

EUROSPINE 2021 scientific programme

Quick Fire presentations

Friday, 8 October 2021, 15:45–17:05

Trauma, Tumour, and MIS

QF60

TEACHABILITY OF LOWER CERVICAL SPINE INJURIES CLASSIFICATIONS

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Study design: Multicenter observational survey study.

Summary of Background Data. Few studies have been carried out on interobserver agreement for different lower cervical spine injury classifications among junior neurosurgeons, and only one study attempted to assess teachability.

Objective: To compare the teachability of the Allen-Ferguson, Harris, Argenson, AOSpine, Subaxial Cervical Spine Injury Classification (SLIC), and Subaxial Cervical Spine Injury Classification (CSISS) and, specifically, to identify the classification that a group of residents and junior neurosurgeons find easiest to learn.

Methods. We used data from 64 consecutive patients. Nine residents and junior neurosurgeons participated in two assessment procedures. Six raters (main group) participated in special seminars between assessments. Three other raters formed the control group. Teachability was measured as the median value of the difference (ΔK) in the interrater agreement on the same patients by the same pairs of subjects. Interrater consistency with experts' opinions (ICexp) was measured with kappa coefficient and calculated by comparing the responses of each rater of the workshop or control group with those of each experienced surgeon.

Results. The overall ΔK for the Allen-Ferguson classification was 0.07, mainly due to the main group ($\Delta K=0.1$). At the same time the ICexp increased substantially for some raters ($K=0.37$). The overall ΔK for the Harrison scheme was 0.01. ICexp was fair for all raters and slight, similarly increased for both groups after the provided seminars. The ΔK for the Argenson classification was 0.26 in the main group, and the level of agreement remained practically unchanged in the control group. ICexp after seminars was moderate and reached a considerable level for some junior neurosurgeons ($K=0.47$). The AOSpine classification demonstrated a significant increase in the main group ($\Delta K = 0.38$) without changes in the control group ($\Delta K = 0.04$). ICexp at the second stage was high for the workshop group and for some raters reached excellent level ($K=0.64$). Management agreement for SLIC after the first stage in the workshop group was better than that in the control group (median $\Delta K=0.16$ and median $\Delta K=0.02$). Interrater consistency with experts' opinion for single measures as well as for management was practically similar for both groups during the 1st and 2nd stages. The ΔK and ΔICC for the CSISS were virtually unchanged in all groups.

Conclusions. Among morphological classifications of lower cervical spine injuries, the AOSpine scheme had the greatest teachability. Among numeric scales, SLIC demonstrated better results. Appropriate application of these classifications by residents and junior neurosurgeons was possible after a short educational course. The use of these scales in educational cycles at the stage of residency can simplify the communication of specialists, especially at the stage of patient admission.

Disclosures:

author 1: none; author 2: none; author 3: none; author 4: none; author 5: none; author 6: none

QF61

ARE 4 SCREWS STILL BETTER THAN 2 FOR POSTERIOR C1-C2 FIXATION? THE RESULTS OF A META-ANALYSIS AND RETROSPECTIVE COHORT STUDY

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Objectives. To provide a comprehensive comparison of screw-related complications and fusion rates for the Goel-Harms (GHT) and Magerl (transarticular screw fixation - TAF) techniques of C1-C2 fixation, using meta-analysis and a retrospective study.

Methods. The study consisted of two parts. First, a meta-analysis was conducted to estimate the pooled prevalence of GHT and TAF screw-related complications and fusion rates. Second, we conducted a retrospective analysis of patients who underwent surgery in a level 1 trauma centre from 2010 through 2020. We compared GHT and the TAF technique when performed using the routine midline approach (12 and 20 patients, respectively) and when using minimally invasive (MIS) techniques (18 and 32 patients, respectively). Operative time, blood loss, C-arm usage, and early and late surgical results were assessed. The mean follow-up period was 5 years for TAF and 3.4 years for GHT.

Results. A systematic review of the PubMed database revealed 129 studies (73 for GHT and 56 for TAF) satisfying the inclusion criteria. The respective pooled prevalence of screw-related complications for GHT and TAF was as follows: 1) vertebral artery (VA) injury, 2.6% and 1.8%; 2) screw malposition, 2.0% and 3.2%; 3) C2 nerve compression, 4.3% and 0%; and 4) screw breakage, 2.1% and 2.2%. The non-union rates were 2.8% and 3.5%, respectively. Scatterplot mapping of the number of patients and screw-related complications revealed similar associations of complications with surgical experience.

In total, 82 patients (48 men and 34 women; mean age, 43 years) were included in the retrospective analysis. When using MIS techniques, TAF resulted in significantly lower blood loss volumes and operative times (median values, 20 mL and 56 min, respectively) than GHT (median values, 180 mL and 125 min, respectively). For routine midline techniques, the median blood loss volume and operative time were lower in the TAF group than in the GHT group, but the difference was not significant. The level of C-arm usage was significantly lower in MIS and routine GHT. In the TAF group, five screws were malpositioned with only one requiring revisional surgery. In the GHT group, two clinically insignificant screws malpositioned. There were no cases of VA injury or screw breakage. Finally, there were no significant differences in the TAF (3.5%) or GHT (2.7%) non-union rates or in scores of the Neck Disability Index or 36-item Short-Form Health Survey.

Conclusions. C1-C2 fixation still remains challenging. GHT and TAF are similar in terms of screw-related complication rates and fusion rates and both similarly depend on the surgeon's skill. While TAF has more opportunities for minimally invasive methods, less blood loss, and shorter surgical times, the GHT method is advantageous in cases of insufficient lateral joint congruence. Surgical skill with either method can significantly improve the results of treating C1-C2 vertebral fractures.

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QF62

EARLY CLINICAL PREDICTORS OF FUNCTIONAL RECOVERY FOLLOWING TRAUMATIC SPINAL CORD INJURY

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Background: Traumatic spinal cord injuries (TSCI) are associated with great uncertainty regarding the prognosis of functional recovery. We aimed to evaluate the potential of early clinical variables to predict the degree of functional independence assessed by Spinal Cord Independence Measure III (SCIM-III) up to 1 year after injury.

