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#ESA Abstracts 20170125
Extradural Foramen Magnum Tumors: Technical Considerations and Surgical Nuances
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Introduction: Treatment of foramen magnum tumors is surgically challenging in view of their location and their critical relationship with vital neurovascular structures. Ideal approach to these tumors is a controversy in this modern era. We present our surgical experience of treating these tumors at AIIMS, New Delhi.

Methods: This retrospective study includes 50 consecutive patients (mean age 37.5 years, M:F ¼ 1.7:1) of extradural tumors at the surgical foramen magnum, operated at AIIMS, New Delhi, from 2012 to 2016.

Results: Their mean duration of symptoms was 28.3 months. A major portion of the patients presented with motor symptoms (quadriceps, n ¼ 36, 72%) followed by sensory symptoms like tingling/numbness (n ¼ 17, 34%) and neck pain without suboccipital radiation (n ¼ 13, 26%). Nerve sheath tumors (n ¼ 24, 48%) and meningiomas (n ¼ 15, 30%) were the most commonly encountered histologies in our series. Chordoma (2,4%), chondrosarcoma (1, 2%) and osteochondroma (1, 2%) were least common histopathologies observed in our study. Nineteen patients improved immediately after surgery and 8 patients worsened. Operative mortality and morbidity were 2 and 20%, respectively. Mean follow-up duration is of 48 months.

Conclusion: Most of the foramen magnum tumors are amenable to surgical excision and most of the tumors can be excised by posterior approach alone except tumors which are anteriorly located which are better approached by far lateral approach.

#ESA Abstracts 20170126
Cervical Rotation Before and after Hinge-Door Cervical Laminoplasty for Cervical Spondylotic Myelopathy
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Introduction: Cervical laminoplasty is an effective procedure for decompressing multilevel spinal cord compression. It often induces postoperative complications such as loss of lordotic alignment and restriction of neck motion. Although various studies have reported on cervical range of motion after laminoplasty, they have focused mainly on flexion and extension based on lateral x-rays, not on axial rotation. Here in this study we aim to evaluate the range of cervical axial rotation before and after hinge-door cervical laminoplasty using axial CT scan and to correlate it with the post-operative axial neck symptoms.

Methods: Twenty consecutive patients with cervical spondylotic myelopathy who were planned for cervical laminoplasty were enrolled for the study. The clinical and radiological data was recorded for each of these patients. Patient was placed in the supine position on the computed tomography scan table. After the scans in this neutral position, the patient will actively rotate his neck as far as possible taking care that the shoulders remain in the horizontal plane. The preoperative C1-T1 rotation angles will be measured in both the directions. All patients will undergo standard C3-C6 laminoplasty preserving the muscle attachments to C2 and C7. The clinical and radiological follow-up will be recorded at 6 months follow-up. The CT scan in active rotation on either side were again performed at 6 months follow-up. Rotation angle before and after laminoplasty were determined by an experienced neuro-radiologist. The statistical analysis will be carried out using appropriate statistical tests to determine the change of rotation angle after laminoplasty.

Results and Conclusion: Cervical rotation did not decrease significantly at 6 months follow up following hinge-door cervical laminoplasty. The difference in rotation was not statistically significant.

#ESA Abstracts 20170127
MEP Monitoring Versus D-Wave Monitoring in Spinal Cord Tumor Surgery
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Introduction: Accurate intraoperative neurophysiologic monitoring in spinal cord tumor surgery is important for decision of spinal surgeon and the predictive outcome of the patients. SSEP or MEP is a typical modality for intraoperative neurophysiologic monitoring in Korea. Concept of D-wave monitoring was introduced in 1980s. This study aims to evaluate the feasibility and the accuracy of D-wave monitoring in spinal cord tumor surgery comparing to motor evoked potential (MEP) monitoring.

Methods: From March, 2016 to May, 2017, 24 cases of spinal cord tumor (intramedullary) were monitored MEP and D-wave simultaneously. No musculoskeletal blocker was used except anesthetic induction. Real time monitoring was undergone during operation. Each proportion of successful measuring was represented to monitorability. Measured significant wave changes of amplitude and frequency of each modality were collected and transcribed to abnormal or not. Also reports of abnormality of each modality were compared with patients’ real neurologic deficit during immediate post-operation and discharge using Mccormick scale. We analyzed MEP and D-wave immediately after tumor removal and MEP and D-wave after dural repair.

Results: Monitorability was 95.83% in MEP (23 successes of 24) and 83.33% in D-wave (20 successes of 24). However, D-wave has higher specificity, positive predictive values of 100% than MEP. Also in univariate study, D-wave has significant difference in the change of Mccormick scale after immediate post-operation. (p=0.033) By the way, 1month follow up of Mccormick scale after operation is not statistically significant with D-wave and MEP. (p=0.152 vs p=0.754)

Conclusion: D-wave showed higher positive predictive value and specificity compared to MEP. There was no difference in the predictive value of the neurological symptoms of the patient 1 month later.
#ESA Abstracts 20170128
C2 Spinal Schwannoma Presenting with the Ginkgo Leaf Sign: A Case Report
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Introduction: The ginkgo leaf sign has been reported as a useful radiological finding that predicts spinal meningioma (specificity 100%). It appears as a fan-shaped spinal cord with a streak (dentine ligament) in the tumor. We describe a case of a spinal tumor presenting with a ginkgo leaf sign despite its preoperative diagnosis of schwannoma.

