BritSpine 2025
Abstract Book

Presented Oral Abstracts

6

TLICS: Reliable In the hands of Pre-registrar clinicians?

Suhib Taher[1], Megan Baker[2], Margo Dirckx[3], Paul Brewer[1], James Tomlinson[1]

[1]Northern General Hospital, Sheffield, United Kingdom. [2]Rotherham District General Hospital, Rotherham, United Kingdom. [3]Barnsley District General Hospital, Barnsley, United Kingdom

Abstract

Introduction

The Pre-registrar tier in the Trauma & Orthopaedic department is often the first point of contact for patients with thoracolumbar fractures. Fracture classification systems aim to standardise decision-making, particularly benefiting clinicians in a non-specialist centre. There are very few published studies assessing the inter-rater reliability and usability of the Thoracolumbar Injury Classification and Severity Score (TLICS) by non-experts

Methods

Twenty clinicians working in the pre-registrar tier in South Yorkshire trauma and orthopaedic departments were recruited. Participants were asked to retrospectively review anonymised imaging of 25 trauma patients and score the fractures using the TLICS system.

TLICS scores were categorized into three groups: <4 (non-operative), 4 (indeterminate), and >4 (operative). Inter-observer reliability was calculated using the Fleiss-Kappa statistic and assessed against the Landis and Koch criteria

Results

The overall TLICS scoring demonstrated an inter-rater reliability coefficient of 0.49 - moderate reliability according to the Landis and Koch criteria (P<0.001; 95% CI 0.47 to 0.51).

Morphology, 0.36 (P<0.001; 95% CI 0.34 to 0.38) and posterior ligamentous complex (PLC) disruption 0.39 (P<0.001; 95% CI 0.37 to 0.41) had the lowest reliability with neurology, 0.92 (P<0.001; 95% CI 0.90 to 0.94) the highest.

Discussion

The TLICS classification demonstrates moderate reliability when used by pre-registrar clinicians. Neurology status subcategory showed almost perfect agreement, with morphology having the lowest inter-rater reliability.

These findings suggest the use of this scoring system has some benefit; however moderate reliability is not appropriate when deciding management plans for such patients. We therefore advocate for early involvement of senior non-specialist clinicians.

7

Evaluating the Prognostic Role of Computed Tomography Hounsfield Units in Anticipating Spinal Outcomes Post-Instrumentation: A Systematic Review and Meta-Analysis

Chinedu Egu, Elie Najjar, Spyridon Komaitis, Samuel Akintunde, Edidiong Essiet, Vusumuzi Sibanda, Khalid Salem, Opinder Sahota, Nasir Quraishi

Centre for Spinal Studies and Surgery, Queen's Medical Centre, Nottingham, United Kingdom

Abstract

Purpose:
Hounsfield unit (HU) measurements from preoperative CT scans are emerging as a surrogate for bone mineral density (BMD). This review aims to assess the role of HU in predicting spinal outcomes after instrumentation.

Methods:
A systematic review of studies (2017-2024) examined the link between HU values and spinal outcomes in adult patients undergoing spinal instrumentation. Data were extracted and analyzed using a random effects model, and study quality was evaluated with the Newcastle-Ottawa Scale.

Results: Thirty-five studies with 3,927 patients reported complication rates, including cage subsidence (35.5%), pedicle screw loosening (27.9%), proximal junctional failure (28.6%), and pseudoarthrosis (66.7%). Lower HU values were consistently linked to higher complication rates. The delineated HU cutoff thresholds for predicting specific complications were as follows: 198 HU for lumbar interbody fusion cage subsidence; 116 HU and 126 HU for pedicle screw loosening in lumbar and thoracic spine fusions, respectively; 151 HU for proximal junctional failure in thoracolumbar spinal fusion; and 240-260 HU for pseudoarthrosis following anterior odontoid screw fixation.

Conclusion: This meta-analysis substantiates a significant correlation between reduced HU values and spinal complications following instrumentation. Specifically, thresholds of below 130 HU for thoracic and lumbar pedicle screw loosening, below 200 HU for lumbar cage subsidence, approximately 150 HU for proximal junctional failure in the thoracolumbar region, and below 260 HU for pseudoarthrosis after anterior odontoid screw fixation were identified. The mean vertebral HU of the surgical segments serves as a reliable metric for this assessment.

13

The UK&I National Neuromodulation Registry: Spinal Cord Stimulation for Chronic Neuropathic Pain

Sean Martin ORCID iD[1], Ganesan Baranidharan[2], Simon Thomson[3], Ashish Gulve[4], Vivek Mehta[5], Sarah Love-Jones[6], Roger Strachan[4], Stana Bojanic[1], Sam Eldabe[4], James FitzGerald[1]

[1]John Radcliffe Hospital, Oxford, United Kingdom. [2]Leeds Neuromodulation Centre, Leeds, United Kingdom. [3]Mid & South Essex University Hospitals, Essex, United Kingdom. [4]James Cook University Hospital, Middlesbrough, United Kingdom. [5]St Bartholomew's Hospital, London, United Kingdom. [6]North Bristol NHS Trust, Bristol, United Kingdom

Abstract

Background and aims

The National Neuromodulation Registry (NNR) is a UK-wide repository of demographic, diagnostic, device identification, and quality-of-life (QoL) outcome data for patients undergoing SCS.

Large “real-world” datasets showing outcome after SCS for refractory severe neuropathic pain, complementing data from clinical trials, are an important endeavour.

Here we present a national multi-centre prospective series including more than 2300 patients - of which two-thirds have chronic pain following spinal surgery.

Methods

QoL (EuroQoL 5-dimension 5-level) and demographic data were extracted from the NNR, for patients treated between February 2018 and July 2023 in 27 UK centres. Those without recorded baseline EQ5D data were excluded. Follow-up timepoints were 6 and 12 months.

Results

Of the 2308 included patients, 1263 (54.7%) were female, 1043 (45.2%) were male, and 2 undisclosed. The mean age at surgery was 52.4 years (sd=13.4 years).

Median EQ5D utility index was significantly higher 6 months after surgery than before (0.548 [n=1313] vs. 0.263 [n=2308], $p \ll 0.0001$), and this change was sustained at 12 months after surgery (0.546 [n=1243] vs. 0.548 at 6 months [n=1313], p=0.22).

Utility index increased by a mean of 0.205 (sd = 0.297 [n=1582]). 76.2% of patients had an improvement in EQ5D utility.

Conclusions

SCS significantly improves QoL for patients with chronic neuropathic pain in a large prospective multicentre patient cohort. The NNR continues to show its value by demonstrating the effectiveness of SCS on a large scal

15

Patient Prioritisation for Lumbar Decompression by Pre-operative Patient Reported Outcome Measures.

Mostafa Beshr ORCID iD, Duncan Whittaker, Santosh Baliga, Andrew Frost

NHS Grampian, ABERDEEN, United Kingdom

Abstract

Significant NHS waiting lists for Lumbar Spine Decompression necessitate further research to better prioritise patients. We aimed to investigate the association of pre-operative patient reported outcome measures (PROM) on the post-operative improvement following surgery. A retrospective cohort analysis on PROM data collected at Woodend General Hospital between January 2018 and June 2022. Excluding multilevel level decompression and revision surgery, all patients >16yrs undergoing lumbar decompression were included. Our primary outcomes were pre-operative, and 1yr post-operative, Oswestry Disability Index (ODI) and EQ-VAS questionnaires. Linear regression modelling on pre-operative ODI/EQVAS and the degree of improvement from pre-operative baseline at 1yr. This analysis was undertaken in R (version 4.4.1).

A negative correlation of pre-operative ODI/EQ-VAS with the degree improvement at 1yr was found; with significance values for ODI and EQ-VAS of $p = 0.0028$ and $p < 0.001$, respectively. These findings can be used to identify patients who are likely to benefit most from surgery, as well as better counsel patients considering lumbar decompression surgery. Pre-operative ODI >25 and pre-operative EQ-VAS <62 inferred a significant (95% confidence interval) likelihood of an improvement at 1yr. Furthermore, assuming a minimally clinically important difference of 12 points, a clinically detectable difference is predicted for > 34 ODI and/or >16 EQVAS points, pre-operatively.

This study supports lumbar decompression surgery for patients with the most debilitating pre-operative PROMs. This study also suggests cut off values for pre-operative PROMs which can aid patient consenting and timing of surgery. Further studies are however required to further characterise this relationship.

27

Use of Enhanced Recovery After Surgery Protocols in Adult Spinal Deformity with Meta-Analysis – Are They Effective?

Ahmed Hassan ORCID iD, Mohamed Hassanin, Elie Najjar, Nasir Quraishi

Centre for Spinal Studies and Surgery, Queen`s Medical Centre, Nottingham University Hospitals NHS Trust, Nottingham, United Kingdom

Abstract

Introduction

The study investigates the effectiveness of Enhanced Recovery After Surgery (ERAS) protocols in adult spinal deformity (ASD) surgery, aiming to reduce complications, blood loss, hospital stay, and improve post-operative ambulation. Although ASD surgery can enhance patient outcomes, it often involves high complication rates.

Materials and Methods

This systematic review examined PubMed, Web of Science, and Cochrane databases until June 2024, following PRISMA guidelines. Studies with less than three fused segments or secondary spinal deformities were excluded. Risk of Bias (ROB) was assessed with the Joanna Briggs Institute tool, and meta-analysis was conducted with Review Manager 5.5, using odds ratios for categorical data and mean differences for continuous data.

Results

Out of 65 initially identified studies, only five met inclusion criteria, covering 261 patients using ERAS protocols and 224 on conventional pathways. Results indicated statistically significant improvements in blood loss ($z=2.03$, $p=0.04$), hospital stay duration ($z=3.39$, $p<0.0007$), and post-operative ambulation ($z=3.94$, $p<0.0001$) for ERAS patients.

Conclusion

The study concludes that ERAS protocols show promise in managing ASD but emphasizes the need for large, randomized trials with consistent assessment tools to provide stronger evidence. The study limitations include the non-randomized, retrospective nature of available studies and the lack of a standardized ERAS protocol across research sites.

29

Human vs. Machine: Deciding on High-Stakes Surgery in Possible Cauda Equina Syndrome

Elie Najjar ORCID iD, Rodrigo Muscogliati, Ahmed Hassan, Nasir Quraishi, Khalid Salem

Queen's Medical Centre, Nottingham, United Kingdom

Abstract

Background: Cauda Equina Syndrome (CES) is a neurosurgical emergency requiring rapid intervention to prevent lasting neurological damage. Accurate identification of cases needing urgent surgery is crucial. This study evaluates the concordance between an AI language model (ChatGPT) and a Spinal Multidisciplinary Team (MDT) in recommending surgical intervention for suspected CES.

Objective: To measure the alignment between ChatGPT and a Spinal MDT in surgical recommendations for possible CES cases, using statistical analysis.

Methods: From 160 referrals with red flags for CES, 10 cases were used to calibrate ChatGPT to specific clinical and diagnostic criteria. The remaining 150 cases, each presented in standardized slides with clinical history, imaging, and examination findings, were assessed by both the MDT and ChatGPT for the need for urgent surgery. The patient cohort had an average age of 50.6 years (range 18–87) and a male-to-female ratio of 68:82. Discordant cases (n = 17) were reviewed by three spinal surgeons blinded to prior decisions.

Results: ChatGPT and the MDT were concordant in 133 of 150 cases (88.7% agreement; Cohen’s Kappa = 0.764, P < 0.001). In 17 discordant cases, ChatGPT tended toward recommending surgery more often than the MDT, though this was not statistically significant (McNemar’s test = 1.23, p = 0.46). Independent surgeon review reached consensus in 11 discordant cases, illustrating variability in CES triage.

Conclusion: The study demonstrates substantial agreement between ChatGPT and the MDT, suggesting that ChatGPT may be a valuable adjunct in CES decision-making, though further validation is needed.

32

Solitary Bone Plasmacytoma of the Spine: A Systematic Review

Weronika Nocun[1], Rodrigo Muscogliati[1], Aidalena Chakar[2], Elie Najjar[1]

[1]Queen's Medical Centre, Nottingham, United Kingdom. [2]Lebanese American University, Beirut, Lebanon

Abstract

Background: Solitary bone plasmacytoma (SBP) is a localized proliferation of plasma cells within a single bone, with the spine being a commonly affected site. Literature on solitary bone plasmacytoma of the spine (SBPS) is limited.

Purpose: To evaluate the literature on the clinical manifestations, locations, management, and progression of SBPS.

Methods: A systematic review of English-language literature was conducted using PubMed, Embase, and Cochrane databases up to July 2024, following Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) guidelines.

Results: Out of 503 initial articles, 17 met inclusion criteria, covering 1,982 patients with SBPS (mean age 55, range 26–85; 36% female). The majority (88.3%) presented with pain, while 78.6% had neurological symptoms, including paraplegia, paraparesis, or tetraparesis in 40.5% of cases. Spinal deformity was noted in 17.6%. Lesion locations included the cervical spine (26.9%), thoracic spine (46.1%), lumbar spine (20.7%), and sacrum (4.7%). Paraprotein levels were elevated in 35.4% of patients. Disease progression to multiple myeloma occurred in 12.2% of cases. Treatment approaches varied, including radiotherapy, surgery, or a combination of both.

Conclusion: SBPS is a rare spinal tumor often presenting with severe neurological compromise and primarily affects the thoracic spine. It carries a 12.2% risk of progression to multiple myeloma. Radiotherapy is the primary treatment, but surgical intervention may be necessary in cases of neurological or structural compromise.

39

Human vs. Machine: Concordance and Conflict in Spinal Oncology Management

Elie Najjar

Queen's Medical Centre, Nottingham, United Kingdom

Abstract

Background: Spinal metastases are a common complication in cancer patients, requiring multidisciplinary team (MDT) decision-making guided by frameworks like the Spine Instability Neoplastic Score (SINS). This study evaluates the potential of ChatGPT to complement MDT workflows by analyzing concordance rates and identifying areas for improvement.

Methods: A retrospective analysis of 100 spinal oncology cases was conducted. Each case was anonymized and presented to both ChatGPT and the MDT using identical summaries. Concordance was assessed with Cohen's Kappa, and discordant cases were analyzed for trends in decision divergence.

Results: ChatGPT's recommendations aligned with MDT decisions in 86% of cases, with substantial agreement (Cohen's Kappa = 0.66). Discordant cases (14%) predominantly involved younger patients and rare tumors, where ChatGPT prioritized localized factors such as high SINS scores. Conversely, MDT decisions emphasized systemic prognosis, favoring palliative care in these cases.

Conclusion: ChatGPT demonstrates significant potential as a decision-support tool in spinal oncology, particularly in cases with straightforward surgical indications. However, discordance in complex cases underscores the need for integrating systemic prognostic tools and dynamic data. These findings highlight ChatGPT's promise in enhancing clinical workflows and the importance of future refinements.

43

Association of exercise adherence with pain and function in people with chronic non-specific low back pain: a systematic review and meta-analysis.

Matthew Jones[1], Andrew Bastianon[1], Harrison Hansford[1], Mitchell Gibbs[1], Yannick Gilanyi[1], Nadine E Foster[2], Sarah Dean[3], Jill A Hayden[4], Lianne Wood[3]

[1]Neuroscience Research Australia, Sydney, Australia. [2]University of Queensland, Brisbane, Australia. [3]University of Exeter, Exeter, United Kingdom. [4]Dalhousie University, Halifax, Canada

Abstract

Background: Exercise is a first-line treatment for people with chronic low back pain (CLBP). We explored the association between exercise adherence with pain and function in adults with CLBP.

Methods: We conducted a secondary analysis of the Cochrane review 'Exercise therapy for CLBP' using a subset of trials that compared exercise to a non-exercise comparator and reported exercise adherence. Exercise adherence was categorised as high (90-100%), moderate (70-89%), or low (14-69%). Random effects meta-analysis with subgroup analysis for each adherence stratum for pain and function (0-100 scales) was performed in R. Certainty of evidence was appraised using GRADE.

Results: Of the 456 trials eligible, we screened 104 trials that included any measure of adherence (23%). 46 Included trials (with 56 exercise groups) reported information on exercise adherence and included a non-exercise comparator. High adherence was associated with clinically important reductions in pain (21 comparisons) [mean difference (MD) -14.32 (95% Confidence Interval (CI) -18.06 to -10.03), moderate certainty] and function (19 comparisons)[MD -8.08 (95%CI -10.68 to -5.49), moderate certainty]. Moderate adherence was not associated with reduced pain (14 comparisons) [MD -4.53 (95%CI -9.39 to 0.34), low certainty] or function (16 comparisons) [MD -2.75 (95%CI -6.00 to 0.51), low certainty]. Adherence subgroups were not significantly different.

Conclusion: Higher adherence is associated with larger improvements in pain and function in adults with CLBP. Other differences may exist in included exercise programs that could explain the observed result. Improved reporting of exercise adherence in trials is needed to expand the evidence base.

46

Concurrence of calcium pyrophosphate deposition disease in patients undergoing surgery for spinal degenerative disease: A Case series and systematic review

Oluwaseyi Adebola ORCID iD, Masna Inam, Ory Levy, George Johnson, Piyali Pal, Suresh Chandrasekaran, Maggie Lee, Nisaharan Srikandarajah

The Walton Centre, Liverpool, United Kingdom

Abstract

Objectives

To report our institutional series of patients who underwent spinal surgery for degenerative disease and whose intraoperative samples confirmed the presence of Calcium Pyrophosphate Deposition Disease (CPPD).

We performed a systematic review of the clinical, radiological features and outcomes of patients who underwent surgery for degenerative spine problems with a subsequent diagnosis of spine CPPD.

Design

Retrospective case series and systematic review of the literature

Methods

The systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.

Results

Two hundred and eleven articles from electronic databases met our search criteria. Thirty-seven clinical studies comprising 153 patients aged 23 to 83 years were included. Of these, 68 were male and 85 were female. A total of 33.7% involved the cervical region, 16.2% involved the thoracic region, and 50% involved the lumbar region. Common comorbidities included hypertension, dyslipidaemia, diabetes mellitus, cardiac and renal issues. The common radiological features included nonspecific degenerative changes, an epidural mass, and calcified masses, among others. The most common intraoperative finding was chalky white deposits. The vast majority of patients had good postoperative outcomes

Conclusions

Spinal CPPD is likely much more common than we currently report, primarily because it is underdiagnosed. This review investigated the epidemiology, presenting features, imaging, histopathological and intraoperative findings of this disease. Future work needs to investigate these issues further. In patients with degenerative spine disease with coexisting spinal CPPD planned for medical management, targeted medical therapy aimed at pseudogout might improve the overall outcome.

48

Surgical Results of Magnet-driven Growing Rods(MdGR) For Early-onset Scoliosis(EOS) At Ten Years: Journey From Growth To Graduation

Nanjundappa S Harshavardhana[1], Alexander Gibson[2], Hilali M H Noordeen[2]

[1]NHS - Dumfries & Galloway, Dumfries, United Kingdom. [2]RNOH NHS Turst, Stanmore, United Kingdom

Abstract

Introduction: MdGR is a novel implant that eliminates repetitive anaesthesia by office-based distractions. There is NO study reporting long-term results upto skeletal maturity.

