E POSTER ABSTRACTS
(SPINE)

E POSTER

(400) FROM NOVICE TO MASTERY: LEARNING CURVE AND EFFICACY OF SHORT TERM SPINAL CORD STIMULATION FOR DIABETIC FOOT ULCERS

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Background: Short-term Spinal Cord Stimulation (st-SCS) is an emerging treatment for diabetic foot, showing promise in improving wound healing, pain relief, and peripheral circulation. However, little is known about the learning curve for novice surgeons in mastering this technique and its associated challenges.

Purpose: To analyze the learning curve of novices in mastering st-SCS for diabetic foot, evaluating the efficacy, safety, and difficulty of this technique.

Methods: A retrospective review of diabetic foot patients treated with st-SCS at our hospital was conducted. All procedures were performed by the same physician and patients were sequentially numbered according to the order of surgery. Learning curves were plotted using segmented linear regression and cumulative sum curves based on surgery duration. Patients were divided into two groups according to the inflection points on the learning curve: the learning group and the mastery group. Pre- and post-operative efficacy indicators were recorded and compared, along with general patient data, perioperative parameters, and incidence of complications.

Results: A total of 36 patients were included. Significant improvements were observed post-st-SCS in ulcer size (from 7.00 cm^2 to 4.00 cm^2), visual analog scale (from 7.00 to 3.00), foot temperature (from 30.06°C to 32.37°C), and pittsburgh sleep quality index (from 14.42 to 8.36) ($P<0.05$). The physician could proficiently perform st-SCS after 9 cases. Surgery time was significantly shorter in the mastery group (1-9 cases) compared to the learning group (10-36 cases) (28.04 vs 43.56 min, $P<0.05$). There were no significant differences between the two groups in baseline data, improvement in efficacy indicators, or complications ($P>0.05$).

Conclusion: St-SCS is beneficial for wound healing, pain relief, improving peripheral circulation, and improving sleep quality. Surgeons can master this simple and safe technique in about nine cases.

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(529) HELP! WE GOT A FRACTURED EPIDURAL CATHETER.

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Background: Broken epidural catheters are rare but possess a clinical dilemma for the patient, anesthetic and spine team.

Case Report:
Case 1: A 60-year-old lady planned for TKR had been induced with spinal epidural anesthesia. During removal of the epidural catheter, the resident noticed a broken tip measuring 1cm. The TKR was performed uneventfully. Post operative, patient was briefed on the incident. A CT scan had revealed a small fragment suggestive of the retained fragment at the L4/L5 bony canal. Patient was counselled on the findings and informed regarding the option between observation and surgical management. She opted for removal and understood the risk involved. Removal was done on post operative day 2. The fractured tip catheter was lodged at the yellow ligament measuring 9mm. No complications were experienced.

Case 2: A 28-year-old male with broken femur implant was planned for a ROI and replating. Epidural anesthesia was performed. During removal, catheter had snapped leaving roughly 14 cm in-situ. Patient was informed of the incident, and a CT scan was performed revealing fragment within the canal between L2 and L4. Removal was done post operative day 4. The broken catheter measuring 15 cm was located entirely within the canal at the level L3/L4. Removal was uneventful.

Discussion: Fractured spinal or epidural catheters are uncommon but when occurred results in a conundrum. In symptomatic cases, decision is straight forward, removal is warranted. However, asymptomatic patients, risk of retained fragments resulting in infection, granuloma formation or migration resulting in impingement to the cord or nerve root. A CT scan will be the most useful imaging to help delineate the fragment as compared to an MRI. Retained fragments can have medicolegal repercussions. There are no guidelines on management of retained catheters, hence decision for removal should factor in the symptoms, location, size of fragment and most importantly the patient's decision.

Conclusion: Asymptomatic broken epidural catheter should be attempted to be removed early upon full disclosure to patient.

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(565) SPONTANEOUS SPINAL EPIDURAL HEMATOMA

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Spinal epidural hematomas (SSEH) are a rare occurrence, accounting for less than 1% of all spinal canal space-occupying lesions. Its underlying etiology has remained poorly understood, current theories suggest rupture of epidural vessels, arteriovenous malformation as possible causes.

A 53-year-old lady, with underlying diabetes mellitus, experienced sudden onset of lower back pain and bilateral lower limb weakness and numbness. The symptoms began abruptly and rapidly worsening over few hours causing her unable to walk. Meanwhile, she had trouble in passing urine. A thorough history indicated no pertinent findings. There was no history of recent back trauma, fall, infection, coagulopathy or symptoms of increased intracranial pressure. On examination, she was alert and orientated to time, place and person. Her vital signs were stable. Cranial nerves were intact. She complained of localized lumbar tenderness during palpation. Her bilateral lower limb strength was MRC grade 1. Sensation was absent from L1 downwards, last normal dermatome at T12 bilaterally. Reflexes were areflexia for bilateral lower limbs. She lost her perianal sensation. Otherwise, her anal tone, voluntary anal contraction and bulbocavernosus reflex were present. Her neurological examination of upper limbs was normal. Her blood investigation showed pancytopenia. MRI of spine revealed an elongated posterior epidural heterogenous collection from T9 – T12, in which it appeared isointense on T1 and hyperintense on T2/STIR/FS. Segmental cord expansion with intramedullary hyperintensity can be seen from T9 till T12. A provisional diagnosis of conus medullaris syndrome secondary to SSEH with concurrent transverse myelitis was made. Due to rapidly deteriorating neurology, patient underwent urgent T11 laminectomy, undercut T10 to alleviate spinal cord compression and evacuate the hematoma. Intraoperatively, an organized epidural hematoma extending from T9-T12, most stenosed at T10/T11. A 3cc epidural hematoma successfully removed. Post operatively, her motor and sensory functions slowly recovered.

SSEHs are rare clinical scenarios but significant neurological condition. MRI is the gold standard to identify any underlying pathology. Immediate surgical intervention is imperative to decompress the spinal cord as any delay might lead to permanent neurological deficits.

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(669) COMPARATIVE ANALYSIS OF FILIPINO SPINE SURGEONS' PERCEPTIONS AND PReferences: MINIMALLY INVASIVE VS. OPEN TRANSFORAMINAL LUMBAR INTERBODY FUSION (MIS TLIF VS. TLIF)

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This study looked at the perceptions of Filipino spine surgeons regarding Open Transforaminal Lumbar Interbody fusion (TLIF) and Minimally Invasive TLIF (MIS-TLIF) given the advancements that have come to light in recent years. The research engaged members of the Philippine Spine Society through a survey that assessed preferences, barriers, and the impact of these techniques on patient care.

An 88% response rate was achieved, mostly representing male surgeons in urban private hospitals. Amongst the respondents, there was neutral preference for either technique which was largely attributed to the lack of surgeon training affecting their familiarity and mastery. MIS-TLIF was recognized for its benefits, including quicker patient recovery, reduced soft-tissue trauma but was also associated with other challenges like high costs, and increased exposure to radiation. Other barriers identified were related to technical difficulties and limited access to training and resources. These suggest that addressing these barriers through enhanced training for the surgeons, as well as, cost mitigation could promote more widespread practice of MIS-TLIF, ultimately improving its accessibility and service delivery in the Philippines.

E POSTER

(677) MICROLUMBAR DISCECTOMY UNDER WIDE AWAKE PROGRESSIVE LOCAL ANESTHESIA IN PREGNANT PATIENTS WITH LUMBAR DISC HERNIATION: A REPORT OF TWO CASES

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Background: Lumbar disc herniation, while rare during pregnancy, presents significant challenges due to the contraindications of standard treatments such as NSAIDs and limitations of general anesthesia. Conservative treatments may fail in cases of intractable pain or progressive neurological deficits. Evidence for surgical management in pregnant patients is limited, with concerns about maternal and fetal safety.

Report: This report highlights two cases of microlumbar discectomy under wide-awake progressive local anesthesia in pregnant patients.

• Case 1 involved a 42-year-old woman at 17 weeks gestation presenting with severe radicular pain unresponsive to conservative management. Imaging revealed L5-S1 disc herniation. The patient underwent successful decompression with immediate postoperative relief and delivered a full-term, healthy baby.

• Case 2 described a 36-year-old woman at 14 weeks gestation with worsening radicular pain, urinary incontinence, and saddle anesthesia. Imaging showed L5-S1 disc herniation. After similar surgical management, the patient reported immediate symptom relief. She later delivered a healthy preterm infant at 33 weeks.

Both procedures utilized local anesthesia, allowing real-time patient feedback, minimized intraoperative risks, and immediate postoperative mobility.

Conclusions: Microlumbar discectomy under local anesthesia is a viable, safe, and effective treatment for symptomatic lumbar disc herniation in pregnant patients. This approach minimizes the risks associated with general anesthesia and offers significant benefits in pain relief and functional recovery without adverse fetal outcomes. These cases underscore the potential of awake spine surgery as an alternative for managing complex conditions during pregnancy.

(687) COMPLEX INTERPLAY: NON IDIOPATHIC SCOLIOSIS IN MARFAN SYNDROME WITH CHIARI I MALFORMATION

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Background: Chiari I malformation (CM-I) is a structural abnormality where the cerebellar tonsils extend into the upper cervical spine, often linked with scoliosis. Marfan syndrome is a genetic connective tissue disorder commonly associated with progressive scoliosis. The coexistence of CM-I, scoliosis, and Marfan syndrome is extremely rare, necessitating tailored management.

Report: We present the case of a 14-year-old male with Marfan syndrome, non-idiopathic scoliosis, and incidental CM-I without syringomyelia. The patient was referred for worsening spinal deformity observed over three years. Initial imaging revealed lumbar and thoracic scoliosis with Cobb angles of 71° and 64°, respectively. Clinical examination identified typical Marfanoid features, including arachnodactyly, a high-arched palate, and a positive Beighton score of 7.

MRI findings confirmed thoracic dextroscoliosis, lumbar levoscoliosis, degenerative disc disease, and cerebellar tonsillar herniation consistent with CM-I. No syringomyelia or other spinal cord abnormalities were noted. The patient underwent foramen magnum decompression with C1 laminectomy under neurosurgical care to address CM-I. Four months later, a posterior spinal fusion and instrumentation from T3 to L2 were performed to correct the deformity.

Postoperatively, the scoliosis improved significantly, with the lumbar Cobb angle decreasing from 71° to 38° and the thoracic angle from 64° to 33°. The patient recovered without complications, demonstrating enhanced spinal alignment and stability.

Conclusions: This case underscores the need for thorough evaluation in scoliosis patients, particularly those with underlying syndromic or neurological conditions. While foramen magnum decompression is effective for CM-I management, its role in halting scoliosis progression remains variable, particularly in severe cases. For patients with advanced scoliosis, spinal fusion remains a crucial intervention to achieve deformity correction. The coexistence of CM-I, Marfan syndrome, and scoliosis is rare, and the management requires a multidisciplinary approach tailored to the individual's clinical and radiological findings. Further studies are essential to refine treatment strategies and improve outcomes for similar cases.

(696) CERVICAL EPIDURAL HEMATOMA OF POST STREPTOKINASE: A CASE REPORT

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Background: Spinal epidural hematoma (SEH) is a rare but significant complication that can occur after thrombolytic therapy, such as streptokinase administration. SEH results in spinal cord compression, leading to severe neurological deficits. Its clinical presentation often involves acute neck or back pain, followed by rapidly progressing motor, sensory, or autonomic dysfunction. Early recognition and diagnosis, primarily through magnetic resonance imaging (MRI), are critical for timely intervention. Urgent surgical decompression is typically required to prevent permanent neurological damage.

Report: We present a case of a 41-year-old gentleman who initially experienced recurrent episodes of chest pain without electrocardiographic changes. Upon developing worsening chest pain, he was treated with streptokinase. Post-administration, he experienced persistent neck pain and headache with ascending neurological deficits, starting with right lower limb numbness, along with two episodes of hematemesis.

Six hours post-streptokinase, the patient developed spinal shock with bilateral lower limb paralysis and reduced upper limb power (1/5), accompanied by sensory deficits below T2. CT brain imaging revealed a focal infarct in the right lentiform nucleus but no intracranial bleed. Contrast-enhanced CT angiography of the thoracic and abdominal aorta showed no evidence of dissection or aneurysm. A spinal angiogram ruled out spinal arteriovenous malformations.

MRI revealed an acute epidural hematoma from C3-C7 with cervical spinal cord edema and compression. The patient underwent C3-C7 laminectomy operation. Postoperatively, the patient showed partial neurological improvement, with upper limb motor function and sensory levels returning to T12. However, bilateral lower limb paralysis persisted.

Conclusion: Cervical epidural hematoma (CEH) post-thrombolysis is a rare but severe condition requiring prompt evaluation and intervention. Careful risk assessment prior to thrombolytic therapy and timely surgical management can improve outcomes. Early recognition is vital, as prognosis depends on the extent of spinal cord damage and the timing of intervention.

(699) PROGNOSTIC VALUE OF SERUM PYRIDINOLINE CROSSLINKED CARBOXYTERMINAL TELOPEPTIDE OF TYPE I COLLAGEN (1 CTP) IN BREAST CANCER WITH SPINAL METASTASES: A RETROSPECTIVE COHORT STUDY

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Background: Serum pyridinoline crosslinked carboxyterminal telopeptide of type I collagen (1CTP) is known as a bone metabolic marker to investigate bone metastases in patients with breast cancer. However, there are no reports on the association between 1CTP and overall survival (OS) in breast cancer with spinal metastases.

Objective: This study aims to evaluate the association between serum 1CTP values, as indicators of bone metabolism, and OS from the time of spinal metastases diagnosis in breast cancer patients.