Methods: Prospectively collected data from 143 SCI patients treated in Western Denmark during 2012-2019 were retrospectively analyzed. Linear regression was used to model total SCIM-III scores against age, gender, body mass index (BMI), comorbidity, American Spinal Injury Association (ASIA) Impairment Scale (AIS) grade A-B and C-D, ASIA Motor Score (AMS), timing of surgical treatment and occurrence of medical complications.

Results: Univariate analyses indicated that variables significantly associated with decreased functional independence included increased age ($p=.023$), increased BMI ($p=.012$), pre-existing comorbidity ($p=.001$), AIS grades A-B ($p<.001$), decreased AMS ($p<.001$) and occurrence of medical complications ($p<.001$). However, in the multivariable regression model were pre-existing comorbidity ($p=.010$), AIS grade A-B ($p<.001$), low AMS ($p<.001$) and late surgical treatment ($p=.018$) significant predictors of decreased functional independence one year after injury.

Conclusion: TSCI patients with greatest potential for functional recovery up to 1 year after injury seems to be patients that immediate after trauma presents with few or no comorbidities, who sustain motor-incomplete injuries and undergo early decompressive surgery.

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QF63

RISK FACTORS FOR REFRACTURE FOLLOWING PRIMARY OSTEOPOROTIC VERTEBRAL COMPRESSION FRACTURES

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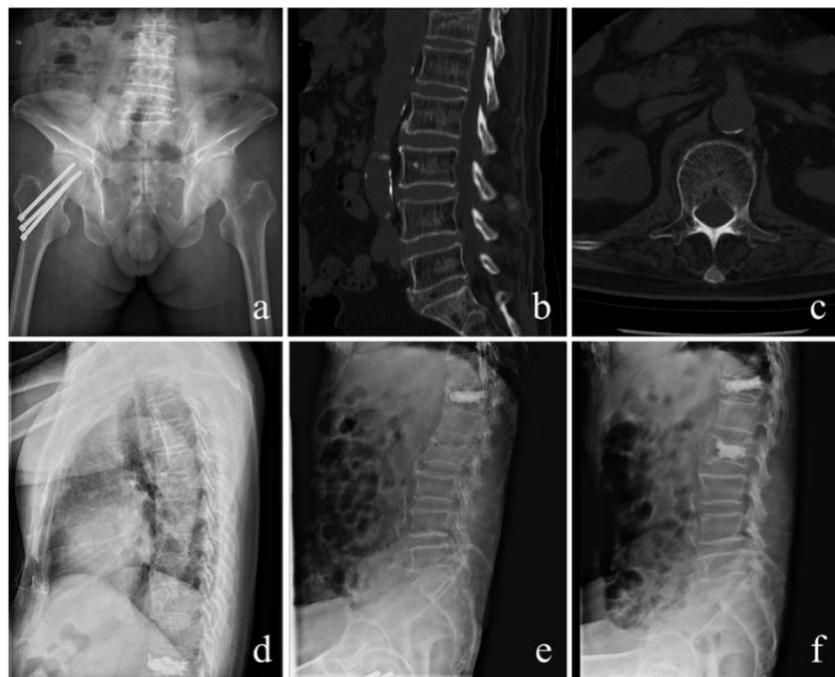
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Purpose: In the aging population, osteoporosis and related complications have become a global public health problem. Osteoporotic vertebral compression fractures (OVCFs) are among the most common type of osteoporotic fractures and patients are at risk of secondary vertebral compression fracture (SVCF). This study aimed to identify risk factors for SVCF following primary OVCF.

Methods: This retrospective cohort study evaluated the risk factors for SVCF in 317 consecutive patients with systematic OVCF who received percutaneous vertebroplasty and kyphoplasty (PVP/PKP) or conservative treatment. Patients were divided into SVCF (n=43) and non-SVCF (n=274) groups. We retrospectively analyzed clinical characteristics and radiographic parameters, including sex, age, body mass index, number of primary fractures, primary treatment (PVP/PKP or conservative treatment), non-spinal fracture history before primary fracture, primary fracture at the thoracolumbar (TL) junction, steroid use, bisphosphonate therapy and Hounsfield Units (Hu) value of L1.

Results: Comparison between the groups showed significant differences in age ($p=0.001$), non-spinal fracture history ($p<0.001$) and Hu value of L1 ($p<0.001$). The receiver operating characteristic curves demonstrated that the optimal thresholds for age and Hu value of L1 were 75 (sensitivity: 55.8%; specificity: 67.5%) and 50 (sensitivity: 88.3%; specificity: 67.4%), respectively. In multivariate logistic regression analysis, non-spinal fracture history (OR=6.639, 95%CI=1.809-24.371, $p=0.004$) and Hu value of L1 < 50 (OR=15.260, 95%CI=6.957-33.473, $p<0.001$) were independent risk factors for SVCF.

Conclusion: Patients with low Hu value of L1 or non-spinal fracture history are an important population to target for secondary fracture prevention.



QF64

THE INFLUENCE OF PHARMACOLOGICAL OSTEOPOROSIS TREATMENT ON REFRACTURES FOLLOWING A KYPHOPLASTY

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Introduction: The aim of this study was to examine the relationship between pharmacological osteoporosis treatment on the refracture rate in patients who have had a thoracic or lumbar level kyphoplasty for a diagnosis of osteoporotic compression fracture.

Methods: A single center observational cohort study with 192 patients who had kyphoplasty from 2015 until 2019 was conducted. All patients who had at least one kyphoplasty from the center were included in the study. The patients were divided into two main groups. Group I (pharmacological osteoporosis treatment) and Group II (no pharmacological osteoporosis treatment). Each group had 96 patients. In this study, refracture was defined as having at least one future osteoporotic compression fracture requiring a kyphoplasty after the initial. Patients who were successfully treated in a brace were exempt from the study. Patients that had a subsequent fracture following the initial kyphoplasty procedure were placed into the „Post Kyphoplasty Refracture“ (PKR) category, whereas those that didn't have a fracture subsequent to the initial kyphoplasty were categorized as „No Post Kyphoplasty Refracture“ (NPKR). The refracture rate was determined for each group. 44 patients self-reported the intent to start osteoporosis treatment with their Primary Care Provider (PCP) and were placed in Group I based on the assumption that they were an Intended to Treat Group (ITT). A Chi Square Independence Test was used to analyze the data.

