Introduction:
Modic changes (MC) are specific for chronic low back pain. Despite the high prevalence of MC, the histopathology of MC remains poorly understood. The only published histological data from clinical MC biopsies are from Michael Modic’s original paper. Based on three biopsies, he described Modic type 1 changes (MC1) as vascularized fibrous tissue and Modic type 2 changes (MC2) as yellow marrow replacement. No histomorphometric data is available that would help to understand the pathophysiology of MC. The aim of this study was to characterize MC histomorphometry with multiphoton excitation microscopy (MPE), histology, and immunohistochemistry (IHC) in order to better understand MC pathophysiology.

Methods:
From patients undergoing lumbar spondylosis, bone marrow biopsies (n=3 MC1, n=5 MC2, n=6 control; based on T1- and T2-weighted MRI) were taken through pedicle screw trajectory before screw insertion. Fixed biopsies were analyzed en-bloc with MPE and as paraffin sections with histology and IHC. MPE: second-harmonics-generation (SHG) of collagen and tissue autofluorescence were recorded of large volumes. Sections were stained histologically (eosin/hematoxylin, masson trichrome) and analyzed with IHC for alpha smooth muscle actin (αSMA), collagen-1, collagen-3, cellular fibronectin, and CD68 (macrophages).

Results:
In MC1, hematopoietic marrow was replaced with increased number of adipocytes. Fibrotic marrow changes were found in 2 of 3 MC1 biopsies and were accompanied by increased vascularization. No myofibroblasts positive for α-smooth muscle actin were found in fibrotic areas. Collagen-1 was exclusively found in fibrotic marrow. Collagen-3 and fibronectin fibers were present in fibrotic areas but were also found in control marrow. In MC2, hematopoietic
marrow was replaced by adipocytes with little marrow fibrosis. Macrophages were not increased in MC1 and MC2. Fibrotic marrow was best identified and visualized with MPE using SHG.

Conclusion:
The historical MC1 histopathology paradigm „fibrovascular granulation tissue“ needs to be re-evaluated. First, because fibrosis was not a consistent characterization of MC1, and second, because increased number of adipocytes has been associated until now only with MC2. Adipocyte abundance in MC1 along with spatial tissue heterogeneity suggest phases of MC1 flare-ups and MC2 remissions. Therefore, sub-phenotypes of MC1 exist and question the T1- and T2-weighted MRI-based MC classification.

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EMERGING TRENDS IN THE SURGICAL TREATMENT OF DEGENERATIVE SPONDYLOLISTHESIS; THE UTILITY OF A NOVEL SURGICAL DECISION AID

R. Andrew Glennie, Chris Bailey, Neil Manson, Raj Rampersaud, Charles Fisher
Department of Surgery, Dalhousie University, Halifax, Nova Scotia, Canada

Introduction
Universal instrumented fusion for lumbar degenerative spondylolisthesis (LDS) has been challenged recently with high impact trials demonstrating similar changes in health-related
quality of life (HRQOL) and less morbidity/cost with laminectomy alone. Randomized trials often fail, however, to evaluate a heterogeneous population of patients. A standardized clinical assessment and management plan (SCAMP) was created as a decision aid for surgeons based on the radiographic stability and clinical presentation of patients. The purpose of this study was to compare outcomes of those patients who followed the decision aid with respect to fusion/no fusion.

Methods
Patients were prospectively enrolled from eleven different Canadian institutions and followed from 2015-2019. A degenerative spondylolisthesis instability classification system (DSIC) was created using best available evidence stratifying patients into three different subtypes (1. stable degenerative spondylolisthesis, 2. potentially unstable spondylolisthesis and 3. unstable spondylolisthesis). The decision aid recommends laminectomy alone for group 1 patients, posterolateral fusion with pedicle screws in type 2 patients and pedicle screw and interbody fusion for type 3 patients. One year changes in HRQOL, length of hospital stay (LOS), medication use and surgical time were compared between each group and in context of whether the treatment fell within the decision aid recommendation.