Methods: Twenty-nine children(11M&18F) with EOS secondary to Idiopathic(8), Congenital(3), Neuromuscular(5), Tumour(2) and Syndromic(11) etiologies with a mean follow-up of 12.50years formed the study cohort. They were evaluated for improvement in Cobb angle, T_1-S_1 length and other radiographic parameters. Adverse events causing unplanned return to theatres, device malfunction, infections and spinal imbalance were recorded.

Results: The mean age at MdGR implantation was 9.77y(range:3.50-12.50y) and all patients had minimum follow-up of TEN years. There were nine single rod(SR) and twenty dual rod(DR) insertions with six rod breakages over the period to skeletal maturity. In-total Forty operations were performed during these 12.5y. There were seven PJK (one PJF) and three DJK with two deep infections. Spinal decompensation was seen in five pts (Sagittal[2] & Coronal[3]). Break in the housing mechanism of telescoping rod was seen in eight instances and three pts needed exchange MdGR having attained maximal lengthening. 8patients chose to retain MdGR on graduation without any untoward side-effects / complications.

Conclusion: MdGR is a safe and reliable implant that maintained spinal alignment / balance in EOS during growth. It is attractive in being a one-off surgery to last the life-span in select cohort of vulnerable kids' perhaps eliminating the need for DSF. Lessons learnt from this series were instrumental in identifying and proposing recommendations to address design flaws.

55

Fusion Rate of Biphasic Calcium Phosphate Bone Graft with Needle-Shaped Submicron Topography in Interbody Lumbar Fusion for Degenerative Disc Disease: A Single-Center Retrospective Review

Samuel Wakelin[1], Kelsey Cobourn[2], Thomas Stirrat[1], Katherine Sage[3], James T. Ryaby[3], Faheem A. Sandhu[2], Luuk Van Dijk[4]

[1]Georgetown University Medical School, Washington DC, USA. [2]MedStar Georgetown University Medical Center, Washington DC, USA. [3]Kuros Biosciences, Atlanta, USA. [4]Kuros Biosciences, Bilthoven, Netherlands

Abstract

Objective: The purpose of this study is to determine the 12-month fusion rate and clinical outcomes following lumbar interbody fusion utilizing synthetic biphasic calcium phosphate graft with submicron needle-shaped surface topography (BCP<μm).

Methods: A single-center retrospective review was conducted to identify patients who underwent lumbar interbody arthrodesis with BCP<μm with or without autograft. Post-operative x-rays were obtained at 3, 6, and 12 months, and computed tomography (CT) scans were obtained at 12 months post-operative. Fusion was determined by an independent neuroradiologist using the CT alpha-numeric classification. Secondary outcomes included changes in Visual Analogue Scale (VAS), length of stay, and fusion of all treated levels.

Results: Sixty patients with 105 treated levels were included (57% female, 43% male). The average age was 63, and average BMI was 30.1. Patients had an average of three comorbidities and two levels fused. 57% of the cases were anterior lumbar interbody fusions (ALIFs), 26% were transforaminal lumbar interbody fusion (TLIF), and 17% were lateral lumbar interbody fusion (LLIF). Bony ingrowth or bridging trabecular bony fusion without evidence of supplemental fixation failure was demonstrated in 95.2% of levels treated (100/105). Fusion rates were not statistically different between procedure types (p=0.95). 5 patients reported complications, and VAS improved by a mean of 24.18 (p<0.0001) 6 months post-operative.

Conclusions: BCP<μm may offer an alternative to ICBG in patients undergoing spinal interbody fusion. This study demonstrates a fusion rate of 95.2% with a low overall complication rate in a diverse population including patients with multiple comorbidities.

56

Cauda Equina Screening in Physiotherapy: A qualitative study into the cultural experience of Pakistani interpreters

Damien KIMBER ORCID iD[1], Gemma Mansell ORCID iD[2], Conor Wood ORCID iD[1], Gurkiran Birdi[2], Juliet Harris[1]

[1]Birmingham Community Healthcare NHS Trust, Birmingham, United Kingdom.
[2]Aston University, Birmingham, United Kingdom

Abstract

Introduction

Cauda Equina Syndrome (CES) is a rare but serious condition associated with low back pain. Delay in diagnosing or treating CES can lead to long-term problems and therefore, effective screening is essential. Previously published work with Physiotherapists involved in the screening for CES, highlighted perceived barriers to effective screening caused by culture and language. The aim of this study was to explore the experiences, cultural beliefs and feelings of Pakistani interpreters, specifically relating to culture and language, during the process of screening for CES.

Methodology

Ethical approval was granted by Aston University (REC ID HLS21145). Recruitment of Pakistani interpreters was via purposive sampling from the interpreting service used by the researcher's NHS Trust. Semi-structured interviews were conducted, recorded and transcribed via Microsoft Teams. Transcripts were verified and subjected to Reflexive Thematic Analysis.

Results

12 participants were interviewed. Data saturation was reached. Results reveal 5 main themes; acceptability & language barriers, society & culture, educational background, improvements for practice and interpreter role.

Discussion

In this first known exploration of Pakistani culture and language relating specifically to CES screening, 5 important themes have emerged. This new understanding will have direct impact on clinicians and Pakistani patients, providing more culturally appropriate CES screening. Some key findings, namely the use of less explicit, more modest genital sensation and sexual function terminology, differs markedly from the current best-practice guidance. These findings would benefit from deeper exploration with the Pakistani community in order to update guidance and deliver better, more culturally-appropriate care in the future.

60

Patients undergoing surgery for lumbar spinal stenosis associated neurogenic claudication and their surgical outcomes in the UK: what does the British Spinal Registry tell us?

Lianne Wood[1], Rebecca Hunter[1], Esther Williamson[1], Opinder Sahota[2], Paul Hendrick[2], Bethan Phillips[2], Khalid Salem[3], Andrew Booth[4], Sarah E Lamb[1]

[1]University of Exeter, Exeter, United Kingdom. [2]University of Nottingham, Nottingham, United Kingdom. [3]Nottingham University Hospitals NHS Trust, Nottingham, United Kingdom. [4]University of Sheffield, Sheffield, United Kingdom

Abstract

Background

Surgery for lumbar spinal stenosis has a variable outcome. We estimated the association between pre-operative patient demographics, surgical variables and patient-reported outcome measures (PROMs) with a clinically important change (30% change from baseline) in physical function at 6-months in a large, national data registry.

Methods

We used data from the British Spinal Registry (2013-2023). Anonymised data included demographics, PROMs (Oswestry Disability Index (ODI); back and leg pain on the visual analogue scale (VAS)) at 6-weeks and 6-months, surgical approach, duration of surgery and intra-operative blood loss. We used descriptive and multivariate analyses.

Results

A total of 2667 patients provided 6-month follow-up data on the ODI. They were on average 68.8 years of age (SD 11.5 years), male (n=1364/2667, 51%), and from higher socioeconomic areas (mean rank 83.7, SD 40.2). Prior to surgery, most had severe disability (mean ODI 46.9, SD 17.3), moderate leg (VAS mean 6.8, SD 2.5) and back pain (VAS mean 6.1, SD 2.5). Only 25% of the included sample (539/2119) achieved a clinically important improvement in ODI. Baseline more severe back pain (OR 0.9; 95% CI 0.9, 1.0) reduced the odds; while more severe leg pain (OR 1.1; 95% CI 1.1, 1.2), severe ODI (OR 4.3; 95% CI 3.3, 5.7) and male gender (OR 1.3; 95% CI 1.0, 1.6) increased the odds of achieving clinical change.

Conclusions

Patients undergoing surgery in the UK are severely disabled by symptoms prior to surgery. A substantial proportion of patients do not achieve a clinically important change by 6 months.

65

Apophyseal ring contact surface area as a predictor of endplate subsidence following transforaminal interbody fusion

Kay Raftery[1], Hannah Levy ORCID iD[2], Lea Adamson[3], Christopher Magera[2], Thomas Slater[1], Brett Freedman[2], Nicolas Newell ORCID iD[1]

[1]Department of Bioengineering, Imperial College London, London, United Kingdom. [2]Department of Orthopaedic Surgery, Mayo Clinic, Rochester, USA. [3]Faculty of Medicine, Imperial College London, London, United Kingdom

Abstract

Introduction: There is a 22.7% higher risk of subsidence following transforaminal lumbar interbody fusion (TLIF) relative to other approaches. Decreased subsidence risk is associated with anterior cage placement, speculated to be because of increased apophyseal ring contact. The aim of this retrospective study was to determine whether cage subsidence could be predicted with the apophyseal ring contact area.

Methods: 3D geometries of the endplates and interbody cage at the index level within a TLIF patient cohort (N = 43) were segmented from pre-operative and post-operative CT scans, respectively. The apophyseal ring boundary was manually defined for each pre-operative endplate geometry. An automated pipeline aligned the pre-operative endplate object with the cage using rigid registration, and calculated the apophyseal ring contact area with the cage relative to whole-endplate contact area. Subsidence was measured from post-operative CTs, and the cohort was categorised based on subsidence severity (No Subsidence (NS): <2mm; Moderate Subsidence (MS): 2-4mm; Severe Subsidence (SS): ≥4mm).

Results: Relative apophyseal ring contact was significantly higher in NS relative to MS (+18.0±6.6%) and SS (+18.2±5.9%). Univariate logistic and linear regression models respectively demonstrated that relative apophyseal ring contact predicted the incidence of subsidence ($p < 0.01$), and correlated with the total amount of subsidence at the index level ($p < 0.05$). A 50% risk of subsidence was predicted at 44% cage-apophyseal ring contact (CI: 36-52%).

Conclusion: Findings demonstrate the importance of exploiting the stronger peripheral regions of the endplate when installing cages during TLIF surgery, which may contribute to reducing post-operative subsidence.

67

Epidural fibrosis following primary microdiscectomy

Ghazal Motazedian[1], Alexander Durst[2], Michael McCarthy[1]

[1]Cardiff University, cardiff, United Kingdom. [2]Cardiff University, Cardiff, United Kingdom

Abstract

Background:
Lumbar discectomy is a minimally invasive surgery for herniated lumbar discs but carries risks such as infection, scar tissue, and recurrent symptoms. Epidural fibrosis, a natural postoperative complication, has a debated role in symptom recurrence.

Objectives:
To assess the incidence of epidural fibrosis following single-level primary microdiscectomy at the L3/L4, L4/L5, and L5/S1 levels.

Methods:
This retrospective observational study analysed clinical data from 5809 patients treated between 2013 and 2023 at Cardiff and Vale University Hospital. Inclusion criteria yielded 241 patients aged 14–83 years. MRI reports identified epidural fibrosis, and revision surgery rates were examined. Statistical analyses (Chi-squared, Pearson correlation) explored relationships between fibrosis, revision surgery, patient age, and surgical year.

Results:
Epidural fibrosis was found in 19.1% (n=46) of patients, most common in those aged 30–39 years, with the highest prevalence at L5/S1 (58.7%). A significant negative correlation (r=-5.63) was observed between fibrosis incidence and surgery year, with rates decreasing after 2017. Among 112 patients with recurrent symptoms and repeat MRIs, 95.5% had recurrent disc herniation. Revision surgery occurred in 20.3% (n=49), predominantly due to recurrent herniation (93.9%). No association was found between epidural fibrosis and revision surgery (P=1).

Conclusion:
Epidural fibrosis incidence decreased significantly after 2017, with no association with revision surgery. Future efforts should aim to minimise fibrosis and revision rates to enhance patient outcomes and clinical care.

70

A New Vibe: MRI-Based Synthetic CT Scans analysed for creation of custom made 3D spine models

James Geddes[1], Liam Rose[1], Zachary Dossett[2], Peter Terjanian[2], Peter Seevinck[3], Marijn van Stralen[3], Mary Smitheman[4], Libby Gooda[1], Nik Papadakos[1], Tesfaldet Kurban[1], Jason Bernard[1], Tim Bishop[1], Darren Lui[1], Jack Williams[1], Bethan Armes[1], Bisola Ajayi[1], Krunal Patel[1], Charlie Taylor[1]

[1]St George's Hospital, London, United Kingdom. [2]Mighty Oak Medical, Colorado, USA. [3]MRI Guidance, Utrecht, Netherlands. [4]Edge Medical, Manchester, United Kingdom

Abstract

Background:

CT scans can be used to produce custom made spine models to guide accurate pedicle screw insertion. The main drawback, similar to intraoperative navigation, is radiation dose. A novel option is to use a Synthetic CT generated from an MRI scan. We compared Synthetic CT to traditional CT scans to establish if they could produce similar spine models on which to base jigs and plan screw trajectory.

Methods:

We obtained MRI and CTs on 4 consecutive scoliosis patients. Pre-op planning CT with 0.625mm axial cuts were taken. Simultaneous MRI scans were obtained and automatically converted to synthetic CTs using BoneMRI software.The Original CT and synthetic CT were segmented for Firefly 3D model creation at each vertebral level.
Models were virtually overlaid and compared for similarity with volumetric analysis. This produced a Dice coefficient to statistically compare the similarity at each vertebral level for both modalities.

Results:
Analysis was possible at 67 vertebral levels from 4 patients, due to exclusions because of cut-offs. The mean Dice coefficient was 0.94 (0.89 to 0.97).

Discussion:
Both scan types were successfully converted into virtual models capable of planning screw trajectories, 3D printed models & jigs. Segmentations from the traditional and synthetic CT demonstrated high DICE coefficients when compared to levels reported in literature (0.8875).

The Synthetic CT produced a highly comparable model to Standard CT, and would make it possible to produce accurate custom jigs using synthetic CT alone.

This could obviate the need for additional radiation and cost of planning CTs.

77

Enhancing Surgical Decision-Making in Lumbar Degenerative Spondylolisthesis: A Comparative Evaluation of UCSF DS and DSIC Classification Systems

Rajib Ahmed[1], Ramy Sherif

ORCID iD

[2], Francis Brooks[2], Michael McCarthy[2]

[1]Cardiff University, Cardiff, United Kingdom. [2]University Hospital of Wales, Cardiff, United Kingdom

Abstract

Background: Degenerative spondylolisthesis of the lumbar spine (DSLS) is a common spinal pathology. Surgical intervention is typically required when conservative management fails. However, there is no standardized method for determining the most appropriate surgical approach. Recent attempts to develop classification systems, such as the Degenerative Spondylolisthesis Instability Classification (DSIC) and the UCSF DS system, aim to bridge this gap by providing frameworks to predict surgical interventions. This study evaluates the utility of these systems in guiding surgical decisions.

Methods: Data from 89 DSLS cases that underwent surgical treatment were retrospectively reviewed using a comprehensive database. Two classification systems, UCSF DS and DSIC, were applied to each case to predict the appropriate surgical intervention. Predictive accuracy for each system was measured using F1 scores, and the types of surgical interventions were analyzed to assess alignment with clinical practice.

Results: The UCSF DS system outperformed the DSIC system, achieving an F1 score of 0.438 compared to 0.371. The UCSF DS system correctly predicted surgical interventions in 43.8% of cases, while the DSIC system achieved a prediction accuracy of 37.1%. Additionally, the UCSF DS system tended to recommend less invasive procedures in 41.6% of cases, whereas the DSIC system suggested more invasive approaches in 39.3% of cases.

Conclusion: The UCSF DS classification system demonstrates promise as a predictive tool for guiding surgical interventions in DSLS cases. Its superior performance compared to the DSIC system suggests it may facilitate less invasive and more cost-effective treatment options.

79

Outcomes of a 5-Year Project to Improve Coding Accuracy for Paediatric Spinal Procedures

Duncan Loader[1], Conor Boylan ORCID iD[1], Morgan Jones[2]

[1]University of Birmingham School of Medical and Dental Sciences, Birmingham, United Kingdom. [2]The Royal Orthopaedic Hospital NHS Foundation Trust, Birmingham, United Kingdom

Abstract

Introduction

In 2019, local paediatric spinal procedures moved sites. Due to clinical coder inexperience, monetary rebates for these procedures fell despite case numbers remaining the same. A long-term quality improvement process was initiated in order to improve coding accuracy at the new institution.

Method

Over three quality improvement cycles, a systematic process of reviewing paediatric spinal procedures and subsequent coding activity was undertaken. Procedures were manually coded and mock rebates generated and compared to actual codes and rebate requests from the new site. Instruction was provided on how to more accurately code spinal procedures. A spinal coding “operation manual” was generated with lay descriptions of spinal procedures and advice on coding them.

Results

Quality improvement checkpoints took place in three phases in 2019 (n=45), 2021 (n=41) and 2024 (n=37). The mean difference between optimal and actual rebate requests in phase 1 was £4243.16 (SD £12,070.53), in phase 2 was £2560.59 (SD £10,846.56), and in phase 3 was £264.42 (SD £4923.71). This represents a stepwise improvement from 82.16% to 89.91% to 98.40% of the calculated optimal rebate. The change from phase 2 to phase 3 is statistically significant (U=569.0, z=-2.234, **p=0.025**, r=-0.253).

Conclusion

This quality improvement process has improved the accuracy of clinical coding for paediatric spinal procedures and has generated an annual saving of £596,811.00 for the site.

The authors have learned much from this iterative process and have recommendations that are applicable on a larger scale to any Trust with similar issues.

80

Sacro-iliac joint pain treatment. A single center survey.

Miguel Carvalho, Miguel Varzielas, Eduardo Mendes

Hospital CUF, Viseu, Portugal

Abstract

Sacro-iliac joint pain is often misdiagnosed and left untreated. Treatment options are currently a topic of debate. SIJ pain diagnosis is currently based on specific clinical features and a positive injection test. Once diagnosed treatment options as injection therapy, Radiofrequency ablation ou surgery are considered. In this center, patients with this diagnosis are first treated conservatively, then with injections (first with steroids and then with Platelet Rich Plasma (PRP)) and finally, surgery, when the previous treatments fails. Survey was performed on patients who failed conservative treatment and were submitted to infiltration therapy or surgery.

Enrolled for survey were 142 patients, which 28,9% (37pt) were submitted only to SIJ steroid infiltration, 46,9% (60pt) were also submitted to PRP and 24,2% (31pt) were submitted to SIJ fusion.

Patients reported improvement were of 64,5% with steroid SIJ injection, 66,7% with PRP treatment and 81,1% with surgery.

Two patients needed revision surgery, one for misplaced implant and the other for delayed infection. Both patients had favorable outcomes without consequences. Eight patients undergone lumbar fusion and bilateral SIJ fusion using S2-I screws and a triangular section implant. Survey results are similar despite the type of surgery.

This study states the importance of SIJ as a pain generator with a rate of 21,6% among patients with lumbar pain. Conservative treatment appear to be the weakest treatment as 70,3% of patients end up to perform some form of invasive treatment. Patients submitted to surgical fusion report higher improvement and satisfaction rates with a fairly good pain control.