Case Presentation: A 54-year-old woman presented with a 4-month history of myelopathy. Magnetic resonance imaging showed a C2 dumbbell-shaped tumor extending contralaterally to the ventral side, resembling a ginkgo leaf, although the preoperative diagnosis was schwannoma. A possible explanation for this ginkgo leaf sign was that the tumor arose from the left C2 nerve root and extended to the foramen magnum, lacking a dentate ligament because the tumor had overcome the dentate ligament and extended contralaterally to the ventral side.

Methods: Intraoperatively, an extradural lesion was removed first using the posterior approach, followed by a midline dural incision. Unexpectedly, during intradural inspection, only a small part of the tumor was found. Magnetic resonance imaging revealed that this part of the tumor seemed to extend contralaterally.

Results: The tumor was totally resected, and the pathological diagnosis was schwannoma. Combined with the intraoperative findings, the pathological evaluation showed this tumor arising from the left C2 ventral nerve root. It was not the dentate ligament that appeared to be the stalk of ginkgo leaf sign, however, but the dura mater itself. A large part of the tumor had been compressed outside the extradural area.

Conclusion: An unusual case of a spinal tumor presented with the ginkgo leaf sign, although it was not a spinal meningioma but a schwannoma. Thus, although the ginkgo leaf sign is a useful radiological finding for diagnosing a spinal intradural extramedullary tumor, there are some exceptions. Because of the short staying time, I would like to digital poster presentation.

#ESA Abstracts 20170130
Surgical Management of Chiari I Malformation Based on Different Cerebrospinal Fluid Flow Patterns at the Cranial-Vertebral Junction
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Introduction: Chiari I malformation has been shown to present different cerebrospinal fluid (CSF) flow patterns at the cranial-vertebral junction (CVJ). Posterior fossa decompression is the first-line treatment for symptomatic Chiari I malformation. However, there is still controversy on the indication and selection of decompression procedures. This research aims to investigate the clinical indications, outcomes, and complications of the decompression procedures as alternative treatments for Chiari I malformation, based on the different CSF flow patterns at the cranial-vertebral junction.

Methods: In this study, 126 Chiari I malformation patients treated with the two decompression procedures were analyzed. According to the preoperative findings obtained by using cine phase-contrast MR (cine PC-MRI), the abnormal CSF flow dynamics at the CVJ in Chiari I malformation was classified into three patterns. I: Abnormal CSF flow to the dorsal of cervico-medullary brainstem; II: Abnormal CSF flow to the dorsal of cervico-medullary brainstem and the cerebellar aqueduct; III: Abnormal CSF flow to the ventral and dorsal of the cervico-medullary brainstem and the cerebellar aqueduct. After a preoperative evaluation and an intraoperative ultrasound after craniectomy, the two procedures were alternatively selected to treat the Chiari I malformation. The indication and selection of the two surgical procedures, as well as their outcomes and complications, are reported in detail in this work.

Results: Forty-eight patients underwent subdural decompression (SDD), and 78 received subarachnoid manipulation (SAM). Ninety patients were diagnosed as having Chiari I malformation with a syrinx. Two weeks after the operation, the modified Japanese Orthopedic Association (mJOA) scores increased from the postoperative value of 10.67 ± 1.61 to 12.74 ± 2.01 (P < 0.01). The mean duration of follow-up was 24.8 months; the mJOA scores increased from the postoperative value of 12.74 ± 2.01 to 12.79 ± 1.91 at the end of follow-up (P = 0.48). More complications occurred in the patients who underwent SAM than in those who received SDD (SAM 11 of 78 (9.5%) vs SDD 2 of 48 (3.5%)). The abnormal CSF flow dynamics at the CVJ in Chiari I malformation can be classified into three patterns. Conclusion: A SAM procedure is more feasible in Chiari I malformation (CM1) patients with pattern III CSF flow dynamics, whereas a SDD procedure is more suitable for CM1 patients with pattern I CSF flow dynamics. In CM1 patients with pattern II CSF flow dynamics, an
intraoperative ultrasound after craniectomy could play an important role in the selection of an effective decompression procedure. Key words: Syringomyelic decompression; Subarachnoid decompression; preoperative CSF flow; Intraoperative ultrasound.

**#ESA Abstracts 20170131**


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Introduction: To measure the clivus-axial angle (CAA) of Chinese. O prove a normal value and explore the correlation between CAA with cervical medullary angle (CMA).  

Methods: The CAA was measured on CT of Cervical spine in 225 Chinese with normal cranio-vertebral junction (CVJ). Both the CAA and CMA were measured on the MRI of cervical spine in 117 subjects. A regression analysis was used for analyzing the correlation between CAA and CMA. Two experienced spinal surgeons performed the measurements. The CAA and CMA were measured three times, the mean value was considered as the result.  