Results
There were 394 patients initially enrolled (84.1%1 year F/U). There were 95 type 1 (stable), 224 type 2 (potentially unstable) and 75 type 3 (unstable) patients initially classified. Baseline Ostwestry disability index (ODI), EQ-5D, and SF-12 MCS scores were significantly worse for type 3 patients versus type 1 patients. One hundred and eight patients were treated within the recommendations of the DSIC system (108/334, 32.3%). Surgeons performed interbody fusions in 141 patients (42%) rather than follow DSIC recommending a less invasive approach. There were no significant differences EQ-5D, SF-12 PCS/MCS, PHQ-9 or ODI at one year between patient groups. There was a trend towards shorter operating times for those patients following the DSIC system (195 minutes non-followers versus 180 followers, p=0.078) and reduced hospital stay (4.46 days non-followers versus 3.98 followers, p=0.065).

Conclusions
Surgeons were more likely to perform potentially unnecessary interbody fusions even in those patients with stable or potentially unstable spondylolisthesis. Although not statistically significant, there is some suggestion that following the DSIC system based on best evidence recommendations leads to more judicious/responsible use of hospital resources. Further study is required to determine why surgeons are more likely to choose more invasive, higher rigidity constructs in patients with LDS.

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NEUROPATHIC PAIN: A COMPONENT TO BE CONSIDERED WHEN TREATING DEGENERATIVE LUMBAR DISEASE?
Paulo Pereira, Bart Heijnen, Seung-Won Park, Aleksandr Krutko, Carlos Santos, Wolfgang Senker, Vasilieios Arzoglou, Alexander Cristea
Department of Neurosurgery, Centro Hospitalar Universitário São João, Porto, Portugal
Background
Persistent post-operative pain has been reported after instrumented spine surgery for degenerative lumbar disease (DLD) despite consistently high fusion rates. Neuropathic pain (NP) may play a role in this, yet prevalence and incidence of NP in spine fusion patients is scarce.

Purpose
The aim of this study was to systematically assess the concomitant occurrence of NP in DLD patients with chronic leg- and back pain, before and at 3 months after the primary fusion. The purpose was to examine whether NP may play a role in persistent pain post-surgery.

Methods
Patients with DLD enrolled in a multi-center, prospective study (NCT02617563) undergoing a 1-2 levels minimally invasive fusion procedure completed a Visual Analogue Scale (VAS) for leg pain (LP) [VAS-LP] and low back pain (LBP) [VAS-LBP] at baseline and at 3 months after the primary fusion. The patients also completed validated Douleur Neuropathique 4 questionnaires (DN4) to assess NP at the leg- and low back level. A score ≥ 4 out of 10 is indicative of a NP component. For VAS, paired t-test was used for changes at 3 months from baseline and ANCOVA-test was used to test for group differences.

Results
146 subjects (58.2% women, average age 58.8±10.6 years, average BMI 27.2±4.1) were identified that completed a pre-operative and 3-months post-operative DN4 for back, leg or both. At baseline 50.7% (74/146) of the patients were identified with NP located in leg (n=38), back (n=5) or both locations (n=31). NP remained present in 27% (20/74) of the patients; additionally, 12.5% (9/72) of the patients with no NP at baseline had developed a NP component 3 months after the surgery.

The average DN4 and VAS scores for back and leg of each group are presented in Table 1. Firstly, the data is presented for the groups with or without NP at baseline. Further, within-subject changes from pre-op to 3M post-op were reviewed to identify NP that is i) persistent, ii) disappearing, iii) absent and iv) appearing.
Patients with persistent NP, or who developed NP at 3 months after surgery, had less improvement on VAS-LP and VAS-LBP at 3M follow-up, more pronounced for VAS-LP.

Discussion/Conclusion
This study shows that half of the DLD spine patients suffering from leg pain and low back pain also had a NP component before the primary fusion. Some patients developed new NP after the surgery. The NP component seem to play a role in persistent pain after the first fusion surgery in DLD patients, especially in VAS-LP.
Patients with persistent NP demonstrated limited pain relief after surgery, which might be perceived as a partial treatment failure. These patients could be at risk for re-operations. Based on these results we strongly recommend routine NP assessment before surgery, especially in patients with predominant leg pain.
This is the first global prospective study which systematically assessed NP in a real-world DLD population before and 3-months after minimally invasive spine fusion surgery.
Table 1. Neuropathic pain and VAS levels in back and leg at baseline and 3-months post minimally invasive lumbar interbody fusion procedure.