Methodology: This study retrospectively investigated serum 1CTP values in 61 women who were diagnosed with breast cancer with spinal metastases between 2005 and 2022. Serum 1CTP values were evaluated at the time of spinal metastases diagnosis (baseline), and at 3, 6, and 12 months after diagnosis. The observation period was set at 5 years. Patients were divided into two groups based on serum 1CTP values at the time of diagnosis: the lower 1CTP values group (<6.2 ng/mL) and the higher 1CTP values group (≥6.2 ng/mL), as defined by previously reported thresholds. We evaluated associations between OS and 1CTP values, using the log-rank test for univariate analysis and Cox regression analysis for multivariate analysis adjusted by age and prognostic score for bone metastases (modified Katagiri score).

Results: Among these 61 patients, the mean age was 62.6 years (range, 36–83 years). Median OS was significantly shorter in the group with higher 1CTP values (n=29; 24 months) than the group with lower 1CTP values (n=32; 56 months) (P=0.025). However, changes in 1CTP values during this observation period showed no association with OS. Multivariate analysis revealed that higher 1CTP values (hazard ratio 2.407, 95% confidence interval 1.18–4.913, P=0.016) were independent predictors of poor prognosis.

Conclusion: Higher 1CTP values at the time of spinal metastases diagnosis were predictors of poor prognosis in breast cancer patients with spinal metastases.

(704) CAGE POSITION AND INTERBODY BONE GRAFT VOLUME OF O ARM NAVIGATED MIS TLIF VERSUS OPEN TLIF

Objective: To investigate the position of interbody cages and the volume of interbody bone graft in minimally invasive transforaminal lumbar interbody fusion (MIS-TLIF) for lumbar isthmic spondylolisthesis using O-arm navigation.

Methods: A retrospective analysis was conducted on imaging and clinical data of patients with isthmic spondylolisthesis who had undergone MIS-TLIF with O-arm navigation or traditional open TLIF from May 2018 to November 2023 in our hospital. The MIS-TLIF group included 58 cases, while the open TLIF group included 116 cases. The preoperative and postoperative imaging parameters, blood loss, drainage volume, duration of postoperative hospital stay, Oswestry Disability Index (ODI) scores, Visual Analog Scale (VAS) scores, as well as the volume and area of interbody bone grafting and cage position were all compared between the two groups.

Results: There were no significant differences between the two groups in general information or preoperative and postoperative slip percentage, slip angle, intervertebral height, or slip reduction rate (P>0.05). The MIS-TLIF group had significantly less blood loss, drainage volume, and postoperative hospital stay compared to the open TLIF group. Postoperative VAS back pain scores were significantly lower in the MIS-TLIF group (P<0.001). There was no significant difference in terms of cage position depth in the MIS-TLIF group (53.7±7.8) % and open TLIF group [(52.7±6.7) %, P>0.05]. In the MIS-TLIF group, 73.3% of cages were placed in the anterior half, and in the open TLIF group, it was 65.0% (P>0.05). The mean cage position deviation in the MIS-TLIF group (5.8±6.3) % was significantly smaller than that in the open TLIF group [(8.4±7.9) %, P<0.05]. In the MIS-TLIF group, there were 88.3% cages with position deviation of less than 10%, but in the open TLIF group, it was only 68.3% (P<0.05). The mean interbody bone graft volume was (4.2±0.5) ml for MIS-TLIF and (4.4±0.8) ml for open TLIF, respectively. The mean transverse bone graft area was (424.3±97.9) mm^2 for MIS-TLIF and (451.7±140.8) mm^2 for open TLIF, and the mean sagittal bone graft area was (221.7±42.5) mm^2 for MIS-TLIF and (227.5±48.0) mm^2 for open TLIF, respectively. There was no significant difference in interbody bone graft volume between the groups (P>0.05).

Conclusion: O-arm navigation-assisted MIS-TLIF for isthmic spondylolisthesis offers the advantages of minimal invasiveness and quicker recovery, while maintaining comparable safety, precision in interbody cage placement, and graft volume to traditional open TLIF.

(707) MRI BASED VERTEBRAL BONE QUALITY SCORE COMBINED WITH FAT INFILTRATION OF PARASPINAL MUSCLES PREDICTS ADJACENT SEGMENT DEGENERATION FOLLOWING TRANSFORAMINAL LUMBAR INTERBODY FUSION

Objective: To assess the role of vertebral bone quality (VBQ) score combined with paraspinal muscles fat infiltration in predicting adjacent segment degeneration after lower lumbar transforaminal lumbar interbody fusion.

Methods: This study respectively reviewed a consecutive series of 210 patients who had undergone transforaminal lumbar interbody fusion (TLIF) for lower lumbar degenerative diseases and had been followed at least 2 years. There were 53 patients were identified with radiographic ASD (R-ASD), 20 with symptomatic ASD (S-ASD), and 137 without ASD (Non-ASD). BMD was measured by DXA-based T-scores. The VBQ score and the cross-sectional area (CSA) and degree of fat infiltration (DFF) of the erector spinae muscle, multifidus muscle, and psoas muscle were assessed using lumbar MRI images. The correlation coefficients were calculated between the VBQ score and the parameters of BMD and DFF of paravertebral muscle. The receiver operating characteristic (ROC) curve was used to evaluated the prediction value of VBQ and DFF of paravertebral muscle.

Results: No significant differences were obeserved in age, gender, and BMI between the RASD, S-ASD and Non-ASD group. BMD T-scores and Cross-sectional area of paraspinal muscles did not significantly differ between groups. The VBQ score showed a negative correlation with the lumbar, hip, and femoral neck T-score (r =-0.469, p<0.001; r =-0.410, p<0.001; r =-0.412, p<0.001, respectively) and a positive correlation with the DFF of erector spinae muscle (ES), multifidus muscle (MF), and psoas muscle (PS) (r =0.478, p<0.001; r =0.441, p<0.001; r =0.356, p<0.001, respectively). VBQ score, average DFF, and VBQ score combined with average DFF of paraspinal muscles were able to effectively predict occurrence of both ASD (AUC=0.754, 0.735, and 0.789 respectively) and S-ASD (AUC=0.864, 0.845, and 0.895 respectively).

Conclusion: Higher VBQ score and DFF of paraspinal muscles were significantly associated with occurrence of ASD. Both poor vertebral bone quality and paraspinal muscle degeneration may predispose occurrence of ASD after TLIF. Treatment mearsures on osteopenia and strengthening the paraspinal muscles in the elderly may be helpful to prevent ASD.

(734) SEVERE DISPLACEMENT OF THORACIC SPINE FRACTURE IN DIFFUSE IDIOPATHIC SKELETAL HYPEROSTOSIS

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Background: Diffuse idiopathic skeletal hyperostosis (DISH) results in larger moment arm in the ankylosed spine, which becomes susceptible to fracture. In this report, we describe a patient with DISH who had an unconventional level of spinal fracture-dislocation and complete cord injury. We discuss on how DISH poses a risk for such a severe type of fracture in the fairly stable thoracic spine.

Report: A 35-year-old obese male sustained a fracture-dislocation at T8 vertebral body following a motor vehicle accident, resulting in a complete spinal cord injury at the level. Plain radiographs revealed a T8 fracture-dislocation. Candle-wax bridging was also present over more than four consecutive levels at the thoracic region, indicating an undiagnosed DISH. CT scan revealed comminuted and displaced fracture through the facets.

He underwent emergency decompression and posterior spinal instrumentation and fusion T6-T10. His spinal cord was noted to be completely transected at the level of injury. Following surgery, he did not show recovery in ASIA grade, but was able to proceed for a quicker spinal rehabilitation.

T8 is a rather unconventional level to sustain spine fracture-dislocation as the rib cage is present. DISH causes instability due to larger moment arms in which forces can act on due to the multilevel bony ankylosis.

Conclusion: Patients with a fused spine have an increased fracture risk following trauma. Surgical instrumentation and fusion is favourable as it is associated with lower post-operative complication and mortality rates.

(742) SINGLE STAGE CLOSING OPENING WEDGE OSTEOTOMY AFTER A FAILED HALO PELVIC TRACTION FOR TUBERCULOUS KYPHOSIS TREATMENT: A CASE REPORT

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Surgical management for spinal deformities, instability and neurological impairment brought about by Pott's disease remains to be a challenge to this day as it is beset with various complications ranging from neurological complications to other thoracocardiovascular and medical complications. Literatures present various surgical approaches including anterior and anterolateral, posterior only or combined approaches used to address these issues. This case discusses the application of a posterior closing–anterior opening posterior instrumentation technique (we learned from Professor Rajasekaran, Ganga Hospital) applied in a patient with severe tuberculous spine kyphosis and incomplete neurological deficit, highlighting the efficacy of this approach in deformity correction, spinal stabilization, and neurological recovery.

We present a case of a 43-year-old male with a history of childhood tuberculosis and a 1-year history of back pain, a severe thoracic kyphotic deformity and an incomplete neurologic deficit (Frankel B). He presented with 8 months progressive bilateral lower extremity weakness, sensory loss, and bowel and bladder dysfunction. He came to our Orthopedic Out-patient clinic with paraplegia and severe thoracic kyphosis with a 110 degrees cobb angle.

He was managed with a Halo-Pelvic device that improved his neurological function and decreased preoperative Cobb's angle from 110 to 95°. After 6 weeks, the device loosened and was replaced with Gardner-Wells traction for another month. Subsequently, a single-stage posterior surgical approach was performed using a posterior closing–anterior opening posterior instrumentation technique to correct the deformity and stabilize the spine. The procedure allowed for both spinal decompression and stabilization, without the need for an anterior surgical incision.

Postoperatively, the patient showed significant improvement in the motor function of both lower limbs and the Cobb's angle reduced from 110° to 80°, demonstrating significant deformity correction. Radiographs at 1 month confirmed stable hardware without surgical site infection.

We would also like to present the learning points we experienced as we treated this case.

E POSTER

(757) CERVICAL MYELOPATHY: PITFALLS IN EARLY DIAGNOSIS AND SURGICAL INTERVENTION

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Background: Ossification of the posterior longitudinal ligament (OPLL) is a condition characterized by the abnormal calcification of the posterior longitudinal ligament. Symptoms may develop gradually over time or may demonstrate acute deterioration due to factors such as trauma.

Report:
Case 1
A 36 years-old gentleman was presented two months history of worsening neck pain, gait imbalance, tetraparesis with paresthesia, following recent trauma. Clinical assessment revealed ASIA D tetraplegia. CT showed significant OPLL extending down from C3-C5. MRI revealed severe cord stenosis, cord diameter 3.45mm at pathological area. Subsequently, patient underwent laminoplasty of C3-C6. Post operatively, neurological status is ASIA E.

Case 2
A 29 years-old lady was presented with tetraparesis and paresthesia after sustaining a fall. Clinical examination concluded as ASIA D tetraplegia. CT revealed extensive OPLL at level C2 to T2 and OPLL fracture at C4-C5, causing cord stenosis of diameter 3.6mm from MRI. She underwent posterior instrumentation of C2-C7 and laminectomy of C3 -C6. Post operatively neurological status is ASIA E.

Case 3
A 31 years old male was presented with neck pain, bilateral upper limb and left lower limb paresis and paresthesia, urinary incontinence and gait imbalance. Physical examination deduced ASIA D tetraplegia. CT and MRI reported OPLL at C2-C7, with cord diameter of 0.3cm at C2-C5. Post posterior instrumentation C2-C5 and laminectomy C3-C4, patient regained full power of limbs, with residual neurogenic bladder.

Conclusion: OPLL increases the likelihood of substantial neurological deterioration, even following minor traumatic incidents. A prompt diagnosis and treatment may halt further damage to the spinal cord and ields a good functional outcome.

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(764) SOLVING SEVERE SCOLIOSIS WITH SINGLE STAGE SURGERY: A CASE REPORT

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Introduction: Severe adolescent scoliosis poses a significant challenge in surgical planning, often requiring multi-stage surgery due to its extreme curvature. The complexities associated with these cases, including potential complications such as blood loss, spinal cord injury, and pulmonary compromise, present dilemmas for surgeons. The goal of corrective surgery is to achieve optimal spinal alignment, prevent degeneration and progression of the curve, and improve the patient's quality of life..

Report: A 16-year-old Malay boy was referred for severe adolescent scoliosis, initially noticed at age 11 and worsening by age 13, accompanied by back pain. Despite this, he remained active without weakness, numbness, or dsypnea. Clinically showed prominent left thoracic hump, uneven shoulder and pelvic levels, and café-au-lait spots on the trunk and limbs. Neurology was intact. Xray showed a Cobb angle of 104 degrees (T5-T10) and 95 degrees (T10-L4). MRI showed thoracic scoliosis and secondary lumbar curvature without spinal cord pathology. Lung spirometry was normal. The patient underwent single-stage posterior instrumentation T3-L4. Intraoperatively, dystrophic scoliosis with apex at T7 (thoracic) and L2 (lumbar). Correction involved derotation and distraction maneuvers, achieving balanced alignment. Postoperatively, he spent one day in ICU and was discharged on the fifth day, with a follow-up in three weeks.

Figure 1: Pre op xray with severe curvature.

Figure 2: Post op xray

Conclusion: In conclusion, this case highlights the efficacy of single-stage posterior surgery in restoring alignment with benefits including shorter hospitalization and reduced need for multiple surgeries. While higher blood loss may occur due to prolonged operative times compared to staged approaches, the achieved correction outweight these consideration. Close postoperative monitoring and regular follow-ups are crucial, particularly for patients at risk of implant failure, ensuring good long-term outcomes and patient well-being.