Results: There were 121 females and 71 males with an average age of 77 years. There was a significant reduction in the refracture rate between Group I and Group II ($p=0.036$). Group I PKR showed a 20.8% refracture rate (20/96) versus a 34.4% refracture rate in Group II PKR (33/96). In Group I NPKR 58% (44/76) patients claimed to start pharmacological osteoporosis treatment with their PCP. These patients were part of the ITT population. In Group I, the ITT group (44/76) were the only patients who were lost to follow up. No patients in Group II were lost to follow up. The Chi Square Independence score was 4.4045.

Conclusions: There was a significant reduction in refractures following kyphoplasty in patients who had pharmacological osteoporosis treatment. The Chi Square Independence Test suggested a strong dependent relationship pharmacological osteoporosis treatment and the refracture rate following kyphoplasty.

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PERCUTANEOUS SHORT FIXATION ASSOCIATED WITH KYPHOPLASTY FOR BURST FRACTURES OF THE THORACOLUMBAR SPINE: MONOAXIAL VERSUS POLYAXIAL SCREWS

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Introduction

Burst fractures of the thoracolumbar and lumbar fractures account for almost 50% of spine fractures. They require a surgical treatment most of the time to achieve good deformity correction and quick patient recovery. Percutaneous short fixation associated with kyphoplasty appears as an effective treatment. Several studies report mechanic advantages, and better fracture correction when using monoaxial screws over polyaxial screws. Monoaxial screws offer the possibility to better transmit the bending of the rods to the spine. The goal of our study was to compare the correction obtained with monoaxial and polyaxial screws in percutaneous short fixation associated with kyphoplasty. Our hypothesis was that the correction was better with monoaxial screws.

Material and method

We included from October 2009 to 2020, all the patients who presented with a Magerl A3 or A4 fracture of the thoracolumbar or lumbar spine without neurologic deficit, treated by percutaneous short fixation and kyphoplasty. Minimum radiologic follow-up was 6 months. We measured vertebral kyphosis (VK), local kyphosis (LK), and calculated the traumatic regional angulation (TRA), and anterior vertebral compression ratio (AVCR). All measures were made by a single assessor on computer, before surgery, on early postoperative X-Rays, and at last follow-up. Last follow-up X-Rays were the last before device removal if so was performed. The main judgment criteria were VK, and LK.

Results

79 patients were included. Monoaxial screws were used in 43 patients, and polyaxial in 36 patients. The mean improvement of VK at last follow-up was 7°. At last follow-up there was no significant difference between both groups regarding KV: 6° and the LK: 3°. There was no difference either regarding TRA: 6° in both groups. AVCR was better in the monoaxial group: 84% versus 78% in the polyaxial group (p=0.027).

Discussion

The results of our study are good, and similar to those reported in the literature. Although some studies report better fracture correction and better mechanic stability with monoaxial screws, the radiographic correction in our study was the same in both groups. However, this is to our knowledge, the only study comparing both screws type in the case of percutaneous short fixation with kyphoplasty. Our interpretation is that the kyphoplasty, which provides a good anterior column support in our construct, minimizes the impact of the screw type.

Conclusion

We did not find any difference regarding fracture radiologic correction between monoaxial and polyaxial screws in percutaneous short fixation associated with kyphoplasty in this study.

Radiographic results in both groups

	Monoaxial N=43	Polyaxial N=36	p
VK postoperative (°)	3 (+/-5)	3 (+/-4)	0.653
VK last follow-up (°)	6 (+/-5)	6 (+/-5)	0.6402
LK early (°)	-5 (+/-11)	-3 (+/-9)	0.522
LR last follow-up (°)	3 (+/-14)	3 (+/-11)	0.5711
TRA postoperative (°)	-3 (+/-6)	0 (+/-6)	0.059
TRA last follow-up (°)	6 (+/-7)	6(+/-7)	0.9881
AVCR early (%)	90 (+/-6)	88 (+/-9)	0.162
AVCR last follow-up (%)	84 (+/-8)	78 (+/-13)	0.027

Disclosures:
author 1: none; author 2: none

QF66

SURGICAL TREATMENT OF SPINAL METASTASES. RESULTS OF A LARGE SINGLE CENTRE STUDY

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Background

Up to 20% of patients with spinal metastases show neurological symptoms due to spinal cord compression. Determination of the best treatment option in these cases is multi-faceted and has to be evaluated on a patient-specific basis.

Objectives

The current literature provides only few studies, focusing on spinal metastases receiving surgical treatment. The objective of the current study was to analyze a series of consecutive patients undergoing surgery for spinal metastases in order to identify factors that influence overall survival.

Design and Methods

In a retrospective single-center study, 268 patients with spinal metastases who received surgical treatment between 1990 and 2019 were reviewed.

The cohort consisted of 111 (41%) female and 157 (59%) male patients with a mean age at the time of surgery of 60.4 years (range: 17 - 86 years). The mean follow-up was 18.2 months (range: 0 - 207.8 months). Two-hundred thirty-three patients (87%) died with a mean postoperative survival of 14.84 months (range: 0 - 207 months).

The most frequent underlying malignancies were renal tumors in 73 cases (27%), breast cancer in 37 cases (14%), lung cancer in 39 cases (15%), tumors of the gastrointestinal tract in 20 cases (8%), 62 (23%) other known tumors and 18 patients (7%) with an unknown tumor.

Results

Overall survival was 59.7%, 41.8%, 28.1% and 11% after 6, 12, 24 and 60 months post-surgery, respectively. The underlying tumor entity proved to be a significant factor in regard to survival. Multivariate survival analysis revealed that age at the time of surgery (HR 1.022, $p = .001$), tumor entity (HR 1.069, $p = .02$), Tokuhashi- Score (HR .829, $p < .001$), abdominal metastases (HR 2.154, $p = .007$) and extraspinal bone metastases (HR 1.450, $p = .024$) influence the survival significantly. Patients ≥ 70 years who are not able to walk (sitting in a wheelchair or bedbound) had a significantly worse survival compared to the rest of the cohort (mean survival 5.44 months vs. 21.19 months, $p = .022$).