86

The acceptability of the STructured Rehabilitation and InDividulaised Exercise and education (STRIDE) programme for lumbar spinal stenosis: a multi-methods study

Suzanne McIlroy ORCID iD[1], Lindsay Bearne ORCID iD[2], Andrew McCarter[1], Chloe McPherson[3], Hema Chaplin[3], Lisa Brighton ORCID iD[3], John Weinman ORCID iD[3], Sam Norton ORCID iD[3]

[1]King's College Hospital NHS Foundation Trust, London, United Kingdom. [2]City St George's, London, United Kingdom. [3]King's College London, London, United Kingdom

Abstract

Introduction

Most people do not increase their walking after surgery for lumbar spinal stenosis (LSS). Rehabilitation can improve outcomes, yet existing programmes lack robust evidence and theoretical underpinning. To address this, 34 patients and clinicians participated in four co-design workshops to develop STRIDE (**ST**ructured **R**ehabilitation and **I**n**D**ividulaised **E**xercise and education), informed by the Behaviour Change Wheel. STRIDE includes 3 core and 1-2 optional sessions delivered over 12-weeks before and 12-weeks after surgery.

This prospective pre-post single-arm study evaluated STRIDE acceptability and preliminary efficacy.

Methods

Participants awaiting surgery for LSS were recruited from a single hospital.

Acceptability was assessed using the Theoretical Framework of Acceptability questionnaire (scored 0-5, 5 = high acceptability) and through focus groups. Preliminary efficacy was analysed using the 6-minute walk test (6MWT), daily step count, and Oswestry Disability Index (ODI), collected pre-intervention, following prehabilitation (T1), and 12-weeks post-operatively (T2).

Results

15 participants were recruited (mean age 70 years, recruitment rate 48%). Participant retention was 80% (2 decided against surgery, 1 unable to complete final assessment).

Acceptability questionnaires scored median 5/5. Focus group data indicated participants valued the supportive, personalised intervention, perceived STRIDE to enhance motivation, preparation and recovery from surgery. Travel was perceived as burdensome. Participants suggested adding peer support.

Improvements were observed at T1 (6MWT +50m, steps +868, ODI -3) and T2 (6MWT +82m, steps +1405, ODI -14).

Conclusion

STRIDE is highly acceptable to patients, positively impacting experiences before and after surgery. If effective, STRIDE will transform care and outcomes after surgery for LSS.

98

Knowledge is Power: Developing a Core Information Set to Enhance Patient Education in Degenerative Cervical Myelopathy

Munashe Veremu[1], Irina Sangeorzan[2], Mark Kotter[1], Benjamin M Davies[1], On Behalf Of DCM-COINs Collaborative[2]

[1]Department of Clinical Neurosciences, University of Cambridge and Department of Neurosurgery, Addenbrooke's Hospital, Cambridge, United Kingdom.
[2]Myelopathy.org, Cambridge, United Kingdom

Abstract

Background:

Degenerative cervical myelopathy (DCM) is poorly understood outside specialist settings. Patients often arrive with limited knowledge, hindering shared decision-making (SDM), which is crucial for optimal care given the variable options in DCM management (e.g., type and timing of surgery). Core Information Sets (CIS)—checklists of critical information—streamline consultations, personalise education, and prevent information overload.

Objectives:

To develop a DCM Core Information Set (DCM CIS) to address patient education needs.

Methods:

A mixed-methods approach was used, including a scoping review, qualitative interviews, and a Delphi process with two online survey rounds. An expert panel refined the CIS, which was validated for face, content, and construct validity at a tertiary neurosurgery centre.

Results:

The study achieved a 100% response rate, with 57 participants in round 1 and 46 in round 2, indicating a 19% attrition rate. In round 1, 23 of 31 descriptors (74%) reached consensus. In round 2, 16 of 28 descriptors (67.7%) achieved consensus. After merging overlapping descriptors, 32 were reviewed in a final consensus meeting, resulting in the DCM CIS. Piloting at a tertiary centre demonstrated face, content, and construct validity.

Conclusions:

A DCM CIS was developed to improve patient understanding and SDM in DCM care. It has shown provisional validity in a single centre. Further evaluation and external validation are required to ensure broader applicability and benefits.

99

Words matter: Clinicians' use of minimising language ('just', 'bit', 'little' etc.) can escalate symptom reporting in back pain interactions

Lisa Roberts ORCID iD, Katherine Roberts

University of Southampton, University Hospital Southampton NHS Foundation Trust, United Kingdom

Abstract

Introduction

Skilful communication enhances history-taking, clinical reasoning, patient experience and outcome, and can be improved when good practice derived from real-time clinical data, is implemented. This novel study aimed to identify the prevalence and impact of minimising language in spine consultations.

Methods

Eighty adult primary care consultations (42 initial, 38 follow-up) in a musculoskeletal service in Southern England were audio-recorded, transcribed and co-analysed by 1 linguist and 1 clinician to identify the prevalence and impact of minimising language used.

Results

The mean duration of initial consultations was 38 minutes:46 seconds, (range 26:21—53:16). Clinicians used 14 words/phrases in a minimising context. The five most prevalent were: 'just' (mean use per consultation n=61.9); 'bit' (n=20.4); 'sort of' (n=14.7); 'little' (n=12.1) and 'kind of' (n=8.5).

There was evidence of minimising for mirroring (empathic gesture), to reduce distance between speakers, allay anxiety (by signposting the consultation process), reduce effort of treatment burden, indicate tentativeness in questions about symptom severity, and soften criticism (including of lifestyle choices). Conversely, when used to underplay symptom severity (intensity, frequency or spread), minimising language frequently resulted in multiple escalations in the patients' language, such as: Clinician: *"Were you woken up just once or twice?";* Patient*: "…..But I still have problems…. I can't lie on my side…. I'm finding that very difficult",* adversely affecting the clinician:patient relationship.

Conclusion

Analysing recordings from clinical practice minimises recall and social desirability bias, and enables clinicians to evaluate their conscious/unconscious use of minimising language and its impact on the consultation.

103

A comparison of five animal models for intervertebral disc herniation research

Thomas Slater ORCID iD[1], Beatrice Gagliostri[2], Matthew Kibble ORCID iD[1], Peter Cripton ORCID iD[3], Nazlı Tümer ORCID iD[2], Nicolas Newell ORCID iD[1]

[1]Imperial College London, London, United Kingdom. [2]Delft University of Technology, Delft, Netherlands. [3]University of British Columbia, Vancouver, Canada

Abstract

Introduction
Lumbar disc herniation is a leading cause of lower back pain worldwide. Herniations are biomechanically studied to determine failure mechanisms; and develop effective treatment strategies against reherniation. Animal models are commonly used due to reduced variability, lower cost, and lack of degeneracy compared to human specimens. However, no consensus exists on the ideal species for modelling human herniation. This study aims to compare herniations in different animal species under a standardised complex load.

Method
A dynamic shear-compressive, complex load was applied to isolated discs from five animal models: bovine tail, bovine lumbar, ovine lumbar, porcine lumbar, and porcine cervical (n=6 per group, n=30 total). Discs were flexed 10° and subjected to posterolateral shear-compression at 40 mm/min until a force drop or pre-set displacement (~80% disc height). Microstructural analysis identified modes of failure.

Results
Herniation features observed were categorised as endplate and annulus fibrosus (AF) tears, AF delamination, vertebral fractures, nucleus pulposus (NP) extrusions, and radial NP movements. Bovine tail discs showed tears in sequential lamellae (66%), while bovine lumbar and porcine cervical discs exhibited radial NP movement (84% and 100%, respectively). In ovine lumbar discs, NP extrusion into vertebral bodies occurred (67%) without radial NP movement (0%), while porcine lumbar segments showed both AF tears and radial NP movement (67%).

Conclusion
The animal discs tested are well-suited for different herniation-related research purposes: bovine tail discs for studies requiring tall-discs; ovine discs for endplate-junction or AF failures; porcine cervical, porcine lumbar, and bovine lumbar discs for extrusion-type herniation models.

106

Patient-Specific Modelling of the Cervical Spine with an Integrated Functional Spinal Cord for Enhanced Surgical Planning for Degenerative Cervical Myelopathy

Rajan Vraitch ORCID iD[1], Xianghong Ma ORCID iD[1], Eirini Theodosiou ORCID iD[1], Francesco Giorgio-Serchi ORCID iD[2], Adrian Gardner ORCID iD[3], Jean-Baptiste Souppez ORCID iD[1]

[1]Aston University, Birmingham, United Kingdom. [2]Edinburgh University, Edinburgh, United Kingdom. [3]The Royal Orthopaedic Hospital, Birmingham, United Kingdom

Abstract

Introduction:

Degenerative Cervical Myelopathy (DCM), the most common form of spinal cord injury, affects 7.44 per 100,000 individuals in England and incurs an annual cost of £635 million to the NHS. Despite its prevalence, surgical management relies heavily on clinical experience, with limited quantitative, evidence-based data on spinal cord compression pressure during movement. To address this gap, we present a novel approach to modelling patient-specific cervical spines integrated with functional spinal cords, aimed at enhancing surgical decision-making.

Method:

Segmentation, the process of isolating and defining the anatomical structures within medical imaging, was used to create a 3D model of a patient-specific cervical spine. This enabled the 3D printing of a physical spinal model. Building upon prior research that achieved the mechanically accurate manufacturing of vertebrae and age-specific intervertebral discs, this study focuses on integrating a functional spinal cord. Consequently, mechanical testing was conducted on various silicone blends with embedded pneumatic artificial muscles.

Results:

We present (i) the successful manufacturing of a patient-specific physical cervical spine, (ii) the integration of a functional spinal cord replicating the increased pressure and stiffening inherent in DCM, and (iii) the model's anatomical and physiological relevance for enhanced surgical planning.

Conclusion:

This study highlights the potential of rapid prototyping and tuneable stiffening of patient-specific cervical spine models for clinically observed DCM cases. These findings are hoped to enable surgeons to experimentally assess the outcomes of various surgical strategies before implementation, providing evidence-based solutions for interventions. Ultimately, this approach could improve patient outcomes and reduce healthcare costs.

107

Impact of Early vs. Late Mobilisation on functional outcomes and length of stay in adults with traumatic spinal cord injury: insights from a database analysis

Natalie Gray[1], Vicky Tolfrey[2], Alison Cowley[3], Nasir Quraishi[3], Vicky Booth[1]

[1]University of Nottingham, Nottingham, United Kingdom. [2]Loughborough University, Loughborough, United Kingdom. [3]Nottingham University Hospitals NHS Trust, Nottingham, United Kingdom

Abstract

Introduction

The timing of mobilisation following spinal cord injury (SCI) continues to cause debate. This has led to variation in practice, which may have implications for patient outcomes. Objectives: 1. To examine demographics and 2. Asses the association between timing of mobilisation and outcomes of function and length of stay (LOS), in a sample of adults with traumatic SCI in England.

Methods

Demographic and outcome data from the National Spinal Cord Injury Database (NSCID) was analysed over 10-years (2013-2023). Sub-group analysis compared outcomes of Early mobilisation (0-28 days) and Later mobilisation (29-56 days) using the Spinal Cord Independence Measure (SCIM III) and LOS.

Results

Demographic analysis was conducted on 2038 adults (age >18yrs, ASIA A-D), reporting a mean gain of 27.6/100 (CI:26.6-28.6) on the SCIM III at discharge from hospital. Comparative sub-group analysis (n=1490) identified that those mobilised early had a greater mean gain in SCIM III of 6.4 (CI:4.2-8.5) and shorter mean LOS by 33 days (CI:28.3-38.6) than those mobilised later ($p<0.01$). Linear regression identified that this finding was not influenced by baseline SCIM, baseline ASIA or age.

Conclusion

Analysis of data within the English NSCID found that adults with traumatic SCI who are mobilised early are leaving hospital earlier and are more functionally able than those who mobilised later. This knowledge provides valuable insights into optimal rehabilitation strategies for healthcare professionals and individuals with SCI.

108

Who participates in randomised controlled trials evaluating physiotherapy interventions for persistent low back pain? A scoping review.

George McNamee

ORCID iD

[1], Gurpreet Singh[1], Christopher Newton[1], Christopher Patterson[1], Keri Bramford-Hale[1], Hannah Woodward[2]

[1]University Hospitals Coventry and Warwickshire NHS Trust, Coventry, United Kingdom. [2]Coventry University, Coventry, United Kingdom

Abstract

Background: Low back pain (LBP) disproportionately affects socioeconomically disadvantaged individuals, ethnic communities, and those with multiple long-term health conditions. These groups are often underrepresented in research studies; however, it is unclear if this applies to LBP physiotherapy randomised controlled trials (RCTs).

This scoping review aims to establish who participates in RCTs evaluating physiotherapy interventions for persistent LBP.

Methods: Six electronic databases (CINAHL Ultimate, MEDLINE, ProQuest, Pedro, PubMed and Trip) were searched for RCTs published between January 2020 and June 2024.

Results: 108 RCTs were included in this review. Participants mean age was 42.3 years (±9.6) with 50.8% (±23.9%) being female and 72.4% (±8.5) from white ethnic backgrounds. Average pain intensity was 5.5 (±1.1) and duration was 49.5 months (±43.9). Age was the most common inclusion criteria (n=102, 94%) followed by duration of LBP (n=99, 92%). The need to understand the native language of the study's country of origin was the most reported participant characteristic (n=24, 22%). Previous spinal surgery was the single most reported reason for exclusion (n=74, 69%), followed by pregnancy (n=54, 50%) and a history of spinal trauma or fracture (n=54, 50%). People with mental health conditions were excluded in 30% (n=32) of RCTs.

Conclusion: People at higher risk of persistent and disabling LBP, including those with mental health conditions and from ethnic minority groups, either do not participate in or are excluded from RCTs evaluating physiotherapy interventions for LBP. Future RCTs should adopt strategies to ensure these under-served populations are represented.

115

The Current Concepts of the Management of Oligometastatic Spinal Disease at a Quaternary Centre

Maryam Kashif[1], Benein Obaid[1], Adnan Shaikh[2], Ayesha Sattar[1], Hasan Raza[2], Mohamed Ali Ugas[2], Priyanshu Saha[3], Charlie Taylor[2], Bisola Ajayi[2], Samantha Nimalasena[4], Alicia Piggott[2], Vino Siva[2], Francis Johnston[2], Marios Papadopoulos[2], Pawan Minhas[2], Fay Greenway[2], Jason Bernard[2], Timothy Bishop[2], Darren Lui[2]

[1]St George's University, London, United Kingdom. [2]St George's Hospital, London, United Kingdom. [3]Homerton Healthcare NHS Foundation Trust, London, United Kingdom. [4]Royal Marsden Hospital, London, United Kingdom

Abstract

Introduction

Radical treatment of oligometastatic disease (OMD) can be curative. Spinal OMD (SOMD) has historically been treated with tomita-en-bloc spondylectomy (TES). With advancements in Stereotactic Body Radiation Therapy (SBRT), current concepts in SOMD management have evolved. We outline our pathway for radically managing SOMD at a quaternary spinal centre.

Methods

A retrospective analysis (2017–2024) identified SOMD cases at a quaternary centre with specialised spinal oncology and stereotactic MDTs. Data on patient demographics, imaging, treatments, and outcomes were analysed.

Results

Of 5269 spinal metastases referred, 177 (3.3%) were SOMD (0.9% in 2017; 2.7% in 2023).

Primary neoplasms included renal cell carcinoma (24%), breast (17%), prostate (10%), lung (9%), colorectal (5%) and sarcoma (5%). 33% (n=38) were synchronous and 67% (n=78) metachronous.

Surgical management (n=113): TES (9.5%), separation surgery (25%), palliative decompression (46%; mix of OMD and oligoprogressive), kyphoplasty (17.1%), and radiofrequency ablation (RFA; 2.9%). Non-surgical patients (n=64) were referred for SBRT using Bilsky's NOMS algorithm.

Two-year overall survival: separation surgery (100%), palliative decompression (84.6%), TES (80%), and kyphoplasty (90%). Carbon fibre instrumentation was used in 30 cases, and titanium in 24.

Conclusion

The management of SOMD has shifted from TES to less morbid procedures. Following NOMS, 65 patients (n=113/178) underwent separation surgery, kyphoplasty, or RFA, combined with SBRT, demonstrating excellent local control and 100% survival at two years. A high index of suspicion within MDTs is critical, as radical treatment offers potential for curative outcomes and disease-free survival.

117

Promotion of sports, exercise, and participation in physical activity during post-operative interventions for adolescent idiopathic scoliosis: an international e-Delphi study

Susanna Tucker ORCID iD[1], Andrew Soundy ORCID iD[1], Adrian Gardner ORCID iD[2], Alison Rushton ORCID iD[3], Emily Russell ORCID iD[4], Nicola Heneghan ORCID iD[1]

[1]University of Birmingham, Birmingham, United Kingdom. [2]The Royal Orthopaedic Hospital NHS Foundation Trust, Birmingham, United Kingdom. [3]Western University, London, Canada. [4]Milton Keynes University Hospitals NHS Foundation Trust, Milton Keynes, United Kingdom

Abstract

Introduction: Up to 10% of individuals with adolescent idiopathic scoliosis (AIS) progress to spinal fusion. Post-surgery, many experience reduced musculoskeletal function and do not return to sports. A global lack of evidence and variability between professionals remains regarding rehabilitation and return to sports. This study aims to obtain expert consensus on post-surgical return to physical activity, sports, and exercise.

Methods: International surgeon and physiotherapy experts in AIS were recruited for 3 iterative rounds. Round 1 included open-ended questions examining rehabilitation milestones, interventions, and frameworks. Rounds 2 and 3 presented a summary of findings and participants rated their agreement on a 5-point Likert scale. Round 1 consensus was agreement >1 participant for statements. Round 2 consensus was agreement ≥75% between participants for statements. Round 3 consensus was calculated using a Kendall's coefficient of concordance (W), stability was assessed using a Wilcoxen Sum-rank test.

Results: Fifty-three experts from 18 countries (1 unknown) consented. Round 3 included 29 experts (14 surgeons, 15 physiotherapists). The 67 statements agreed upon in Round 3 had significance ($p<0.001$) and $W=0.5$ moderate agreement. Experts were consistent in their views, Wilcoxen Sum-rank $p<0.05$. Round 3 generated 7 themes with corresponding statements; Overarching Considerations, Pre-operative care, Physiotherapy treatment modalities, Multidisciplinary team, Inpatient rehabilitation, Early Phase 1, Intermediate Phase 2, Late Phase 3, and Final Phase 4.

Conclusion: These 67 statements provide the first expert consensus on post-surgical return to sports, exercise, and physical activity in AIS. Further work is required exploring the implementation of this consensus.

Ethics: ERN_1617-Nov2023.