Results: The CAA of 225 subjects was 133.52-172.16 (156.93±6.53°). The 95% confidence interval was 145.10-170.19° in male and 142.67-168.47° in female. If the patients were divided into five groups according to their age. On comparison of these groups showed that there were no significant differences among the groups with respect to CAA. It showed that there was consistency between the CAA measured with MRI and CT. The CMA for 117 patients ranged from 130.38-168.75°, with a mean value of 154.17±6.54°. If the patients were distributed according to their gender or to their age, there were no significant differences among the groups. The relationship between CAA and CMA was linearity and the regression coefficient was as high as 0.95 (P=0.007)  

Conclusion: CAA is valuable for measuring the compression of spinal cord which can be accessed easily during the procedure.

**#ESA Abstracts 20170132**

**Long Term Result Analysis of Posterior Spinal Process Splitting Laminoplasty for Multilevel Over 60% Occupying Rate Cervical Spine Stenosis**

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Introduction: Posterior cervical spine laminoplasty is an effective method to management the multilevel cervical spine stenosis. However there are still controversial for its effect in severe multilevel cervical spine stenosis.  

Methods: We review the patients who receive the posterior cervical spinal process splitting laminoplasty in our hospital through 2005-2011. There are 138 patients meet the inclusion conditions. We divided these patients in 2 groups according to MRI occupying rate, normal compression group is occupying rate less than 60%, severe compression group is occupying rate over 60%. JOA improvement, NDI are compared between 2 groups.  

Results: There are 72 patients divided into normal compression group, 66 patients divided into severe compression group. No significant difference in Age, sex, operation time and blood loss. The normal compression group JOA score is 15.0±3.0 at pre-operation, 16.2±2.0 at last follow-up, 14.7±1.7 at the best time during follow up, there is significant difference between pre-operation and post-operation (P=0.000). The severe compression group JOA score is 11.1±3.1 at pre-operation, 14.2±2.5 at last follow-up, 15.0±2.0 at the best time during follow up, there is significant difference between pre-operation and post-operation (P=0.000). However, there is no significant difference at pre-operation, last follow-up and the best time post-operation. Normal compression JOA improvement is 53.07±39.2 at the best time post-operation 36.3±43.8 at last follow-up. Othere is significant difference between that (P=0.018), severe compression JOA improvement is 65.7±35.8 at best time follow-up 49.2±46.4 at last follow-up. There is significant difference between that (P=0.018), At best follow-up severe compression group is better than normal compression group (P=0.037) but no significant at last follow up (P=0.09), Normal compression group NDI is 23.9±12.4 pre-operation/0.16.47±15.0 at best time during follow-up 17.9±14.5 at last follow-up there is significant difference between pre-operation and follow-up (P=0.013), Severe compression group NDI is 23.8±12.8 pre-operation 17.9±16.2 at best time, 18.9±15.7 at last follow-up. There is significant difference between pre-operation and the best time (P=0.018), no difference between pre-operation and last follow-up (P=0.09). No difference between 2 group at pre-operation, the best time and last follow-up.  

Conclusion: Posterior cervical spine laminoplasty is an effective method to managethe multi-level cervical spine stenosis. Whether the compression rate is less or over 60%, it has the same clinical effect.

**#ESA Abstracts 20170133**

**Posterior Foraminotomy for Cervical Disc Herniation**

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Introduction: The efficacy and safety of posterior cervical foraminotomy (PCF) in the treatment of cervical radiculopathy has been well demonstrated in the literature. However, there is little data analyzing the relative effectiveness of PCF for radiculopathy due to soft disc versus osteophyte disease. In the present study, we review our experience with PCF in a cohort, with long term follow up.  

Methods: A cohort of 50 patients was designed to assess improvement in symptoms and function.  

Results: A total of 200 follow up visits were completed with a mean follow up of 5 years. Approximately 90% of visits reported improved pain, weakness, or function following PCF. Ninety three percent of patients were able to return to work after PCF. The overall complication rate was 3.3%, and the rate of recurrent radiculopathy requiring surgery was 6.2%. Soft disc subtypes compared to osteophyte disease by operative report were associated with improved symptoms (P < 0.05). The operative report of these subtypes was associated with the pre-operative magnetic resonance imaging (MRI) interpretation (P < 0.001).  

Conclusion: These results suggest that PCF is a highly effective surgical treatment for cervical radiculopathy with a low incidence of complications. Radiculopathy due to soft disc subtypes may be associated with a better prognosis compared to osteophyte disease, although osteophyte disease remains an excellent indication for PCF.

**#ESA Abstracts 20170134**

**Metallosis After Traumatic Loosening of Bryan Cervical Disc Arthroplasty: A Case Report and Literature Review**

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Introduction: Cervical disc arthroplasty has been a popular alternative to traditional arthrodesis treatment for maintaining postoperative cervical spine mobility. However, certain adverse reactions to cervical disc arthroplasty have emerged during the last few decades.