Overall survival did not differ when compared between the surgical approaches (ventral vs. dorsal approach, $p = .881$). There was also no difference in complications between the two surgical approaches ($p = .134$).

Conclusion

The current investigation is one of the largest single-centre studies in the current literature and analyses the outcome of surgical treatment of spinal metastases. According to our data, histological entity of the primary tumor as well as the age at the time of surgery are important prognostic factors regarding overall survival. The surgical approach did not affect overall survival. Our results suggest that available prognostic scores seem to be more accurate in the short-term survival. Patients that are unable to walk and 70 years or older died at a mean of 5.44 months after surgery. Further investigations have to be performed to evaluate the benefit of surgical treatment of spinal metastases.

Disclosures:

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author 3: none; author 4: none; author 5: no indication; author 6: none; author 7: no indication

QF67

REVIEW OF THE EFFECTIVENESS OF STEREOTACTIC RADIOSURGERY (SRS) TREATMENT OF SPINAL OLIGOMETASTATIC DISEASE DETERMINED BY LOCAL CONTROL, OVERALL SURVIVAL, PAIN RESPONSE AND TOXICITIES: A SYSTEMATIC REVIEW

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Background: The objective is to determine the effectiveness of stereotactic radiosurgery (SRS) for the treatment of spinal oligometastatic disease determined by tumor control, pain control, toxicity and morbidity.

Methods: A systematic review was conducted by searching electronic databases such as Pubmed, Medline (Ovid), and Oxford Academic using an adapted version of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist. Retrospective and prospective studies were identified that investigated methods of treatment such as SRS, surgery, and radiotherapy of spinal oligometastatic disease. Local Control rates, overall survival rates, pain response and toxicities were extracted to be investigated and compared. A study eligibility criterion was made to ensure results were valid, statistically significant, and relevant to the investigation.

Results: 105 articles were found that were relevant to oligometastatic disease with the mention of spinal oligometastatic disease and stereotactic radiosurgery. However 89 of these articles were excluded based on irrelevance to investigation, title, abstract, and duplication. 16 full-text articles were thoroughly screened including 9 of them in the review. For 601 patients 9 studies reported the average 12 months local control rate was 89% of, 4 studies reported the average 24 months local control rate was 87% and 1 study reported the average 60-month local control rate was 78%. 6 studies reported the 12 months overall survival rate was 88%, 2 studies reported the 24-month overall survival rate was 80% and 1 study reported the 60 months overall survival rate was 60%. 4 studies reported an improvement of pain after stereotactic radiosurgery administration. 70 patients experienced Grade 1 and 2 toxicities, 5 patients experienced grade 3 toxicities, and 23 patients experienced vertebral compression fractures.

Conclusion: Stereotactic radiosurgery is an excellent modality of treatment of spinal oligometastatic disease determined by local control, overall survival, pain response, and toxicities. 1 study also compared SRS to surgery and conventional external beam radiotherapy which concluded that SRS was the optimal modality of treatment. Similar investigations need to be carried out to make comparisons to determine the optimal treatment of spinal oligometastatic disease.

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QF68

TOTAL SPONDYLECTOMY OF C2: A SERIES OF 10 CASES FROM A SINGLE CENTER

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Introduction

Tumorous involvement of the second cervical vertebra is an infrequent, but a severe disease. Primary tumors and solitary metastases can be addressed by a radical procedure, a complete removal of the whole compartment. The second cervical vertebra has a highly complex anatomy and its operation requires considerable surgical skills. The aim of the study is to present clinical and radiological evaluation of a group of patients who had complete resection of C2 for tumor indications operated on at our spinal center.

Methods

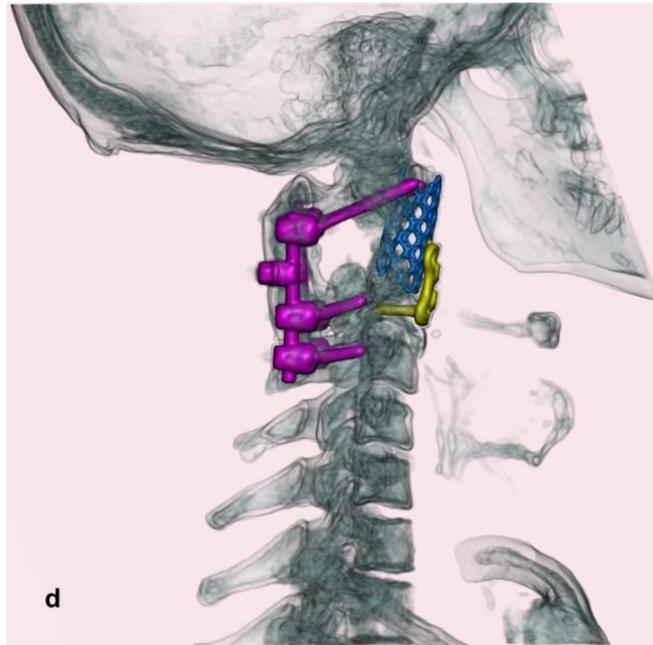
Between 2006 and 2019 we performed 10 total resections of C2 for primary bone tumor or solitary metastasis at our center. Operation was indicated for chordoma in 4 cases and for other diagnoses (plasmacytoma, EWSA, metastases of papillary thyroid carcinoma, medullary thyroid carcinoma, lung carcinoma and sinonasal carcinoma) in one case each. The operative procedure was in all cases performed in two steps. It always started with the posterior approach. The anterior procedure was scheduled according to the patient's condition after an average interval of 16.9 days (range, 7-21). In addition to regular follow-ups, the surviving patients (N=4) were also examined upon completion of the study, i.e., on average 81 months (range, 7-169 months) postoperatively. With exclusion of an early deceased patient, the average follow-up period in deceased patients was 34.6 months (range, 9-55) (N=5). The average follow-up of the whole group of patients was 55.2 months (N=9).

Results

A stable bone fusion over the whole instrumentation and a stable upper cervical spine were achieved in all living patients. Three patients returned to their preoperative activity level. By the final follow-up 6 patients died: one patient mentioned above, three patients died of generalization of the underlying disease and two patients due to complications associated with local recurrence of the disease.