119

A comparison of freehand pedicle screw placement and 3D-printed guides in paediatric scoliosis surgery

Ella Clifford Spence, Michael McCarthy ORCID iD, Alwyn Jones, Stuart James

University Hospital of Wales, Cardiff, United Kingdom

Abstract

Introduction: Pedicle screw instrumentation is the gold standard method for the correction of spinal deformity, and personalised 3D-printed guides (3DPGs) are one method of ensuring accurate screw placement. Our aim was to compare the freehand technique with the use of 3DPGs for inserting pedicle screws in paediatric scoliosis surgery.

Method: Between 2018 and 2024, 118 paediatric scoliosis corrections were performed by 3 surgeons in a tertiary centre. 70 sequential cases used the free hand technique (FHG), and the remaining 48 sequential cases used 3DPGs. Implants and surgical technique of deformity correction remained the same. Patient notes and radiological imaging were used to gather information on screw placement, complications and outcomes. SPSS software was used for statistical analysis.

Results: Overall, 1237 screws were inserted in the FHG and 1053 in 3DPG. There were no significant differences in operation time, blood loss or returns to theatre (one return in each group). Intraoperative image intensifier found an average of 1.5 malplaced screws per patient in the FHG and 0.85 in the 3DPG. Postoperative radiographs showed 0.5 screws per patient were malplaced in the FHG (3% of screws), and 0.15 screws in the 3DPG (0.7% of screws) ($p<0.001$). 15 screws were deemed too long in the FHG versus only 2 in the 3DPG group (p=NS). There were two cord monitoring alerts in the FGH and none in the 3DPG, and no neurological deficits in either group postoperatively.

Conclusion: Rates of screw malplacement were significantly higher in the FHG compared to the 3DPG.

129

Lumbar Facet Arthroplasty for Spondylolisthesis and Stenosis: Two Year Outcomes from a Prospective Randomized Clinical Trial

Christopher Dare ORCID iD

Wessex Nuffield Hospital, Southampton, United Kingdom

Abstract

Introduction: The surgical management for lumbar spondylolisthesis and stenosis has historically been limited todecompression-only and decompression with fusion. Lumbar facet arthroplasty, a new motion-preserving alternative, allowsfor decompression of the neural elements and stabilization of the segment while preserving pre-operative motion at the treated level.

Methods: The study was a level I study evaluating lumbar facet arthroplasty (Investigational) to transforaminal interbody fusion (Control) and pedicle screw fixation, for the treatment of degenerative Grade I spondylolisthesis with stenosis. Follow-up duration was a minimum 24 months. The primary outcome was a composite measure of clinical success: (1) No reoperations (2) No device breakage (3) ODI reduction of > 15 points (4) No new or worsening neurological deficit. Patients were considered a clinical success only if they met all four measures.

Results: A total of 321 patients were randomized 2:1 to eitherfacet arthroplasty (n=219) or to the control TLIF (n=102). The facet replacement group had higher overall clinical success at 24 months than did the TLIF group (79.1% vs. 54.5%; P=0.0001), equating to a between-group difference of 24.5% (95% CI 11.8% to 37.2%). The higher rate of clinical success in the facet replacement group was driven by subjects reporting no new or progressive neurologic deficit (97.5% vs 88.0%; P=0.0025) and a reduction in ODI of greater than 15 points (95.5% vs. 84.5%; P=0.0064).

Conclusion**:** This study demonstrates that posterior lumbar decompression combined with motion-preserving facet arthroplasty is safe and efficacious and may represent a viable alternative for the treatment of lumbar stenosis with degenerative spondylolisthesis.

131

Comparing the radiation dose for L1-S1 nerve root blocks between surgeons and radiologists in the private sector and NHS

Michael McCarthy ORCID iD

[1], Samantha Todd[2], Stuart James[1], Kathleen Lyons[1], Kausik Mukherjee[1], Sridhar Kamath[1]

[1]University Hospital of Wales, Cardiff, United Kingdom. [2]Cardiff University, Cardiff, United Kingdom

Abstract

Objective: Compare the radiation dosage administered by two groups of clinicians, Spinal Surgeons (SS) and Radiologist Consultants (RAD) within and between, the NHS and private practice (PP) for lumbar nerve root blocks.

Background: Epidural injections are frequently used for pain management. IRMER 2017 outline the use of the ALARA principles. Currently the only guidelines that exist are from the UK Health Security Agency with proposed National Diagnostic Reference Levels (NDRLs) that lumbar spine radiation exposure should be <6 Gy.cm2 for X-ray guided interventions.

Methods: 500 patient's data was collected for 5 different clinicians, 3 RADs and 2 SSs, for both the NHS and PP with one SS having trainee radiation dosage included on the NHS (50 injections each). The techniques used were single X-ray shots, done by the SS's, and continuous cinnefluoroscopy used by the RADs.

Results: The average radiation dose for both groups in the NHS and PP was 2.66 Gy.cm2. The RAD's radiation dose were greater than the SC's in both contexts ($p < 0.001$). Post hoc tests for one-way ANOVA showed no significant difference between SS's in either context ($p = 1.00$) and there was significant difference between the majority of RAD's and SS's ($p<0.001$). Two-way ANOVA tests between clinician group and pathology ($p= 0.916$) or clinician and lumbar level ($p=0.120$) showed no effect on radiation dose.

Conclusion and Suggestions:

Both SSs had lower radiation doses than RADs. It can be suggested that the use of the single image and last image hold techniques reduce radiation exposure.

134

Early post-operative complications in 1-2 Level Lumbar Spinal Fusion surgery: Is high volume low complexity (HVLC) spine surgery straightforward?

Muhammad Junaid Khan, Alex Torrie, Hui-Ling Kerr, Rathnam Sundaram, Yousaf Shah, Riaz Mohammed

Gloucestershire Royal Hospital, Gloucester, United Kingdom

Abstract

Introduction:

Lumbar spinal fusion surgery (LSF) is a HVLC operation nationally audited through the GIRFT programme. Common recognised early complications include incidental durotomy, haematoma, wound concerns and medical complications. This study aimed to review all early (30 day) postoperative complications in 1-2 level elective LSF in our unit.

Methods:

HES data was analysed for 185 consecutive patients (F:M 112:73), mean age 67 years (41-87) between May 2021 and April 2024. A third of the patients underwent Transforaminal Lumbar Interbody Fusion (TLIF) with the remainder receiving Posterior Lumbar Fusion (PLF). All reasons for re-presentation within first 30 days of the index surgery were documented and formally graded using the Clavien-Dindo (CD) classification.

Results:

13(7%) patients overall were re-admitted within 30 days of their index surgery. One patient died in critical care unit due to respiratory tract infection (CD grade V) with another having an unrelated cardiac event needing intervention (CD grade IV). 3(1.6%) patients each underwent wound washout (CD grade IIIB) or were treated with extended antibiotics for wound ooze (CD grade II). Seven patients presented with neuropathic pain classified as CD grade I. There were 8(4.3%) incidental durotomies equally distributed between TLIF and PLF procedures, of which one required reoperation (CD grade IIIB).

Conclusion:

1-2 level elective LSF is described as HVLC surgery but significant early complications, that necessitate intervention (CD III and above) may occur. Clinicians need to remain cognizant of these significant associated risks in LSF ensuring that their patients are fully informed preoperatively.

136

A Modified Wiltse Approach and far-lateral Decompression for Lumbar Degenerative Disc Disease with Foraminal Stenosis.

Eid-Christian Oweis ORCID iD, Shimal Devapura ORCID iD, Robyn Brown ORCID iD, Kent Warrillow ORCID iD, Alex Torrie, Riaz Mohammed ORCID iD, Hui-Ling Kerr ORCID iD

Gloucestershire NHS Foundation Trust, Gloucester, United Kingdom

Abstract

Introduction

Lumbar degenerative disc disease (DDD) and foraminal stenosis are pathological processes observed in chronic back pain. Surgical management has contemporaneously concentrated on decompression and fusion techniques, increasing the associated risk profile and cost. We present our case series of patients with lumbar DDD and foraminal stenosis treated using a modified Wiltse approach, utilising a central incision for a paramedian decompression and far lateral foraminotomy.

Methods

Patients with MRI and CT confirmed foraminal stenosis treated by a single surgeon between December 2022 and June 2024 were included. Baseline and 6-12 week postoperative EQ-5D, VAS for back and leg pain, and ODI were recorded from existing British Spine Registry, alongside postoperative complications. Minimum Clinically Important Difference accepted were >0.262, >7.5, >2.5, >3.5, and >10 change for EQ-5D index and VAS, VAS back, VAS leg, and ODI respectively.

Results

20 patients were analysed. At 6-12 weeks postoperatively, clinically significant improvements were observed in EQ-5D index (0.35 to 0.67), EQ-5D VAS (50.4 to 70.2), mean back VAS (7.9 to 4.1), leg VAS (8.0 to 3.3), and ODI (50.8 to 34.2). All outcomes were statistically significant ($p<0.05$). No patients required reoperation in the follow up period.

Conclusion

Far lateral decompression via the modified Wiltse approach produces good clinical outcomes whilst reducing soft tissue trauma and avoiding spinal instrumentation in patients presenting with DDD in the absence of spinal instability. The primary advantage, compared with the standard Wiltse approach, is the ability to utilise the same midline incision for staged contralateral decompression latterly.

137

What are the outcomes for patients undergoing treatment for benign spinal intradural tumours?

Mohammad A. Mustafa ORCID iD[1], George E. Richardson ORCID iD[1], Ali Bakhsh[1], Abdurrahman Islim ORCID iD[2], Masna Inam[1], Martin Wilby[1], Simon Clark[1], Radek Kaiser[3], Nisaharan Srikandarajah[1]

[1]The Walton Centre NHS Foundation Trust, Liverpool, United Kingdom. [2]Salford Royal NHS Foundation Trust, Manchester, United Kingdom. [3]Charles University, Prague, Czech Republic

Abstract

Background

Primary Spinal Intradural Tumours (PSIT) are rare tumours with an incidence of 0.74 per 100,000 person years. The mainstay of treatment is surgery. Our objective was to summarise outcomes following treatment of PSIT.

Design

Systematic review.

Inclusion

Studies with >10 adult patients undergoing treatment for PSIT.

Methods

A systematic search of two databases (MEDLINE and EMBASE). Descriptive statistics were performed.

Results

25 studies (1,124 patients) were included. Of these, 61.3% (n=689) were female and the median age of included participants was 47.7 years [IQR 44.5 – 58.5]. Most studies were retrospective (n=24, 96%) and single-centre (n=22, 88.0%). Median follow-up was 36.6 months [IQR 18.0 – 48.0]. Presenting symptoms included sensory deficit (n=353), motor deficit (n=324), pain (n=282) and bladder and bowel dysfunction (n=244). Surgery was offered as treatment in 92.5% of studies (n=27) with SRS being offered in 7.4% of studies (n=2). Gross-total resection was achieved in 82.1% (n=640/780) of cases. Most common sub-types of PSIT were meningioma (n=498), schwannoma (n=237), ependymoma (n=62), hemangioblastoma (n=40) and neurofibroma (n=22). No tumour related deaths were reported. A total of 32 tumour progression (recurrence/regrowth) events occurred across overall patient follow-up, of which 10 (31.3%) required re-intervention. Most common postoperative complications include cerebrospinal fluid leak (n=19) and surgical site infection (n=7). A total of 84.5% (n=430/509) patients had an improvement in neurological function and 100% (n=101/101) had an improvement in pain post-operatively.

Conclusion

This is the first systematic review summarising outcomes following treatment of PSIT. Surgery remains the mainstay of treatment with favourable outcomes.

138

A Systematic Review on VertebralSpinal Endometriosis: Clinical Presentation, Diagnostic Challenges and Treatment Outcomes

Amir Khadmy[1], Sashin Ahuja ORCID iD[2]

[1]Beilinson, Petah Tikva, Israel. [2]University Hospital of Wales, Cardiff, United Kingdom

Abstract

Study Design: Systematic Review

Objectives: To synthesize existing evidence on vertebral-spinal endometriosis (VSE), emphasizing its clinical presentation, diagnostic challenges, and treatment outcomes, to enhance awareness and guide management strategies for this rare condition.

Methods: A systematic review adhering to PRISMA guidelines was conducted. Comprehensive searches of PubMed, Google Scholar, and the Cochrane Library were performed using terms like "endometriosis and spine" and "sacral endometriosis." Inclusion criteria focused on peer-reviewed articles and case reports detailing VSE's clinical presentations, diagnostic methods, and treatment outcomes. Data were extracted and analyzed for patient demographics, lesion location, symptoms, diagnostic tools, and treatment efficacy.

Results: Fifteen studies involving 15 patients (mean age 37.9 years) met inclusion criteria. Common symptoms included back pain (66.6%), radicular pain (60%), and urinary symptoms (40%). Lesions predominantly occurred in the lumbar region (53.85%). MRI (86.66%) and histopathology (73.33%) were the primary diagnostic tools. Treatments included spinal decompression (40%), hormonal therapy (20%), and combined approaches (40%). Post-treatment, 53.33% of patients experienced symptom reduction, though pain management outcomes remained inconsistent ($p = 0.50$).

Conclusions: Vertebral-spinal endometriosis presents diverse clinical challenges with variable treatment outcomes. MRI and histopathology are critical for diagnosis, though they do not predict treatment success. Improved pain management strategies and multidisciplinary approaches are essential for effective care. Further research is needed to explore long-term outcomes and innovative therapeutic strategies.

Keywords: Vertebral-spinal endometriosis, diagnostic challenges, treatment outcomes, spinal decompression, hormonal therapy.

139

Risk Of Infection In Cervical Spine Surgery Following Epidural Steroid Injection: A Systematic Review and Metanalysis

Riaz Mohammed ORCID iD[1], Pranav Shah ORCID iD[2]

[1]GLOUCESTERSHIRE HOSPITALS NHS FOUNDATION TRUST, Cheltenham, United Kingdom. [2]Namaha Hospital, Mumbai, India

Abstract

Introduction:

Risk of infection is foremost when planning an elective cervical spine surgery (CSS) on the background of an epidural steroid injection (ESI), and is more so a concern when these episodes are in close proximity. Our systematic review assesses post operative infections (POI) following CSS within 3 months of an ESI for a degenerative spinal pathology.

Method:

A systematic review in accordance with Preferred Reporting Items for Systematic review and Meta-Analyses (PRISMA) guidelines was conducted for literature assessing infection as an outcome in CSS following cervical ESI. Studies with interval greater than 3 months between ESI and CSS were excluded. 3 retrospective cohort studies were identified and were included for systematic review and meta-analysis.

Results:

Cumulative 22445 patients received an ESI within the preceding 3 months of CSS as against 355002 patients in the control group undergoing CSS without preceding ESI. Post-operative infection was found in 155 patients (0.69%) receiving preceding ESI as against 2950 patients (0.83%) in the control group. One study assessed outcomes of anterior and posterior CSS separately while the remaining two included both anterior and posterior CSS. Analysis performed using random effects model with Mantel-Haenszel method found no statistical difference between the two cohorts with risk ratio of 1.21 with a 95% confidence interval of 0.92-1.6.

Conclusion:

Our meta-analysis confirms safety of proceeding with CSS within 3 months of ESI, with the reassurance of no significant increased risk of infection. However, larger trials to assess cost-benefit analysis can shed more information for shared decision making.

142

Effect of anterior versus posterior spinal approaches on clinical outcomes in patients with multilevel degenerative cervical myelopathy: a systematic review and meta-analysis

Omar Kouli ORCID iD[1], Lana Al-Nusair[1], Ashish Basnet[1], Radek Kaiser[2], Michael Fehlings[3], Martin Wilby[1], Nisaharan Srikandarajah[1]

[1]Neurosurgery Department, The Walton Centre NHS Foundation Trust, Liverpool, United Kingdom. [2]Spinal Surgery Unit, Oxford University Hospitals NHS Foundation Trust, Oxford, United Kingdom. [3]Division of Neurosurgery, Toronto Western Hospital, University of Toronto, Toronto, Canada

Abstract

Introduction

There remains a paucity of evidence regarding optimal surgical approach to multilevel degenerative cervical myelopathy (MDCM). This systematic meta-analysis compared clinical outcomes of anterior and posterior surgery in MDCM patients.

Method

MEDLINE, Web-of-Science and Cochrane were searched up to November 10, 2024. Primary outcomes were Neck Disability Index (NDI), SF-36-PCS, and modified Japanese Orthopaedic Association (mJOA). Primary outcome measures had a minimum of one-year follow-up. Secondary outcomes were bleeding, operative duration, length of stay (LOS), C5 palsy, and re-operation. The pooled mean differences (MDs) and odds ratios (ORs) were calculated. Subgroup analysis by cause of MDCM (cervical spondylosis (CS) and/or ossification of the posterior longitudinal ligament (OPLL)) was performed where appropriate.

Results

Fifty-six studies were included. At final follow-up, the MDs of mJOA were greater in the anterior group in both CS (0.4 [95%CI 0.08 to 0.73]) and OPLL (0.74 [0.31 to 1.18]), however, the differences were not clinically significant given the minimal clinically important difference (MCID) of 2. The MD of the NDI (-1.32 [-2.49 to -0.14]) for CS was lower in the anterior group but was not clinically significant given the MCID of 15. In the anterior group, the MD for LOS (-1.6 [-2.0 to -1.1]) and OR for C5 palsy (0.36 [0.23 to 0.55]) were lower. Other outcomes were similar between groups.

Conclusion

Anterior and posterior approaches achieve similar functional outcomes. Anterior approach offers shorter LOS and lower odds of C5 palsy. Decisions on surgical approach should be patient-centred and made on an individualised basis.

143

Cost-effectiveness evaluation of Spine Awake Surgery Vs the same Surgical Procedure under GA

Muhammad Adnan, Yizhou Wan, Helen Hann, Murtuza Skinder

Oxford University Trust Hospital, Oxford, United Kingdom

Abstract

Spine awake surgery has been gaining popularity in recent years due to its potential benefits such as faster recovery time, reduced risk of complications, and shorter hospital stays. However, there is still limited evidence on the cost-effectiveness of spine awake surgery compared to the same surgical procedure under general anesthesia (GA).

A retrospective study included patients who underwent spine surgery for various conditions such as lumbar disc herniation or one to two level stenosis during the year 2021-2022. Data on total hospital costs, operating room costs, length of hospital stay, and post-operative complications were collected and analyzed.

The results of the study showed that spine awake surgery was associated with lower total hospital costs compared to surgery under GA. This cost difference was primarily driven by reduced operating room costs and shorter hospital stays in the spine awake surgery group. Additionally, patients who underwent spine awake surgery had lower rates of post-operative complications, further contributing to cost savings.

Overall, the study findings suggest that spine awake surgery may be a cost-effective option for certain spine procedures compared to surgery under GA. Further research is needed to validate these results and to better understand the long-term cost-effectiveness of spine awake surgery. In the meantime, clinicians and healthcare providers may consider the potential cost savings and benefits of spine awake surgery when recommending treatment options for patients with spine conditions.

146

Breaking the cycle of persistent low back pain, health inequalities and multimorbidity: a UK NHS cohort study of Cognitive Functional Therapy.