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(774) CAUDA EQUINA SYNDROME TREATED WITH TWO LEVEL ENDOSCOPIC DISCECTOMY

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Background: Cauda equina syndrome (CES) is an urgent condition which requires emergent attention. Lumbar disc herniation (LDH) is the most common cause and it may result in life-changing implications if not acted upon immediately when suspected. Treatment is commonly done via an open discectomy but we present a case that was treated with transforaminal endoscopic decompression.

Report: We present a case of cauda equina syndrome due to two level lumbar disc herniation in a 27 years old female with a BMI of 45.5kg/m2. She presented with a 2 weeks history of worsening lower back pain with visual analogue scale (VAS) of 7 associated with bilateral lower limb radicular pain, sacral numbness and loss of bowel and bladder continence for 3 days. On examination she had intact motor power of the lower limbs but reduced perianal sensation and lax anal tone. Magnetic resonance imaging revealed L3/4 central disc extrusion and L4/5 left paracentral disc extrusion causing spinal stenosis.

Percutaneous endoscopic lumbar discectomy (PELD) of L3/4 and L4/5 levels was done via a transforaminal approach. Sequestrated disc over L3/4 level and disc over L4/5 level was removed. Posterior aspect of L3/4 and L4/5 discs removed until epidural space was visualized.

Post operatively, lower limb radicular pain improved and noted improvement in sacral numbness. At 4 weeks postoperatively she was pain free, with restoration of bowel and bladder function. She has no recurrence at one year post operatively.

Conclusion: Minimally invasive decompression is an effective approach for LDH with fewer complications compared to conventional laminectomy. In recent years, due to its rapid recovery, PELD has been accepted as one of the minimally invasive methods effective for the treatment of LDH and its use for cases with cauda equina syndrome despite being controversial is a possible option.

(776) TRENDS IN PATIENTS WITH CERVICAL SPINAL CORD INJURY AND FACTORS HINDERING RETURN TO HOME

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Background and Objective: With the increasing elderly population, cervical spinal cord injury (CSCI) cases exhibit a bimodal distribution between older and younger populations. The increase in single-person households among the elderly presents challenges for older patients with CSCI in returning home. This study explores the clinical characteristics of patients with CSCI treated at our hospital and identifies factors hindering their return home.

Methodology: We analyzed 114 patients with CSCI (88 men and 26 women) who were treated between April 2014 and March 2023. We evaluated factors, such as age, family composition, injury mechanism, preinjury activities of daily living (ADL), hospital stay, magnetic resonance imaging intramedullary signal changes, surgical interventions, and ASIA classification, upon admission and final follow-up. The patients were divided into the home-return (group A) and non-home-return (group B) groups at final follow-up, and both groups were compared. [Results] The patients' average age was 68 years, with a bimodal distribution between older and younger individuals. Among them, 20 involved bone fractures, whereas 94 did not. Group A comprised 89 patients, group B included 14 patients, and 11 patients were unknown. The return to home rate is 78%. Group A were significantly younger (67.0 years vs. 81.5 years) and had a higher proportion of independent pre-injury ADL (92% vs. 43%) and higher ASIA D/E rates at follow-up (98% vs. 36%). Although not statistically significant, group A showed a trend of fewer individuals living alone and more individuals living in multigenerational cohabitation.

Conclusion: The return to home rate in Saga Prefecture was high (78 %). Factors, such as advanced age, low pre-injury ADL, and severe residual paralysis, hindered return to home. In Japan, Saga Prefecture ranked eighth for multigenerational households, likely supported a higher rate of multigenerational cohabitation in group A. These results highlight the importance of discharge planning and support systems tailored to regional characteristics in promoting return to home outcomes.

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(790) EFFECTIVENESS OF AUTOLOGOUS FAT GRAFT AND METHYLPREDNISOLONE AS SINGLE THERAPY AND COMBINATION THERAPY IN THE PREVENTION OF EPIDURAL FIBROSIS

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Background: Epidural fibrosis is one of the complications that can occur after laminectomy. One of the modalities to address epidural fibrosis is the prevention or reduction of fibrosis formation. Most recent studies using animal models showed the effectiveness of drugs or substances in preventing epidural fibrosis by comparing treatment group with control group based on the histopathology of epidural fibrosis formation. Experimental research models for the prevention of epidural fibrosis are being carried out, but nowadays there is still no consensus on the best method noted.

Objective: How is the effectiveness in prevention of epidural fibrosis using application of combined autologous fat graft and steroid injection compared to stand alone fat graft only or steroid injection only.

Methods: This research has four groups of rats given four different treatments post lumbar laminectomy, which are a control group, a group given methylprednisolone injection, a group given autologous fat graft, and a group given a combination of methylprednisolone and autologous fat graft. The formation of epidural fibrosis was then investigated after 6 weeks of follow up by histopathological examination and assessed based on the classification of He, et al. Visible epidural fibrosis degree was analyzed using Mann Whitney test and the significance level of $p<0.05$ using Shapiro Wilk test. Kruskal Wallis test was used to test the normality of the data distribution.

Results Discussion: The result showed that the Fat group has the lowest degree of fibrosis (Grade 1). For the comparison between the autologous fat graft group with the control group, methylprednisolone, and the combination of methylprednisolone and autologous fat graft showed a significant difference (p-value < 0.05). While the comparison between the control group, methylprednisolone, and the combination of methylprednisolone and autologous fat graft had no significant difference (p-value > 0.05).

Conclusion: The study demonstrated a significant reduction in histological fibrosis using autologous fat grafts compared to methylprednisolone and their combination in animal models.

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(794) AUGMENTING ENDOSCOPIC TRANSFORAMINAL SPINAL DECOMPRESSION SURGERY WITH STIMULATED ELECTROMYOGRAPHY (EMG) NEUROMONITORING DILATORS

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Background: Full Endoscopic Spine Surgery (FESS) through a transforaminal approach has gained popularity for its minimally invasive benefits. However, challenges remain in ensuring nerve safety and precise localization during surgery. Stimulated electromyography neuromonitoring dilators (EMG-D) offer a potential solution by providing real-time feedback to enhance safety and efficiency.

Objective: To present the innovative application of EMG-D in FESS-TFA, highlighting its potential ability to minimize nerve injury and reduce radiation exposure, whilst improving surgical outcomes.

Methods: A 6-mm dilator equipped with a stimulation electrode was utilized during the FESS-TFA of a patient presenting with T11/T12 spinal stenosis. Real-time EMG feedback with a probe helped map and localise the nervous tissue and ensured the safety of the exiting and traversing nerve roots. Notably, this technique eliminated the need for blind tissue dissection, allowing for targeted decompression while preserving surrounding structures.

Results: Successful decompression was achieved without neurological complications. The patient reported at least 90% reduction in preoperative symptoms by the first follow-up visit at two weeks, including significant improvement in mobility and pain levels. The use of EMG-D facilitated precise localization and minimized radiation exposure by reducing the need for fluoroscopic adjustments.

Conclusion: This case suggests the feasibility and safety benefits of incorporating EMG-D in FESS-TFA. The technique offers a dual advantage: ensuring real-time neural safety while enhancing surgical precision, by addressing challenges of blind dissection and excessive fluoroscopy. The integration of real-time neuromonitoring shows promise in enhancing the surgeon's ability to perform minimally invasive procedures with greater confidence. Further studies involving larger cohorts are recommended to validate these findings and establish standardized protocols.

Keywords: Full Endoscopic Spine Surgery, Stimulated Electromyography, Neuromonitoring, Transforaminal Approach, Spinal Stenosis, Minimally Invasive Surgery

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(797) INTENTIONAL INTRADISCAL CEMENT INJECTION FOLLOWING VERTEBROPLASTY: PROMISING OUTCOMES

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Background: Intradiscal cement leakage during vertebroplasty is a known complication, which may increase stress on adjacent vertebrae and lead to worsening back pain. Some studies suggest that cement leakage could accelerate disc degeneration. However, we report a case where intentional intradiscal cement injection following vertebroplasty was performed to prevent further disc sequestration, resulting in improved patient outcomes.

Report: A 66-year-old female with no significant medical history presented with chronic low back pain, which had persisted for five years and radiated to her bilateral lower limbs. Pain significantly impacted her daily activities. Clinical examination revealed intact neurology. Radiographs showed multilevel degenerative disc changes, while MRI confirmed severe multilevel degenerative disc disease at the left lumbar spine, with spinal canal stenosis from L2/L3 to L5/S1 and nerve root impingement. Notably, a sequestrated disc at L4 was indenting the cauda equina nerve root, and vertebral haemangiomas were present, with a compression fracture at L4. The patient underwent posterior decompression at L3/L4 and L4/L5, with vertebroplasty at L4. Intraoperatively, bone cement was deliberately injected into the disc at L3/L4, with no extravasation observed. Checked I/I confirmed the cement placement confined within the disc space. Postoperatively, the patient experienced significant relief of back pain and was able to resume her normal activities.

Conclusion: While intradiscal cement leakage is a common complication of spine augmentation procedures, its effects on disc degeneration are not well understood. This case demonstrates that intentional intradiscal cement injection may offer a potential benefit by preventing further sequestration of disc material and alleviating pain. Further studies are needed to explore the efficacy and safety of this approach in a broader clinical setting.

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(799) TRAUMATIC C5/C6 BILATERAL FACET DISLOCATION WITHOUT ANY FRACTURES

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Background: Diagnosis of cervical spine injuries remains a significant problem in many blunt trauma patients. Correct and early diagnosis of these injuries is imperative.We present a rare case of a bilateral C5/C6 facet joint dislocation without evidence of fracture post trauma.

Report: A 59 year old male with unremarkable medical history presented with neck pain and bleeding over his right index finger after an alleged fall around 8 feet height. Physical examination on admission revealed severe cervical tenderness and limited motion. No apparent bruising or deformity were noticed over the neck. Hard cervical collar applied and an urgent computed tomographic (CT) scan of the cervical spine was performed which was reported as no fractures with preserved normal alignment. He sustained an open fracture over the middle phalanx right index finger and underwent surgery- K wiring over his right index finger under general anesthesia and was subsequently discharged.

He presented to us again with worsening neurology whereby he had numbness over bilateral upper limbs with weakness over bilateral lower limbs (Frankel C) .His repeated CT demonstrated C5C6 bilateral facet joint dislocation with low-grade anterior spondylolisthesis of C5 vertebra over C6 vertebral body. Magnetic resonance imaging (MRI) findings revealed C5-C7 cord edema .We proceeded for an emergency anterior cervical discectomy and fusion C5/C6 with posterior spinal fusion and instrumentation C4-C7

Post operatively patient had no more numbness and he was discharged post op day 3.

At further follow up at 3 and 6 months patient neurology improved and he has sufficient neck movement for normal activities and is able to ambulate independently.

Conclusions: Prompt and accurate diagnosis of cervical spine injuries is crucial in preventing the devastating consequences of undetected fractures or dislocations. Although radiography/CT may be normal, findings of neck pain or tenderness are important clues suggesting the potential for underlying ligamentous cervical spine injury. MRI should be done if there is strong clinical suspicion.

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(800) CERVICAL TUBERCULOSIS , ISIT TOO LATE?

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Background: Incidence of tuberculosis have been documented as high as 45% in Asian countries as of 2023 whereby spinal involvement is the commonest extrapulmonary tuberculosis location.We would like to highlight a case of a young patient with tetraplegia secondary to cervical tuberculosis with its management.

Report: A 27 year old male with unremarkable medical history presented with insidious onset neck pain for 2 months associated with bilateral upper limb weakness. He had loss of appetite and loss of weight around 7kg in a month. Physical examination on admission revealed patient was already quadriplegic (Frankel A) with severe spasticity. Urgent computed tomographic (CT) scan of the cervical spine and MRI reviewed spondylodiscitis from C2-C6 with C4 vertebra body destruction with a contiguous subligamentous spread. Sputum Acid fast bacilli and Mantoux test was negative with an ESR of 8 and CRP of 1.2. Patient was admitted to intensive care unit as he was ventilated due to concomitant hospital acquired pneumonia. CT Abdomen revealed disseminated tuberculosis over the liver.We proceeded for posterior instrumentation C2-C7 and biopsy.

His gene expert Tuberculosis sample was positive and he was started on anti tuberculosis treatment for a year. Response to therapy at 3 and 6 months postop was assessed by general wellbeing, weight gain, and neurology improvement. Patient had neurological recovery with concomitant anti tuberculosis treatment and is currently ambulating with support (Frankel B).

Conclusions: No patient with spinal TB and severe neurological deficits which include patients with flaccid paraplegia—should be considered too ill to undergo surgical decompression. Combination of anti tuberculosis and decompression should form a comprehensive treatment plan for TB spine patients with neurological complications.

Good recovery in young patients are postulated due to better arteriolar dilation which may compensate and prevent spinal cord ischemia due to compression. Preserved volume of spinal cord with edema/myelitis of cord on MRI also indicates good neural recovery.

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(814) A SAFE AND REPRODUCIBLE ANTERIOR COLUMN RESTORATION TECHNIQUE FOR KÜMMEL'S DISEASE: TRANSPEDICULAR BONE PACKING

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Background: Kümmel's disease (KD), delayed post-traumatic vertebral collapse, is diagnosed with characteristic radiologic findings such as intravertebral vacuum cleft. Because patients with KD are elderly, have many underlying diseases, poor bone quality, and relatively limited surgical outcomes compared to other spinal diseases.

Objective: The aim of this study is to describe a minimally invasive surgical technique and to evaluate the clinical and radiological outcomes of this technique.

Methodology: As a surgical treatment method for KD, we performed bone substitute packing via small pedicle holes with a posterior instrumented fusion. 10 consecutive patients underwent surgery for KD. Clinical outcomes and radiologic parameters were evaluated pre- and post-operatively.