Conclusion

Total spondylectomy of C2 is an exceptional surgical procedure associated with a risk of serious complications, but, offers a chance for a complete recovery of the patient. Defining indications accurately, especially in solitary metastases, is very difficult even with current level of imaging and other testing. The quality of life of long-term surviving patients in our series was not significantly impacted.



Disclosures:
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QF69

EN BLOC RESECTION OF GRADE II INTRAMEDULLARY EPENDYMOMAS IS ASSOCIATED WITH SUPERIOR GROSS TOTAL RESECTION (GTR) RATES AND FUNCTIONAL OUTCOME AT 3 MONTHS

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Introduction:

Grade II intramedullary ependymomas are circumscribed lesions, with a plane of cleavage from healthy tissue. A surgical approach utilising the oncologic principle of 'en bloc' resection may exploit this plane of cleavage, and facilitate gross total resection (GTR). 'En bloc' refers to the resection of a tumoral mass „in its entirety, completely surrounded by a continuous layer of healthy tissue“. This involves resection as a single piece, via circumferential dissection along a plane or margin of healthy tissue, with no disruption of internal architecture. In contrast, 'piecemeal' resection refers to the resection of a tumoral mass with disruption of tumoral architecture, involving removal in one or more pieces, frequently via internal debulking. Gross total resection has an established benefit to overall and progression free survival, which is superior to subtotal resection and radiotherapy.

Aim:

This paper seeks to compare 'en bloc' versus 'piecemeal' resection strategies for Grade II intramedullary ependymomas, in terms of resection rates (GTR or subtotal resection) and functional outcome (McCormick grade at 3 months).

Materials and Methods:

Retrospective medical file and radiological review of all grade II ependymomas over a 13-year period from Beaumont Hospital, operated by 6 surgeons. Statistical analysis was performed by independent statistician by standard methods.

Results:

39 patients were identified, with neuropathology confirmed grade II intramedullary ependymoma. There was no statistical difference between groups in pre-operative factors including MCC scores.

22 underwent 'en bloc' resection, with GTR rate of 86.36% (n=19). 17 underwent 'piecemeal' resection, with GTR rate of 52.94% (n=9). Fisher's exact test confirms statistical significance between groups (p=0.033). Multivariate regression analysis for factors influencing resection rate was performed to include a number of factors, (sex, age at resection, syrinx, IOM use, en bloc resection, longitudinal extension). MVRA including parsimonious model found increased odds of GTR for en bloc [OR 6.98, p=0.027], while OR of GTR in presence of a syrinx is reduced [OR 0.09, p=0.033].

Functional outcome was assessed by change in pre-operative versus 3 months post-operative MCC grade. Subgrouping for analysis was as follows: 'improved' (i.e. improved 1 MCC grade), 'neutral/no change', 'disimprovement' (i.e. decline by 1 MCC grade), 'significant disimprovement' (i.e. decline by >1 MCC grade). Assessment of change in pre- and post-operative MCC by 'en bloc' versus 'piecemeal' confirmed 'en bloc' was associated with more favourable MCC outcome. Fisher's exact test confirms statistical significance between groups (p=0.018).

Discussion/Conclusion:

This series supports the oncologic resection strategy of 'en bloc' resection is superior to 'piecemeal' resection for Grade II intramedullary ependymomas, in terms of resection rates and functional outcome.

Disclosures:

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Spineguard, royalties=Spineguard

QF70

THE MANAGEMENT OF SPINAL OLIGOMETASTASES AT A SUPRA-REGIONAL CENTRE IN THE ERA OF STEREOTACTIC ABLATIVE RADIOTHERAPY

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Introduction

Treatment of spinal metastatic disease has evolved with the advent of advanced interventional, surgical and radiation techniques. Spinal Oligometastatic disease (SOD) is a low volume disease state where en bloc resection of the tumour, based on oncological principles, can achieve maximum local control (MLC). Hybrid therapy incorporating Separation surgery (>2mm clearance of the thecal sac) and Stereotactic Ablative Radiotherapy (SABR) offer an alternative approach to achieving MLC. Hybrid therapy is a viable option in patients eligible for SBRT who have failed conventional radiation therapy. The authors present a supra-regional centre's experience in managing spinal oligometastases.

Methods

Retrospective review of SOD at a supra-regional centre between 2017 and 2021. Demographics, operative course, complications and Instrument type are examined.

Results

Demographics: 24 patients, mean age 53.8y (range 12-77), 44% (40y-59y), 40% (60y-69y); 51% Male. Histology: Breast, Renal and Sarcoma, 16.7% each; Thyroid, Prostate and Chordoma, 8.3% each. Primary disease 7%, Synchronous 15%, Metachronous 78%. Instrumentation: Carbon-fibre (85%), TiAl (11%), Non-Instrumented (3%). Separation Surgery (70%), En-bloc resection/Tomita (30%); SABR/Proton Beam Planned: 70%. Average length of stay 19.1 days; 20 patients required ICU admission for an average 2.7 days. 30 Day Mortality 8.3% (n=2: COVID-19 during admission and ventriculitis post discharge), 1y Mortality - 16.7%, 3y Mortality - 25%; Synchronous mortality 75% (n=3) at 3 years. 30 Day infection rate 3%; 1y infection rate 7%. Local Recurrence (LR): Of 15 patients for whom postoperative imaging were readily available: LR - 6 (range 1 -22 months), No LR - 9; 4 patients demonstrated systemic disease progression before/without LR. 2-year Revision for LR 5% (Revision at 23 months).

Conclusion

Very few series focus on SOD due to the relatively new concept of adjuvant SABR and its limited availability. Solid tumours predominated the histology in our series with metachronous disease being the most commonly operated disease state. 92% of cases were eligible for SABR. The majority (85%) of cases were performed with Carbon-fibre instrumentation and has been shown to be safe with no mechanical failures in this series. Infection rates are in keeping with patients requiring radical radiotherapy with 3% early and 7% late. As expected, mortality is highest with synchronous disease and should be operated on sparingly. Surgery for local recurrence was uncommon (5%) with 4 cases where there was local control despite systemic progression.