Methods: Metallosis or metalloma is a rarely reported complication after spinal fusion or spinal arthroplasty surgery. We report on the first metallosis case occurring in a patient who received Bryan Disc implantation approximately 8 years earlier. She was involved in a traffic accident and sustained a whiplash injury to the cervical spine one and a half years ago. The traumatic Bryan Disc loosening developed after the traffic accident, causing metallosis.

Results: To the best of our knowledge, this is the first reported case of spinal metallosis caused by the Bryan Disc. A series of metallosis cases reported in the literature are also reviewed.

Conclusion: Although uncommon, intraspinal metallosis or metalloma should be considered as an infrequent cause of delayed neurological symptoms after spinal surgery involving metallic instrumentation, especially after disc arthroplasty. Once metallosis is suspected, immediate metallic implant removal is mandatory for definite diagnosis and treatment.

#ESA Abstracts 20170135
Robot Assisted Cervical Spinal Surgery: A Preliminary Clinical Study

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Introduction: The anatomical variations of spinal vertebrae are wide, and it adjacent to important organs such as spine cords, oblongata and vertebral artery, all of which make cervical spinal surgery very difficult and unsafe. This study aims to introduce a new designed robot system and share the preliminary experience about robot assisted cervical spinal surgery.

Methods: Prospective randomized controlled study Patient Sample 34 patients were involved, 18 patients were treated by traditional free-hand surgery, and 16 patients were treated by robot assisted surgery. Outcome Measures The penetration was measured according to the Gertzbein-Robbins classification, and the discrepancies between the actual path and planned trajectory were also measured.

Methods: Patients were randomized enrolled in traditional free-hand group and robot assisted group. A postoperative CT scan was performed after surgery. The CT image data were reconstructed by the mimics software, and a blind evaluation of the position of screws was performed. Any penetration of the cortex in the lateral, medial, cranial or caudal directions was measured according to the Gertzbein-Robbins classification. Also, the discrepancies between the actual path and planned trajectory in entry point and end point were also measured.

Results: All surgeries were smoothly performed. According to the post-operation CT image data, none of the screws necessitated re-surgery for revised. In the robot assisted group, all 54 screws were safely placed (category A+B), and mean deviation in entry point was 1.35 +/- 0.63mm, mean deviation in end point was 1.41 +/- 0.84mm. In the traditional free-hand group, all 62 screws were safely placed (category A+B), mean deviation in entry point was 2.63 +/- 1.28mm, mean deviation in end point was 2.54 +/- 1.31mm.

Conclusion: This new designed robot system is the first medical robot can do cervical spinal surgeries, and makes the cervical spinal surgery easier and safer.

#ESA Abstracts 20170136
Posterior-Only Approach for L5 Corpectomy: Indications and Technical Notes

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Introduction: To evaluate the efficacy and safety of a posterior-only approach for L5 corpectomy, with lumbo pelvic fixation for treatment of secondaries, infections, or burst fractures.

Methods: Between 2010 and 2013, 17 patients with L5 pathology, had corpectomy through posterior-only approach, with reconstruction of the anterior column using titanium cages filled with bone graft. The indication for surgery was presence of secondaries in 9 patients, spondylitis and spondylodiscitis in 5 patients and burst fractures due to high energy trauma in 3 patients. All patients underwent detailed neurological examination as well as plain radiography, CT, and MRI studies.

Results: This study included 17 patients (8 males and 9 females) with a mean age of 48.3 years. The mean operative time was 186.1 minutes with mean blood loss of 744 ml. No intraoperative or immediate postoperative complications were encountered. Three patients died during follow up due to advanced malignancy. The remaining 14 patients were followed up for a mean of 24.9 months. One patient had cut thorough of L3 screws 2 years after surgery requiring metal removal. One patient had asymptomatic broken screw, with no need for further intervention.

Conclusion: L5 corpectomy is a challenging procedure indicated for treatment of various cases of metastasis, infections or comminuted fractures. The posterior approach is safe, efficient, and allows both rigid posterior stabilization and anterior reconstruction after L5 corpectomy without the need for an anterior approach and its possible related morbidity.

#ESA Abstracts 20170137
A Prolapsed Cervical Interverbral Disc as the Presenting Feature for Alkaptonuria: Case Report

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Introduction: Alkaptonuria is a rare, autosomal recessive metabolic disorder characterised by absence of homogentisic acid oxidase activity. It's a disorder of very low incidence reaching as low as 0.001%. Degenerative changes in alkaptonuric patients is mainly due to the pigmentation of connective tissues which is called Ochronosis. Our objective in presenting this case report is to highlight the atypical intraoperative findings during cervical discectomy and how to deal with it surgically, how to re evaluate and diagnose retrospectively.

Methods: Male patient aged 38ys, presented with neck pain and Lt brachialgia. MRI findings shows C5-6,C6-7 disc herniation with lateralization foramina compromise on the Lt side.