Results: The average operation time was 150.5+19.64 minutes with a mean estimated blood loss of 252+173.32 ml. The mean Visual Analogue Scale(VAS) score for back pain was reduced from preoperative 8.7±0.82 to 2.8±1.14 ($p<0.001$), and the mean Oswestry Disability Index(ODI) score improved from 30.6±3.2 preoperatively to 11.6±4.81 ($p<0.001$) at the final follow-up. The sagittal Cobb angles decreased from 23.19±9.52 degrees preoperatively to 11.59±10.06 degrees ($p<0.001$) immediately after surgery, and 13.31±10.43 ($p=0.002$) degrees at the final follow-up. Except for 1 case of minor screw migration, there were no serious perioperative complications.

Conclusions: Transpedicular bone packing does not involve technically demanding procedures such as corrective osteotomy, vertebral column resection, and insertion of large metal cage. Therefore, it may be minimally invasive and reproducible surgical option.

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(816) RESIDUAL NEUROPATHIC PAIN AFTER LUMBAR SPINE SURGERY

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Residual neuropathic pain after lumbar spine surgery

Introduction: Numbness and pain often persist after lumbar spine surgery as neuropathic pain (NeP). In the current study, we investigated the prevalence of and risk factors for residual NeP after lumbar spine surgery.

Methods: In total, 155 patients (83 males and 72 females; mean age 68.2 years) who underwent lumbar spine surgery and were followed up for more than three months were included in this study. An assessment tool for NeP - the PainDetect questionnaire (PDQ) - was administered, and a PDQ score of ≥13 was defined as NeP in patients. In all cases, we observed the Oswestry disability index (ODI) score and the visual analog scale (VAS) for satisfaction with postoperative treatment. In addition to age, sex, and diagnosis, body-mass-index, number of decompressed levels, type of surgery (decompression or fusion), duration of illness, and history of diabetes, cerebrovascular disease, and other spinal surgeries were also recorded. All measurements were compared between two groups after dividing the patients into the NeP and non-NeP groups, and risk factors for NeP were investigated using multiple logistic regression analysis.

Results: The prevalence of residual NeP was 27.7% (47/155). In the NeP group, the mean ODI score in the NeP group was 24.9±19.6, which was significantly higher than that in the non-NeP group ($p<0.05$). The VAS score for satisfaction with postoperative treatment in the NeP group was 26.0±19.6 which was significantly lower than that in the non-NeP group ($p<0.05$). Among the risk factors for residual NeP, there were significantly more decompressed levels and fewer fusion surgeries in the NeP group than in the non-NeP group. Multivariate analysis showed that a higher number of decompressed levels was an independent risk factor for residual NeP.

Conclusions: This study shows that the prevalence of residual NeP after lumbar spine surgery was unexpectedly high, with more decompressed levels, fewer fusion surgeries, poorer clinical scores, and poorer satisfaction with postoperative treatment in patients with NeP. In particular, the number of decompressed levels might be an independent risk factor, and preoperative multi-level canal stenosis might be a risk factor for residual NeP postoperatively.

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(850) ACUTE CERVICAL SPONDYLODISCITIS POST VERTEBRAL FRACTURE

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Background: Spondylodiscitis is a common spinal infection encountered but can present with insidious onset with vague symptoms. Preceding trauma is a rare and interesting etiology.

Case Report: A 45-year-old male patient with underlying diabetes had a fall two weeks prior and developed neck pain. He did not seek medical attention at first till after a week of the fall, he developed bilateral upper and lower limb weakness and numbness. He did not exhibit signs and symptoms of infection and there were no constitutional symptoms. Upon presentation, there was localized posterior cervical tenderness and neurological features of a central cord syndrome. Plain radiographs were inadequate and CT cervical revealed bony destruction of the inferior C5 and superior C6 with prevertebral hematoma. WBC, CRP and ESR were within normal range. Blood and urine cultures were negative. MRI reported features suggestive of spondylodiscitis.

ACCF C5/C6 with tricortical iliac bone graft was performed. Intraoperative, the prevertebral fascia was thickened and glistening, with underlying tissue sloughy. Surgery was uneventful and antibiotics were commenced after surgery. Post operatively, patient experienced immediate improvement of neurological symptoms and was ADL independent at 6 weeks. All intraoperative cultures were negative. HPE reported inflamed tissue with focal suppuration in keeping with spondylodiscitis. TB PCR was negative. He completed a 6-week antibiotic therapy. At 4 months post operatively, patient was ambulating without aid and was free of local symptoms.

Discussion: Pyogenic spondylodiscitis usually occurs via hematogenous or non-hematogenous spread. In an acute fracture, the fracture hematoma is possible site of inoculation and coupled with the inflammatory and proliferation process in fracture healing it could lead rapid bone resorption. Despite normal biochemical markers and negative cultures, the intra operative finding is imperative to assist in narrowing the diagnosis. There is limited literature with fracture related spondylodiscitis however most had presented with evident distant infection and raised laboratory markers.

Conclusion: Spondylodiscitis can arise from a closed fracture hematoma which is an ideal bed for pathogenic inoculation and proliferation.

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(851) AGGRESSIVE CERVICAL THORACIC VERTEBRAL HEMANGIOMA

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Background: Vertebral hemangiomas are benign vascular tumors accounting for 2-3% of spinal tumors and are usually identified as an incidental finding during routine radiological studies.

Case Report: A 21-year-old female presented with a one-month history of ascending bilateral lower limb weakness and numbness. Patient denies any history of trauma, nor did she exhibit signs or symptoms of infection and there were no constitutional symptoms. Plain radiographs show no obvious abnormalities. A whole spine MRI revealed large lobulated enhancing epidural mass from C6 to T1 with a T1 pathological fracture. No specific features were identified. CT Tap revealed no other lesions elsewhere. Tumour markers and infective markers were not raised. Her neurological symptoms had slowly deteriorated from and Asia grade C to B at the level of T4. C4-T5 Posterior spinal instrumentation and decompressive laminectomy of T1 and T2 with biopsy was performed. Intraoperatively, the posterior elements at the level T1/T2 demonstrated friable tissue akin to atypia. HPE reported all samples with features of benign vascular lesions suggestive of vertebral hemangiomas. All culture and sensitivities were negative. At 2 months post operatively, patient was independently ambulating with almost complete resolution of her symptoms.

Discussion: Largely asymptomatic, around 1 % of vertebral hemangiomas demonstrate aggressive behaviour resulting significant manifestation. These are deemed "Aggressive Vertebral Hemangiomas" which could have detrimental effects. Early lesions demonstrate typical radiological features which aids diagnosis, but late or aggressive types do pose a diagnostic dilemma. Treatment of vertebral hemangioma are mostly conservative unless there is instability and or neurological component which then requires surgical intervention. Besides instrumentation, stabilization and decompressions, adjuncts such as vertebroplasty adds to mechanical stabilization and the exothermic reactions aids in tumor necrosis. Other modalities such as ethanol injections, radiation and embolization have also been described. Metastatic potential and recurrence are rare.

Conclusion: Aggressive vertebral hemangiomas with progressive clinical manifestations are rare and requires prompt intervention. Surgical decompression and stabilization will be the mainstay treatment with adjunct treatments considered on case-to-case basis.

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(855) CHALLENGES AND DELAYED DIAGNOSIS OF CAUDA EQUINA SYNDROME IN A PREGNANCY : A CASE REPORT

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Background: Diagnosing cauda equina syndrome (CES) during pregnancy can be particularly challenging due to symptoms that overlap with common pregnancy-related conditions. This case report highlights the difficulties associated with the early recognition and management of CES in pregnant patients.

Report: A 28-year-old woman in her first pregnancy, at 13 weeks gestation, presented with acute urinary retention and bowel incontinence that had persisted for two weeks. These symptoms were accompanied by saddle anesthesia and radicular pain radiating to the posterior aspect of her right thigh. She reported no history of trauma, heavy lifting, or back pain.

Initially, the patient sought medical treatment at a public health clinic, where her symptoms were attributed to normal pregnancy-related changes. She then visited a general practitioner twice, receiving similar reassurances without further evaluation. Due to her persistent symptoms, she returned to the public health clinic and was referred to our center.

Magnetic resonance imaging (MRI) revealed a prolapsed intervertebral disc at the L5/S1 level, causing significant spinal canal stenosis. The patient underwent urgent discectomy at the L5/S1 level. During the procedure, an extruded central disc fragment was located and successfully removed. Her bowel and bladder function recovered completely two months post operatively.

Conclusions: Cauda equina syndrome (CES) is a rare spinal emergency that can occur in pregnant patients. The presence of overlapping symptoms with common pregnancy-related changes contributes to the delayed diagnoses. This situation requires careful clinical assessment in order to get accurate diagnosis thus minimizing the complications.

Although MRI poses minimal risk to the fetus, its use is warranted in emergency situations. To minimize permanent neurological damage and improve long-term outcomes, surgical decompression should be performed within 48 hours of the onset of symptoms.

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(858) REVOLUTIONIZING CARE FOR TRAUMATIC CERVICAL SPINAL CORD INJURY: THE INTEGRATION OF EXPANSION DUROPLASTY IN POSTERIOR DECOMPRESSION – A CASE REPORT

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Traumatic spinal cord injury leads to severe impairments, significantly reducing the quality of life, and increasing financial burden.1 While bony decompression, especially within 24 hours, has improved outcome, several techniques are still being explored for better outcomes. 3,4 Changes in cerebrospinal fluid dynamics potentially play a role in the cascade of events in spinal cord injury. 5

This is a case of a 35-year-old male with cervical traumatic spinal cord injury managed with laminectomy, expansion duraplasty, and fusion.

The patient was received 3 hours post-injury, classified as ASIA A, with last normal level at C5. Perianal sensation, bulbocavernosus reflex, clonus or Babinski reflex was not appreciated. A computed tomography scan showed C3 spinolaminar fracture, C4 bilateral laminar fracture, and C5 burst fracture with posterior elements compressing the spinal cord. MRI revealed spinal cord edema from C3 to C6, absence of CSF signal anteriorly and posteriorly at C5, and 8mm canal diameter.

At 20 hours postinjury, C3-C6 laminectomy, C3-C6 instrumentation, and expansion duraplasty were done. At postoperative day 1, sensory improved from grade 0/2 to 1/2 at C6 to S5. Postoperative day 3, C5 myotome improved from 3/5 to 5/5 bilaterally while 1/5 for C6 and C7 from 0/5 (ASIA C). At 3 weeks, noted motors improved: C6 and C7 from 1/5 to 2/5 bilaterally, and C8 and T1 myotomes at 1/5 from 0/5. Lower extremities from 0/5 in all myotomes improved to 1/5 on right L2 and L3; left L2 improved from 2/5 to 3/5 and left L4 from 1/5 to 4/5. After 18 months, the patient can sit upright, stand, and ambulate with assistance. Partial recovery of gross motor function of upper extremities appreciated. However, fine motor skills remain impaired.

Bony decompression without expansion duraplasty is analogous to decompressive craniectomy without durotomy for traumatic brain injury, which is largely ineffective at reducing intracranial pressure.2,6,7
Expansion duraplasty may offer advancement to the standard of care for patients with traumatic spinal cord injury.

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(880) NON HODGKIN LYMPHOMA OF THE CERVICAL SPINE INITIALLY MANAGED AS POTT'S DISEASE: A CASE REPORT

Jed Delwin L. Ching

Background: Primary bone lymphoma (PBL) is a rare malignancy, representing approximately 1% of all lymphomas and 7% of primary malignant bone tumors. Non-Hodgkin lymphoma (NHL) in the cervical spine is particularly uncommon, and this case report highlights an unusual presentation of anaplastic large cell lymphoma (ALCL) in a young adult, initially managed as Pott's disease (tuberculosis of the spine).

Case Presentation: A 22-year-old Filipino male presented with progressive cervical pain and generalized body weakness. A CT-guided biopsy confirmed the diagnosis of Pott's disease, and he was started on anti-tuberculosis treatment. However, his symptoms worsened, including bilateral extremity weakness, upper extremity tingling, and significant weight loss. MRI revealed a large paravertebral mass from C3 to C6, prompting reevaluation of the diagnosis. A subsequent biopsy revealed atypical lymphoid infiltrate consistent with ALCL. Subsequently, posterior decompression, C4-C5, C5-C6 spinal level with Instrumented spinal fusion from C3-C7, with post operative chemotherapy and rehabilitation was done. Patient was able to regain full sensory function and near maximal strength at the time of the study.

Conclusion: This case highlights the diagnostic challenges and successful management of a rare cervical spine ALCL misdiagnosed as tuberculosis. It emphasizes the need for high clinical suspicion and advanced imaging when faced with atypical spinal pathologies, especially in young patients with neurological deterioration.

(893) SHOULDER BALANCE CORRECTION IN SCOLIOSIS: A RADIOLOGICAL COMPARISON BETWEEN PATIENT SPECIFIC RODS AND INTRA OPERATIVELY BENT RODS

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Background: Patient Specific Rods (PSR) have been improving outcomes of scoliosis surgeries over the past decade. One of the parameters which has been least studied is the shoulder balance correction.

Objective: Comparing shoulder balance correction achieved between intraoperatively bent rods (IOBR) and PSR

Methodology: This is a retrospective study of 31 patients from 2 centers namely Hospital Sultanah Bahiyah, Kedah and Hospital Pulau Pinang. They had underwent scoliosis corrective surgery from 2019 to 2021. We began using PSR in our centers since 2019.

The choice of rods were mainly based on clinical indication and funding eligibility The surgeries were performed by the same lead surgeon.

Shoulder height difference (SHD) measured using the difference in height of the right and left coracoid processes.SHD was measured on pre and post operative radiographs.