<table>
<thead>
<tr>
<th></th>
<th>NP at BL (n=74)</th>
<th>No NP at BL (n=72)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BL 3M</td>
<td>BL 3M</td>
</tr>
<tr>
<td>DN4-LP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VAS-LP</td>
<td>6.70±2.16</td>
<td>5.56±2.86</td>
</tr>
<tr>
<td>DN4-LBP</td>
<td>3.35±2.19</td>
<td>1.07±1.09</td>
</tr>
<tr>
<td>VAS-LBP</td>
<td>6.68±2.28</td>
<td>5.42±2.68</td>
</tr>
</tbody>
</table>

Date presented as mean±SD
BL=baseline; LBP=Low Back Pain; LP=Leg Pain; NP=neuropathic pain; 3M=3 months follow-up

Statistical significance:
- VAS 3M compared to BL (improvement in group); p-value *<0.05, **<0.01, ***<0.001,
- VAS between groups at 3M (NP at BL versus No NP at BL; i) versus ii); iii) versus iv)); p-value *<0.05, **<0.01, ***<0.001

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INCIDENCE AND RISK FACTORS FOR RECURRENT INTER-VERTEBRAL DISC PROLAPSE IN A PROSPECTIVE CONSECUTIVE SERIES OF 888 LUMBAR DISCECTOMY CASES WITH A MINIMUM 2-YEAR FOLLOW UP

Jonathan Geere, Girish Swamy, Paul Hunter, Joanne Geere, Am Rai
Department of Orthopaedics and Spinal Surgery, Spire Norwich Hospital and Norfolk & Norwich University Hospital, Norwich, United Kingdom

Introduction
The rate of reherniation after lumbar discectomy varies widely in the literature and the role of risk factors in the reherniation is not fully established. Equally the subsequent treatment option in the management of symptomatic recurrent lumbar disc herniation remains unclear.

The aim of the study was to identify the true incidence and the associated risk factors for reherniation after lumbar discectomy.

Methods
We looked at a consecutive series of 888 cases undergoing lumbar discectomy from January 2008 to December 2017. We prospectively collected data on patient demographics and patient-reported outcome measures (back and leg pain, Oswestry Disability Index (ODI), and EQ-5D). In the post-operation period we reviewed all patients' MRI scans across the geographic region to ensure complete data capture. Reherniation outcome was positive if clinical symptoms were confirmed by concordant nerve root compression on the MRI scan.

This was correlated with surgical findings. A multivariable logistic regression analysis of demographic and clinical variables was used to identify key predictive factors.

Results
Out of 888 cases, complete data capture was available on 796 (89.6%). Mean age was 48.5 (+/-13.3) years, 41% were female and 24% were smokers. ASA grades recorded were 56% grade 1, 42% grade 2 and 2% grade 3+. Same level reherniation occurred in 82 cases (10.3%) and reherniation at a different level occurred in 5 cases (0.6%) at a median of 235 days (IQR 112-410 days) post-surgery. Fifty-four same level cases had a reoperation and 2 different level cases had a reoperation. Current smoker (OR = 1.75, 95% CI = 1.08-2.8, P = 0.024), female sex (OR = 1.62, 95% CI = 1.02-2.68, P = 0.041) and higher ODI score (OR = 1.02, 95% CI = 1.01-1.03, P = 0.007) were associated with an increased risk of recurrent disc herniation. Female sex was a statistically significant risk for reoperation (OR = 2.26, 95% CI = 1.28-4.00, P = 0.005).

Conclusions
This is one of the largest series to date which has identified female sex, smoking and higher pre-operation disability as independent risk factors for reherniation. Female sex was also identified as the only independent risk factor for reoperation. These findings are important for healthcare practitioners involved in the treatment of intervertebral disc herniation in consenting patients and developing management strategies.