Results: It was surprisingly to found the disc material jet black in color allover during discectomy till the posterior spinal ligament, that was encountered in the first level , we was thinking about the cause and thinking about that pathology which was more demanding when we opened the second level which was typically the same. Reviewing literature explains the diagnosis which was retrospectively evaluated and diagnosed by serum and urine homogentisic acid level. This metabolic disease is often recognized on physical re-examination after the black disc material was seen during the operation as we report in
this case. Therefore urinalysis for homogentisic acid should be performed in all patients with degenerative changes of the vertebral column, urine usually turns deep brown to black in color on exposure to oxygen.

Conclusion: Alkaptonuria with cervical disc herniation as the presenting feature is not common, Alkaptonuria most prominently involves the lumbar region. Only a few patients required surgical intervention. but here we present an alkaptonuric patient, who was operated on for cervical disc herniation. His discectomy material was black and the metabolic disorder was diagnosed retrospectively.

#ESA Abstracts 20170138
Evaluation of Long Term Results of Treatment of Degenerative Lumbar Disorder by Unilateral PLIF

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Introduction: The purpose of this study was to evaluate the clinical and radiological results of instrumented posterior lumbar interbody fusion (PLIF) using an unilateral pedicular screws and cage.

Methods: Thirty patients with unilateral radiculopathy who underwent unilateral pedicular screw fixation with a single fusion cage inserted on the symptomatic side for treatment of focal degenerative lumbar spine disease were prospectively enrolled in this study. Their clinical results, radiological parameters, and related complications were assessed 14 days, 3 months, and 12 months postoperatively.

Results: There was no instrumented fusion failure, significant cage subsidence, or retropulsion in any patient. One case with pseudoarthrosis. The surgery restored the disc space height and maintained it as of 12 months postoperatively and did not exacerbate the lumbar lordotic and sciatic angular. All patients had excellent or good outcomes according to the Oswestry score. The mean pain score according to the visual analogue scale was 7.5 preoperatively but had improved to 2.5 when reassessed 3 months postoperatively. The improvement was maintained as of 12 months postoperatively.

Conclusion: In cases of uncomplicated unilateral radiculopathy, unilateral PLIF using a single cage can be an effective and safe procedure but here we present an alkaptonuric patient, who was operated on for cervical disc herniation. His discectomy material was black and the metabolic disorder was diagnosed retrospectively.

#ESA Abstracts 20170139
Anterior Cervical Reconstruction Using Free Vascularized Fibular Graft after Cervical Corpectomy

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Introduction: This prospective study aims to evaluate the clinical and radiologic results of using free vascularized fibular graft (FVFG) for anterior reconstruction of the cervical spine following with varying levels of corpectomy.

Methods: Ten patients underwent anterior cervical reconstruction using an FVFG after cervical corpectomy augmented with internal instrumentation. All patients were evaluated neurologically according to the Japanese Orthopaedic Association (JOA) and modified JOA scoring systems and the Nurick grading system. The neurologic recovery rate was determined, and the clinical outcome was assessed based on three factors: neck pain, dependence on pain medication, and ability to return to work. The fusion status and maintenance of lordotic correction by the strut graft were determined by measuring the lordosis angle and fused segment height (FSH).

Results: All patients achieved successful fusion. The mean follow-up period was 35.2 months (range, 28 to 44 months). Graft union occurred at a mean of 3.5 months. The mean loss of lordotic correction was 0.95 degrees, and the mean change in FSH was <1 mm. The neurologic recovery rate was excellent in four patients, good in five, and fair in one. All patients achieved satisfactory clinical outcome. No neurologic injuries occurred during the operations.

Conclusion: The use of FVFG is a valuable and effective technique in anterior cervical reconstruction for complex disorders.

#ESA Abstracts 20170140
Posterior Cervical Decompression with Lateral Mass Fusion in Cervical Myelopathy: The Role of Sagittal Alignment

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Introduction: Simple posterior decompression has been utilized for over 40 years in the management of spondylotic disease. Poorer outcomes in comparison to anterior approaches and postoperative kyphotic deformity have always been the downsfalls of this technique. To avoid some of the drawbacks associated with laminectomy alone, a posterior fusion can be added. Currently, fusion in association with laminectomy is typically performed with lateral mass instrumentation. Fusion may improve spondyloitic neck pain and prevent post-laminectomy kyphosis as well as limiting repetitive microtrauma to a healing cord and also prevent the development of postoperative instability, which has been associated with poorer neurologic outcomes. Classically, this technique is performed in patients with lordotic sagittal alignment; however, there have been studies that included patients with neutral and slightly kyphotic cases as well. This study will evaluate the effectiveness of lateral mass fixation techniques after posterior cervical decompression in cervical stenosis causing myelopathy with different causative pathologies e.g. CSM, multiple disc disease, SLE and instability, with both lordotic and kyphotic alignment.

Methods: Twenty eight myelopathic patients with minimum of 2 years follow up were included. All patients received 2-7 level laminectomy with 2-6 levels of lateral mass fixation with or without extension to occiput or thoracic spine according to the existing pathology. Neck pain, motor and sensory power, JOA score for myelopathy and degree of loss of lordosis were measured, in addition to moderate to serious complications. Lordotic (15 cases) and Kyphotic (13 cases) subgroups were formulated and were compared according to all of the previously mentioned criteria.

