the excretory lacrimal apparatus from the lacrimal sac to the nasal fossa. Methods: We will provide an anatomical review of the various structures easily identifiable on CT and MRI and suggestions of the best imaging protocols to be used. Results: The lacrimal apparatus includes the various structures related to the production and flow of tears. In this educational exhibit we will focus on the excretory apparatus from the lacrimal sac to the nasal fossa. We will present various pathologies affecting the excretory lacrimal apparatus with attention to the specific features of each condition to facilitate an appropriate differential diagnosis. We will emphasize specific anatomical/imaging findings to help the diagnosis and propose a standardized reporting system for the Neuroradiologist and useful to the ENT surgeon. Conclusions: This educational exhibit offers a unique opportunity to review the anatomy and pathology of sometimes overlooked or forgotten structures which are however always included in our CT and MRI studies.

Neurosurgery (CNSS)

Functional Neurosurgery and Pain

P.076

Long-term outcomes of radiofrequency ablation for temporal lobe epilepsy

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Background: Radiofrequency ablation (RFA) is a minimally-invasive procedure that has been used to treat temporal lobe epilepsy (TLE), however its long-term efficacy is unknown. We aim to characterize the long-term outcomes of patients from the original series by Parrent and Blume (1999). Methods: Consecutive patients who underwent stereotactic RFA for TLE were retrospectively reviewed. Demographics, procedural details, and seizure outcomes until last follow-up were abstracted. Seizure-freedom after initial RFA treatment was estimated with Kaplan-Meier analysis. Results: 27 patients underwent RFA from 1994 to 2002. There were 14 female (52%) patients. 24 (89%) had mesial temporal sclerosis. Mean age at time of RFA was 33.1 years (range 12-45 years). 17 (63%) patients underwent left-sided RFA. 15 (56%) patients had further interventions: 4 (15%) underwent only repeat RFA, 1 (4%) had repeat RFA and anterior temporal lobectomy (ATL), and 10 (37%) underwent subsequent ATL only. Mean follow-up was 9.0 years (range 0.5-22.7 years). At last follow-up, 16 (59%) patients were seizure-free: 5 (19%) received one RFA treatment and 11 (41%) underwent additional procedures. Conclusions: Based on the original series describing the technique, stereotactic RFA for TLE is a safe, minimally-invasive procedure. The role of stereotactic RFA in the treatment of TLE remains to be determined.

P.077

Reducing artifact during in bi-directional brain interfacing

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Background: Bi-directional brain interfacing (closed loop DBS) is a modern focus of neuroengineering research. Most current clinical systems are open loop, allowing one way communication from the IPG battery to the brain. Bi-directional systems allow both stimulation and recording of neural activity (local field potential, LFP). The system algorithm can measure known pathologic LFPs to guide change in stimulation. However, recording LFPs from the brain encounters electrical artifact from the heart. Reducing artifact is imperative to accurate measurement of neural activity. Artifact will cause the bi-directional system to miscalculate stimulation parameters. This project evaluated reduction of artifact by moving the IPG further away from the heart in a device implanted into the skull. Methods: LFP data from ongoing clinical trials was collected and analysed for artifact using open source code. Anatomic targets include STN, PPN, CMT, and PAG. Results: Cardiac artifact is reduced in skull mounted DBS as shown by power spectral density of LFPs in each region. Conclusions: This project shows the importance of surgical placement of DBS sensing devices to reduce cardiac artifact in bi-directional brain interfacing. This has important engineering and surgical design implications for safety and performance as the field of closed loop DBS transitions from research to clinical settings.

P.078

fMRI-based deep brain stimulation programming: a blinded, crossover clinical trial

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Background: Success of deep brain stimulation (DBS) in Parkinson's disease (PD) relies on time-consuming trial-and-error testing of stimulation settings. Here, we prospectively compared an fMRI-based stimulation optimization algorithm with >1 year of standard-of-care (SoC) programming in a double-blind, crossover, non-inferiority trial. Methods: Twenty-seven PD-DBS patients were prospectively enrolled for fMRI using a 30-sec DBS-ON/OFF cycling paradigm. Optimal settings were identified using our published classification algorithm. Subjects then underwent >1 year of SoC programming. Clinical improvement was assessed, after an overnight medication washout period, under SoC and fMRI-determined stimulation conditions. A predefined non-inferiority margin was -5 points on the Unified Parkinson's Disease Rating Scale (UPDRSIII). Results: UPDRSIII improved from 45.3 (SD=14.6) at baseline to 24.9 (SD=10.9) and 24.1 (SD=10.9) during SoC and fMRI-determined stimulation, respectively. The mean difference in scores was 0.8 (SD=8.5; 95% CI -4.5 to 6.2). The non-inferiority

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margin was not contained within the 95% confidence interval, establishing non-inferiority (p=0.013). Conclusions: This is the first prospective evaluation of an algorithm able to suggest stimulation parameters solely from the fMRI response to stimulation. It suggests equivalent outcomes may be achieved in 3 hours of fMRI scanning immediately after surgery compared to SoC requiring 6 or more in-person clinic visits throughout >1 year.