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30
A PROSPECTIVE, CONTROLLED, MULTICENTRE STUDY TO EVALUATE THE ASSOCIATION BETWEEN "APPROPRIATE USE OF SURGERY" AND OUTCOME IN DEGENERATIVE SPONDYLOLISTHESIS
Anne F Mannion, Francine Mariaux, Tamas F Fekete, Frank S Kleinstück, Dezsö Jeszenszky, Markus Köhler, Daniel Haschtmann, Jon Lurie, Adam M Pearson, Philippe Otten, Michael Norberg, Markus Loibl, Valerie Pittet, François Porchet
Schulthess Klinik, Zürich, Switzerland

Introduction: Many treatment failures in spine surgery are attributable to poor patient selection and the application of inappropriate treatment. Identifying appropriate candidates for surgery is important to optimise outcomes and prevent unnecessary risk and expense. Appropriate Use Criteria (AUC) serve to help clarify the indications for a procedure.
Aim: This study evaluated the short-term outcomes of patients with lumbar degenerative spondylolisthesis (LDS) classified as appropriate or otherwise for surgery using a recently developed appropriateness algorithm(1).
Methods: This was a prospective, controlled, multicentre (5 in Switzerland; 1 in USA) study of 736 patients (493 surgical and 244 nonsurgical controls; 70±10y; 67% female) with a first follow-up (FU) after treatment. The AUC were used to judge the appropriateness of surgery for each patient, based on the presenting symptoms and a constellation of other variables documented at baseline. Patients completed the Core Outcome Measures Index (COMI) at baseline and 3 months' FU. The care plan (surgery or nonsurgical care) was decided at the discretion of the treating physician, as per their normal practice and irrespective of the criteria. The data were analysed using repeated measures ANCOVA.
Results: According to the AUC, surgery of some type was considered appropriate (A) in 143/493 (29%), uncertain (U) in 230/493 (47%) and inappropriate (I) in 120/493 (24%) of the surgical patients; it was A in 43/244 (18%), U in 94/244 (38%) and I in 107/244 (44%) of the nonsurgical patients. As per convention, the A and U groups were combined for comparison with the I group. There was a significant interaction (p=0.02) between the change in COMI score from baseline to 3mo FU in relation to treatment group and appropriateness for surgery: the benefit of surgery over nonsurgical care was greater in patients for whom
surgery was considered A/U (2.9-point greater reduction in COMI) than in those for whom it was I (1.8-point greater reduction). In patients A/U for surgery, the COMI minimal clinically important change (MCIC) score was reached by 76% who got surgery and 27% who got non-surgical care; in those who were I for surgery, it was reached by 61% patients who got surgery and 26% who got non-surgical care.

Conclusion: The AUC were able to successfully identify patients who derived greater benefit from surgery. Although the literature suggests that the early outcome heralds the longer-term results, the findings should be confirmed by further analyses of the 12 mo-FU data.

Validation of the AUC for surgery for LDS should support their widespread adoption for quality improvement in spine surgery.


Disclosures:

31

COMPARISON OF 5 YEAR OUTCOMES BETWEEN WIDE LAMINECTOMY, SEGMENTAL BILATERAL LAMINOTOMIES AND UNILATERAL HEMI-LAMINECTOMY FOR LUMBAR SPINAL STENOSIS

Jamal Bech Bouknaitir, Leah Carreon, Stig Brorson, Casper Friis, Mikkel Andersen
Spine Unit, Department of Orthopedic Surgery, Zealand University Hospital, Køge, Denmark; Spine Surgery and Research, Spine Center of Southern Denmark – part of Lillebaelt Hospital, Denmark

Comparison of 5 year outcomes between wide laminectomy, segmental bilateral laminotomies and unilateral hemi-laminectomy for lumbar spinal stenosis

Background
The optimal procedure for lumbar spinal stenosis remains controversial. Studies have shown no difference in short term outcomes among micro-laminectomy, hemi-laminotomies, broad laminectomy and laminectomy with instrumented fusion.