Results: 18 patients used PSR, 13 patients used IOBR. Mean SHD for IOBR and PSR were 1.372 and 1.454 respectively. Mann Whitney test was used to analyze these data in view of the small sample size. A p-value of 0.282 was yielded which was not significant. This is due to the small sample size.

Conclusion: PSR is a relatively new technology especially in our country. Although the p value is insignificant, this study hopes to pioneer more studies which look into achieving better correction of shoulder with PSRs. The main weakness of this study is the small sample size. We intend to do a follow up study with a bigger sample size in future.

(903) A DOUBLE THREAT : A COMPLEX CASE OF LONG SEGMENT SPINAL TB WITH STAPHYLOCOCCUS AUREUS CO INFECTION IN A TODDLER

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Background: We present a case of a 1-year-11 months old boy who developed long-segment spinal tuberculosis with Staphylococcus aureus co-infection. Following skip laminectomy and a combination of anti-tubercular and antibiotic therapies, the child recovered well. This case highlights the importance of early diagnosis and timely management in pediatric spinal infections.

Report: The patient presented with a 12-day history of fever, posterior neck swelling, limb weakness, and reduced oral intake. His initial GCS was full, and pupils were equal, reactive. Neurological examination revealed generalized hypertonia, hyperreflexia, with power of 4/5 in bilateral upper limbs and 3/5 in bilateral lower limbs. MRI findings showed an extensive extradural collection extending from C4 to L5. The child underwent skip laminectomy at the C6, C7, and T11 levels. Intraoperatively, during dissection of the paraspinal muscle at C6-C7, a gush of clear fluid was noted. C6 and C7 laminectomy was performed, revealing minimal fluid beneath the ligamentum flavum. At the T11 level, no fluid was found beneath the ligamentum flavum. Exploration of the subdural space at C6-C7 revealed no pus discharge or abnormal vessels. Intraoperative tissue and fluid cultures grew Staphylococcus aureus. AFB smear of the fluid was positive, but both TB GeneXpert and cultures returned negative. Histopathology evidence demonstrated acute-on-chronic inflammation however no granuloma or malignancy. The patient was started on anti-TB therapy and completed a 3-week course of Cloxacillin, intravenous followed by oral. A follow-up MRI on 22/10/24 showed resolution of the collection with no evidence of spinal cord compression. The child regained full mobility and continues follow-up under pediatric infectious disease team.

Conclusion: This case highlights the challenges in diagnosing co-infections in pediatric spinal disease. Timely surgical intervention and combined medical treatment are crucial to achieve positive outcome. Early recognition and management of spinal TB with concurrent bacterial infections are essential to prevent long-term neurological complications in children.

(917) IMPACT OF CORRECTIVE OSTEOTOMY ON SAGITTAL ALIGNMENT AND QUALITY OF LIFE IN ANKYLOSING SPONDYLITIS

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Ankylosing spondylitis is a chronic, seronegative, autoimmune spondyloarthropathy primarily affecting the axial joints. It leads to progressive spinal stiffness and kyphosis, resulting in sagittal imbalance. This deformity causes debilitating functional limitations and significantly diminishes quality of life.

We present the case of a 48-year-old male with a 13-year history of painless ankylosing spondylitis. He experienced progressive spinal stiffness and a stooped posture, limiting his forward gaze. Prolonged standing was difficult due to back muscle fatigue. Bilateral anterior thigh pain, secondary to compensatory hip flexion for forward vision, was also reported. The patient required three pillows for sleep due to his kyphotic spinal deformity. Clinical examination revealed an occiput-to-wall distance of 47 cm and reduced cervical range of motion. Chest wall expansion was limited to 2 cm, and lumbar ROM was absent, with a Schober test measuring 1 cm. Hip and shoulder ROM were normal. He underwent an L2 pedicle subtraction osteotomy and posterior spinal instrumented fusion from T9 to L5. Postoperatively, the patient reported sleeping with only one pillow, improved posture without hip or knee flexion, and a restored chin-brow angle with improved forward gaze. Postoperative spinal radiographs showed improved sagittal vertical alignment.

This case underscores the complexity of managing rigid spinal deformities in ankylosing spondylitis, often requiring surgical intervention to restore function and quality of life. While significant risks exist, advances in surgical techniques and implants have improved outcomes, even in complex cases. Meticulous preoperative planning, precise surgical execution, and vigilant postoperative care are essential for success in these high-risk procedures.

(918) FACTORS ASSOCIATED WITH GOOD GAIT ABILITY AFTER EXTENSIVE CORRECTIVE FIXATION FOR ADULT SPINAL DEFORMITY

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Background: Extensive corrective fusion surgery for adult spinal deformity (ASD) improves gait posture and ability. However, there are cases in which postoperative improvement in gait ability is not sufficient.
Objective: The purpose of this study was to investigate the factors associated with good gait ability after extensive corrective fusion surgery for ASD.

Methods: Forty-seven patients (43 women, mean age 70 years (5-84)) who underwent corrective thoracic-pelvic fusion surgery for ASD at age 40 years or older and whose gait was measured using a markerless three-dimensional gait analysis system (System Friend Inc. Hiroshima, Japan) before and two years after surgery were analyzed. Patient factors, surgical factors, gait factors, and radiographic parameters were compared between the good gait group with a 6-minute postoperative walking distance of 400 m or more and the poor gait group with a 6-minute postoperative walking distance of less than 400 m.

Results: The 6-minute walking distance was improved preoperatively/postoperatively (334±99m /368±101m, p=0.018). The anterior tilt angle of the trunk during walking was significantly improved preoperatively/postoperatively (16.9±12.3°/12.5±5.5°, p=0.003). In terms of radiographic parameters, SVA (129.0±62.7/58.9±52.4, p<0.001) was significantly improved in the preoperative/postoperative period. Comparing the good walking group (n=24) and the poor walking group (n=23), there was no significant difference in age (69 vs. 72 years, p=0.099), but significant differences in preoperative walking speed (68.0 m/min vs. 54.4 m/min) and stride length (55.0 cm vs. 44.2 cm, p<0.001). Radiographic parameters showed no significant difference before surgery, but significant differences in LL (42.0° vs. 36.6°, p=0.039) immediately after surgery and SVA (40.9mm vs. 77.6mm, p=0.017) at 2 years postoperatively.

Conclusion: Patients with a good 6-minute postoperative walking distance were those who had good walking speed and stride length before surgery, good correction, and good maintenance of correction in the medium to long term.

(930) EPIDEMIOLOGY OF PEDIATRIC SPINAL TRAUMA IN KOREA

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Background: Traumatic spinal injuries in children are uncommon and result in different patterns of injuries due to the anatomical characteristics of children's spine. However, there are only a few epidemiological studies of traumatic spinal injury in children.

Objective: The purpose of the study was to investigate the characteristics of traumatic spinal injury in children.

Methodology: We retrospectively reviewed the cases of pediatric patients (age < 18) with traumatic spinal injury who were treated at a Level 1 trauma center between January 2017 and December 2021. We divided into three groups according to age and analyzed demographics, injury mechanism, level of injury, and injury pattern.

Results: A total of 62 patients (255 fractures) were included, and the mean age was 13.8 ± 3.2 years. There were 5 patients (22 fractures) in the group I (0 to 9 years), 24 patients (82 fractures) in the group II (10 to 14 years), and 33 patients (151 fractures) in the group III (15 to 17 years). Both the injury severity score and the revised trauma score were highest in group I, but there was no statistical difference between the age groups. Fall from height was the most common injury mechanism, of which 63% were suicide attempts. The level of spinal injury was different for each age group, T10-L2 injury being the most common. In all age groups, the number of multilevel continuous injury was larger than that of single-level injury or multilevel non-continuous injury. Surgical intervention was required in 24.2%, and mortality was 3.2%.

Conclusion: In our study, fall from height was the most common mechanism of injury, and there were many suicide attempts associated with mental health issues. Thoracolumbar junction injuries were predominant, and the rate of multilevel contiguous injuries was high. The support and interest of society and families for adolescent children seems crucial in preventing spinal trauma, and image testing of the entire spine is essential when evaluating pediatric spinal injuries.

(933) RESTORING GAZE AND MOBILITY: TRANSFORMING LIVES WITH CORRECTIVE SPINAL OSTEOTOMY AND HIP REPLACEMENT IN SEVERE ANKYLOSING SPONDYLITIS

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Background: Ankylosing Spondylitis (AS) is a chronic inflammatory disease affecting 0.1-0.5% of the global population, primarily young men. While AS predominantly affects the axial spine, it often leads to secondary osteoarthritis (OA) in the hips, further limiting mobility and significantly impairing quality of life.

Report: A 51-year-old man with AS presented with a 20-year history of back pain and worsening spinal deformity. He experienced severe back pain, significant right hip mobility limitations, and impaired horizontal gaze, which affected his ability to walk. On examination, he had a severely deformed spine with forward stooping, loss of lumbar lordosis, thoracic hyperkyphosis, forward head posture, and chest wall collapse. A painful fixed flexion deformity of 10° was observed in the right hip. No motor weakness or hypoesthesia was detected in the lower extremities. Radiographic examination revealed an ankylosed spine with loss of lordosis in the cervical and lumbar regions, and an 85-degree kyphotic angle at the thoracic level. The spinal vertical axis (SVA) was 68 mm, sacral slope 33°, pelvic tilt 5°, pelvic incidence 38°, and the right hip was severely ankylosed. The patient first underwent spine surgery in the prone position with pedicle screws inserted from T10 to S1. Pedicle Subtraction Osteotomy (PSO) and Y-shaped osteotomy were performed at level L1 and L4, with four rods inserted for final fixation. Intraoperative neurophysiological monitoring(IOM) confirmed preserved neurological function after kyphosis correction. Two weeks later, a crucial early decision for right total hip arthroplasty (THA) was made to address fixed flexion and hip pain, which prevented the patient from sitting up, and to reduce undue stress on the spinal implant. A dual mobility implant with a cementless acetabular cup and cemented femoral stem was used. Postoperatively, the patient was able to ambulate and resume daily activities following rehabilitation.

Conclusions: A comprehensive multidisciplinary approach, combining Corrective Spinal Osteotomy, Total Hip Arthroplasty (THA) and rehabilitation, is key to managing severe ankylosing spondylitis (AS). This combination restores sagittal balance and horizontal gaze, improves function, and enhances overall quality of life.

(939) A CASE REPORT ON CHANCE FRACTURE WITH DIFFUSE IDIOPATHIC SKELETAL HYPEROSTOSIS (DISH) WHICH UNDERWENT SURGICAL MANAGEMENT

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Chance fractures are horizontal vertebral fractures extending along the posterior spinal column to the anterior vertebral body, typically due to flexion and distraction forces, with usually associated intra-abdominal injuries. Diffuse Idiopathic

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Skeletal Hyperostosis (DISH) is an entity defined by pathological ossification and calcification of spinal ligaments, making the spine more susceptible to fracture. To diagnose DISH, criteria such as preserved disc height, continuous ossifications along adjacent vertebrae, and absence of sacroiliac joint fusion are considered. If not treated in a timely manner, patients with DISH have a higher risk for serious neurological sequelae after vertebral fractures.

In this case study, a 73-year-old male fell from a motor vehicle and sustained a laceration over the forehead, with no associated sensorimotor deficits. The initial imaging showed osteophytes and changes consistent with degenerative spinal changes and diffuse idiopathic skeletal hyperostosis (DISH). Three days after the trauma, after a physical activity, the patient experienced severe pain in the upper back and complete sensory loss below T6 due to Chance fracture at T4 and spinal cord injury. The osteosynthetic stabilization is indicated for the patients with an unstable fracture, neurological deficits, and DISH. The patient underwent Posterior decompression was finally carried out with the application of pedicle screws and spinal instrumented fusion, along with the application of autologous bone graft and bone substitute at the level of T4-T8.

This case demonstrates the need for early recognition and treatment in vertebral fractures with associated DISH. This delay in treatment predisposes to severe neurological deficits and prolonged periods of immobility. This patient underwent surgical intervention in the form of posterior decompression and spinal fusion, which successfully restored spinal stability. Rehabilitation and physical therapy following surgery were vital in enhancing functional outcomes. DISH recognition in the setting of spinal fractures is crucial for minimizing irreversible sequelae and maximizing recovery potential.

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(947) CERVICAL SPINAL TUBERCULOSIS: A RARE CASE REPORT

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Introduction: Spinal tuberculosis (TB) accounts for 10% of extrapulmonary TB cases and represents a significant challenge, particularly in countries with high TB prevalence like Indonesia. Cervical spinal TB, though rare, poses severe risks due to its proximity to critical neurological structures, necessitating prompt diagnosis and appropriate intervention.

Case Presentation: We report the case of a patient presenting with persistent back pain, tingling, and progressive weakness in both legs, ultimately limiting ambulation. Despite the absence of bowel or bladder disturbances, the patient experienced significant weight loss and had a history of hemoptysis, aligning with pulmonary TB symptoms. MRI revealed vertebral destruction at C5-C6 and Th6-Th7, consistent with spinal TB. The patient underwent a corpectomy, discectomy, and anterior cervical fusion with titanium mesh and plating. Postoperative outcomes included notable improvement in motor function alongside continued anti-TB therapy.

Discussion: Spinal TB, caused by Mycobacterium tuberculosis, predominantly affects the thoracic region, with cervical involvement less frequent but potentially catastrophic. This case highlights the classical symptoms of spinal TB, including back pain, neurological deficits, and paraparesis. Early surgical intervention combined with anti-TB therapy was crucial for recovery, underscoring the importance of timely diagnosis to prevent complications like quadriplegia. Literature supports surgical intervention in cases with neurological impairment, severe pain, or instability. While the optimal timing for surgery remains debated, our case reinforces that cervical involvement requires careful preoperative planning due to heightened risks.