P.079

Relationships between anatomical features and outcome after stereotactic laser amygdalohippocampotomy

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Background: Stereotactic laser amygdalohippocampotomy (SLAH) has recently been shown to be comparable to traditional temporal lobectomy procedures. The ideal extent and volume of laser ablations remains an area of investigation Methods: 65 patients treated with SLAH for MTS were considered in this retrospective study. Manual segmentations of ablations were created using post-procedure T1-MRI scans. Ablations were assessed in relation to whether they crossed the coronal plane of the superior lateral mesencephalic sulcus (LMS), the extent to which ablation crossed this landmark, and extent of ablation of the uncus. Analysis of was done with binary categorization of 12-month Engel classification score. Results: Distance of ablation posterior to the coronal plane of the LMS was not associated with better surgical outcome (Engel class 1: 6.32 ± 4.16 mm; Engel class 2-4: 7.93 ± 3.75mm; (p = 0.099)). Ratio of ablations extending posterior to the LMS was 0.82 (SD = .39) in Engel 1 patients, and 0.90 (SD = 0.3) in Engel 2-4 patients; (p = 0.370). Volume of ablation showed little correlation with outcome (Engel class 1: 6064 ± 2128 mm^3; Engel class 2-4: 5828 ± 3031 mm^3; (p=0.239)). Ablation of the uncus showed a strong association with better surgical outcome (Engel class 1: 0.71 (SD = 0.31); Engel 2-4: 0.37 (SD = 0.36); p <0.001). Conclusions: Contrary to current practice, extension of ablation posterior to the LMS did not demonstrate improved outcome.

NEURO-ONCOLOGY

P.081

Chordoma management with artificial intelligence: a scoping review of current applications and future prospects

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Background: Chordomas are rare, malignant bone tumors that present significant challenges in management and treatment due to their complex anatomical locations and propensity for recurrence. Advancements in artificial intelligence (AI) and machine learning (ML) show promise in improving chordoma management. Methods: A comprehensive literature search was conducted following PRISMA guidelines across multiple databases, including MEDLINE, Cochrane, Embase, Scopus, and Web of Science. The search targeted articles related to AI and ML applications in clinical tasks associated with chordoma management. The selection process involved systematic screening, data extraction, and assessment of inter-rater variability. Results: The search yielded 1,006 records, with 18 included for analysis. Convolutional neural networks (CNNs) excelled in tumor volume estimation, with the state-of-the-art model achieving a Dice similarity score of 74.2%, sensitivity of 79.4%, and positive predictive value of 74.3%. Clustering algorithms were effective in prognostic evaluations. Bayesian models and logistic regression demonstrated robustness in diagnostics. Support vector machines (SVMs) were noted for their diagnostic precision. Conclusions: AI and ML algorithms, particularly CNNs, clustering algorithms, Bayesian models, logistic regression, and SVMs, show promise in improving chordoma management through enhanced imaging, diagnostics, and prognostics. Future research should focus on larger, externally validated datasets and explore underutilized techniques like multi-modal data integration.

P.082

Preoperative corticosteroids reduce diagnostic accuracy for primary central nervous system lymphoma biopsies: a meta-analysis

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Background: Primary central nervous system lymphoma (PCNSL) is highly sensitive to corticosteroid induced cell arrest, apoptosis and shrinkage. However, the precise impact of preoperative corticosteroid on accuracy of PCNSL diagnosis using tissue obtained from open or stereotactic biopsies remains debated. Methods: We conducted a systematic review and meta-analysis to determine the effect of preoperative corticosteroids on non-diagnostic biopsy rates for PCNSL in immunocompetent adults. Subgroup analyses explored whether non-diagnostic rates varied based on biopsy type. Results: Nineteen studies, comprising 1226 patients (55% male; mean age: 60.3 years), of which 679 (55.4%) received corticosteroids prior to biopsy were included. Overall, patients pretreated with corticosteroids were two times more likely to have a non-diagnostic biopsy compared to patients that were corticosteroid-naïve prior to biopsy (RR = 2.1 [95% CI: 1.1-4.1]). In the subgroup analysis limited to stereotactic biopsies, patient pretreated with corticosteroids were three times more likely to have a non-diagnostic biopsy (RR = 3.0 [95% CI: 1.2-7.5]). Whereas, in the open biopsy subgroup, there was no significant difference in non-diagnostic rates. Conclusions: Corticosteroids should be withheld, if clinically safe, prior to stereotactic biopsies in cases of suspected PCNSL. If corticosteroids are administered preoperatively, an open biopsy should be considered instead of stereotactic biopsy.

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