Purpose
To report on outcomes in Lumbar spinal stenosis patients who underwent wide laminectomy, segmental bilateral laminotomy or unilateral hemilaminectomy

Method
Patients with spinal stenosis who were enrolled in the DaneSpine database from January 2010 until May 2014 and underwent wide laminectomy, segmental bilateral laminotomy or unilateral hemilaminectomy were identified. Patients completed standard questionnaires preoperatively and 1, 2 and 5 years after surgery that included the Oswestry Disability Index (ODI). Peri-operative data, including ASA score, body mass index and smoking status were also collected.

Results
Five hundred ten patients (265 males and 245 females) were included. Most patients were operated with segmental bilateral laminectomy over one level (n=283). Operative method (p=0.07) was not found to be a predictor for patients achieving MCID for ODI (12point change) from baseline to one, two and five years follow up. ASA score (p=0.036) and smoking status (p=0.015) were associated with change in ODI above MCID after one and
Two-year patients were re-operated on same level after primary decompression alone, either because of disc prolapse (n=3), dural tear (n=3), re-decompression (n=17), hematoma (n=4) or fusion (n=1). We did not find reoperation to be associated with operative method (p=0.60), although age at operation time seems to predict reoperation (p=0.039).

Conclusion
There is no difference in MCID change in ODI with either broad laminectomy, segmental bilateral laminotomy or unilateral hemi laminectomy after one, two and five years. Factors associated with achieving ODI MCID were smoking status and ASA score at one and two years follow up but without significant difference at five years post-op. Age at surgery was found to predict risk of reoperation after five years.

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32
ARE MODIC CHANGES ASSOCIATED WITH HEALTH-RELATED QUALITY OF LIFE AFTER DISCECTOMY - A STUDY ON 620 PATIENTS WITH TWO-YEAR FOLLOW-UP
Peter Udby, Søren Ohrt-Nissen, Rune Paulsen, Christian Stottstrup, Andreas Andresen, Mikkel Osterheden Andersen, Stig Brorson, Leah Carreon
Spine Unit, Zealand University Hospital, Denmark

Abstract
Study design: A registry-based comparative cohort study with two-year follow-up.
Objective: To assess whether Modic Changes (MCs) are associated with health-related quality of life, long-term physical disability, back- or leg pain after discectomy.
Summary of background data: Previous studies have failed to show a clinically significant association between MCs and patient-reported outcomes (PRO's) after discectomy.
Methods: Data from the Danish National Spine Registry on patients undergoing first-time lumbar discectomy at a single institution from 2014-17 with an accessible preoperative lumbar MRI, complete pre-operative and two-year follow-up questionnaires were obtained. PRO's including ODI, EQ-5D, VAS back and leg pain and patient satisfaction were collected. Patients were stratified based on the presence (+MC) or absence (-MC) of MCs on the preoperative MRI.
Results: Of 620 patients included, MCs were present in 270 patients (47%). Of these, MC type 1 (MC-1) was present in 70 (25%) and MC type 2 (MC-2) in 210 (75%) patients. Preoperative data for ODI, EQ-5D, VAS-BP, and VAS-LP were comparable for the +MC and -MC groups. Both groups had a statistically significant improvement in PRO's from baseline compared to two-year follow-up (p<0.001). At two-year follow-up, both groups had improved with no significant difference between them in regards to ODI (15.5 vs. 17.2, p=0.208); EQ-5D (0.75 vs. 0.72, p=0.167); VAS-BP (27.1 vs. 28.3, p=0.617); VAS-LP (26.8 vs. 25.0, p=0.446) and patient satisfaction (74% vs. 76%, p=0.878).
Conclusion: MCs were not found to be associated with health-related quality of life, disability, back- or leg pain or patient satisfaction two years after discectomy.
OPTIMAL RECONSTRUCTION OF SAGITTAL ALIGNMENT ACCORDING TO GAP SCORE HELPS REDUCE ADJACENT SEGMENT DEGENERATION AFTER LUMBAR FUSION SURGERY

Xu Sun, Muyi Wang, Yong Qiu, Zezhang Zhu, Bangping Qian, Bin Wang, Yang Yu, Zhen Liu
Department of Spine Surgery, Drum Tower Hospital, Medical School of Nanjing University, Nanjing, China

Background. The global alignment and proportion (GAP) score was applied to predict postoperative complications for adult spinal deformity, as well as to facilitate future outcome-based research on optimal treatment for various spinal conditions. However, it remains unclear whether reconstruction of alignment according to GAP score can reduce the adjacent segment degeneration (ASD) rates.