Conclusion: This case emphasizes the importance of early diagnosis, strategic surgical planning, and continued anti-TB management to optimize outcomes and prevent life-altering complications. The observed postoperative improvements reaffirm that multidisciplinary management can yield favorable prognoses in cervical TB cases.

Keywords: anterior cervical fusion, corpectomy, discectomy, spinal tuberculosis.

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(975) A COMPARATIVE META ANALYSIS OF IBANDRONATE, ZOLEDRONIC ACID, AND ALENDRONATE IN THE PREVENTION OF SPINAL FRACTURES IN OSTEOPOROTIC PATIENTS.

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Objective: This meta-analysis aims to compare the efficacy of three bisphosphonates—ibandronate, zoledronic acid, and alendronate—in preventing spinal fractures in individuals with osteoporosis. The study evaluates the relative effectiveness of these drugs in reducing the incidence of vertebral fractures, based on data from randomized controlled trials (RCTs).

Methods: A systematic review of RCTs was conducted, with studies selected according to pre-defined inclusion criteria. Data were extracted from trials comparing at least two of the three bisphosphonates for spinal fracture prevention. The primary outcome was the incidence of spinal fractures, and secondary outcomes included overall fracture reduction and adverse events. Statistical analyses were performed using a random-effects model to calculate pooled odds ratios (OR) and 95% confidence intervals (CI). Heterogeneity was assessed using the I^2 statistic.

Results: A total of 15 studies with 12,000 participants were included in the meta-analysis. Zoledronic acid demonstrated the most significant reduction in spinal fracture incidence compared to both placebo and other bisphosphonates (OR = 0.52, 95% CI: 0.38–0.72). Ibandronate and alendronate were also effective, with odds ratios of 0.67 (95% CI: 0.50–0.89) and 0.67 (95% CI: 0.52–0.87), respectively, when compared to placebo. While both ibandronate and alendronate showed similar efficacy in preventing spinal fractures, zoledronic acid was found to be superior in head-to-head comparisons (OR = 0.62, 95% CI: 0.45–0.85 for ibandronate vs zoledronic acid; OR = 0.75, 95% CI: 0.60–0.94 for alendronate vs zoledronic acid). The heterogeneity across studies was low (I^2 = 25-52%).

Conclusions: Zoledronic acid was the most effective bisphosphonate for preventing spinal fractures in osteoporotic patients, followed by alendronate and ibandronate. While all three bisphosphonates significantly reduced the risk of spinal fractures, zoledronic acid showed the greatest benefit. These findings support the use of zoledronic acid as a first-line treatment for osteoporosis-related spinal fracture prevention. Further studies are needed to assess the long-term safety and efficacy of these treatments in diverse patient populations.

Keywords: spinal fractures, osteoporosis, ibandronate, zoledronic acid, alendronate, meta-analysis, fracture prevention

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(992) A CASE OF PREGNANT LADY WITH NEGLECTED L1 BURST FRACTURE WITH SUCCESSFUL POST TRAUMATIC KYPHOSIS CORRECTION USING PEDICLE DECANCELLATION METHOD

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Background: Diagnosing thoracolumbar fractures during pregnancy is a challenge due to concerns about the effects of ionizing radiation on fetal development, alas delaying treatment. Additional factors, such as the increasing size of the gravid uterus, can further disrupt spinal alignment biomechanics and sagittal balance, potentially leading to post-traumatic kyphosis.

Report: We describe the case of a 29-year-old woman who presented with post-traumatic back pain during her second trimester, but declined imaging due to pregnancy. Imaging done at two-weeks postpartum revealed a L1 burst fracture. Subsequent evaluations noted worsening forward listing and persistent back pain. However, neurological examination findings were unremarkable. One year later, plain radiographs revealed a L1 burst fracture with a kyphotic angle of 35°. MRI lumbosacral showed no significant canal stenosis. Due to unresolved back pain and progressive kyphosis, the patient underwent posterior spinal instrumentation and fusion from T11 to L3, with pedicle decancellation at L1. Key factors for the successful correction included a flexible anterior ligamentous component which confirmed via MRI, complete and wide decompression comprising of laminectomy, facetectomy, and foraminotomy, and pedicle decancellation and synchronous bilateral compression. Postoperative radiographs demonstrated a significant correction of the thoracolumbar kyphotic angle to 5 degrees. Her forward listing was resolved, and the patient's clinical symptoms improved significantly. Neurological findings remained unremarkable.

Conclusion: Serial follow-up in pregnant patients who decline imaging should begin in early postpartum to ensure timely diagnosis and management. Pedicle decancellation may be a good corrective option for such patients.

(993) ACUTE SPINAL EPIDURAL ABSCESS WITHOUT FEVER: A CASE OF RAPID NEUROLOGICAL DECLINE IN A YOUNG PATIENT WITH DIABETES AND RECENT SEPSIS

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Background: Spinal epidural abscess (SEA) is a rare but potentially life-threatening condition, which can lead to neurological deficits if not promptly diagnosed and treated.

Report: A 32-year-old man presented with acute bilateral lower limb paralysis with urinary and bowel incontinence. He also complained of progressive lower back pain persisting for two weeks. The patient denied trauma or fever but reported a history of recent hospitalization for sepsis with liver abscess and newly diagnosed diabetes mellitus. Clinical examination revealed complete neurological deficits below T12, alongside a lax anal tone, and bilateral lower limbs hypotonia and hyporeflexia. Plain radiographs of the spine indicated T9/T10 end plate erosions. MRI revealed small amount of spinal epidural collection on the right side of the cord posteriorly, with spinal cord edema at T8 to T9/T10 level. The patient underwent posterior spinal instrumentation from T7 to T12 with T10 and T11 laminectomy. Abscesses of less than 2cc were found at the right posterior epidural space during laminectomy. Unfortunately, despite the prompt surgical decompression and debridement, the patient did not experience any neurological recovery.

Conclusion: The symptoms of SEA are typically characterized by rapid onset of back pain and fever with high risk of neurological symptoms. Less than one percent of patients presenting with the classical triad do not have SEA. This particular patient however did not have fever and had very acute onset of severe neurological deficits, without the progression through the stages as described by Heusner. SEA can rapidly progress to complete paralysis and the prognosis remains guarded even when prompt surgical intervention is performed, highlighting the importance of maintaining a high index of suspicion in patients presenting with back pain and neurological deficits, particularly those with risk factors such as recent sepsis, abscess formation, or diabetes mellitus. Early recognition and timely intervention are crucial for improving patient outcomes, underscoring the need for heightened clinical awareness of this potentially life-threatening condition.

(994) MANAGING POSTOPERATIVE CEREBROSPINAL FLUID LEAKAGE IN SPINAL FRACTURE DISLOCATION: A CASE REPORT HIGHLIGHTING THE ROLE OF DURAL SEALANTS

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Background: Cerebrospinal fluid (CSF) leaks resulting from spinal fracture-dislocations can be challenging to manage due to the significant complications they may cause. Persistent CSF leakage increases the risk of surgical site infections, impairs wound healing, and contributes to higher morbidity. Additionally, it can prolong hospital stays, extend periods of immobilization, and expose patients to a host of related complications.

Report: We present the case of a 46-year-old man who sustained L1/L2 fracture-dislocation with complete neurological deficit (ASIA A) following a motor vehicle accident. The patient underwent posterior spinal instrumentation spanning T11 to L3, along with T12 and L1 laminectomy. A large dural tear was discovered, which could not be surgically repaired. The defect was closed using autologous fascia harvested from the surgical incision site, with dural sealant applied to reinforce the repair. Valsalva maneuver did not reveal any CSF leakage. However, two weeks postoperatively the patient developed swelling and serous discharge from a sinus at the surgical site, necessitating incision and drainage. During the procedure, the previously applied dural sealant and graft was found to be intact. CSF leakage was observed at the distal edge of the laminectomy site during Valsalva maneuver. To address this, a dural sealant was reapplied to the leakage site following thorough wound debridement. Postoperatively, the patient was maintained in the Trendelenburg position for seven days, with the surgical drain removed on the fifth day. Subsequently, the wound healed completely, with no recurrence of CSF leakage. The patient also experienced near-complete recovery of bilateral lower limb strength.

Conclusion: Dural sealants are frequently employed in spine surgery to mitigate postoperative CSF leakage following durotomy. Although a 2019 systematic review indicated that currently available sealants may not significantly reduce CSF leakage rates in spine surgery, they remain a valuable tool in a surgeon's arsenal for managing dural tears. This case highlights the potential efficacy of dural sealants in addressing challenging postoperative complications.

(997) DOES BODY MASS INDEX INFLUENCE INTRAOPERATIVE TIME IN LUMBAR DEGENERATIVE SURGERY? A STUDY FROM A LOW AND MIDDLE INCOME COUNTRY

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Introduction: Body Mass Index (BMI) is a well-recognized risk factor that can predict adverse intraoperative and postoperative outcomes.

Objectives: This study aims to evaluate the relationship between BMI, operative duration, and postoperative complications to optimize risk stratification and care.

Methodology: A retrospective cohort study was conducted using the ACS NSQIP database from January 2020 to June 2024. The study included Level 1 decompressive surgeries performed without the use of instrumentation. The sample was stratified into five BMI categories based on the LMIC classification: Underweight (BMI < 18.5), Normal weight (BMI 18.5–22.9), Overweight (BMI 23–27.4), Obesity Class I (BMI 27.5–32.4), and Obesity Class II (BMI ≥ 32.5).

Results: A total of 431 patients were analyzed across BMI categories: Normal weight (N = 49), Underweight (N = 8), Overweight (N = 148), Obesity Class I (N = 142), and Obesity Class II (N = 84). Prolonged operative time was significantly associated with higher BMI, ranging from 120 minutes in the healthy BMI group to 140 minutes in Obesity Class II ($p = 0.004$), with an OR of 1.01 (95% CI: 1.00–1.02, $p = 0.023$). Underweight patients had significantly higher odds of superficial (OR 0.00, $p < 0.001$) and organ-space surgical site infections (OR 0.02, $p < 0.001$). Patients in Obesity Class II also had a higher risk of organ-space SSI (OR 0.00, $p < 0.001$). Moderate frailty in Obesity Class I (OR: 4.81, $p = 0.003$) and Class II (OR: 4.52, $p = 0.008$) predicted adverse outcomes. ASA III–IV was significant in Obesity Class II (OR: 3.33, $p = 0.035$).

Conclusion: Higher BMI is significantly associated with prolonged operative time and organ-space SSIs, while underweight patients face elevated SSI risks. Frailty and ASA III–IV further predict adverse outcomes in obesity.

(998) ASSOCIATION OF MODIFIED FRAILTY INDEX 5 (MFI 5) WITH POSTOPERATIVE COMPLICATIONS IN LUMBAR DEGENERATIVE SURGERY: A STUDY UTILIZING THE NSQIP DATABASE FROM A TERTIARY CARE HOSPITAL IN PAKISTAN

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Introduction: Frailty is a critical prognostic factor influencing a number of surgical outcomes. The modified Frailty Index (mFI-5) has been a useful tool in predicting these occurrences.

Objectives: This study evaluates the role of mFI-5 in predicting the surgical outcomes of patients undergoing lumbar degenerative surgery.

Methodology: Patients undergoing Level 1 decompressive surgeries (CPT codes 63005, 63042, 63047, 63090) for lumbar degenerative conditions between January 2020 and June 2024 were included in this study using the ACS NSQIP database. The mFI-5 score was calculated for each patient based on five factors: hypertension requiring medication, chronic obstructive pulmonary disease, diabetes mellitus, congestive heart failure, and partially or fully dependent functional status. Patients were then categorized into two groups: no frailty (mFI=0) and moderate frailty (mFI=1).

Results: A total of 497 patients were included in the analysis, with 360 patients in the No Frailty group and 137 patients in the Moderate Frailty group. Logistic regression analysis revealed significant associations between frailty and specific demographic and clinical factors. Patients aged 40–60 years were 3.45 times more likely to be admitted with moderate frailty (OR: 3.45, 95% CI: 1.77–7.15, $p < 0.001$), with the risk further increasing in those aged 60–80 years (OR: 9.41, 95% CI:

4.27–22.0, p < 0.001). Male gender was also associated with a higher risk of frailty (OR: 1.74, 95% CI: 1.07–2.85, p = 0.042). Additionally, a higher BMI was identified as a significant predictor of moderate frailty (OR: 1.09, 95% CI: 1.04–1.14, p < 0.001). However, no significant association was observed between mFI-5 scores and postoperative complications.

Conclusion: Moderate frailty was strongly associated with advancing age, male gender, and higher BMI. Although mFI-5 demonstrated its utility in identifying frailty-associated risk factors, its role in predicting postoperative complications in lumbar degenerative surgery was not significant in our population.

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(999) Optimizing Blood Utilization And Transfusion Practices In Lumbar Spine Surgeries For Degenerative Spine Disease: A Single Center Retrospective Study At A Tertiary Care Hospital In Karachi, Pakistan

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Introduction: Lumbar degenerative spine disease (LDSD) is a leading cause of back pain and radiculopathy, often requiring surgeries such as spinal decompression or fusion. These procedures can cause significant blood loss, necessitating transfusions. However, overestimation leads to excessive preoperative blood ordering, with up to 70% of blood units unused and inappropriate transfusions ranging from 16% to 66%. This inefficiency burdens blood banks, increases costs, and risks complications, especially in resource-limited settings. Despite the Maximum Surgical Blood Ordering Schedule (MSBOS) improving practices in other surgeries, its application in lumbar spinal surgery remains unexplored.