Results: A significant improvement was detected in post-operative neck pain and neurological outcome in all cases: post-operative alignment improved to more lordosis in early follow up but returned to the same pre-operative alignment at final follow up. Significant better neck pain and neurological outcome was achieved in cases with lordotic preoperative alignment.

Conclusion: Laminectomy with lateral mass fusion is a reliable technique to treat myelopathic patients even with preoperative kyphosis, although better results are achieved in patients with pre-operative lordosis.
Results:
Five cases had undergone 4 levels ACDF, and 12 cases had undergone 3 levels ACDF with a total of 56 levels operated upon. As regard clinical state there was a statistically significant improvement in VAS for pain and neck disability index NDI, and radiologically evaluated foraminal height, and regaining the lordotic cervical curvature, besides it gave high rate of fusion with less complications. The aim of this study is to evaluate the safety and efficacy of 3 and 4 levels ACDF with PEEK cages only without plating, and to assess the clinical and radiologic outcome.

Conclusion: Three and four levels ACDF with PEEK cage alone without plating in treatment of degenerative cervical radiculomyelopathy is safe and effective and had good clinical outcome with low complication, and good radiologic outcome with excellent fusion rate, restoring the lordotic curve and increasing and maintaining disc height.

Introduction: Stand-alone cage-assisted anterior cervical discectomy and fusion (ACDF) has proved to be safe and effective procedure for treatment of mono-segmental cervical degenerative stenosis (CDS). However, the success rate has reported to decline as the number of levels increases. The aim of this study was to evaluate the short-term results of multilevel ACDF using standalone polyetheretherketone (PEEK) cages.

Methods: Twenty-eight patients (16 males and 12 females; mean age 40.5 years) of symptomatic multilevel CDS were enrolled in this prospective study. The criteria were used to evaluate clinical outcomes. Radiological evaluation was done to evaluate: fusion, cervical sagittal angle (CSA) and cage subsidence.

Results: There was a statistical significant improvement in clinical parameters and radiological CSA values in all groups post-operatively. This improvement was well maintained till final follow-up. Subsidence and non-union were encountered in seven and two fusion levels, respectively, with no significant differences between groups. All patients were satisfied and none of them had major complications or required revision surgery.

Conclusion: With proper patient selection, meticulous surgical technique and strict post-operative cervical bracing, the less-invasive indirect anterior cervical decompression technique augmented with stand-alone PEEK cage-assisted ACDF is an efficient and safe method for the treatment of multilevel CDS.

Introduction: One of the most common congenital anomalies in human development, including the myelomeningocele, myelocle, lipomyelomeningocele. It is considered to be caused of neural tube closure defect (caudal closure) that occurs between the 3rd and 4th weeks of the embryo. Genetic and environmental causes are encountered in its occurrence and more common among the low income populations. This retrospective study aims to describe the incidence of the menigo- myelocle and the different modalities of the surgical treatment among one Egyptian center.

Methods: At the Damanhour Medical National Institute, Damanhour city, Egypt, From April 2016 to April 2017 the team operated 33 patients (20 males, 13 females) with spina bifida operta. 26 patients with myelomeningocele, 5 patients with meningocele, 2 patients with lipomyelomeningocele. 60% of the cases were operated beyond the age of 3 days within the 1st week after delivery while the rest of the cases were operated within the first three days of age. 10 patients presented with ruptured content.

Results: The team operated 33 patients. 60% of the cases were operated after age of 3 day old while the role was surgical intervention within the 48 hours after birth. CSF diversion device was inserted in the same session with the back repair in 7 patients. 2 cases did not need CSF diversion devise any more up till now. One case died intraoperative. The mean follow up was 4.5 months, all the wounds of the patients healed, one experienced ischemia while 2 cases showed CSF leakage and revision surgery was done. No added deficits were happened after the surgical repair.

Conclusion: most of the case of spina bifida operta were be diagnosed during the prenatal follow up, but because many factors including delivery at home and loss of orientation of the nature and figures of the spina bifida operta by the family members, the patients presented after the 1st week after week after birth. Still ignorance and bad nutrition were a common risk factors among our patients. Health education and early surgical intervention by specialized team do improve the management and outcome. Keywords: spina bifida, myelomeningocele, meningocele, neural tube defect.

Introduction: Incidence of Spina Biﬁda Operta and Surgical Treatment at One Egyptian Center Within One Year
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Introduction: anterior cervical discectomy and fusion ACDF is the commonest procedure used in treatment of degenerative cervical radiculomyelopathy, and the use of spinal cages with autograft helped in increasing foraminal height, and regaining the lordotic cervical curvature, besides it gave high rate of fusion with less complications. The aim of this study is to evaluate the safety and efficacy of 3 and 4 levels ACDF with PEEK cages only without plating, and to assess the clinical and radiologic outcome.