George McNamee[1], Gurpreet Singh[1], Tom Mathews[1], Christopher Patterson[1], Ewan Ablett[1], Anil Gumber[2], Ala Szczepura[2], Chris Newton ORCID iD[1]

[1]University Hospitals Coventry and Warwickshire NHS Trust, Coventry, United Kingdom. [2]Coventry University, Coventry, United Kingdom

Abstract

Introduction: Low back pain (LBP) disproportionately affects socioeconomically disadvantaged individuals, ethnic communities, and those with multimorbidity. Cognitive Functional Therapy (CFT) is a physiotherapist-led intervention targeting the biopsychosocial complexity of LBP, not previously evaluated in people affected by health inequalities. This study aimed to determine the clinical and cost benefits of CFT in people with LBP living in the most deprived areas of a multi-ethnic UK city.

Method: Single cohort study.

Participants: Adults aged >18 years with LBP (>3 months), reduced work ability due to LBP, living in the 20% most deprived areas of Coventry, and having 2 or more long-term conditions.

Intervention: Cognitive Functional Therapy.

Healthcare resource use data were collected for 13 weeks pre-intervention, and at 13 and 26 weeks. Measures of self-reported pain intensity and disability were collected at baseline, 13, and 26 weeks. Descriptive analysis identified changes in self-reported outcomes. Cost-benefit analysis used NHS tariffs.

Results: 61 participants (64% female, mean age 51 years, LBP duration 6.8 years, 4.6 comorbidities). Baseline disability (RMDQ) was 17.2 and pain intensity 7.6. At 26 weeks, mean disability reduced to 11.7 (mean reduction 5.5, 95% CI 3-8) and pain to 4.4 (mean reduction 2, 95% CI 1.1-2.9). Healthcare contacts for LBP reduced from 2.1 to 0.3 at 26 weeks. Opioid prescriptions reduced by 32%, saving £25.20 per participant. 5.3 CFT appointments were attended at a cost of £334 per participant.

Conclusion: Pain, disability, and healthcare utilisation costs reduced following CFT for people with persistent LBP living in deprived areas with multimorbidity.

154

In vivo safety study of an injectable hydrogel for nucleus augmentation in an aging sheep model

James Warren[1], Jane Mclaren[2], Matthew Culbert[1], Graham Haggar[3], Nagitha Wijayathunga[1], Marlene Mengoni[1], Hazel Fermor[1], Almas Khan[1], Felicity Rose[2], Ruth Wilcox[1]

[1]University of Leeds, Leeds, United Kingdom. [2]University of Nottingham, Nottingham, United Kingdom. [3]Royal Veterinary College, London, United Kingdom

Abstract

Introduction: Nucleus augmentation is an emerging intervention for intervertebral disc (IVD) degeneration in which a biomaterial is injected into the disc nucleus. We have developed a self-assembling peptide-glycosaminoglycan (SAP-GAG) hydrogel for nucleus augmentation that can be injected through very fine (dual-29G) needles and instantaneously forms a gel in situ, restoring healthy disc stiffness. The aim of this study was to establish the feasibility and safety of the procedure using an *in vivo* aging sheep model, shown previously to exhibit similar disc degeneration to humans.

Methods: Sheep (>6 years) were CT imaged and n=4 selected for surgery. Non-operated animals were used as controls. Following 12 weeks activity monitoring, each sheep was anaesthetised and three lumbar IVDs were augmented under fluoroscopic guidance using a custom delivery system with either the SAP-GAG hydrogel (n=3) or a sham (n=1). The sheep were then monitored for 12 weeks, euthanised, the spines imaged, and the IVDs (treated and adjacent) histologically examined.

Results: All sheep returned to normal levels of activity following the procedure with no adverse effects observed. There was no statistically significant difference in disc height measured from pre-surgery and post-mortem imaging in either the treated or non-treated IVDs. Histologically, no adverse effects were observed.

Discussion: The study provided the first *in vivo* safety data for the SAP-GAG hydrogel nucleus augmentation in a large animal model. The results demonstrated none of the adverse effects seen in first generation nucleus replacement devices (e.g. expulsion, annular damage). Further *in vitro* work in human IVDs is underway.

155

Impact of Cervical Spine Alignment on Surgical Outcomes in Cervical Myelopathy: A Decade-Long Cohort Study

Maria Lofthouse[1], Ramy Sherif ORCID iD

[2], Michael J H McCarthy[2], Stuart James[2], Alwyn Jones[2], Iqroop Chopra[2], Sashin Ahuja[2], John Howes[2], Francis Brooks[2]

[1]Cardiff University, Cardiff, United Kingdom. [2]University Hospital of Wales, Cardiff, United Kingdom

Abstract

BACKGROUND: Cervical myelopathy, characterized by spinal cord compression presents with progressive neurological deficits, which may culminate in severe disability. Surgical management aims to decompress the spinal cord, yielding improved quality of life. Despite its efficacy, surgical outcomes exhibit variability in complication and reoperation rates. This study examines adverse event and revision rates following primary cervical myelopathy surgeries over a 10-year period.

METHOD: Using the BlueSpier Database, 291 patients undergoing primary cervical myelopathy surgeries between January 2013 and December 2022 were identified. Patients with prior surgeries or central cord syndrome were excluded. Data on presentation, surgical approach, postoperative outcomes, and reoperations were analyzed using SPSS.

RESULTS: Among 291 cases, anterior discectomy and fusion (58%) and posterior approaches (36%) predominated. Overall, 22% experienced adverse events, and 27% reported persistent symptoms, while 8.6% required revision surgery. Recurrence of myelopathic symptoms accounted for most revisions (58%).Swallowing difficulties (10%) and infections (3%) were the most common complications. Outcomes did not significantly differ between anterior and posterior approaches regarding adverse events (p=0.105) or revision rates (p=0.864). However, straight preoperative cervical spines were significantly associated with higher revision rates (p=0.029), particularly in anterior surgeries (17% vs. 5% for lordotic spines, p=0.023). Posterior approaches were associated with late-stage disease (p=0.010).

CONCLUSION: While surgical approach had no significant impact on adverse outcomes, preoperative spine morphology influenced revision rates, underscoring its importance in surgical planning for cervical myelopathy; this study highlights the critical role of preoperative cervical spine alignment in predicting surgical outcomes, adding valuable insight to existing literature.

158

Uninformed Compliance or Informed Consent: What Patients Think About Animal-Based Products in Spinal Surgery

Remil Ignatius, Alex Torrie, Hui-Ling Kerr, Yousaf Shah, Rathnam Sundaram, Riaz Mohammed

Gloucestershire Hospitals NHS Foundation Trust, Gloucester, United Kingdom

Abstract

Introduction:
Animal-based products (ABP) are routinely utilized in standard spinal procedures. Patients ordinarily are uninformed of ABP used in their treatment, whilst most surgeons lack adequate knowledge to deliver comprehensive ABP information. Montgomery principles state that patients must receive sufficient information regarding their treatment, including material origins and ethical considerations. Increasingly in a multicultural society, a cohort of patients will necessitate an enhanced understanding of ABP used in their treatment, prior to providing informed consent. This study assesses patient understanding of ABP used in spinal surgery.

Method:
We conducted a prospective survey of 110 patients attending spinal outpatient clinics and elective surgeries. A standardised questionnaire was distributed to assess patient awareness, acceptance, and preferences regarding ABP. The responses were documented and analysed.

Results:
80% of patients were unaware of ABP utilisation in spinal surgery. 75% considered that all patients should be informed about ABP utilisation and receive reasonable background information prior to providing their informed consent. 25% reported a preference to be informed of ABP utilisation for an emergency spinal operation. 9% would not consent or were unsure about ABP use in emergency spinal surgery. Horse-based ABP were deemed least favourable ABP.

Conclusion:
This study identified that most patients are uninformed of ABP routinely involved in their spinal surgery. Most patients would accept the use of ABP necessarily involved in either an elective or emergency spinal operation. A strong preference for full disclosure regarding ABP utilisation confirms the requirement for its inclusion as part of fully informed consent.

171

The Impact of E-Cigarettes on Bone Health-A Systematic Review of the Literature

Michelle Diamond[1], Sashin Ahuja ORCID iD[2], Anthony Perera[3]

[1]Cardiff University, cardiff, United Kingdom. [2]University Hospital Wales, Cardiff, United Kingdom. [3]Spire Cardiff hospital, Cardiff, United Kingdom

Abstract

Background
Electronic cigarette (E-cig) usage reached 9.1% of the British population in 2023, driven by the popularity of disposable e-cigs. While marketed as safer alternatives to smoking, the long-term effects of E-cigs on bone health remain unclear.

Aim
The systematic review evaluates the impact of E-cig vapour on bone health indicators, including inflammatory markers, stem cell differentiation, osteoblast activity, and processes like bone healing, remodelling, and fusion.

Methods
A systematic search , spanned databases such as PubMed, Google Scholar, and ScienceDirect. Studies using the PRISMA guidelines addressing bone health indicators in human and animal models were included, while those focusing solely on tobacco smoking were excluded. A total of 20 studies were analysed, including six *in vivo*, four in vitro, 2 *ex vivo*, 3 reviews, 3 systematic reviews, and 1 meta-analysis.

Results
E-cig use negatively impacts bone health at molecular, tissue, and orthopaedic levels. At the molecular level, E-cigs induce a proinflammatory state, oxidative stress, and impaired osteoblast proliferation and differentiation, alongside elevated osteoclast activity. At the tissue level, E-cigs disrupt stem cell differentiation, reducing osteogenic markers, mineralisation, and connexin43 protein. *In vivo* studies reveal microfractures and bone architecture changes, though bone strength and volume remain largely unaffected. Orthopaedic effects include higher rates of fragility fractures in adults and concerns about impaired skeletal development in paediatric users.

Conclusion
E-cigs pose bone health risks comparable to smoking. Further human trials are needed to clarify their effects on orthopaedic outcomes and guide clinical recommendations.

172

Unilateral Biportal Endoscopic TLIF – is it worth undergoing the learning curve if you have mastered Tubular Minimally Invasive TLIF ?

Anindya Basu

Institute of Neurosciences Kolkata, Kolkata, India

Abstract

Introduction

The Unilateral Biportal Endoscopic TLIF(UBE-TLIF) technique is gaining popularity as it avoids extensive paraspinal muscle damage. Minimally invasive TLIF(MI -TLIF) using tube has been an accepted mode of treatment providing excellent outcomes. This study is aimed at comparing the two methods in terms of outcomes for patients with degenerative low grade unstable spondylolisthesis

Method

The study examined the outcomes of 65 patients with Meyerding grade I /II degenerative unstable spondylolisthesis who underwent single-level fusion since November 2022 . Clinical assessments included the measurement of pain levels using the Visual Analogue Scale (VAS) for low back and leg pain, the Oswestry Disability Index (ODI), surgical time, post op drain collection and demographic information.

Results

The VAS-Back demonstrated a statistically significant improvement in Group UBE-TLIF compared to the other groups at the 3 day and 7 day postoperative evaluation ($p < .05$). UBE-TLIF group exhibited a significantly longer total operative time compared to the MI-TLIF group ($p < .05$). However, the collection in the drain were significantly greater in the MI-TLIF compared to the UBE-TLIF group ($p < .05$).

Conclusion

The present study looked at the effectiveness of a relatively new technique of Lumbar fusion for unstable low grade degenerative spondylolisthesis . UBE-TLIF had better short term post operative pain outcomes, less collection in post operative drain but had a longer surgical time . However, the author with an experience of more than 350 MI- TLIF feels the contralateral lateral recess and traversing root visualization and surgeons posture are much improved in UBE -TLIF

175

real-time tissue segmentation and surgical tool detection in endoscopic spinal surgery

Ziqi Zhang[1], Bruno Hawkins[1], Kamya Gandhi[1], Raashi Padhiyar[1], Ananya Marla[1], Rabiah Bhutta[1], Warda Mosabbir[1], Sancia-rhema Lam[1], Akshata Pore[1], Athul Dinesh[1], Peter Snow[1], David Baxter[2]

[1]University College London, London, United Kingdom. [2]University College London and the Whittington Hospital, London, United Kingdom

Abstract

Introduction

Endoscopic spinal surgery is gaining global popularity as it provides comparable outcomes to traditional open surgery while reducing complication rates. However, its adoption is limited by a steep learning curve, as the technical dexterity required is not typically trained during surgical education. Furthermore, the visualization of anatomy in endoscopic surgery differs significantly from open techniques, posing an additional challenge for new learners.

Methods

To address these barriers, we developed a proof-of-concept artificial intelligence (AI) system for real-time tissue and instrument recognition in endoscopic spinal surgery. A dataset of labeled masks for anatomical structures and surgical tools was created. Two AI models were implemented: a YOLO-based object detection model to identify surgical instruments and a U-Net model with attention modules for segmenting anatomical structures. The models were optimized for real-time performance using an RTX 3060 GPU.

Results

Our system demonstrated accurate tissue and instrument recognition with real-time performance. The YOLOv8 model effectively identified surgical tools, while the U-Net model reliably segmented anatomical structures. The AI's inference speed and accuracy were validated in simulated surgical environments, meeting the high demands of endoscopic spinal procedures.

Conclusions

We have developed a proof-of-concept AI system capable of real-time tissue and instrument recognition for endoscopic spinal surgery. This includes a robust pipeline for data processing, algorithm training, and inference. This innovation has the potential to support surgeons in overcoming the challenges of endoscopic techniques, improve training, and expand access to advanced spinal surgery worldwide.

178

Gender differences in outcomes in patients treated for thoracolumbar burst fractures without neurological deficits: prospective international multicenter study

Charlotte Dandurand[1], Marcel Dvorak[1], Cumhur Oner[2], Klaus Schnake[3], Alexander Vaccaro[4], Lorin Benneker[5], Emiliano Vialle[6], Gregory Schroeder[4], Shanmuganathan Rajasekaran[7], Mohammad El-Sharkawi[8], Ahmed Hassan ORCID iD[9], Rishi Kanna[7], Mohamed Aly[10], Martin Holas[11], Jose Canseco[4], Sander Muijs[2], Eugen Cezar Popescu[12], Jin Wee Tee[13], Gaston Camino-Willhuber[14], Andrei Fernandes Joaquim[15], Ory Keynan[16], Harvinder Singh Chhabra[17], Sebastian Bigdon[18], Ulrich Spiegel[19], Richard Bransford[20]

[1]Vancouver General Hospital, University of British Columbia, Vancouver, Canada. [2]University Medical Centers, Utrecht, Netherlands. [3]Center for Spinal and Scoliosis Surgery, Malteser Waldkrankenhaus St. Marien, Erlangen, Germany. [4]Rothman Institute, Thomas Jefferson University Hospital, Philadelphia, USA. [5]Sonnenhof Spital, University of Bern, Bern, Switzerland. [6]Cajuru Hospital, Catholic University of Paraná, Curitiba, Brazil. [7]Ganga Hospital, Tamil Nadu, India. [8]Assiut University School of Medicine, Assiut, Egypt. [9]Queen`s Medical Centre, Nottingham University Hospitals NHS Trust, Nottingham, United Kingdom. [10]Prince Mohammed Bin Abdulaziz Hospital, Riyadh, Saudi Arabia. [11]Klinika Úrazovej Chirurgie SZU a FNsP F.D.Roosevelta, Banská Bystrica, Slovakia. [12]Prof. Dr. N. Oblu" Emergency Hospital, Iasi, Romania. [13]National Trauma Research Institute (NTRI), The Alfred Hospital, Melbourne, Australia. [14]Institute of Orthopedics "Carlos E. Ottolenghi" Hospital Italiano de Buenos Aires, Buenos Aires, Argentina. [15]State University of Campinas, Campinas-Sao Paulo, Brazil. [16]Rambam Health Care Campus, Haifa, Israel. [17]18. Sri Balaji Action Medical Institute, New Delhi, India. [18]nselspital, University Hospital, University of Bern, Bern, Switzerland. [19]University of Leipzig, Leipzig, Germany. [20]Harborview Medical Center, University of Washington, Seattle, USA

Abstract

Introduction

Exploring gender differences in outcomes after spinal surgery is essential to ensure equitable and effective treatments. This study assessed gender differences in Oswestry Disability Index (ODI) improvement for patients with thoracolumbar (TL) burst fractures without neurological deficit. Secondary objectives included analyzing gender differences in baseline characteristics and treatment choices.

Methods

Patient demographics, clinical, and outcome data were prospectively collected. The primary endpoint was the time to achieve the minimal clinically important difference (MCID) in ODI. Additionally, achieving minimal disability in ODI was explored.

Results

Baseline characteristics were largely similar between genders, except for working status, as were injury characteristics and treatment selection. Surgically treated females achieved MCID in ODI faster than males (14 days vs. 28 days, p=0.009). However, nonoperatively treated females had a lower likelihood of achieving ODI improvement compared to males (HR 0.55, p=0.036).

Females required more time to reach minimal disability (102 days vs. 62 days, p=0.008), especially with nonoperative treatment (130 days vs. 61 days, p=0.048). Multivariable analysis confirmed that nonoperative females had a reduced likelihood of achieving minimal disability compared to males (HR 0.55, p=0.042).

Conclusion

Gender differences in outcomes for TL burst fractures exist, with females performing worse with nonoperative management compared to males. Females benefit more from surgical management than nonoperative treatment, while this trend was not observed in males. These findings underscore the need for personalized, gender-

sensitive treatment strategies and further research into gender differences in other spinal injuries.

182

Meta-analysis of adjacent segment disease and revision rates following cervical disc replacement compared to fusion

Medha Raketla ORCID iD[1], Sashin Ahuja ORCID iD[2], Keith Morris[3], Lauren Williams[4]

[1]Cardiff University, Cardiff, United Kingdom. [2]University Hospital Wales, Cardiff, United Kingdom. [3]Cardiff Metropolitan university, Cardiff, United Kingdom. [4]University of Aberdeen, Aberdeen, United Kingdom

Abstract

Introduction:

Symptomatic cervical radiculopathy that is unresponsive to conservative treatment is commonly managed surgically with either anterior cervical discectomy and fusion (ACDF) or cervical disc replacement (CDR). ACDF achieves stabilisation via vertebral fusion, while CDR preserves mobility, potentially reducing adjacent segment disease (ASD). This meta-analysis evaluates the incidence of ASD and same-level revision rates between these procedures. The study employs a contemporary systematic search, robust patient cohort analysis, comprehensive statistical methods and precise assessment of heterogeneity.

Method

A systematic search of PubMed, Medline and Embase was conducted from January 2012 to September 2024. Data extraction was in accordance to PRISMA guidelines. The Peto method was utilised for pooled odds ratio calculations. Heterogeneity was assessed using the I^2 statistic.

Results

Revision rate data from 13 studies (1694 CDR and 1417 ACDF patients) revealed rates of revision surgeries were significantly lower in CDR patients than ACDF patients (combined odds ratio = 0.37, 95% CI: 0.29-0.47, p <0.01), with moderate heterogeneity of data (I^2 = 53%).