Although radical en bloc surgery carries significant morbidity, it should be considered in selective cases to achieve MLC. All SOD cases deserve extra consideration and specialist MDT as not all are suitable for SABR. Multimodal Hybrid therapy, incorporating less invasive surgical techniques and SABR, represents a paradigm shift in achieving MLC in oligometastatic spinal disease

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QF71

COST-EFFECTIVENESS OF OPEN TRANSFORAMINAL LUMBAR INTERBODY FUSION (OTLIF) VERSUS MINIMALLY INVASIVE TRANSFORAMINAL LUMBAR INTERBODY FUSION (MITLIF): A SYSTEMATIC REVIEW.

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Background Context

The number of performed instrumented lumbar spine surgeries have increased over the last decades, and will increase further in the future. With the consistent growth of healthcare-related costs, cost-effectiveness of surgical techniques is of major relevance. Common indications for instrumented lumbar spine surgery are spondylolisthesis and degenerative disease. A commonly used technique is the open transforaminal lumbar interbody fusion (OTLIF). Nowadays, there is an increasing interest in the minimally invasive variation of this technique (MITLIF). Currently available literature describes that MITLIF has comparable or even better clinical results compared to OTLIF. Cost-effectiveness of MITLIF and OTLIF is important considering the growing health-care related costs, although no consensus has been reached regarding the most cost-effective technique. Previous literature concerning costs and cost-effectiveness of OTLIF was compared with MITLIF in patients with lumbar spondylolisthesis or degenerative disease. Methodological quality of included studies was assessed.

Outcome Measures

The following data items were evaluated: study design, study population, utility measurement tool, gained Quality Adjusted Life Years (QALYs), cost sources, health care and societal perspective costs, total costs, costs per QALY (cost-effectiveness) and incremental cost-effectiveness ratio (ICER).

Methods

A systematic search was conducted using databases PubMed, CINAHL, EMBASE, Cochrane, Clinical Trials, Current Controlled Trials, ClinicalTrials.gov, NHS Centre for Review and Dissemination, Econlit and Web of Science on studies reporting OTLIF or MITLIF, spondylolisthesis or lumbar instability or degenerative disease, and costs. Relevant studies were selected and reviewed independently by two authors.

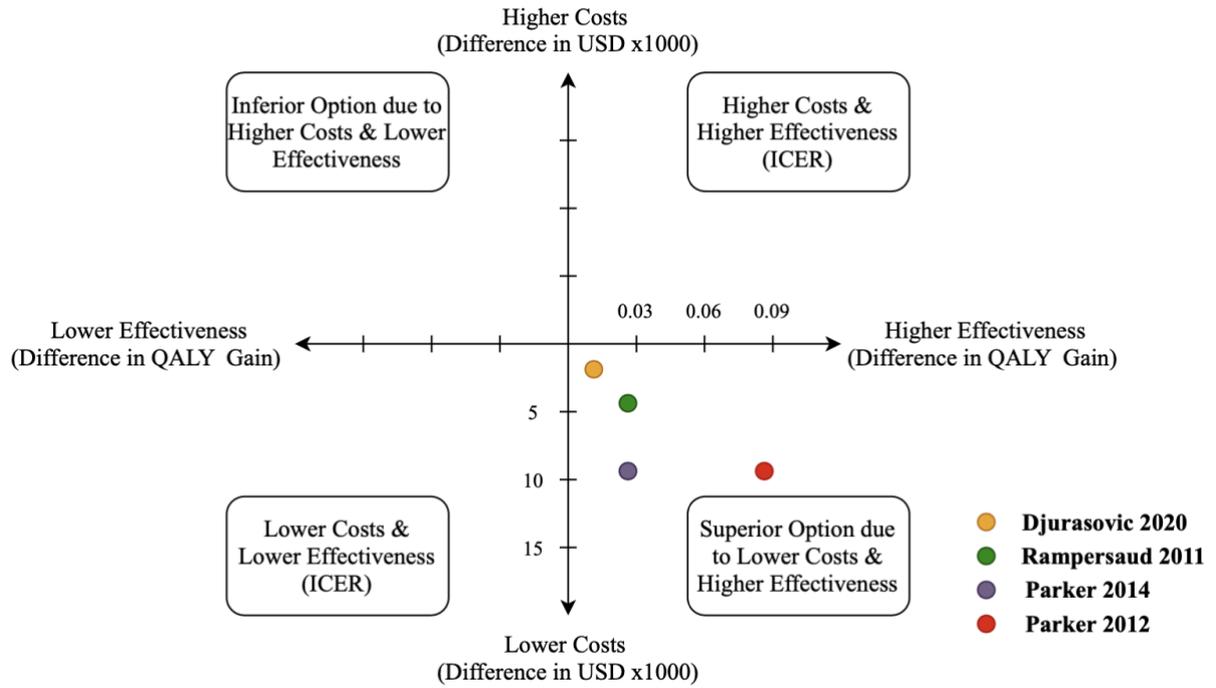
Results

A total of 892 studies were identified. Eventually, 32 studies were included. Nine studies compared OTLIF and MITLIF directly. All studies mentioned healthcare perspective costs. Seven studies mentioned societal perspective costs. Cost-effectiveness of OTLIF was mentioned in five studies, ranging from \$47,303/QALY to \$218,766/QALY. Cost-effectiveness of MITLIF was mentioned in one study, \$121,105/QALY. Meta-analysis of hospital perspective costs showed a significant overall effect in favour of MITLIF, with a mean difference of \$2,650. There was great heterogeneity in healthcare and societal perspective costs due to different in-, and exclusion factors, baseline characteristics, and calculation methods. Overall quality of studies was low.

Conclusions

OTLIF and MITLIF appear to be expensive interventions when using a threshold of \$50,000/QALY. Results of this study and previous literature suggest that MITLIF is more cost-effective compared to OTLIF. Considering the increase in healthcare costs of instrumented spine surgery, cost-effectiveness could be one of the factors in surgical decision-making. More qualitative research is needed.

