

SPINE AND PERIPHERAL NERVE SURGERY

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Uncovering differences in oligodendrogenesis between human and rodent spinal cord stem cells

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Background: Spinal cord regeneration in pre-clinical rodent studies is feasible by promoting oligodendrocyte regrowth, which is necessary for axon myelination. It is uncertain whether human neural stem/progenitor cells (NSPCs) are capable of differentiation into oligodendrocytes, similar to rat. In this study, we compare the functional and transcriptional features of primary spinal cord NSPCs from adult humans and rats. Methods: Oligodendrogenesis between human & rat NSPCs from adult donors and rats was cultured using the Neurosphere assay. NSPCs were exposed to 1% FBS to trigger differentiation & PDGF-AA to promote oligodendrocyte formation. Immunocytochemistry & RNA sequencing compared transcriptomes and analyzing differentially expressed genes. Results: Human NSPCs showed a reduced potential for oligodendrocyte generation compared to rat NSPCs (0.013±0.01% and 0.029±0.01% O4+ after one and two weeks in humans; 4.9±0.4% and 6.3±0.6% O4+ after one and two weeks in rats). PDGF-AA treatment at 40 ng/μL for one week was able to effectively promote oligodendrocyte differentiation in rat NSPCs, but had a minimal effect on human NSPCs (8.5±1.4 fold increase in O4+). OLIG1/2, SOX10, and CNP were enriched in rat NSPCs. Conclusions: We compared oligodendrogenesis potential between human and rat NSPCs and found significantly lower capacity in human NSPCs, possibly hindering successful myelinating techniques.

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Anterior spinal cord herniation following an anterior cervical discectomy and fusion: case report

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Background: Anterior cervical discectomy and fusion (ACDF) and corpectomy is one of the most common spinal operations performed worldwide to treat herniated discs causing anterior spinal cord compression, cervical spondylosis, fractures, and neoplasms, with the routine complications. There have been just a few known cases of anterior spinal cord herniation following multilevel anterior ACDF and corpectomy fusion cases. Methods: A 53-year-old male initially presented with a 3 year's duration of increasing myelopathy with history of Anterior cervical surgery C3 -5. About 10 years prior he was not able to walk had difficulty to use his hand. (he have nice images on MRI scan of typical spinal herniation)Results: Patient was initially treated medically with utilizing analgesia and physiotherapy and gradually deteriorated over two year. Patient revision

surgery and release of spinal cord with intra-operative durotomy and release of the spinal cord. He had only mild improvement in hand function, No change in legs function post operatively. Conclusions: The occurrence of spinal cord herniation through a prior ACDF or Corpectomy defect must be considered when patients present with recurrent myelopathy following anterior cervical surgery. Early investigation and early release surgery can improve the outcome for these group of patients

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Exploring the bacterial hypothesis of low back pain: a prospective cohort study

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Background: Occult bacterial infection is a proposed etiology of low back pain (LBP). However, a causative link between LBP and bacteria remains unconfirmed. Herein, we determined the incidence of occult discitis in patients receiving surgery for LDH. Methods: Study Design: prospective cohort study. Inclusion criteria: consecutive adult patients undergoing discectomy for symptomatic LDH. Exclusion criteria: prior epidural steroid use, prior spinal surgery, and antibiotic use within 2 weeks of surgery. Tissue samples: Four nuclear tissue and ligamentum flavum (control) samples were obtained per patient using stringent aseptic protocol. Samples underwent 16S-PCR and culturing. Results: Eighty-one patients were enrolled (mean age 43.3±13.3 years). All (100%) of tissue samples were negative by 16S PCR and no virulent species were detected. Nuclear and ligament cultures were both negative in 51 (62.9%) cases. Cultures were positive for nuclear tissue only, ligament only, or both in 14.8%, 12.3%, and 9.9% of cases, respectively. Fifteen of 20 (75%) disc positive samples grew a single colony of an indolent species. Conclusions: The findings of this prospective cohort study of consecutive patients receiving surgery for LDH do not support the theory of occult discitis. All samples were 16S-PCR negative, and most cultures were negative or grew a single colony suggestive of contamination.

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Perceptions of frailty in spinal metastatic disease: international survey of the AO spine community

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Background: Frailty is increasingly recognized for an association with adverse events, mortality, and hospital discharge disposition among surgical patients. The purpose of this study

was to describe how spinal surgeons conceptualize, define, and assess frailty in the context of spinal metastatic disease (SMD). **Methods:** We conducted an international, cross-sectional, 33-question survey of the AO Spine community. The survey was developed using a modified Delphi technique and was designed to elucidate preoperative surrogate markers of frailty in the context of SMD. Responses were ranked using weighted averages. Consensus was defined as $\geq 70\%$ agreement among respondents. **Results:** Results were analyzed for 312 respondents (86% completion rate). Study participants represented 71 countries. Most respondents informally assess frailty in patients with SMD by forming a general perception based on clinical condition and patient history. Consensus was attained regarding the association between 14 clinical variables and frailty. Severe comorbidities, systemic disease burden, and poor performance status were most associated with frailty; severe comorbidities included high-risk cardio-pulmonary disease, renal failure, liver failure, and malnutrition. **Conclusions:** Surgeons recognized frailty is important but commonly evaluate it based on general clinical impression rather than using existing frailty tools. We identified preoperative surrogate markers of frailty perceived as most relevant in this population.

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Enhanced Recovery after Surgery (ERAS) in Anterior Cervical Discectomy and Fusion (ACDF). A single center retrospective analysis of prospective collected data

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Background: Enhanced recovery after surgery (ERAS) concept has been implemented in many surgical specialties, with improved surgical and clinical outcomes, all while decreasing

hospital cost. We have established a single center ERAS protocol for Anterior Cervical Discectomy and Fusion (ACDF) same-day surgeries. **Methods:** A retrospective analysis of prospective collected data of all patients undergoing one to two level ACDF surgeries at the CHUM based on a patient selection criteria's list. Demographics, BMI, patient report outcome measures (NDI, VAS, mJOA), operative time, wake up time, time in recovery room and time till discharge were analysed. Complications were also noted. **Results:** When compared to our pre-ERAS group, our study showed that an ERAS protocol in select patients is not associated with any peri-operative complications, no 30-day / 90-day readmissions, nor any conversion to admission. All patients were safely discharged as planned. Operative length was similar. There was no dysphagia noted. There was improvement in all PROMs. **Conclusions:** ERAS protocol for ACDF same day surgeries in carefully selected patients is safe and provide same clinical outcomes. Meticulous surgical techniques, close post operative observation with a follow-up telephone call the next day are all key in assuring a safe and successful surgery and patient discharge.