ASD data from 8 studies (559 CDR and 576 ACDF patients) showed no significant difference in ASD incidence between the procedures (combined odds ratio = 0.61, 95% CI: 0.33-1.13, p = 0.37), with low heterogeneity of data (I^2 = 8%).

Conclusion

This meta-analysis demonstrates that CDR significantly reduces revision surgeries compared to ACDF but offers no significant reduction in adjacent segment disease. Future research should aim to explore outcomes across varying follow-up durations for broader insights.

183

Surgical versus non-surgical treatment of thoracolumbar burst fractures in neurologically intact patients: A Cost-utility analysis.

Cumhur Oner[1], Charlotte Dandurand[2], Klaus Schnake[3], Richard Bransford[4], Gregory Schroeder[5], Nicolas Dea[2], Mark Phillips[6], Alexander Joeris[7], Mohammed El-Sharkawi[8], Ahmed Hassan ORCID iD[9], Shanmuganathan Rajasekaran[10], Lorin Benneker[11], Jin Tee Wee[12], Eugen Cezar Popescu[13], Jérôme Paquet[14], John C. France[15], Alexander Vaccaro[5], Marcel Dvorak[16]

[1]University Medical Center, Utrecht, Netherlands. [2]University of British Columbia, Vancouver, Canada. [3]Malteser Waldrankenhaus St. Marien · Center for Spinal Surgery and Scoliosis, Erlangen, Germany. [4]University of Washington School of Medicine, Seattle, USA. [5]Rothman Institute, Thomas Jefferson University Hospital, Philadelphia, USA. [6]McMaster University, Hamilton, Ontario, Canada. [7]AO Innovation Translation Center, Davos, Switzerland. [8]Assiut University School of Medicine, Assiut, Egypt. [9]Queen`s Medical Centre, Nottingham University Hospitals NHS Trust, Nottingham, United Kingdom. [10]Ganga Hospital, Coimbatore, Tamil Nadu, India. [11]Sonnenhof Spital, University of Bern, Bern, Switzerland. [12]National Trauma Research Institute (NTRI), The Alfred Hospital, Melbourne, Australia. [13]Prof. Dr. N. Oblu" Emergency Hospital, Iasi, Romania. [14]CHU de Quebec, Université Laval, Quebec City, Canada. [15]West Virginia University, Morgantown, WV, USA. [16]University of British Columbia, Vancouver, British Columbia, Canada

Abstract

Introduction

The optimal treatment for neurologically intact thoracolumbar (TL) burst fractures remains debated, with studies failing to establish a consensus between surgery and nonoperative management. To address this, the AO Spine performed a cost-utility analysis comparing surgical and non-surgical treatments for TL burst fractures in a multicenter, international study.

Methods

This cost-utility analysis compared surgical and non-surgical treatments for neurologically intact TL burst fractures using data from a prospective multicenter cohort study. The incremental cost-effectiveness ratio (ICER) was calculated for one-year, two-year, and lifetime horizons. Costs included clinical data, patient diaries documenting productivity loss, literature, and healthcare costing databases. Statistical methods included the central limit theorem, bootstrapping, Kaplan-Meier Sample Average (KMSA) estimations for censored patients, and sensitivity analysis to explore uncertainty.

Results

From 11 sites, 213 patients were recruited: 130 treated surgically (61%) and 83 non-surgically (39%). At one year, surgical treatment had an ICER of $191,648 per QALY. By two years, non-surgical patients had higher healthcare utilization, medication use, workdays lost (143.12 vs. 114.78), and caregiver workdays lost (29.86 vs. 2.39). At two years, surgical treatment was cost-effective, saving $28,978.50 per QALY. Over a lifetime, surgical treatment remained cost-effective, with savings of $25,530.18 per QALY.

Conclusion

Surgical management of neurologically intact TL burst fractures is cost-effective from a societal perspective at two years and beyond, with sustained benefits through a working-lifetime horizon. Cost-effectiveness is driven by reduced productivity loss among patients and caregivers. These findings emphasize the societal value of surgical treatment, particularly when productivity is prioritized.

185

Surgical versus non-surgical treatment of thoracolumbar burst fractures (AO Spine A3, A4) in neurologically intact patients: An AO Spine nonrandomized controlled international multicentre trial

Marcel F Dvorak[1], Charlotte Dandurand[1], Cumhur Oner[2], Klaus Schnake[3], Richard Bransford[4], Eugen Cezar Popescu[5], Mohammed El-Sharkawi[6], Ahmed Hassan

ORCID iD[7], Shanmuganathan Rajasekaran[8], Gregory Schroeder[9], Jin W. Tee[10], John C. France[11], Jérôme Paquet[12], Richard Allen[13], William F. Lavelle[14], Miguel Hirschfeld[15], Spyros Pneumaticos[16], Emiliano Vialle[17], Alexander R. Vaccaro[9]

[1]University of British Columbia, Vancouver, British Columbia, Canada. [2]University Medical Center, Utrecht, Netherlands. [3]Malteser Waldrankenhaus St. Marien · Center for Spinal Surgery and Scoliosis, Erlangen, Germany. [4]University of Washington School of Medicine, Seatlle, WA, USA. [5]Prof. Dr. N. Oblu" Emergency Hospital, Iasi, Romania. [6]Assiut University School of Medicine, Assiut, Egypt. [7]Queen`s Medical Centre, Nottingham University Hospitals NHS Trust, Nottingham, United Kingdom. [8]Ganga Hospital, Coimbatore, Tamil Nadu, India. [9]Rothman Institute, Thomas Jefferson University Hospital, Philadelphia, USA. [10]National Trauma Research Institute (NTRI), The Alfred Hospital, Melbourne, Australia. [11]West Virginia University, Morgantown, WV, USA. [12]CHU de Quebec, Université Laval, Quebec City, Canada. [13]University of California, San Diego, California, USA. [14]SUNY Upstate Medical University, Syracuse, NY, USA. [15]Orthopedic surgery and traumatology, Marbella, Spain. [16]KAT Hospital, Department of Orthopaedic Surgery, Kifisia, Greece. [17]Cajuru University Hospital, Curitiba, Brazil

Abstract

Background Treatment for thoracolumbar burst fractures in neurologically intact patients remains controversial. Non-surgical treatment is favoured for its low costs, low complication rate, and good clinical outcomes. Proponents of surgery report improved radiographic outcomes and more rapid improvement in pain and disability.

Material and Methods This prospective non-randomized controlled trial recruited patients aged 18-65 with acute AO type A3/A4 fractures. Improvement in Oswestry Disability Index (ODI) within one year was compared in patients treated surgically and non-surgically in 14 orthopaedic and neurosurgical departments across five continents. The primary endpoint was time to achieve an improvement in ODI of more than 12.8 points within one year after baseline. Time-to-event analyses were applied, including log-rank test for equality of survivor functions, Kaplan Meier survival curves and Cox proportional hazard models.

Results In 198 Patients enrolled, the median time to achieve a 12.8 point improvement in ODI from baseline was not significantly different between the surgical group (n=122) and the non-surgical group (n=76). An exploratory analysis of time to achieve minimal disability on the ODI, the log-rank test did not achieve significance between the two groups (P = 0.057), and the adjusted hazard ratio (Wald test) was 1.39 [95% CI, 0.97; 1.].

Conclusions Surgically and non-surgically treated patients with thoracolumbar burst fractures without neurological injury do not differ in achieving a 12.8 point improvement in ODI. An exploratory analysis revealed a strong trend towards statistical significance, indicating that Surgical patients improve more quickly than non-surgical patients.

186

Exploring the mediators of the BOOST intervention on walking function at 12 months: a causal mediation analysis

Lianne Wood[1], Christine Comer[2], Paul Newell[1], Daniel Ribeiro[3], Esther Williamson[1], Hopin Lee[1], Sarah E Lamb[1]

[1]University of Exeter, Exeter, United Kingdom. [2]Leeds Community Healthcare NHS Trust, Leeds, United Kingdom. [3]Curtin University, Perth, Australia

Abstract

Background

The Better Outcomes for Older People with Spinal Trouble (BOOST) randomised controlled trial evaluated the effectiveness of a physiotherapy delivered physical and psychological group intervention compared to best practice advice for individuals with neurogenic claudication. This study aimed to identify how improvements in the walking component of the Oswestry Disability Index (ODI) were mediated by factors such as walking confidence, capacity, fear avoidance, symptom severity, and physical performance.

Methods

A causal mediation analysis was conducted with 435 community-dwelling adults aged 65 years and older. A directed acyclic graph identified potential pre-treatment confounders between mediators (walking confidence, capacity, fear avoidance, symptom severity, physical performance) and the ODI walking component. We used multiple imputation for missing data, and estimated intervention-mediator and mediator-outcome effects, along with the natural indirect effects (NIEs) through each mediator, the natural direct effect (NDE) and the total effect (TE). Analyses were performed in R software (version 4.4.0).

Results

At 12-months, people in the BOOST intervention were statistically more likely to be in the more able walking groups of the ODI walking component (OR 0.62, 95% CI (0.40, 0.96)). The combined NIE via all mediators was statistically significant in favour of the intervention (OR 0.71, 95% CI (0.56, 0.91)). Walking confidence at 6-months accounted for 41% of the combined indirect effect from all mediators, and 39% of the total effect, with an NIE of 0.87 (95% CI (0.76, 1.0)).

Conclusion

The BOOST intervention improved walking disability primarily through improving the walking confidence of older adults with neurogenic claudication.

191

Injectable Peptide/Glycosaminoglycan Hydrogels for Minimally Invasive Nucleus Pulposus Augmentation

Jame Warren ORCID iD, Marlène Mengoni ORCID iD, Ruth Wilcox ORCID iD

University of Leeds, Leeds, United Kingdom

Abstract

Introduction:

Intervertebral disc degeneration is a leading factor associated with low back pain. Degeneration involves glycosaminoglycan (GAG) loss from the nucleus, resulting in reduced hydration and swelling pressure, altered mechanics, and pain. Current surgical treatments are invasive with limited long-term efficacy. Injection of a biomaterial into the disc ('nucleus augmentation') is a promising emerging treatment for early-stage disc degeneration.

Methods:

A patented self-assembling peptide, derived from natural amino acids, was combined with a GAG to create a hydrogel mimicking the nucleus pulposus. The peptide and GAG can be injected as liquids and transition rapidly to a gel *in situ*. The *in vitro* efficacy of nucleus augmentation using the hydrogel was examined in a bovine tail model where discs were mechanically tested in the native, artificially degenerated and treated states under cyclic loading. The effects of differing hydrogel compositions, differing volumes and injection forces, and the inclusion of a radio-opaque agent, were all examined.

Results:

The addition of GAGs significantly increased the stiffness of peptide gels, even after injection of the components down long (>10cm), narrow bore (29G) needles. In the *in vitro* tests, augmentation with the SAP-GAG hydrogel restored the stiffness and disc height to the native (healthy) levels, that were statistically different to the degenerated levels. The stiffness change was related to the volume injected. The radio-opaque agent enabled the gels to be visualised without adversely affecting the properties.

Discussion:

A hydrogel has been developed that has been shown to meet the biomechanical and clinical requirements for nucleus augmentation.

192

EFFECT OF SPINAL FUSION ON BIOMECHANICS OF HUMAN THORACIC FACET JOINTS ACROSS THREE LEVELS

James Warren ORCID iD, Sophie Hutchinson, Marlène Mengoni ORCID iD

University of Leeds, Leeds, United Kingdom

Abstract

Introduction

Adjacent disc degeneration is a known adverse outcome of spinal fusion, but the role of facet joints altered biomechanics in this process remains unclear. This study developed a model to systematically assess the impact of spinal fusion on same- and adjacent- level facet joints with multi-modality analysis of biomechanics of cadaveric tissue.

Methods

Following ethical approval (Yorkshire and the Humber REC 15/YH/0096), human thoracic spinal segments (T10-T12) (n=3) were dissected, prepared with PMMA endcaps, and tested pre- and post-fusion. The fusion model simulated lateral cage fusion surgery using partial nucleotomy and PMMA cement injection into the superior intervertebral disc.

Mechanical testing included displacement-controlled compression (to 1.1 kN) using a materials testing machine, with samples in a neutral position. Motion capture of facet joints during compression was performed, and load transfer through the facets was mapped using a flexible pressure sensor.

Results

Relative facet joint displacement under load, was significantly ($p = 0.01$ over 4x3 joints) higher before fusion (3.0 ±0.3 mm) than post fusion (2.3 ±0.3 mm)

The measured loads transferred through the post-fusion state and adjacent facets were significantly different compared to the pre-fusion state and adjacent facets. Bi-linear analysis of the load-displacement curves before and after fusion showed significant differences in final stiffness.

Discussion

The thoracic facet load-displacement data aligned with previous findings in human lumbar joints, despite anatomical differences. Post-fusion changes in facet displacement, load transfer and altered load-displacement data confirm that spinal fusion significantly impacts facet joint biomechanics, potentially contributing to subsequent spinal degeneration.

193

MUSCLES: Measuring and Understanding Sciatica and Leg Weakness Study. A scoping review

Lucy Dove ORCID iD[1], Carl Wong ORCID iD[1], Prof Lisa Roberts ORCID iD[2], Prof Annina Schmid ORCID iD[1]

[1]Nuffield Department of Clinical Neurosciences, Oxford, United Kingdom. [2]University of Southampton, Southampton, United Kingdom

Abstract

Introduction

Sciatica is a common and disabling condition. The reported prevalence for sciatica is up to 43%. Leg weakness is often reported by people with sciatica, but clinical measures commonly fail to detect subtle weakness of the leg. This scoping review aims to identify existing clinical tools to detect and report leg weakness in people with sciatica, including their psychometric properties.

Methods

Medline (Ovid), Embase (Ovid), Cinahl (Ebsco), Cochrane, Scopus, and Web of Science were searched from inception to December 2024. Eligibility criteria: peer reviewed articles including at least one human adult participant with sciatica; includes a measure of lower limb strength or weakness that could plausibly be used in clinical practice in people with sciatica. There are no restrictions on study design. Exclusions: animal studies; studies involving measures of the upper limb; studies where participants with low back pain (LBP) alone and LBP with sciatica are both included and cannot be separately analysed. Two reviewers screened all publications and completed data charting with disagreements resolved by discussion and consensus with third reviewer if required.

Results

The search returned 6015 citations (including 2403 duplicates), and 3612 studies were screened for inclusion. Although part of the UK national pathways, no universal definition of ‘leg weakness’ exists, and both patient-reported and observed parameters have been used to measure this construct.

Conclusion

Leg weakness in people with sciatica is poorly defined and difficult to accurately measure. Identifying accurate clinical measures of reported and observed leg weakness will inform future rehabilitation and intervention strategies.

194

Prioritising Quality Indicators for the Community Care of MSK Conditions: An Online Modified-Delphi Study

Alex Braybrooke ORCID iD[1], Roanna Burgess[1], Mike Brooks[2], Anirban Banerjee[1], Jonathan Hill[1]

[1]Keele University, Keele, United Kingdom. [2]Midlands Partnership Foundation Trust, Newcastle under Lyme, United Kingdom

Abstract

Background

Quality indicators can be used within healthcare to measure and benchmark performance. However, collecting data that populates indicators through routine data collection can be challenging. Variations in the access and quality of healthcare for musculoskeletal conditions, that cause individuals pain in their joints, muscles, and bones, have recently led to worsening patient outcomes and experiences.

Objectives

The study's primary aim was to develop and prioritise a set of care quality themes for musculoskeletal community care.

Methods

A multi-arm, two-round online Delphi process was used. In round one, participants rated 78 indicators, across six care quality themes, for importance to quality in community musculoskeletal care, and following an online panel meeting, re-rated indicators. The panel discussion focused on a) the prioritisation rating of indicators, and b) the wording of care quality themes. Only indicators that had gained consensus ≥60% were taken through to the second round.

Results/findings

Forty-six individuals participated in the first arm of the study, with 21 participating in the second round. After the second round, 58 indicators were ranked as highly important. Six care quality themes emerged: Optimising patient access and assessment, Optimising Patient Education, Self-Management, and Rehabilitation, Optimising Personalised Care, Optimising Diagnosis, Imaging, Investigation, and Referrals, Optimising Patient Experience and Outcomes, and Population Health Relevant to Musculoskeletal Conditions.

Conclusions

This study has prioritised a set of care quality themes and indicators for community musculoskeletal care. In the next stage of indicator development, real-world data will be used to validate the indicators across several constructs.

195

Biomechanical Evaluation of Mature Ovine Intervertebral Discs

Philippe Alipat, Marlène Mengoni, Ruth Wilcox, Nagitha Wijayathunga, James Warren

University of Leeds, Leeds, United Kingdom

Abstract

Introduction:

Understanding how degeneration alters intervertebral disc mechanics is crucial for developing effective treatments. Animal models often use artificially aged healthy tissues that fail to replicate true degeneration. This study examines the time-dependent mechanical behaviour of mature ovine discs under load relaxation and cyclic axial compression.

Methods:

Six mature ovine thoracic bone-disc-bone (BDB) units (>6 years old, grades 1 to 3 using the Griffith scale), were dissected and imaged with CT. After preconditioning in PBS, samples underwent axial compressive relaxation and cyclic axial loading (1,000 cycles). Generalised Maxwell and Voigt models were fitted to stress-relaxation and cyclic displacement data, respectively. Time constants were compared between test types and equivalent healthy bovine caudal data.

Results:

One of the five samples exhibited constant load (~24N) during relaxation, potentially due to the degenerated disc's lack of fluid flow hindering its ability to redistribute loads and cause a static mechanical response. The remaining samples were analysed and exhibited a good fit with the generalised Maxwell model. Relaxation exhibited faster short time constants (70 ± 23s) than cyclic loading (167 ± 61s), and long time constants also indicated faster viscous responses during relaxation (1347 ± 591s vs 2010 ± 461s). In contrast, prior studies on healthy bovine samples demonstrated shorter long response times during cyclic loading than during relaxation.

Conclusion:

The viscoelastic behaviour of mature IVDs was different from that of healthier tissue, which is potentially due to the discs' structural changes and reduced hydration. Thus, it is important to consider specimen-specific degenerative changes.

196

Has the National Suspected Cauda Equina Syndrome (CES) Pathway improved General Practitioner referrals from primary care?

Ahmed Hendawy, Riaz Mohammed ORCID iD

Gloucestershire Hospitals NHS Foundation Trust, Gloucester, United Kingdom

Abstract

Introduction:

The National Suspected Cauda Equina Syndrome (CES) Pathway came out in February 2023 and had clear triage criteria for referring patients from the primary care. An emergency referral to the nearest facility with Emergency MRI provision is recommended when symptom duration is within 14 days. This study aims to look at General Practitioner (GP) referrals for suspected CES to understand whether the pathway has improved the quality of referrals.

Methods:

All GP referrals over a four-month period to our spinal partner Hospital with 24 hour MRI scan provisions were analysed to ascertain the referral symptoms and duration. Patient demographics, CES symptoms, clinical assessment and MRI findings; and final outcomes were documented for scrutiny.