Figure: Cost-Effectiveness of MITLIF compared to OTLIF (ICER)



Disclosures:

author 1: none; author 2: none; author 3: none; author 4: none; author 5: none; author 6: none

QF72

FUSION RATE FOLLOWING THE MINIMALLY INVASIVE ANTEPSOAS (MIS-ATP) TECHNIQUE FOR LUMBAR AND LUMBOSACRAL ARTHRODESIS: A RETROSPECTIVE STUDY

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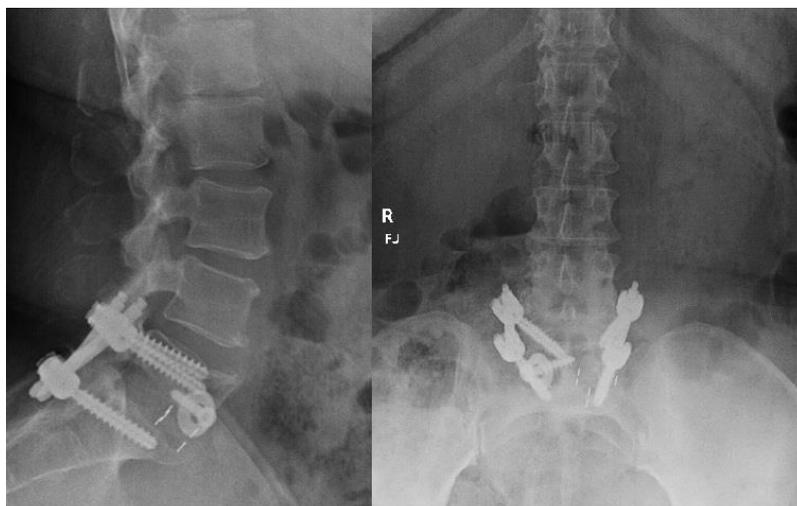
Introduction: Pseudarthrosis is a feared complication following spinal fusions and may affect their clinical outcomes. Many techniques are reported to have different rates of successful arthrodesis. To date there is no sufficient data on the fusion rate following antepsoas (ATP) lumbar and lumbosacral arthrodesis.

Objective: The primary objective of this study is to evaluate the prevalence of pseudarthrosis following ATP lumbar and lumbosacral fusions.

Methods: This is a retrospective review of 226 patients who underwent lumbar MIS-ATP fusions between January 2008 and February 2019 who have at least 6 months postoperative computed tomography (CT) follow-up scans. Following ATP lumbar discectomy and interbody cage(s) placement, all patients received percutaneous posterior pedicle-screws-rods fixation. Fusion was graded using CT scans imaging and adopting a 1-4 grading scale (1-definitely fused, 2-likely fused, 3-likely not fused, 4-definitely not fused/nonunion). Grades 3 or 4 indicate pseudarthrosis.

Results and Discussion: Pseudarthrosis was calculated (as the event occurrence) per operated individuals, as well as per treated segments. In this study, a total of 226 patients [average age: 66 years, 84 Male (37.2%), and 130 (57.5%) smokers] were included. Eight patients (3.5%) developed pseudarthrosis. A total of 707 discs were addressed using the ATP approach. Of those, 695 (98.3%) were considered fused [654 levels (92.5%) were „definitely fused“ and 41 levels (5.8%) were „Likely fused“] and 12 discs (1.7%) developed pseudarthrosis [7 levels (1.0%) were „likely not fused“ and 5 levels (0.7%) were „definitely not fused“]. The intervertebral disc with the highest occurrence of pseudarthrosis (8 out of 12 levels) was L5-S1. Of 130 smokers, 6 developed pseudarthrosis (Odds Ratio = 2.3, p = 0.3). The fusion rates were 95.4% and 97.9% for smokers and nonsmokers, respectively. Of the eight patients who developed pseudarthrosis, only 4 (50%) were symptomatic, of whom 2 (25%) required revision surgery. Both of these patients were smokers. The overall revision rate due to pseudarthrosis was 0.9% (2/226 patients).

Conclusion: The MIS-ATP technique results in a high fusion rate (96.5% of patients; 98.3% of levels). Pseudarthrosis was noted mostly at the L5-S1 discs and in smokers. Future larger studies should be performed to better understand the risk factors associated with pseudarthrosis following MIS-ATP lumbar and lumbosacral fusions.



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royalties=Wolters-Kluwer Publisher

QF73

MINIMALLY INVASIVE SACROILIAC JOINT FUSION VERSUS CONSERVATIVE TREATMENT IN PATIENTS WITH SACROILIAC JOINT DYSFUNCTION: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Background

The sacroiliac joint (SIJ) is affected in 14-22% in patients presenting with chronic low back or buttock pain. This number is even higher in patients that underwent lumbar fusion; 32-42%. When SIJ dysfunction patients do not respond well to non-surgical treatment, minimally invasive sacroiliac joint fusion (MISJF) might be a reasonable option. Systematic reviews comparing MISJF with conservative treatment are currently missing. This study is a systematic review and meta-analysis on the (cost-)effectiveness of MISJF compared to conservative treatment in SIJ dysfunction.

Methods

A systematic search was conducted according to the PRISMA guidelines. Relevant studies were selected and reviewed. The risk of bias of each included study was assessed and graded. Primary outcome measures were pain, disability and patient satisfaction measured by visual analogue scale (VAS) score, Oswestry Disability Index (ODI) and The Short Form 36 item Health Survey (SF-36). Secondary outcome were adverse events, financial benefits and costs.

Results

Two randomised controlled trials and one retrospective cohort study were included comparing MISJF and conservative management with regard to pain and disability outcome, including 341 patients (170 conservative and 181 surgical). In a pooled mean difference analysis, MISJF demonstrated greater reduction in VAS-pain score compared to conservative treatment; -37.03 points ($p < 0.00001$). Moreover, MISJF was associated with a greater reduction in ODI outcome; -19.99 points ($p < 0.00001$). Adverse events were low among the study groups and consistent across the included studies. The cost-effectiveness analysis concluded that MISJF was cost-effective compared to conservative treatment. The overall quality of included studies was good to moderate.

Conclusions

This systematic review and meta-analysis suggests that MISJF is more effective, more cost-effective and more durable than current conservative treatment options in reducing pain and disability in most patients with sacroiliac joint dysfunction, or patients were conservative treatment fails. However, further well-powered, non-funded research is needed to improve the overall evidence.

