield" pattern, and 14 (54%) with hypointense signal on blood sensitive sequences. Transcranial Doppler (TCD) revealed active microemboli in 9 of 17 (53%) cases. Ophthalmologic consultation occurred in 13 with 9 patients found to have retinal hemorrhage or cotton wool spots suggestive of Purtscher or Purtscher-like retinopathy. "Starfield" pattern on MRI was seen in all 9 patients with retinal findings. TCD microemboli were not associated with retinal findings. **Conclusions:** The optimal diagnostic workup of CFE is complicated by confounding conditions, the unknown sensitivity of diagnostic modalities, and the unclear implications of findings on treatment and outcome. Nonetheless, brain MRI, TCD and ophthalmologic evaluation should be considered in all suspected CFE patients.

P.005

Painful epileptic seizures involving the insula

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Background: We have previously described painful epileptic seizures involving the primary and second somatosensory cortices. A recently encountered 24 year old man described left hemicorporal, painful seizures in association with a tumor involving the right insula. **Methods:** Case description with imaging and EEG. **Results:** The patient described frequent, sharp pains simultaneously involving the left face, upper and lower limbs and trunk that lasted from several seconds to a minute and were 10/10 in intensity. These markedly lessened in frequency but the severity of the pain persisted with a maintenance dose of 600 mg/day of carbamazepine. Neurological examination, including cortical sensation, was normal. MRI revealed a 3 cm rounded lesion deep to but immediately against the entire right insula but not extending cortically beyond the confines of the insula. EEGs have been unremarkable. The lesion has been stable for over 1 year. **Conclusions:** Insular seizures can produce brief, sharp, intense pain that involves the whole of the contralateral body simultaneously. This is in keeping with the insula as part of the pain matrix with connections with the thalamus. Stimulation of the posterior insula can produce hemicorporal pain without a march similar to that experienced by our patient.

GENERAL NEUROSURGERY

P.006

Engineering neurosurgery: role of inter-disciplinary collaboration in development of a remote controlled stereotactic system

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Background: Well-crafted engineering solutions have overcome technical challenges faced by surgeons. We present a collaborative effort to develop an innovative solution aimed at saving time and subsequently operating room costs in procedures utilizing a traditional stereotactic system. **Methods:** We met with our University's local engineering team to collaborate a solution over a much-appreciated intra-operative technology gap with respect to mechanical adjustment of a stereotactic frame's co-ordinates. AUTO-CAD software simulated our design, which was materialized with a 3D printer using PLA (polyactic acid). **Results:** We present a novel stereotactic system where co-ordinates can be digitally entered remotely to localize a point in 3D space. As such, this automated stereotactic frame decreases operative time when compared to manually adjusting a traditional stereotactic system such as the Leksell system. In addition our remote controlled stereotactic system helps minimize human-factor risks and allows one the option to modify stereotactic system co-ordinates from a non-sterile field. **Conclusions:** Marriage between Engineering and Neurosurgery can improve clinical outcomes for patients suffering from neurological diseases. We provide a grass roots