Results:

47 patient (26 female) referrals were received in this period, of whom the median age was 53 years (range 27-93 years). Only 18 (38%) of these had symptoms within 14 days. Three patients did not have CES red flag symptoms on clinical assessment. 41 (87%) patients had MRI scans performed urgently, whereas 3 patients already had scans done prior to being referred. Only 2 of these has radiological cauda equina compression, where surgical intervention was recommended.

Conclusion:

Despite the updated National pathway on CES management, referrals from primary care still don’t adhere fully to the triage criteria. More work is needed to inform and educate primary care clinicians regarding symptomatology, duration and referral principles so as to best utilise healthcare resources and improve patient safety in suspected CES.

202

Distal Level in Scoliosis Surgery for Non-Ambulatory Patients with Cerebral Palsy: Is L5 an Option? A case Study.

Jonathan Lucas[1], Ciancio Morales Alejandro[2], Edel Broomfield[2], Stewart Tucker[2], Thomas Ember[1], Mark Harris[1]

[1]Evelina London Children's Hospital, Guys and St Thomas' NHS Foundation Trust, London, United Kingdom. [2]Great Ormond Street Hospital, London, United Kingdom

Abstract

Background:

The benefits of fusing to pelvis vs L5 in this patient group remains unclear.

Aim:

To determine radiographic outcomes for cerebral palsy (CP) patients who underwent posterior spinal fusion from T2/3 to L5, at two quaternary hospitals.

Methods:

Between January 2010 to January 2020, 167 CP scoliosis patients underwent posterior spinal fusion using pedicles crews from T2/3 to L5 in both centers with a minimum of 2 years follow-up (FU). Radiologic measurements and chart review were performed.

Results:

106 patients aged 15.6 ± 0.4 years were included. No patient was lost to FU. All patients had significant correction in Cobb angle (CA), pelvic obliquity (PO). Thoracic kyphosis (TK) and lumbar lordosis (LL), without loss of correction at last FU. The mean values for preoperative, immediate postoperative and last FU were CA 93.4°, 37.5° and 42.8°, PO: 25.8°, 9.9° and 12.7°; TK 52.2°, 44.3° and 45°; and LL -40.9°, -52.4° and -52.9° respectively. Higher residual PO at LFU, was associated with more severe MC and PO baselines, lower implant density and apex at L3.

Conclusions:

CP scoliosis and PO can be corrected, and this correction maintained over the time with posterior spinal fusion using all pedicle screws setting L5 as the lowest instrumented vertebra. Larger preoperative MC and PO values associated with apex at L3 can be related with residual PO. Comparative large-scale studies with patients related clinical outcomes are required to demonstrate whether this intervention is related to improved surgical outcomes and reduced complication rates.

204

Spinal presentations in children with Spinal Muscular Atrophy type 1 following Gene Therapy treatment with onasemnogene abeparvovec – the SMA-REACH UK network experience.

Jonathan Lucas[1], Jennie Sheehan[1], Alex Schofield[1], Helen Cranney[1], Amy Wolfe[1], Emer O'Reilly[2], Georgia Stimpson[2], Alice Andrews[1], Maria Venegas[1], Mark Harris[1], Mariacristina Scoto[2], Vasantha Gowda[1], Elizabeth Wraige[1], Heinz Jungbluth[1]

[1]Evelina London Children's Hospital, Guy's & St Thomas' NHS Foundation Trust, London, United Kingdom. [2]Great Ormond Street Hospital for Children NHS Foundation Trust, London, United Kingdom

Abstract

Introduction: Spinal muscular atrophy (SMA) is a neuromuscular disorder of mainly early onset and variable severity. Prior to the introduction of disease modifying therapies (DMTs), children with SMA type 1 typically died before two years of age and management was primarily palliative. Onasemnogene abeparvovec (OA), nusinersen, and risdiplam are novel DMTs which ameliorate the effects of the underlying genetic defect at least partially and have made SMA a treatable condition. Survival and achievement of previously unmet developmental milestones result in treated SMA type 1 children spending more time upright than would be expected based on the natural history of the treatment-naïve condition. Consequently, spinal asymmetry and kyphosis, features not typically seen in untreated SMA type 1 children due to early mortality, are increasingly common complications. Precise data regarding their prevalence, severity, and management are currently limited.

Methods: This study describes the spinal features and management in 75 children with SMA type 1 who received OA between March 2021 and December 2022.

Results: Retrospective analysis from SMA-REACH UK data showed that 44/75 (59%) clinically had spinal asymmetry and 37 (49%) had kyphosis.

Conclusion: This study aims to raise awareness of this important feature as part of the changed natural history of SMA type 1 post OA treatment.

205

Development and validation of a tool for measurement of the psoas muscle to identify potential sarcopenia in spinal surgery - The PsoasSpine Study Protocol

James Prowse ORCID iD[1], Muhammed Haaris Iqbal[2], Humayoon Zaheen[2], Shuyang Xia[3], Mantaran Singh Bakshi[2], Benjamin Drake[2], Vaasu Bansal[4], Matthew Mawdsley[2], Priyesh Butani[2], Ata Kasis[2], Rahul Dharmadhikari[2], Miles D Witham[5], Cyrus Jensen[2], Antony K Sorial[6]

[1]AGE Research Group, Translational and Clinical Research Institute, Faculty of Medical Sciences, Newcastle University, Newcastle Upon Tyne, United Kingdom. [2]Northumbria Healthcare NHS Foundation Trust, Newcastle Upon Tyne, United Kingdom. [3]Newcastle Upon Tyne Hospitals NHS Foundation Trust, Newcastle Upon Tyne, United Kingdom. [4]Newcastle School of Medicine, Faculty of Medical Sciences, Newcastle University, Newcastle Upon Tyne, United Kingdom. [5]NIHR Newcastle Biomedical Research Centre, Newcastle University and Newcastle upon Tyne Hospitals NHS Foundation Trust, Newcastle Upon Tyne, United Kingdom. [6]Biosciences Institute, Newcastle University, Newcastle Upon Tyne, United Kingdom

Abstract

Introduction

Sarcopenia (the progressive and generalised loss of skeletal muscle strength, mass and quality) is a potential driver of adverse postoperative outcomes in degenerative lumbar surgery. Radiological measurement of psoas cross-sectional area (PCSA) and transverse psoas muscle thickness (TPMT) are surrogates for sarcopenia and potential predictors of adverse post-operative outcomes. There is no standardised method of PCSA or TPMT measurement in spinal surgical patients.

Method

Subject-matter experts were consulted to produce a standardised and reproducible protocol for the assessment of PCSA and TPMT at the inferior endplate of L3 on axial magnetic resonance imaging (MRI) scans. This protocol was provided to a cohort of orthopaedic surgeons and radiologists without further training. The Intraclass Correlation Coefficient (ICC) was calculated using a two-way mixed effects model. The PsoasSpine protocol was employed to retrospectively collect PCSA and TPMT measurements from a large cohort of elective spinal surgical patients to assess association with post-operative outcomes.

Results

The protocol was validated, with bilateral PCSA and TPMT measured in a large cohort (n=1207 spinal surgery patients). A sample (n=30) were triple-reported by orthopaedic surgeons and radiologists for calculation of ICC. The ICC for PCSA using the protocol indicated excellent reliability; 0.939[0.877-0.971], while ICC for TPMT indicated good reliability; 0.793[0.526-0.907].

Conclusion

Measurement of PCSA and TPMT at L3 on routine pre-operative MRI was reproducible with an excellent and good level of reliability respectively. This protocol will be published to standardise research into associations between sarcopenia surrogates and adverse postoperative outcomes in spinal surgery.

206

Long-term Follow-Up of Surgical Microdiscectomy Versus Transforaminal Epidural Steroid Injection for Sciatica Secondary to Herniated Lumbar Disc: Results from the NERVES Trial

ANASTASIOS BENJAMIN KONTEAS ORCID iD[1], Martin Wilby[1], Tony Marson[2], Paula Williamson[2], Simon Clark[1], Manohar Sharma[1], Girvan Burnside[2], Nisaharan Srikandarajah[1]

[1]The Walton Centre NHS Foundation Trust, Liverpool, United Kingdom. [2]University of Liverpool, Liverpool, United Kingdom

Abstract

Introduction: Sciatica secondary to herniated lumbar discs is a common condition, significantly impacting quality of life and work, with socioeconomic implications. The NERVES trial compared surgical microdiscectomy and transforaminal epidural steroid injection (TFESI) for sciatica, finding no significant difference in short-term outcomes at 18 weeks. To assess long-term outcomes, a follow-up study was set up, evaluating patients that participated in the original study. Methods: Previously recruited patients of the NERVES trial were followed-up long term. Patient reported outcomes were used to do so making use of pain scores, satisfaction levels, functional limitations, and the Oswestry Disability Questionnaire (ODQ) as the primary outcome. Results:Of the 76 patients recruited by the centre, 32 responded (42.1%) and 5 excluded from the analysis. Of the remaining 27, 12 underwent surgery and 15 TFESI. The mean follow-up interval was 7 years. The most affected nerve roots were S1 (59.3%). Among surgical patients, 44.4% required further surgery and 55.6% of the TFESI group went on to have additional interventions, including 46.7% undergoing surgery. The mean interval between initial and subsequent procedures was 190.5 days. Recurrence rates of leg pain were 66.7% in the surgery group and 53.3% in the TFESI group (p = 0.759). Mean ODQ scores were 60.8 for TFESI and 73.6 for surgery. Conclusion: No significant differences in ODQ scores were found between groups of patients that did not require further interventions long term. However, TFESI patients had higher failure rate 55.6% requiring additional interventions in the long term.

213

High-volume high-fidelity surgical simulations for overcoming the learning curve of endoscopic spine surgery.

Chan Hee Koh[1], James Booker[1], David Choi[1], Danyal Khan[1], Hugo Layard Horsfall[2], Parag Sayal[3], Hani Marcus[1], George Prezerakos[1]

[1]UCL Institute of Neurology, London, United Kingdom. [2]Crick Institute, London, United Kingdom. [3]National Hospital for Neurology and Neurosurgery, London, United Kingdom

Abstract

INTRODUCTION

Surgical proficiency is mostly acquired via apprenticeship and real-world experience. Spinal endoscopy is widely recognised to have a difficult learning curve, with recent meta-analyses suggesting that 50-60 cases are required to plateau in surgical performance with traditional methods. The aim of this study was to quantify the impact of high-volume high-fidelity surgical simulations by benchmarking against learning curves established in the literature.

METHODS

9 consultant neurosurgeons and spinal surgeons, with minimal or no experience in spinal endoscopy, from 4 hospitals have thus far completed 23 simulated endoscopic lumbar discectomies. High-fidelity spinal simulators were provided alongside live simulated intraoperative fluoroscopy.

RESULTS

The estimated complication rate of the first simulated procedure was 47.1%, versus 25.1% in real-world procedures given in the literature. The estimated incompletion rate of the first simulated case was 30.6%. These could be indicative of the permissive and safe environment for exploratory surgical learning.

Speed of learning with high-fidelity simulations was substantially quicker than described in the literature for traditional apprenticeship. The log-odds of complication in simulations reduced by 0.10 per case, versus 0.04 with apprenticeship. The log-odds of incompletion rates reduced by 0.16 for every simulated case.

CONCLUSIONS

Our results thus far indicate that high-volume high-fidelity simulations can provide a safe environment to overcome at least a part of the early surgical learning curve of endoscopic lumbar discectomies. Our results also show that high-volume simulations could accelerate the attainment of surgical proficiency. Further work is merited to investigate the impact of high-volume simulations on real-world surgical proficiency.

214

Learning Curve Prediction of Pedicle Screw Placement in the Thoraco-Lumbar Spine: A Systematic Review and Meta-Analysis

Udhay Singh Cheema ORCID iD[1], Chan Hee Koh[1], Sanchit Aapan[1], Honglin Zhu[2], James Booker[1], Hani J Marcus[1], Georgios Prezerakos[1]

[1]University College London, London, United Kingdom. [2]Kings College London, London, United Kingdom

Abstract

INTRODUCTION

A learning curve is an inherent part of surgical training. Surgeons early in their learning curve for pedicle screw placement often face longer operative times and higher complication rates. The aim of this meta-analysis was to quantify the learning curves for free-hand and robotic thoracolumbar pedicle screw placement.

METHODS

Searches returned 427 records, with 47 full-text articles screened. Studies of posterior thoracolumbar fixation reporting screw-placement times by case order were included. Mixed-effects nonlinear meta-regressions were conducted to define the learning curves.

RESULTS

Nine studies involving 3386 screw placements across 15 surgeons were included. For free-hand pedicle screw placement, the estimated time per screw for the first case was 10.7 minutes, and the estimated plateau was 2.7 minutes. An estimated 51 screws were required to overcome 80% of this deficit and near-plateau performance was expected after 145 screws. For robotic-assisted pedicle screw placement, the estimated time per screw for the first placement was 6.6 minutes, with a plateau at 2.8 minutes. It was estimated that 103 screws were required to overcome 80% of this deficit, with near-plateau performance expected after 295 screws.

CONCLUSIONS

Our study demonstrates that thoracolumbar pedicle screw placement times are nearly identical between robotic and free-hand techniques once surgeons have overcome their respective learning curves. However, during the initial learning phase, robotic pedicle screw placement is significantly faster and less impacted by the learning curve, as indicated by the smaller difference between the first case and plateau performance. Despite requiring a longer duration to reach plateau performance.

221

The new UK Suspected Cauda Equina Pathway: one year on, how is it working?

Matthew Morgan ORCID iD[1], Clare Ryan ORCID iD[2]

[1]University of Southampton, Southampton, United Kingdom. [2]Hampshire and Isle of Wight Healthcare NHS Foundation Trust and University of Southampton, Portsmouth, United Kingdom

Abstract

Introduction: In February 2023 a new UK framework for diagnosing and treating suspected Cauda Equina Syndrome (sCES) was released with the aim of improving patient outcomes and reducing litigation. This service evaluation aimed to explore physiotherapists' perspectives about how the new pathway was working.

Method: This qualitative interview study was located in the Musculoskeletal Outpatient Service of an NHS Trust in England. Data were collected in Autumn 2024 through three focus groups including thirteen spinal specialist physiotherapists who referred patients to two emergency departments (EDs). The focus groups were videorecorded, transcribed verbatim, and analysed thematically.

Results: With the creation of a 'two-week rule' relating to new or deteriorating symptoms, the new pathway was perceived to aid consistency and clarity about which patients to refer for emergency medical assessment. However, for patients whose symptoms did not align with this timeframe, difficulty accessing urgent imaging resulted in delays excluding cauda equina involvement. Furthermore, at times, the ED's approach of relying on tests other than MRI or failure to image higher when lumbar scans were normal was perceived to be inconsistent with pathway guidance. Finally, there was concern that once CES had been excluded, patients were discharged from the ED without follow up, despite further management being indicated.

Conclusion: Implications include the need to refine how urgent (rather than emergency) presentations are managed, and to clarify accountability for arranging post ED management. Research is required to explore the perspectives and practices of ED clinicians, and to investigate the implications of the 'two-week rule'.

224

Do Patients with Cervical Spondylotic Myelopathy Receive Timely Surgery? Results from a Tertiary Spine Unit

Mohamed Wael Mohamed, Basel Taweel, Mohammad Alfeeli, Debasish Pal

Leeds Teaching Hospitals NHS Trust, Leeds, United Kingdom

Abstract

Introduction

Cervical spondylotic myelopathy (CSM) is a progressive condition requiring urgent surgical intervention, as conservative management offers no therapeutic benefit. However, resource limitations within the NHS often result in variable surgical wait times across spinal units.

Aim

This study aimed to (1) assess the actual time to surgery for patients with CSM listed for urgent surgical intervention and (2) evaluate whether delays in surgery contributed to pre-operative clinical worsening.

Methods

A retrospective review was conducted on patients diagnosed with CSM and booked for urgent surgery (P2 priority, within 28 days) over 12 months (1 January to 31 December 2023) at a tertiary spinal unit. Time from initial clinical assessment to surgery and pre-operative clinical outcomes were analysed.

Results

Of 338 patients listed for cervical decompression, 136 met inclusion criteria (adults, P2 priority, and complete data). Surgical waiting times were as follows: 40 patients (34.2%) waited 1–3 months, 33 patients (28.2%) waited 3–6 months, and 40 patients (37.6%) waited >6 months. Only 19 patients (14%) were operated within 28 days.

Eight patients (6.8%) were clinically significantly worse pre-surgery.

Delays exceeding 65 days significantly increased the likelihood of preoperative neurological decline ($p = 0.04621$).

Conclusion

Prolonged delays in surgery for CSM are associated with deterioration, potentially resulting in irreversible functional deficits. Our regional spinal unit introduced a dedicated cervical myelopathy pathway to prioritise these patients, highlighting the need for similar pathways at both local and national levels.

225

Sensorised surgical force-gloves and machine-learning for the classification of proficiency in spinal surgery – A preclinical study in high-fidelity lumbar decompressions.

Chan Hee Koh[1], James Booker[1], Carmen Salvadores Fernandes[2], Xue Yang[2], Manish Tiwari[2], George Prezerakos[1], Hani Marcus[1]

[1]UCL Queen Square Institute of Neurology, London, United Kingdom. [2]UCL Department of Mechanical Engineering, London, United Kingdom

Abstract

INTRODUCTION
Surgical apprenticeship traditionally involves observation and supervision, with progress and assessments based on subjective impressions of mentors. There are currently a lack of objective metrics to define surgical proficiency. Surgical forces are crucial for mastery in surgery, but have previously been difficult to measure and analyse, limiting utility for surgical assessments. The objective was to investigate the utility of force recordings from surgical force-gloves for surgical assessment.

METHODS
8 neurosurgical consultants or post-certification fellows and 22 early-stage trainees undertook single-level lumbar decompressions on high-fidelity simulators whilst wearing sensorised force-gloves. “Black-box” machine-learning algorithms were trained to classify surgical expertise using crude segments of force recordings, and evaluated using 8-fold-crossvalidation.

RESULTS
Surgical force recordings could predict surgical expertise with accuracy of 84.3% [CI:75.0%-94.4%]. High discriminative index is demonstrated by AUC-ROC 0.90 [CI:0.79-1.00]. This is in comparison to recent work showing that quantitative threshold-based classification in operating time exhibits 84.2% accuracy [CI:67.0%-99.5%] and AUC-ROC 0.95 [CI:0.85-1.00], and with OSATS 71.4% accuracy [CI:51.1%-89.7%] and AUC-ROC 0.83 [CI:0.61-0.98].

However, the black-box nature of this algorithm does not allow explainable quantitative thresholds of surgical proficiency to be established in the same way.

CONCLUSIONS
The performance of this “black-box” algorithm suggests that surgical forces recorded with sensorised force-gloves can classify surgical ability with very good accuracy. There is great potential for further development of force-base algorithms, and for integration as adjuncts to other established objective proficiency metrics. Further work is merited to develop explainable algorithms that can provide meaningful insights and feedback into surgical forces.