Objective: This study aims to evaluate blood ordering and transfusion practices, identify factors influencing transfusion needs, and explore potential cost savings in spinal surgery patients with degenerative spine disease in our setting.

Methods: This retrospective review included adult LDSD patients undergoing spinal surgeries at AKUH, Karachi (2016–2020). Data on demographics, surgical details, and transfusion practices were analyzed. Crossmatch-to-transfusion (C/T) ratio, transfusion index (Ti), transfusion probability and MSBOS were calculated. Costs were evaluated based on actual and potential savings with MSBOS implementation. Univariate and logistic regression analyses identified factors influencing transfusion needs.

Results: A total of 88 LDSD patients were included (mean age 53.3 ± 16.1 years; 51.1% males). Of 158 crossmatched units, 55 were transfused, yielding a C/T ratio of 2.87 and Ti of 0.625. Inappropriate transfusions occurred in 66.7% of cases. Higher transfusion rates were observed in patients with hemoglobin <12 g/dL, ASA class III, and >2 levels of decompression or fusion. The mean cross-matched PCV units per case were 1.795, and transfused units were 0.625. MSBOS implementation reduced the mean cost per case by 52.2%, with the highest savings in micro lumbar discectomy.

Conclusion: LDSD surgeries showed suboptimal blood utilization, with high C/T ratios, particularly in spinal canal compression, and frequent inappropriate transfusions. Implementing MSBOS can improve blood usage efficiency and reduce costs, highlighting the importance of adhering to our recommended MSBOS.

(1002) SELECTIVE SPINAL FUSION: TREATMENT OF CHOICE IN A PAEDIACTRIC PATIENT WITH MULTILEVEL SPINAL TUBERCULOSIS WITH ACUTE NEUROLOGICAL DEFICIT

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Introduction: Spinal tuberculosis (TB), or Pott's disease, is a significant cause of morbidity in paediatric population, often leading to neurological deficits and spinal deformities. Surgical intervention is typically used for patient with significant neurological deficiency, with standard procedures involving extensive spinal fixation.

Case Report: A 14-year-old female presented with progressive back pain and lower limb weakness. Neurological examination revealed acute complete neurological deficit in consistent with spinal cord compression. Radiological imaging of the spine showing kyphotic deformity at thoracic spine and magnetic resonance imaging (MRI) identified multilevel thoracic and lumbar vertebral involvement with significant spinal cord compression. Given the extent of the disease and neurological impairment, surgical intervention was done after 2 weeks of antituberculosis chemotherapy. A selective spinal fixation approach was employed, with posterior spinal instrumentation and decompression was done over T1 - T11 & L3 – S1, targeting upper thoracic and lumbar spine, sparring the thoracolumbar region.

Management and Outcome: The patient underwent selective posterior spinal instrumentation and fusion with decompression of T1 – T11 & L3-S1. Postoperatively, she received a standard anti-tuberculosis chemotherapy regimen with Akurit-4 for 12 months. At the 12-month follow-up, the patient demonstrated significant neurological recovery, with full recovery of motor function and no evidence of spinal instability or deformity progression.

Conclusion: Despite challenges in the primary modularity of treatment of spinal tuberculosis, this case illustrates that selective spinal fixation can be an effective surgical strategy in paediatric spinal tuberculosis cases with multilevel involvement and neurological deficits. This approach may offer a balance between adequate disease management and the preservation of spinal mobility in younger-age group.

(1005) PRIMARY SPINAL EPIDURAL LYMPHOMA MIMIC EPIDURAL ABSCESS

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Primary spinal epidural lymphoma (PSEL) is one of the rarest tumours, due to which its diagnosis is challenging, and the most common type of histology is diffuse large B cell lymphoma (DLBCL). There is a male preponderance of spinal epidural lymphoma, with the thoracic spine being the most affected site.

We present a case of a 44-year-old healthy gentleman with a 2-month history of chronic back pain, numbness, and weakness from the trunk to the bilateral lower limb, causing him to have difficulty in ambulation. Otherwise, denied urinary or bowel incontinence. On examination, there is a palpable left cervical lymph node, and neurologically, an incomplete neurological deficit is noted. Blood investigation was unremarkable. Magnetic resonance imaging revealed a T2–T4 epidural abscess in the phlegmonous stage with adjacent osteomyelitic changes causing spinal cord and nerve root compressions. Emergency decompression and laminectomy were done with the working diagnosis of epidural abscess; however, intraoperatively we noted soft T2 spinous process and lamina with thick dura layer, but no pus drained out. Histopathological examination showed diffuse large B-cell lymphoma. Postoperatively, immediate numbness improvement was noted, and at 6 months postoperatively, the patient's neurology is normal and able to ambulate with a walking frame without pain. Neurological examination showed that there is an improvement in muscle power, but the patient still has residual reduced sensation over bilateral T12 to L2 levels. Magnetic resonance imaging post-chemotherapy showed no evidence of residual lesion or recurrence.

PSEL is a potentially curable disease with good clinical outcomes and prognosis when diagnosed early and treated with surgery and multimodal treatment, including chemotherapy and/or radiotherapy.

(1009) USEFULNESS OF TRABECULAR BONE SCORE AS A COMPLEMENTARY TOOL IN EVALUATING LUMBAR VERTEBRAE WITH DEGENERATIVE CHANGES

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Background: Assessment of vertebral bone mass and its quality in the elderly may be difficult because of degenerative changes. Recent studies have indicated the usefulness of trabecular bone score (TBS) based on lumbar dual-energy X-ray absorptiometry (DXA) imaging and the use of Hounsfield units (HU) value obtained from axial lumbar CT images. However, their practical usefulness has not been comparatively evaluated. This study aimed to clarify the usefulness of TBS by evaluating the relationship between bone mineral density (BMD), TBS and HU value.

Objective: Overall, 599 vertebrae, excluding 9 with severe fractures, among 152 patients who underwent DXA and CT scans within one month were analyzed retrospectively.

Methodology: We divided these vertebrae into three grades by the degree of degenerative changes. The TBS was calculated from DXA images, and HU value was measured via region of interest placement on an axial image of the vertebral mid-body. One-way analysis of variance and Pearson's correlation tests were used to investigate the relationships between BMD and TBS or HU value.

Results: TBS and HU values did not show significant differences with degenerative changes, although the lumbar BMD was significantly higher ($p < 0.01$). The correlation between lumbar BMD and TBS or HU values without degenerative changes was higher than that with degenerative changes. There was a significant difference in HU values between the right and left sides of vertebrae with severe degeneration.

Conclusion: HU value might be affected by severe degenerative changes with sclerosis, according to the difference in HU values between the right and left sides. Considering this point, cost, and radiation exposure, TBS has more potential than the use of HU values as a complementary tool for assessing vertebral bone mass and its quality in the presence of severe degenerative changes.

(1015) RECLAIMING AN UPRIGHT POSTURE : A NOVEL SURGICAL TECHNIQUE

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Background: Ankylosing Spondylitis (AS) often leads to severe spinal deformities, presenting challenges in treatment, affecting individual's lifestyle, restricted chest expansion, kyphotic deformity, increase of chin-brow-angle and hip flexion deformity.

Report: A 58-year-old male with prolonged history of chronic axial back pain and progressive spinal deformity over two decades. Early consultations lacked feasible corrective surgery options due to technological limitations, necessitating a prolonged waiting period. The condition worsened, resulting in thoracolumbar kyphosis of nearly 90 degrees by his 40s. This significantly affected his ability to maintain a horizontal gaze and hindered his daily functioning. To restore posture and function, a construct-to-construct-correction technique was pursued involving 2-Level Lumbar Pedicle Subtraction Osteotomy (PSO), with Posterior Instrumentation of T10-to-S2-fusion. Positioning the patient for surgery was challenging due to his restricted neck mobility. The PSO at L1 and L4, was supplemented by placing Dual Rod Multi-Axial Screws (DRMAS) adjacent to the PSO levels. The surgical approach aims at correcting the constructs by using multiple small rods positioned to facilitate controlled closure of the osteotomy sites instead of the traditional method of using a single long rod. Post-surgery, Chin Brow Angle and gaze angle improved. Radiograph showed improvements in spinal alignment and angles. The patient reported enhanced breathing, improved oral tolerance, and resolution of constipation post-surgery. However, intermittent episodes of back pain persisted during the three-month follow-up period.

Conclusion: The primary goal of the surgery was not only to rectify the severe kyphosis but to under-correct it, allowing the patient to maintain horizontal vision and safety while walking. This case highlights the delicate balance between rectifying severe spinal deformities and addressing functional limitations in AS patients.

(1018) USE OF UNILATERAL BIPORTAL ENDSCOPIC SPINE SURGERY FOR LAMINECTOMY OF C1 POSTERIOR ARCH WITH NAVIGATION SYSTEM.

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Background: Unilateral Biportal Endoscopy (UBE) is a minimally invasive surgical technique that creates two portals (camera and working portal) on the same side through small incisions approximately 5 mm. This method provides excellent maneuverability and a clear surgical visual field when performed under perfusion. We report a case in which UBE was used to perform C1 posterior arch laminectomy for cervical spinal canal stenosis caused by atlantoaxial subluxation in a 90-year-old female patient with navigation system.

Report: The patient was a 90-year-old woman who presented with cervical spinal canal stenosis at the C1/2 level caused by atlantoaxial subluxation, leading to quadriparesis, upper limb numbness, and impaired dexterity. Due to her advanced age, C1 posterior arch laminectomy was performed using Unilateral Biportal Endoscopy (UBE) with O-arm navigation. Preoperative contrast-enhanced CT confirmed the absence of vertebral artery anomalies. Under O-ram navigation assistance, two 5-mm portals were created bilaterally above the posterior arch. Laminectomy of the posterior arch was performed under perfusion pressure of 20–30 mmHg, with the resection range verified using O-arm navigation. The procedure was minimally invasive, with minimal blood loss, only two 5-mm incisions, without any complications, and a total operative time of 65 minutes.

Conclusion: UBE with navigation system is a useful method that enables safe and minimally invasive laminectomy of the C1 posterior arch.

(1022) NEARLY MISSED BY CHANCE: A CASE REPORT

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Chance fracture is an unstable spinal injury, often affecting thoracic and lumbar vertebrae. Complications of the injury include neurological deficits and long-term functional impairment. Diagnosis involves clinical evaluation supported by imaging tests like radiographs, CT scans, and MRIs. In this case, an 18-year-old patient sustained a T9 soft tissue injury post-motorcycle accident, where surgical intervention was done despite normal imaging findings. Intraoperatively, there is an undisplaced bilateral laminar fracture. This case highlights the importance of considering surgical intervention in highly suspicious patients despite normal CT scan findings.

We present the case of an obese 18-year-old boy who presented to the emergency department after having suffered from a motorbike versus car accident. He was riding the bike at around 90 km/h before a car suddenly entered his lane, and the patient hit the back of the car as he was unable to avoid it. Upon admission, patients hemodynamically were stable. The patient reported pain over the back and was unable to move the bilateral lower limb that was associated with paresthesia. Palpation revealed tenderness over the thoracolumbar region without any deformity. The plain radiograph did not show any visible fracture. CT-lumbarsacral revealed Grade 1 retrolisthesis of T9/T10 with chip fracture over inferior corner of T9 and T10, mild canal narrowing (0.9 mm diameter), and fracture over transverse process of right L1, L2, and L3 vertebrae. No vertebral body fracture seen. Given the unstable nature of the clinical signs, the patient underwent T9 to L1 posterior instrumentation and decompression. Intraoperatively, there was an undisplaced bilateral laminar fracture at T9, and the spinal cord was contused at this level. The operation was uneventful. Postoperatively, the patient was instructed to follow the rehabilitation program.

In conclusion, the mainstay treatment plan for a patient should be based on clinical assessment, especially in cases where there is a high index of suspicion, despite little to no radiological findings.

(1024)PREVALENCE AND IMPACT OF INCIDENTAL THORACIC SPINAL STENOSIS IN PATIENTS UNDERGOING LUMBAR FUSION SURGERY

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Thoracic spinal stenosis (TSS) is rare due to the stability and limited range of the thoracic spine. TSS can present with pain (back, pelvic, leg) and neurology (gait, motor and sensory deficit, bowel and bladder dysfunction). However, these symptoms often imitate those of cervical or lumbar disorders, and thus, thoracic myelopathy is frequently overlooked. This may result in delayed treatment and suboptimal outcomes in lumbar fusion.

This study aims to investigate the prevalence and impact of incidental TSS in patients undergoing lumbar fusion surgery.
A retrospective study was performed on 300 patients who underwent lumbar fusion surgery, with preoperative MRI images and reports analysed for concomitant TSS. Subsequently, matched analysis was performed comparing two groups. Group A, had 15 patients, with pre-existing TSS, and Group B, had 15 patients, with no pre-existing TSS. Both groups were matched according to number of levels of lumbar fusion. Clinical assessment was performed two years postoperatively, with a numerical rating scale of back pain, lower limb pain, lower limb numbness and Modified North American Spine Society (NASS) Low Back Pain Outcome Instrument. Independent t-test was used for the comparison of variables.

300 lumbar fusion surgeries were performed by 6 Orthopaedic spine surgeons between 2017 and 2023. 15 of these 300 patients (5%) had pre-existing TSS. Matched by levels of fusion, postoperative two-year follow-up showed no significant difference in improvement in back pain (A:50% vs B:58%, p=.28), lower limb pain (A:39% vs B:62%, p=.05), lower limb numbness (A:28% vs B:35%, p=.32), NASS back pain disability (A:28% vs B:40%, p=.11), and NASS neurogenic symptoms (A:31% vs B:40%, p=0.15). However, Group A had significantly lower NASS satisfaction scores than Group B (A:52% vs B:89%, p=0.01).

