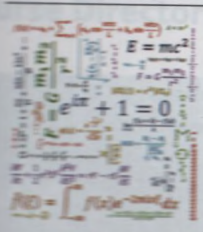
NEUROSURGERY
CONGRESS OF NEUROLOGICAL SURGEONS 1951
THE REGISTER OF THE NEUROSURGICAL MEME

January 2019 | Volume 84 | Number 1 | Pages 1–290

SCIENCE TIMES



On the Cover
This month's cover introduces the new Biostatistics & Methodology for the Neurosurgeon Review Series. This series will be led and is introduced by Dr Stephen J. Haines. The goal of the series is to provide neurosurgeons with sufficient knowledge of study design, analysis, and interpretation concepts that they can correctly interpret biostatistics. Look for this cover image to find articles in the series. Read more on p. 12.

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THORACOLUMBAR TRAUMA GUIDELINES

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EDITOR'S CHOICE

Prospective Tractography-Based Targeting for Improved Safety of Focused Ultrasound Thalamotomy
Vibhor Krishna, Francesco Sammartino, Punit Agrawal, Barbara K. Changizi, Eric Bourekas, Michael V. Knopp, Ali Rezai

BACKGROUND: Focused ultrasound thalamotomy (FUS-T) was recently approved for the treatment of refractory essential tremor (ET). Despite its noninvasive approach, FUS-T reinitiated concerns about the adverse effects and long-term efficacy after lesioning.
OBJECTIVE: To prospectively assess the outcomes of FUS-T in 10 ET patients using tractography-based targeting of the ventral intermediate nucleus (VIM).
METHODS: VIM was identified at the intercommissural plane based on its neighboring tracts: the pyramidal tract and medial lemniscus. FUS-T was performed at the center of tractography-defined VIM. Tremor outcomes were assessed independently by the Tremor Research Group. We analyzed targeting coordinates, clinical outcomes, and adverse events. The FUS-T lesion location was analyzed in relation to unbiased thalamic parcellation using probabilisitic tractography. Quantitative diffusion-weighted imaging changes were also studied in fiber tracts of interest.
RESULTS: The tractography coordinates were more anterior than the standard. Intraoperatively, therapeutic sonications at the tractography target improved tremor without motor or sensory side effects. Sustained improvement in tremor was observed at 3 mo. No motor weakness and sensory deficits after FUS-T were observed during 6-mo follow-up. Ataxia was observed in 3 patients. FUS-T lesions overlapped with the VIM parcellated with probablisitic tractography. Significant microstructural changes were observed in the white matter connecting VIM with cerebellum and motor cortex.
CONCLUSION: This is the first report of prospective VIM targeting with tractography for FUS-T. These results suggest that tractography-guided targeting is safe and has satisfactory short-term clinical outcomes.

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EDITOR'S CHOICE

BACKGROUND: Posterior circulation cerebral aneurysms are at higher risk of rupture and are more symptomatic than those in the anterior circulation. Existing treatments carry significant morbidity. Early reports of flow diversion for posterior circulation aneurysms have suggested high complication and low occlusion rates.
OBJECTIVE: To report safety and efficacy of flow diversion with the pipeline embolization device (Medtronic Inc) for aneurysms located throughout the posterior circulation.
METHODS: A prospective, institutional review board-approved database was analyzed for all patients with posterior circulation aneurysms treated by flow diversion at our institution.
RESULTS: Fifty-nine embolization procedures were performed on 55 patients. Average aneurysm size was 9.4 mm. Morphology was saccular, fusiform, or dissecting/pseudo-aneurysms. Sixty-two percent of aneurysms arose along the vertebral artery. There were 7 mid-basilar and 7 basilar apex aneurysms. Procedural success was 98%; 1 pipeline embolization device was placed in 85%; coiling was performed in 17% of cases. There were 5 major complications, all strokes. Patients with major stroke had modified Rankin Scale score at last follow-up of 1, 3, 4, 6, and 6 (2 mortalities). There were zero intracerebral or subarachnoid hemorrhages. No variable predicted complications on univariate or multivariate analysis. Follow-up digital subtraction angiography was performed for 43 patients. Complete occlusion was 68% at 6 mo and 78% at 12 mo. Average follow-up was 11.8 mo. Fusiform or dissecting morphology and large or giant aneurysm size were predictors of aneurysm persistence at 6 mo on multivariate logistic regression.
CONCLUSION: This is a large single-institution series of Pipeline for posterior circulation aneurysms and demonstrates acceptable safety and effectiveness in these challenging cases.

CORRESPONDENCE

DEPARTMENTS