Purpose of the study. To investigate the relationship between sagittal alignment, GAP score and ASD after fusion surgery for lumbar degenerative diseases.

Materials and Methods. This study retrospectively reviewed a consecutive series of patients who had undergone lumbar fusion and had been followed over 2 years. The following spinopelvic parameters were collected: SVA, SS, PT, PI, LL, L4-S1 LL, GT, TPA. Relative pelvic version (RPV), relative lumbar lordosis (RLL), lordosis distribution index (LDI) and relative spinopelvic alignment (RSA) were calculated as the difference between measured and ideal values. GAP scores were summarized by adding the scores for RPV, RLL, LDI, RSA, and age. The patients were divided into the non-ASD, radiographical ASD (R-ASD), and symptomatic ASD (S-ASD) groups. Comparisons were made in radiological and clinical
variables among groups. Logistic regression analysis and receiver operating characteristic (ROC) curves were performed to investigate the association between GAP score and ASD.

Results. A total of 126 consecutive patients were enrolled, with an average follow-up of 41.1 months and an average fusion span of 1.7 levels. R-ASD and S-ASD were found in 44 patients and in 13 patients, respectively. In contrast to non-ASD and R-ASD groups, the S-ASD group had significantly lower LL, higher GT and higher SVA before surgery, and lower SS and lower LL after surgery. Based on GAP scores, 70 patients were identified with proportioned status, 37 with moderately disproportioned status and 19 with severely disproportioned status, respectively. The Chi-square test found lower percentage of aligned status of RLL, RSA, and RPV in the ASD (R-ASD+S-ASD) and S-ASD groups than the non-ASD group. The Cochran-Armitage test and logistic regression analysis showed a significant linear trend, with higher GAP scores being associated with higher rates of ASD or S-ASD. Upon ROC analysis, we found a low discriminatory power for ASD (AUC: 0.632) and a moderate discriminatory power for S-ASD (AUC: 0.871), respectively. The VAS and ODI in patients with disproportioned status were notably higher than those with proportioned status at the latest follow-up.

Conclusion. Our study revealed significant associations between either postoperative GAP score or GAP subcategories (RLL, RSA, and RPV) and ASD after lumbar fusion surgery. Residual sagittal malalignment after surgery might be risk factors of the occurrence of ASD, especially for S-ASD.


34

SCLEROSATION OF THE INTERVERTEBRAL DISC (IVD) USING LACTIC ACID (LA) IN PATIENTS WITH DISCOGENIC CHRONIC LOW BACK PAIN: RESULTS FROM A PHASE 1B TRIAL

Anders Lehmann, Svante Berg, Andreas Gerward, Kjell Olmarker, Bengt Isberg
Stayble Therapeutics, Göteborg, Sweden

Reduced stability of the IVD, neoinnervation along annular fissures and increased production of inflammatory agents are thought to interact to produce pain in patients with lumbar discogenic pain. While it is unknown why discogenic pain is less common in older individuals, one hypothesis is that sclerosis of the IVD in many patients progresses to a point where stability is regained and inflamed tissue is replaced by connective tissue. Chemical sclerosation of painful IVDs may mimick and fast-forward this process and may therefore be a potential new treatment option. Lactic acid (LA) is present at high concentrations in the IVD and is known to stimulate collagen production in both normo- and pathophysiological conditions. We have found that LA is an effective sclerosing agent in pigs and the objective of the present study was to establish safety and tolerability in patients with lumbar discogenic pain. Reduction of intensity of the nucleus pulposus (NP) at T2-weighted MRI was used as a biomarker for sclerosation, a biomarker which previously was validated in pigs. Fifteen patients suffering from chronic discogenic pain were enrolled in the study which was double-blinded, randomised and placebo-controlled. LA (45, 90 or 180 mg) mixed with Omnipaque (code for the formulation: STA363) was injected into the IVD according to a single ascending dose schedule (n=3 for each dose), and Omnipaque was used as placebo (n=6). One or two IVDs were injected under fluoroscopic control. Patients were followed for 12 months with 3 months as the primary completion time. Primary objective was safety and
tolerability, changes in disc height and NP intensity served as secondary objectives and pain (VAS) and disability (ODI) were exploratory objectives.