Methods: This prospective study case series of 17 patients, their aged 41 to 62 years of age with cervical degenerative radiculomyelopathy who were treated with 3 or 4 ACDF with PEEK cage fusion with mean follow up period > 26 months were reported during the period from 2011 to 2016. Ten males and 7 females, of them 4 cases with cervical spondylotic myelopathy, and 13 cases with radiculopathy were included. Patients were clinically evaluated using visual anlouge score VAS for pain and neck disability index NDI, and radiologically evaluated for neck curvature, fusion rate in lateral radiographs.

Results: Five cases had undergone 4 levels ACDF, and 12 cases had undergone 3 levels ACDF with a total of 56 levels operated upon. As regard clinical state there was a statistically significant improvement in VAS in neck and arm pain, and also in NDI. All cases with myelopathy had significant satisfactory improvement in spasticity with improved ability. As regard radiology all cases had solid fusion , significant improvement in lordotic curve and increasd disc height.

Conclusion: Three and four levels ACDF with PEEK cage alone without plating in treatment of degenerative cervical radiculomyelopathy is safe and effective and had good clinical outcome with low complication, and good radiologic outcome with excellent fusion rate, restoring the lordotic curve and increasing and maintaining disc height.

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Satisfactory Outcomes after Multilevel Stand-Alone Cage-Assisted Anterior Cervical Discectomy and Fusion
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Extraforaminal Microscopic-Assisted Percutaneous Nucleotomy for Foraminal and Extraforaminal Lumbar Disc Herniations
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#ESA Abstracts 20170142
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Extraforaminal Microscopic-Assisted Percutaneous Nucleotomy for Foraminal and Extraforaminal Lumbar Disc Herniations
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Introduction: Foraminal and extraforaminal lumbar disc herniations are uncommon. The main presentation is radicular pain related to the exiting nerve root at the affected level. Different approaches for surgical intervention have been described. Purpose To evaluate the clinical outcome, complications recurrence and reoperation rate of extraforaminal microscopic assisted percutaneous nucleotomy with literature review focusing on complications and recurrence rate

Methods: Prospective cohort study done in a high flow spine center in Germany Patient Sample Between October 2012 and October 2015, 76 patients (35 females and 41 males) with foraminal or extraforaminal lumbar disc prolapse were operated upon. Outcome Measures Self-report measures: Visual Analogue Scale (VAS) for leg pain and back pain. Physiological measures: standing plain x-rays (antero-posterior, lateral, and dynamic views) Functional measures: Oswestry Disability Index (ODI) (validated German version) and Modic criteria. All patients were operated upon with Trans-tubular Foraminal Microscopic-assisted Percutaneous (EF-MAPN) technique. Preoperative clinical and neurological evaluation were done. The mean follow up period was 38 months (range 12 - 54). The study has?TTI received funding for research from any organisation. All authors do not have any conflict of interest.

Results: The mean age was 54 years. The most commonly affected level was L4/5 (34 patients). The mean preoperative VAS for leg pain was 7.6 (3-10), improved to 1.4 (0-4) postoperatively. The average operative time was 57.5 minutes. There were no intraoperative complications. One patient had temporary postoperative quadriceps weakness (L4 radiculopathy) that was completely improved at 3 months follow up. Another patient had deep venous thrombosis after discharge. Two patients had recurrences that necessitated another operation within the first 6 months postoperatively. Both were followed up for one year without a second recurrence.

Conclusion: Trans-tubular percutaneous extra-foraminal microscopic-assisted nucleotomy is effective for foraminal and extraforaminal disc herniations. It is a muscle splitting minimal-invasive approach with minimal morbidity. Complications, recurrence and reoperation rate is not different compared with microsurgical open or endoscopic techniques.

#ESA Abstracts 20170145
Spontaneous Regression of the Herniated Lumbar Disc: Clinical and Imaging Predictors.

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Introduction: To assess the role of imaging to predict the possibility of spontaneous disc regression. Patients and methods: Methods: The study was conducted on 30 patients referred to the Alexandria main University Hospital presenting by lumbar disc herniation. All patients was subjected to: 1. Conservative management 2. Clinical follow up 3. Radiological follow up.

Results: Thirty patients were included in the study, 15patients were male, age ranged from 24 to 61 years, 50% occurred in L5-S1 level, 45% L4-L5, and 5% L1-L2. 80% presented with unilateral sciatica, 20% bilateral, size of herniated disc ranged from 4 to 20 mm, 70% were more than 10 mm. 60% of the prolapse were horizontal in direction, 23% were down and 17 % were up. In 70% of cases the prolapse was posterolateral. The canal was stenotic in only 15 % of cases. The original disc was degenerated in all cases, 40% of cases had moderate disc degeneration and 60% had high grade of degeneration. Only 15% of cases had grade 2 Modic changes of adjacent vertebral bodies.

Conclusion: The regression of herniated lumbar disc is highly suspected in cases with postero-lateral herniation, absence of canal stenosis, high degrees of disc degenerative changes, absence of Modic changes. However a larger number of cases and a comparative study is needed to confirm these observations.