239

3D spine shape estimation from single 2D DXA

Emmanuelle Bourigault, Amir Jamaludin, Andrew Zisserman

University of Oxford, Oxford, United Kingdom

Abstract

Background

The current literature on scoliosis highlights the growing importance of integrating multiple imaging planes, particularly the sagittal view, playing a critical role in assessing spinal curvature and its deviations, such as kyphosis or lordosis.

Methods

We propose a simple yet effective pipeline to estimate 3D spine shape from traditional 2D Dual-Energy X-ray Absorptiometry (DXA). Our goal is to predict the 3D structure of the spine from a single 2D DXA coronal scan. We leverage one of the largest paired DXA and MRI dataset from the UK Biobank to learn this prediction: Given a DXA paired to an MRI, we learn to regress the coronal and sagittal spine curves. The prediction is learnt from over 30k paired images of DXA and MRI scans. We assess the performance of the method on a held-out test set.

Results

We measure the precision of predictions using the Mean Absolute Error (MAE) and Relative Error (RE). The DXA and coronal MRI spine curves are predicted at sub-pixel level precision (MAE=0.66, RE=0.084). Our model can reliably estimate not only the coronal MRI projection from a single DXA but any spine curve projections along a 360-degree rotation about the vertical axis such as sagittal projection (MAE=1.65, RE=0.2, IoU=86.8). Our model can also capture patterns of curves.

Conclusion

This approach could have significant potential for improving scoliosis diagnosing, assessment of other spinal deformities in a more accessible and cost-effective manner, particularly in populations with limited access to advanced 3D imaging technologies such as MRI or CT scans.

240

Drivers of Self-Image Dynamics in Adult Spinal Deformity: A Cluster Analysis Approach

Sleiman Haddad[1], Lluís Vila[1], Chuck Lam[2], Leo Mok[3], Morgan Jones[4], Susana Nuñez-Pereira[1], Javier Pizones[5], Yann-Philippe Charles[6], Ibrahim Obeid[7], Frack Klienstuck[8], Ahmet Alanay[9], Francisco-Javier Perez-Grueso[5], Ferran Pellisé[1], European Spine Study Group[1]

[1]Vall d'hebron University Hospital, Barcelona, Spain. [2]University of Birmingham, Birmingham, United Kingdom. [3]Imperial College London, London, United Kingdom. [4]The Royal Orthopaedic Hospital, Birmingham, United Kingdom. [5]La Paz University Hospital, Madrid, Spain. [6]Hôpitaux Universitaires de Strasbourg, Strasbourg, France. [7]Hôpital Pellegrin, Bordeaux, France. [8]Schulthess Klinik, Zurich, Switzerland. [9]Acıbadem Maslak Hospital, Istanbul, Turkey

Abstract

Introduction:

Adolescent spinal deformity often affects self-image (SI), yet SI dynamics in Adult Spinal Deformity (ASD) remain poorly understood. This study analyzes SI patterns and key predictors in ASD using cluster analysis and machine learning.

Methods**:**

A retrospective analysis of 710 ASD patients with ≥2 years of follow-up was conducted using a prospective multicenter registry. Patients were grouped into three clusters: C1 (young patients with coronal deformity), C2 (adults with moderate deformity/disability), and C3 (adults with severe deformity/disability). Machine learning algorithms predicted preoperative SI, SI at two years post-surgery, and Patient Acceptable Symptom State (PASS) postoperative improvement.

Results:

Only 13% of patients reported acceptable preoperative SI (PASS+): 28% in C1, 24% in C2, and 1% in C3. Key predictors included age, ODI, pain, social function, and sagittal deformity (AUC: 75%). At two years, 64% achieved PASS+: 85% in C1, 68% in C2, and 52% in C3, with C3 showing the greatest relative improvement (65x). PROMs accounted for >66% of SI predictions, while radiographic parameters contributed <30% (AUC: 85%). Among patients with unacceptable SI preoperatively, 61% normalized their SI at two years. ODI and SF-36 pain and function dimensions were the strongest predictors of improvement.

Conclusions:

Most ASD patients (87%) report unacceptable SI preoperatively, yet 61% normalize SI post-surgery, particularly those with severe preoperative disability. Machine learning accurately identified key predictors, with PROMs outperforming radiographic measures. These findings suggest prioritizing dysfunction, pain, and mental health in surgical planning, particularly for older, disabled patients.

241

Automation of Scoliosis Measurement on Total Body Dual Energy X-ray Absorptiometry (DXA) Scans

Emmanuelle Bourigault[1], Amir Jamaludin[1], Timor Kadir[1], Emma Clark[2], Jeremy Fairbank[1], Andrew Zisserman[1]

[1]University of Oxford, Oxford, United Kingdom. [2]University of Bristol, Bristol, United Kingdom

Abstract

Background

Existing scoliosis prevalence estimates are between 1-5%. It is likely that current practice does not identify all cases of scoliosis, and of those that are recognised over 70% are too advanced for non-operative treatment to be feasible.

Methods

In this work, we have developed and validated an automated method for scoliosis detection using deep learning and applied it to the 48 thousand DXA scans of adults in the UK BioBank. The method can be broken down into two main steps: (i) compute the mid-curve of the spine from the DXA, and (ii) analyse the geometry of the curve to find the maximum angle of the spine which represents its severity. To validate our method, we manually annotated a proportion of UK Biobank DXA scans (n=1,929) with angle measurements of the largest curve, the direction of the curve, and the number of curves.

Results

There is very good agreement between the manual and predicted angle of the spine with Pearson's correlation value of 0.87, and a mean difference of less than 5 degrees between manual and automated readings with 95% confidence. Our model accurately predicted curve location (specificity of 0.850), direction (specificity of 0.793) and number of curves (specificity of 0.671).

Conclusion

We have leveraged deep learning and spine geometry to automate scoliosis measurements. These quantitative measurements could be used to refine the evaluation of scoliosis and its evolution, to build a phenotype for scoliosis and to better orient patients towards surgical or conservative treatments.

243

Is out-of-hours decompression for acute disc herniation associated with greater peri-operative complications?

Fergus McCabe ORCID iD[1], Henry Turner[1], Cathal Hannan[2], Maggie Lee[2], Martin Wilby[2], Iain Feeley[2]

[1]Midlands Regional Hospital Tullamore, Tullamore, Ireland. [2]The Walton Centre, Liverpool, United Kingdom

Abstract

Introduction

Timing of surgery for emergent disc herniations, such as cauda equina syndrome, remains a challenging entity, with most authors recommending decompressive surgery as soon as feasible. The literature conflicts on the merit and potential risk of emergent, “out-of-hours” decompression. Our aim was to evaluate if out-of-hours decompressive surgery for emergent disc herniations is associated with more frequent complications.

Methods

This was a single-centre, retrospective cohort study of patients who underwent emergency decompressive surgery for acute disc herniation. Demographic, clinical and operative data, intra-operative complications and revision surgery at 6 weeks and 1 year were recorded. Out-of-hours operating was defined as occurring between 20:00 and 08:00. Patients were followed to at least one year post-operative. Multivariable analysis was performed by multiple logistic regression. Statistical analysis was performed with R.

Results

There were 344 sequential, emergency decompressions for acute disc herniation performed during the study period. The mean age was 50 years and 53% were female. Of cases, 129 (38%) were performed out-of-hours, compared to 146 (42%) during normal working hours and 69 (20%) during daylight weekend hours. There were 35 (10%) intra-operative complications; while 29 (8%) patients required re-operation within 6 weeks. On multiple logistic regression, out-of-hours surgery was not associated with either intra-operative complication or re-operation at 6 weeks. There were no independent predictors of intra-operative complication or revision surgery at 6 weeks.

Conclusion

In this study, out-of-hours emergency decompression for acute lumbar disc herniation is not associated with intra-operative complication or revision surgery at one year.

248

Does pre-operative neutrophil-lymphocyte ratio predict patient reported pain and functional outcomes at 12 months after anterior cervical discectomy and fusion?

Chinmay Tijare[1], Keith Thomas[2], Balint Borbas[2], Temidayo Osunronbi[3], Agbolahan Sofela[2], Himanshu Sharma[2]

[1]Nottingham University Hospitals, Nottingham, United Kingdom. [2]University Hospitals Plymouth, Plymouth, United Kingdom. [3]Manchester Hospitals NHS, Manchester, United Kingdom

Abstract

Introduction

Preoperative neutrophil-lymphocyte ratio (NLR) has been found in various fields to be a predictor of post-operative pain and functional outcomes. To date no studies have looked at NLR in relation to anterior cervical discectomy and fusion (ACDF).

Aims

The primary aim is to determine the relationship between pre-operative NLR, pain and functional outcomes 12-months post elective ACDF surgery.

Methods

This single-centre retrospective cohort study included 60 patients undergoing 1 or 2 level ACDF. Pre-operative NLR and demographic data were collected. Visual analogue scale (VAS) for neck and arm pain as well as Neck Disability Index (NDI) were collected at 12 months post-operatively. Binary logistic regression was used to evaluate the association between NLR and demographic variables with reaching the minimal clinically important difference of VAS and NDI.

Results

A unit increase in NLR was associated with a 56% decrease in the odds of substantial clinical improvement in neck pain (OR: 0.44; CI: 0.21-0.89, p=0.02). NLR was not found to be a statistically significant predictor of improvement in VAS Arm or NDI.

Higher baseline VAS scores were found to be significant predictors of improvement in the respective scores.

Compared to patients with cervical disc herniation, those with cervical stenosis had a 72% decrease in the odds of substantial clinical benefit in NDI score (OR: 0.28 CI: 0.09-0.91, p=0.03).

Conclusion

A higher pre-operative NLR was predictive of poorer outcomes 12 months post-operatively as measured by VAS Neck, however, this was not replicated across other outcome measures.

252

Metastatic spinal cord compression secondary to genitourinary primary cancer, excluding renal and prostate origins: A rare event and a further infrequent surgical indication.

Yasemin Keith[1], Tasnima Raysa[1], Samuel North[1], Marzuq Abbas[1], Sofia Mavili[1], Rukhsar Hussain[1], Maryam Kashif[1], Priyanshu Saha[2], Mohamed Ugas[3], James Geddes[3], Hasan Raza[3], Charlie Taylor[3], Bisola Ajayi[3], Adnan Shaikh[3], Liam Rose[3], Fay Greenway[3], Francis Johnston[3], Pawan Minhas[3], Erlick Pereira[3], Marios Papadopoulos[3], Vino Siva[3], Tim Bishop[3], Jason Bernard[3], Darren Lui[3]

[1]City St George's, University of London, London, United Kingdom. [2]Homerton Healthcare NHS Foundation Trust, London, United Kingdom. [3]St George's University Hospitals NHS Foundation Trust, London, United Kingdom

Abstract

Introduction: Early genitourinary cancer is often managed surgically; however, advanced disease often includes other systemic/targeted treatments. Metastatic spinal cord compression (MSCC) is a rare complication of genitourinary cancer, with surgical management even rarer. This paper aims to assess factors affecting outcomes in genitourinary MSCC.

Methods: Genitourinary cancer MSCC patients identified from a prospectively collected MDT cohort (2017-2023, 2,503 total MSCC cases). Prostate and renal cancer excluded. Data collected: age, sex, primary cancer, comorbidities, performance status, mortality, and Tokuhashi score.

Results: 23 cases. Mean age 73 years (range: 41-92), 82.6% male. 82.6% bladder, 13% penile, 4.3% testicular. 4 (17.4%) had surgery (3 bladder, 1 penile), 19 (82.6%) non-operatives. 100% of surgical group were Frankel E at presentation, versus 60% of non-operatives. 1-year mortality was 80% for bladder, 50% for penile and 100% for testicular. Surgical patients had a 30-day mortality of 0% and 1-year mortality of 100%, versus 31.6% and 73.3% respectively for non-operatives. Surgical patients had a mean Tokuhashi score of 8, versus 3.15 for non-operative. Patients scoring 0-8 on the Tokuhashi score had mean survival of 6.52 months, versus one month when scoring 9-11.

Conclusion: Genitourinary MSCC is rare, with most patients having non-operative management. Bladder MSCC was most common, but penile had the lowest 1-year mortality. Surgical patients had better Frankel scores. The non-operative group had low Tokuhashi scores, concordant with conservative management. Surgical patients had lower 30-day mortality, but greater 1-year mortality. Higher Tokuhashi scores had shorter survival, contrasting predictions. Low prevalence may have limited findings.

253

Current concepts in Metastatic Spinal Cord Compression from Renal Cancer in the era of Immune therapy and Checkpoint Inhibitors

Marzuq Abbas[1], Maryam Kashif[1], Tasnima Raysa[1], Samuel North[1], Yasemin Keith[1], Sofia Mavili[1], Rukhsar Hussain[1], Priyanshu Saha[2], Mohamed Ugas[3], James Geddes[3], Hasan Raza[3], Charlie Taylor[3], Bisola Ajayi[3], Adnan Shaikh[3], Liam Rose[3], Fay Greenway[3], Pawan Minhas[3], Erlick Pereira[3], Marios Papadopoulos[3], Vino Silva[3], Tim Bishop[3], Jason Bernard[3], Darren Lui[3]

[1]St George's Hospital Medical School, London, United Kingdom. [2]Homerton Healthcare NHS Foundation Trust, London, United Kingdom. [3]St George's University Hospitals NHS Foundation Trust, London, United Kingdom

Abstract

Introduction

Renal cell carcinoma (RCC) is a highly vascular malignancy which is often radioresistant. For metastatic RCC the one-year survival is roughly 70% with a 15% five-year survival for stage IV RCC. Systemic anti-cancer therapy (SACT) has improved with many lines of treatment; these include immune checkpoint inhibitors, targeted therapies and cytokines. The impact on survival with respect to surgery in this new era is less well published. This study aims to compare the survival outcomes of surgical vs. non-surgical treatment for MSCC due to RCC.

Methods

A retrospective review of a prospectively collected database of 2,500 patients (2017-2023) from our level 1 centre MSCC MDT. Key parameters are: mean age at presentation, gender ratio, Charlson Comorbidity Index Score (CCI), revised Tokuhashi Score, ECOG performance status, Frankel Score, survival status, immunotherapy or chemotherapy usage, and mean survival time.

Results

69 RCC patients with MSCC were identified. Surgical group: n=42 (61%), 8.33 month mean survival, 16.7% received immunotherapy or chemotherapy. Non-surgical group: n=27 (39%), 6.97 month mean survival, 33.3% received immunotherapy or chemotherapy. Surgical group vs non-surgical group revised Tokuhashi score: 7.8 and 6.6 respectively (p=0.015). Mean age of 64 years for both groups.

Conclusion

The Tokuhashi score remains relevant for RCC metastases with concordant higher scores leading to surgery. There was 8-month survivorship in the operative group vs 6 months in the non-operative group. Larger cohort studies may further clarify the impact of SACT on survivorship.

254

Lung Metastatic Spinal Cord Compression - the development of lung cancer treatment in the era of Targeted Check Point inhibitors.

Sofia Mavili[1], Darren Lui[2], Maryam Kashif[1], Tasnima Raysa[1], Samuel North[1], Marzuq Abbas[1], Yasemin Keith[1], Rukhsar Hussain[1], Priyanshu Saha[3], Mohamed Ugas[2], James Geddes[2], Hasan Raza[2], Charles Taylor[2], Bisola Ajayi[2], Adnan Shaikh[2], Liam Rose[2], Fay Greenway[2], Francis Johnson[2], Pawan Minhas[2], Erlick Pereira[2], Marios Papadopoulos[2], Vino Siva[2], Tim Bishop[2], Jason Bernard[2]

[1]St George's Hospital Medical School, LONDON, United Kingdom. [2]St George's Univeristy Hospitals NHS Foundation Trus, LONDON, United Kingdom. [3]Homerton Healthcare NHS Foundation Trust, LONDON, United Kingdom

Abstract

Introduction
Metastatic spinal cord compression (MSCC) secondary to lung cancer historically carries a poor prognosis. Current UK data show 90% of Stage 1 patients survive 1 year, compared to 15% (male) and 19% (female) of Stage 4 patients. Since 2021, improved systemic anti-cancer therapies (SACT), including targeted KRAS inhibitors, have drastically altered the prognosis of non-small cell lung cancer (NSCLC). The Bilsky NOMS algorithm has gained importance over the traditional Tokuhashi scoring system, which does not account for advancements in SACT.

Materials and Methods
A prospectively collected database of 2500 patients (2017–2024) from the MSCC MDT was examined, data included demographics, surgical details, metastases, Charlson Comorbidity Index, Tokuhashi score, survival duration, and pharmacotherapy.

Results
260 patients with lung MSCC were identified, 47 of whom underwent surgery. Among these, 37 had Tokuhashi scores of 0–8 (group 1), 10 scored 9–11 (group 2), 86% of these patients had 1–2 spinal metastases. Of the surgical patients there was 60% mortality at 12 months in group 1. In group 2 the mortality was 50% at 12 months.

Conclusion
Advances in SACT, particularly checkpoint inhibitors, have improved lung MSCC prognosis, increasing oncologist-driven referrals. NOMS-guided decisions, in collaboration with oncologists, are vital for patients eligible for checkpoint inhibitors. Surgery, alongside SACT, modestly improves survival and remains crucial in MSCC management. Our results show lung MSCC surgical cases surpass the UK average, with 50% surviving at 12 months. Even low-grade Tokuhashi patients benefit, reflecting a more aggressive surgical approach targeting checkpoint inhibitor opportunities.

257

Outcome & recurrence rate after surgical resection of intradural spinal tumours—12 years experience

Kaushik Ghosh

Lancashire Teaching Hospitals NHS Foundation Trust, Preston, United Kingdom

Abstract

Introduction: Intradural spinal tumours are the most commonest primary tumours. This could be intra or extramedullary with differing pathology & outcome.

Method: Retrospective review from the patient's case notes of all the patients operated over the last 12 years. Data was collected on patient demographics, presenting symptoms, tumour characteristics, surgical approaches, postoperative complications, adjuvant therapies, and long-term follow-up.

Results: 85 patients were included in this study. The study cohort had a mean age of 57 years with 34 males and 51 females. Pain (76%), weakness (62%), and sensory disturbances (54%) being the most common presenting symptoms. 26% patients had sphincter problem. 65 of these tumours were intradural extramedullary in location where as the other 20 intramedullary. Thoracic region was the most commonly affected area (46%). The most common extramedullary tumour was meningioma and ependymoma in intramedullary location. The majority of tumours were completely excised with subtotal resections being performed in 14% of cases (mostly intramedullary). 17% patients suffered adverse events, primarily CSF leak and hematomas. Median hospital stay was 6 days. At the 6-month follow-up, 58% of patients reported symptomatic improvement. Typically patients were followed up for 5 years after surgery with a mean of 6.3 MRI scans during follow up. Total 15 patients had recurrence during follow up of which 11 were intramedullary in location.

Conclusion: IDEM spinal tumours are likely to have total excision with very small chance of recurrence. There is a scope to revisit the duration of follow up after IDEM lesions with total excision.