The treated IVD(s) of all enrolled patients were of Pfirrmann grade 3 and all patients were evaluable at the primary completion time. No serious adverse events were recorded and adverse events were related to transient, mild to moderate increase in low back pain with no clear distinction between STA363 and placebo. IVDs injected with the two higher doses of STA363 were darker while this was generally not seen in the placebo and low dose groups. There was no obvious difference in IVD height between the groups after 12 months (change from baseline in mm [mean+SD]: Placebo, -1.0+1.4; STA363 45 mg, -0.5+0.7; STA363 90 mg, -1.2+0.8; STA 363 180 mg, -1.8+1.3).

Given the excellent safety and tolerability profile of STA 363, and its effect on the biomarker, STA363 is now planned to be evaluated in a phase 2 trial to determine effects on pain, disability and quality of life in this medically underserved group of patients.

Disclosures:
author 1: stock/shareholder=Stayble Therapeutics, employee=Stayble Therapeutics; author 2: consultant=Stockholm Spine Center; author 3: stock/shareholder=Stayble Therapeutics, employee=Stayble Therapeutics; author 4: grants/research support=AFA insurance, Stockholm, Sweden, stock/shareholder=STayble Therapeutics AB, Gothenburg, Sweden, royalties=STayble Therapeutics AB, Gothenburg, Sweden; author 5: consultant= study "Sclerosation of the intervertebral disc (IVD) using lactic acid (LA) in patients with discogenic chronic low back pain: Results from a phase 1b trial"

35
SPINAL SURGERY SITE INFECTION LEADING TO SPINAL IMPLANT LOOSENING IS INFLUENCED BY NUMBER OF PRIOR OPERATIONS
Gerhard Bratschitsch, Paul Puchwein, Sebastian Klim, Viktor Labmayr, Andreas Leithner, Lukas Leitner
Department of Orthopedics and Trauma, Medical University of Graz, Graz, Austria

BACKGROUND: Spinal surgery site infection and chronic implant infection are discussed as possible causes for ongoing pain, implant loosening, and development of failed back surgery syndrome. Evidence for chronic infection was found in up to 29.1% of revision cases, but also seems to be preexisting in a considerable amount of degenerative cases without prior surgery. Infection mechanisms and possible clinical correlations are unclear.

METHODS: Standardized screening (swab, tissue samples, sonication of implants) of surgery site, in cases without preoperative clinical evidence of surgery site infection (n=181); including case history, events and factors, which might promote infection.

RESULTS: Screening of cases without prior spinal surgery (n=49; 10.2% positive) was compared to cases with prior spine surgery without implant placement (e.g. micro discectomy) (n=21; 23.8% positive), revision cases following singular spinal fusion (n=73; 23.2% positive) and cases with multiple revisions (n=38; 50.0% positive). Propionibacterium spp. detection rate increased to 80% in screening positive cases with multiple revisions. Metal implants in place during revision surgery revealed a significantly higher positive infection rate (32.4%), compared to no implant in place (14.2%; p=0.007). Positive cases had a significantly higher activity pain level prior surgery, compared to screening negative cases (p=0.019). Preoperative laboratory parameters were not predictive for positive screening.

Logistic regression revealed number of previous spinal surgeries (OR 1.38 per additional operation, p < 0.001) and male sex (OR 1.15, p=0.028) as independent predictive factors for infection.

CONCLUSION: History of prior spinal surgery presents a main risk factor for chronic surgery site infection, leading to chronic pain, implant loosening and revision. Especially
Propionibacterium spp., playing a role in chronic septic implant loosening, accumulate with numbers of surgeries.

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