#ESA Abstracts 20170146
Short Segment Posterior Fixation with Index Level Screws Versus Long Segment Posterior Fixation for Thoracolumbar Spine Fracture: Angle of Correction and Pain

Arab Contractors Medical Center (A.C.M.C) in collaboration with faculty of medicine Ain Shams University, Cairo, Egypt

Introduction: The purpose of this study was to assess and compare between short segment fixation with screws into index level (fractured level) versus long segment posterior fixation in maintaining angle of correction and post-operative pain

Methods: A prospective study of 61 patients, have single level thoracolumbar spine fracture with Cobb’s angle ≤ 25°, underwent posterior fixation. Of them, Thirty three patients underwent short segment fixation one level above and one level below with screws into the index level, and twenty eight patients underwent long segment fixation with two levels above and two levels below with skipped index level. All patients were followed up for about 1 year until the fusion achieved. The angle of correction and pain were regularly assessed by Cobb’s angle measurement and visual analogue scale (VAS) respectively.

Results: The sixty one patients who underwent posterior fixation was grouped into 33 short segment cases (54.1%) and 28 long segment cases (45.9%). All were followed for 12 months. In short segment group the pre-operative mean Cobb’s angle was 19.3° ± 3.7°, whereas, in long segment group the pre-operative mean Cobb’s angle was 18.6° ± 3.8° (P = 0.520). The post-operative mean angle of correction were 6.8° ± 2.6° and 5.8° ± 1.6° respectively (P = 0.098). After 1 year follow up, the angle of correction have become 7.8° ± 1.6° and 7.9° ± 1.8° respectively (P = 0.860). The pain was assessed by VAS on regular base follow up. In short segment group the pre-operative VAS was 5.6 ± 2.1 whereas the long segment group VAS was 5.1 ± 2.1 (P = 0.284). After 6 months the VAS was 2.9 ± 1.4 and 3.9 ± 1.4 (P = 0.883) respectively. On one year follow up the VAS were 1.4 ± 0.5 and 1.8 ± 0.4 (P = 0.590) respectively.

Conclusion: the short segment fixation with screws into index level can maintain the angle of correction till the fusion achieved as long segment fixation for single level thoracolumbar traumatic fracture with lower complication and faster pain relief.

#ESA Abstracts 20170147
Cervical Vertebroplasty in Osteoporotic Patients with Cervical Disc Prolapse Surgery

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**Introduction:** The first vertebroplasty procedure was done by Harve Deramond in France in 1984 for a case of a hemangioma in the body of cervical vertebrae. Bone cement (that injected under pressure) fills the areas of bone loss in the body making it more strong to overcome stress which caused by osteoporosis. The usage of cervical vertebroplasty to strengthen the vertebra in cervical disc surgery in osteoporotic patients before application of cages very limited in literatures. The aim of this study was to evaluate the success rate of this technique and record its sequelae.

**Methods:** In the years 2011–2017 this technique was achieved in 2 male and 5 female. Their age was vary between 47 to 67 years (mean age: 54.1 years.) who documented to have osteoporosis by bone densometry. The surgical steps consist of open anterior cervical vertebroplasty in selected level adjacent to prolapsed cervical disc, discectomy then putting the cages.

**Results:** In 5 cases pain relief was observed immediately after the procedure while 2 cases complained from inter-scapular pain relieved by simple analgesics for 6 weeks. The study showed no life-threatening complications.

**Conclusions:** Cervical spine vertebroplasty with cervical disc surgery and cage application can be done without major sequelae but this data to bae a concept must applied on higher number of cases.

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**#ESA Abstracts 20170148**

**Posterior Revision of Interbody Lumbar Cages Migration: Series of Cases and Literature Review**

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**Introduction:** Revision surgery for lumbar interbody cage migration is technically demand. The study used the posterior approach for cage revision. Different technical operative procedures were analyzed.

**Methods:** This retrospective descriptive study ran from January 2010 to January 2016, we operated 106 patients with PLIF for treatment of spondylolisthesis. Of these, 12 patients experiencing cage subsidence, retropulsion, and over distraction. In subsidence, it was graded from 0 to III. Retropulsion was considered if the cage beyond the level of the posterior longitudinal line of the index two vertebrae. Patients had pre-operative pain assessment and clinical outcome by visual analog scale (VAS) and Oswestry disability index (ODI), respectively. The patient had VAS score ≥5; at least a 40% decrease on ODI, or added neurological deficit were considered for revision of surgery.

**Results:** Cage migration incidence was 11.3%, with subsidence 8 (6.7%), and retropulsion and over distraction 4 (4.6%) cases. The average time for subsidence was 3.3 months (range 2 to 6 months). Three cases had instrumentation with postero-lateral fusion. All surgical cases had either grade II or III subsidence. Retropulsion was accounted in 3 cases and one case had an over-distracted cage. All cases needed revision and fusion. All patients had a good result in VAS and ODI after a second surgery and during follow-up with P < 0.05.

**Conclusion:** Migration of cage into the endplates or spinal canal is usually associated with lumbar fusion failure. A safe approach for cage removal is still debate issue. Cage removal is mandated for retropulsion or over distraction, while postero-lateral augmentation is recommended for high-grade subsidence. In PLIF approach, it is safe and effective for cage revision, but there should be much concern about the medial orientation of the cage.