Table 1 Study characteristics

Study characteristics					Quality assessment	
Study	Study design	MISJF group (N)	CM group (N)	Follow up (months)	Level of evidence	Overall risk of bias
Polly et al. 2016	Randomized controlled trial	102	46	24	1	Low
Dengler et al. 2019	Randomized controlled trial	52	51	24	1	Low
Vanaclocha et al. 2017	Retrospective comparative cohort	27	63	72	4	Moderate
Cher et al. 2016	Cost-effectiveness analysis	274	46	12	-	-

MISJF; minimally invasive sacroiliac joint fusion, CM; conservative management.

Disclosures:

author 1: none; author 2: none; author 3: none; author 4: none; author 5: none; author 6: none

QF74

OUTCOMES OF INJECTABLE PLATELET RICH FIBRIN (IPRF) AND CRYOPRESERVED HUMAN AMNIOTIC MEMBRANE (C-HAM) INJECTIONS FOLLOWING LUMBAR DECOMPRESSION SURGERY A CLINICAL STUDY

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Background

Endoscopic-assisted lumbar decompression is a minimally invasive spine surgery which has been touted to reduce collateral tissue damage, incisional pain, recovery time and complications. Residual back or leg pain and recurrent herniation are commonly reported post-operative outcomes. It has been suggested that injecting orthobiologics like cryopreserved amniotic-derived products (ADPs), bone marrow aspiration (BMA) and Injectable Platelet rich fibrin (iPRF) into the surgery site would have additional benefit on patient outcomes. These common biologic approaches to modulating inflammation have emerged over the last several years. One is using ADP, the other is BMA)-containing messenger signaling cells (MSCs), iPRF containing growth factors. The mechanisms of action are not altogether different. ADP and iPRF is thought to exhibit anti-inflammatory properties reducing pro-inflammatory cytokines, increasing anti-inflammatory cytokines, and inducing apoptosis of pro-inflammatory cells. Bone marrow-derived stem cells have been examined in a number of applications for their ability to modulate neuro-inflammation. The primary goal of this study was to compare patient outcomes of orthobiologic supplementation during endoscopic-assisted lumbar decompression surgery.

Methods

Following ethical approval, 30 patients underwent lumbar endoscopic-assisted decompressive surgery. Patients were randomized to receive

Group 1 - ADP +BMA

Group 2- iPRF+BMA

Group 3- No Supplementation (Control Group)

Outcomes were measured by post-operative questionnaires (visual analog scale (VAS), Oswestry disability index (ODI), 36-item short-form health survey (SF-36) over 12 months.

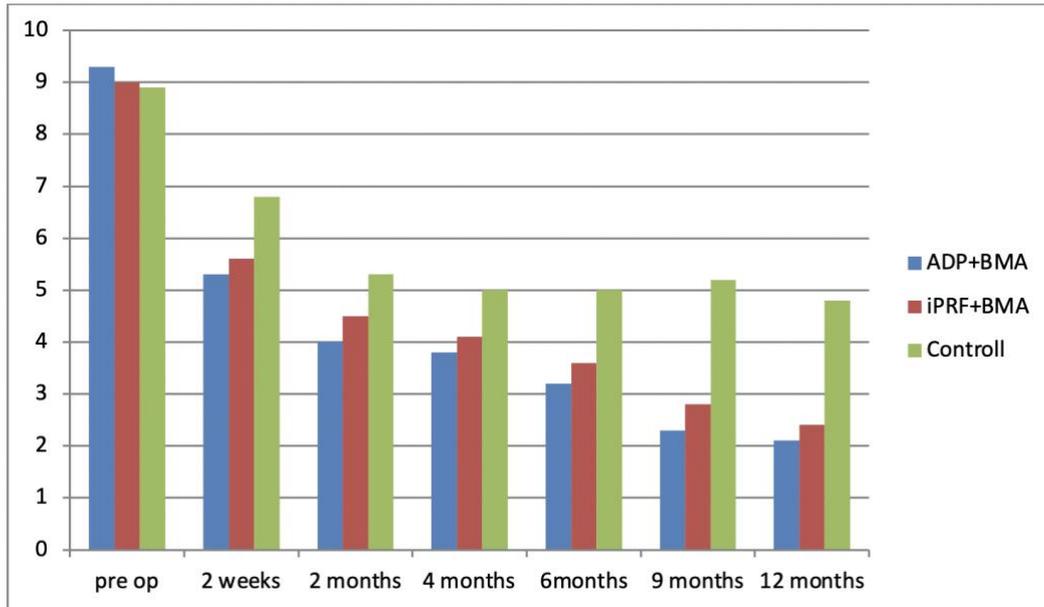
Results

Mean VAS-leg for ADP and iPRF group displayed statistically significant improvements at 2 weeks (2.96 vs 3.55 vs. 4.77, $P = 0.002$), 6 months (1.97 vs 2.34 vs. 3.37, $P = 0.026$), and 9 months (1.78 vs 2.18 vs. 3.57, $P = 0.01$) compared to no supplementation group (control group). Similarly, improvements in mean VAS-back were significant at 2 weeks (3.06 vs 3.98 vs. 5.01, $P = 0.011$), 2 months (2.98 vs 3.22 vs. 3.93, $P = 0.04$), 9 months (1.94 vs 2.38 vs. 4.11, $P = 0.004$), and 12 months (1.82 vs 2.23 vs. 3.58, $P = 0.011$) compared to no supplementation group (control group). There were statistically significant differences in the ODI (2 weeks, 46.16 vs 42.19 vs. 31.11, $P = 0.014$) and SF-36 (4 months, 89 vs 85 vs. 63, $P = 0.043$ for ADP only). Two patients (grp 3, grp1) re-herniated at the same level.

Conclusions

These results show the strong potential for the application of ADP and BMA and i PRF in the recovery and annular tissue regeneration in patients undergoing lumbar micro-discectomy. ADP+ BMA vs iPRF +BMA has shown not much difference but advantage of using iPRF is low costs, and complete immune-biocompatibility So it is concluded that usage of orthobiologics have additional benefit on patient outcomes.

Graph : Shows back visual analogue scale



Disclosures:
author 1: none; author 2: none