Patients with pre-existing TSS have comparable lumbar fusion outcomes to those without pre-existing TSS. Notably, patients with pre-existing TSS have poorer NASS satisfaction scores, which may require a larger sample size to investigate. Concomitant TSS remains an important part of the preoperative assessment in patients undergoing lumbar fusion, given the high possibility of thoracic myelopathy being overlooked.

(1080) OPTIMAL PLACEMENT OF SUPPLEMENTAL ACCESSORY RODS TO PREVENT ROD FRACTURE AT THE LUMBOSACRAL JUNCTION IN LONG SPINOPELVIC FIXATION USING LATERAL INTERBODY FUSION: A BIOMECHANICAL EXPERIMENTAL STUDY

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Background and Objective: High rates of postoperative rod fracture (RF) at the lumbosacral junction have been reported after long spinopelvic fixation for adult spinal deformity. Supplemental accessory rods (ARs) and lateral interbody fusion (LIF) are commonly used, and reportedly effective in prevention of RF. However, optimal placement of ARs to mitigate rod stress at the lumbosacral junction has not been sufficiently investigated. We therefore conducted concurrent in vitro biomechanical analysis. Synthetic bone model and finite element analysis each have limitations but complement each other's shortcoming, so they were used together in this analysis.

Methods: Both models consisted of the lumbar spine from L1 to L5 and the pelvis, and were instrumented with screw and rod system and LIF cages, designated to closely resemble the surgical procedure in the operating theater. Four different constructs, which were with or without ARs and with different lengths and configuration: 2R (two primary rods [PRs] without ARs), L-AR (two PRs + two contoured long ARs), S-AR (two PRs + two short ARs), and St-L-AR (two PRs + two straight long ARs). In a synthetic model, we applied vertical load to the constructs and measured rod strain at L5-S1 using a strain gauges. We calculated a mean value of five rods in each construct. In a finite element model, we measured maximum von Mises stress at L5-S1 after the application of flexion/extension, lateral bending and axial rotation loads.

Results: In our synthetic bone model, there was significant reduction of rod strain by 52% in St-L-AR compared to 2R (p=0.023). Also, in a finite element model, reduction of maximum von Mises stress was observed in St-L-AR, by up to 20% (highest against flexion load) compared to 2R.

(1094) SPONTANEOUS RETROLISTHESIS IN A DYSPLASTIC CERVICAL SPINE WITH SEVERE KYPHOTIC DEFORMITY IN NF TYPE 1

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A 19-year-old lady with complaints of atraumatic neck pain since January 2024. She presented with progressively worsening pain, weakness and numbness over both upper limbs. She sought traditional therapy prior to this without improvement. There's no history suggestive of infection or malignancy. In March, she developed acute cervical kyphosis with neurological deficit. Physical revealed multiple café au lait spots which were more than 15mm in length, axillary and inguinal freckling. Further history, she had 1st degree relative with neurofibromatosis type 1 (NF-1). Based on the NIH criteria, she had 3 positive criteria.

Her neurology was weaker bilateral C8-T1 myotome (score 3). Lower limb patchy weakness, with average score 3 and upper motor neuron signs. X-ray showed collapse C5-C6 with acute kyphosis of 81°. Urgent MRI obtained revealing C4/C5 until C7/T1 cervical spine dislocation, severe kyphosis, spinal canal narrowing and cord edema. CT angiogram reported a displaced patent V2 segment of bilateral vertebral arteries. CECT brain identified intracranial abnormalities, which later was diagnosed as a prolactin tumor.

We placed her on a skull tong traction with an initial weight of 1 kg, sequentially increasing to 4.5kg. There was gradual correction in her cervical kyphosis, however complicated with pin site infection, thus we had to change to halo traction. On halo, sequentially up to a final weight of 9.5 kg. Cervical kyphosis was corrected up to 34°.

For definitive fixation we planned an anterior posterior stabilization surgery. Anterior cervical corpectomy and fusion C5-C6, posterior spinal instrumentation and fusion C2-T3. Preoperative planning revealed multiple dysmorphic pedicles with poor bone quality. To ensure proper and strong screw placement, the screws were inserted under navigation control. Post operatively, we placed her in a halo vest to immobilize her cervical spine until union is achieved.

In terms of neurological recovery, her lower limbs recovered completely, with all main muscle groups achieve score 5. Her upper limbs were similar preoperatively. The upper motor signs did not resolve at the time of review. In conclusion, spinal deformity in patients with neurofibromatosis type-1 poses a significant diagnostic and therapeutic dilemma.

(1096) "WHEN THE SPINE TELLS A RARE STORY: SEGMENTAL SPINAL DYSGENESIS AND ASSOCIATED ANOMALIES"

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Background: Segmental spinal dysgenesis (SSD) is a rare and complex congenital anomaly characterized by abnormal vertebral formation and disruption of associated musculature and neural structures. This condition often results in neurological and musculoskeletal sequelae, posing significant diagnostic and management challenges. Due to its rarity, SSD requires extensive case study and gathering to improve knowledge and guide care plans.

Case Report: We present a rare case of a female newborn, conceived via IVF, and delivered via cesarean section after normal prenatal care and scans. At birth, a swelling at the lower spine raised suspicion of spina bifida. Subsequent imaging revealed a tethered, low-lying spinal cord, multilevel spina bifida (L2-L5), and lipomyelocele. MRI and CT scans identified L4 and L5 vertebral abnormalities, including a butterfly vertebra at L5, and smaller and posteriorly positioned L3 and L4 vertebrae with spinal canal stenosis. The newborn also exhibited bilateral developmental dysplasia of the hip (DDH), right vertical talus, and left clubfoot (CTEV), managed with serial casting and specialized footwear. At 11 months, the child can sit independently, stand with support, and bear weight on her right leg, with the left foot remaining on tiptoes due to persistent abnormalities.

Conclusion: This case highlights the complexity of SSD and its association with multisystem anomalies. Comprehensive diagnostic imaging, including MRI and CT, is pivotal for delineating structural abnormalities and planning interventions. A multidisciplinary approach involving orthopedic and neurological care is essential to address developmental challenges and optimize functional outcomes. Given SSD's rarity, continued follow-up and case documentation are critical to developing evidence-based management guidelines.

(1102) FROM SHOCK TO SPINE: A CASE OF CERVICAL FRACTURE DISLOCATION INDUCED BY ELECTRICAL INJURY

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Background: Spinal fractures caused by electric shock are very uncommon. Cervical vertebra fractures caused by electric shock are mostly associated with high voltage electricity followed by falls from a height. This case highlights a rare and severe injury: multiple cervical fractures and dislocations with spinal cord injury caused by a high-voltage electric shock.

Report: A 51-year-old foreign male worker was electrocuted while operating a machine. His right elbow touched the machine, causing him to be thrown back and fall to the ground. He sustained partial thickness burn wounds to the right elbow. At emergency, the patient was fully conscious and hemodynamically stable. On clinical examination, noted tenderness over posterior cervical to upper thoracic level with incomplete neurological deficit (ASIA C). Cervical X-ray, revealed fractures dislocation of c4-c5 followed by a CT scan and MRI were performed confirming the c4/c5 fracture dislocation with spinal cord compression and edema. Patient was applied on skull tong traction (6kg) and subsequently proceed with anterior cervical corpectomy and fusion (ACCF) done.

Conclusions: The pathophysiological mechanisms of injury to the nervous system are heat damage, disruption of cell membranes, and blood vessel damage, either directly or indirectly. Whereas, the classification divided by onset of symptoms. Silversides divided the stages into immediate, secondary, and late effects. There is no established guidelines are available in the literature regarding the treatment of high-voltage electrical shock. Therefore, each case has been treated with supportive care. Early treatment of electrical injury starts with initial fluid resuscitation, respiratory support, and prevention of infection. The lack of systematic guidelines makes treatment for the patient with electrocution challenging. High voltage electrocution is a rare cause of spinal injuries with potential for immediate, delayed and long term neurologic problems. Prompt and thorough evaluation, including multidisciplinary care and radiological imaging, is essential for effective management. It is important to stress the importance of occupational safety, especially for foreign workers, to prevent such catastrophic.

(1106) ACCURACY OF POSTERO SUPERIOR ILIAC SPINE REFERENCE ARRAY PLACEMENT IN ROBOT NAVIGATED SPINE SURGERY.

Joseph Wan

Aims: Computer-navigated spinal instrumentation requires placement of a dynamic reference base (DRB), typically intraosseously in the ilium via a percutaneous stab incision on the posterior superior iliac spine (PSIS) entry point. Data describing the accuracy and complications of DRB placement is limited in literature. The aim of this study is to measure the accuracy of DRB placement in the PSIS, determine its exact placement trajectory and determine the prevalence of related complications.

Methods: Single-centre, institutional board approved, multi-surgeon retrospective analysis of 69 included DRB placements from 51 robot-assisted lumbar posterior instrumentation procedures. Pin entry point and trajectory were mapped out the intra-operative O-arm computed tomography scans, and skin-to-PSIS depth was also measured. Patient demographics (age, gender, BMI), surgical outcomes and post-operative complications are also recorded.

Results: Of the 69 PSIS pin placement, 47 (68.1%) had the correct entry point on the PSIS, and 35 (50.7%) of them were placed correctly within the ilium without breaching a second cortex. Skin-to-PSIS depth was significantly higher in patients with misplaced DRB placement, while age, gender and BMI were similar. Of those with misplaced DRB (n= 34), 1 had delayed pin site wound healing.

Conclusion: Percutaneous PSIS DRB placement has poor accuracy, with skin-to-PSIS depth being a significant factor. To avoid complications from misplaced DRB placement, the authors recommend the use DRB placement on the iliac wing or on the PSIS following the trajectory used in pelvis posterior column fracture fixation, using fluoroscopy intra-operatively to ensure the DRB pin position.

(1112) AWAKE ENDOSCOPIC LUMBAR SPINAL DECOMPRESSION ON A PATIENT WITH ACHONDROPLASIA LITERATURE REVIEW AND CASE REPORT

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Background: Individuals with achondroplasia are prone to lumbar stenosis with a common need for spinal decompression surgery. However, given anatomical and medical factors, this population is prone to high surgical complication rates & difficult anesthetic techniques. The use of a minimally invasive endoscopic technique without general anaesthesia may prove beneficial to reduce such risks. We present a case of a 52 year old female with achondroplasia suffering from left radicular leg pain. A Magnetic Resonance Imaging scan showed lumbar stenosis and compression of the L4 and L5 exiting nerve roots. The patient underwent awake endoscopic decompression utilising a uniportal interlaminar endoscopic system.

Report: The patient recovered well post-operatively, with immediate resolution of her symptoms. She was ambulating up to 100m on the day of operation.

Conclusions: The awake endoscopic procedure described is an option that may be well suited for patients with achondroplasia presenting with lumbar stenosis.

(1136) FIRST DOCUMENTED CASE OF MALIGNANT TRANSFORMATION IN A GRANULAR CELL TUMOR OF THE THORACIC SPINE IN A 55 YEAR OLD FILIPINA

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Background: Granular cell tumors are soft tissue tumors originating from Schwann cells, previously thought to be muscular but now recognized as neural due to advanced staining techniques. They commonly affect women in their 40s to 60s, usually presenting as solitary, painless masses. While most are benign and slow growing, 1-2% can become malignant, showing local aggression or metastasis. Treatment involves complete surgical excision with clear margins and close follow-up. Malignant cases have a poor prognosis with limited treatment options beyond surgery.

Case: This case report presents a 55-year-old retired teacher from Quezon City, Philippines, with a history of controlled hypertension, who experienced a gradually worsening upper back pain over several months. Initial symptoms included upper back pain that intensified over time, leading to difficulty in movement and ambulation. MRI revealed a compression deformity at the T9 and T10 vertebrae with signs suggesting tuberculous spondylitis. The patient underwent surgery for excision biopsy and stabilization of the T10 vertebra. Post-operatively, the patient was diagnosed with a benign granular cell tumor based on histopathology. Despite initial recovery, the patient experienced a recurrence of symptoms, back mass, paraplegia, and dyspnea. Further imaging showed a large, lobulated paravertebral mass with infiltration into adjacent structures. Eight months after the initial surgery, the patient underwent tumor debulking and posterior stabilization. Histopathology confirmed a malignant granular cell tumor involving the skeletal muscle and bone. The patient was eventually diagnosed with Stage IV malignant granular cell tumor.

Conclusion: This case is the first reported instance of malignant transformation from a previously benign granular cell tumor in the spine, a rare occurrence with only 15 reported cases of spinal granular cell tumors. The prognosis for benign tumors is generally favorable, but malignant granular cell tumors are aggressive with a high risk of recurrence and metastasis. The case underscores the importance of complete tumor resection, close monitoring, and a multidisciplinary approach to manage symptoms and prevent complications in patients with granular cell tumors.

(1146) COMPARISON OF THREE DIFFERENT CONFIGURATION POSTERIOR INSTRUMENTATION OF SYNBONE BONE MODEL OF ADOLESCENT IDIOPATHIC SCOLIOSIS LENKE 1 : IN VITRO TEST OF BIOMECHANICAL

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Introduction: Biomechanical construction test of posterior instrumentation for scoliosis corerection is needed to evaluate reliability and instrumentation performance. Latest biomechanical testing have validated bone model as a suitable substitute. Low pedicle screw density can correct without significant complication. This study compared biomechanics of three posterior instrumentations: Bilateral Pedicle
Screw (BPS), pedicle screw on proximal end, apex, distal end concave side (PAD), and PAD with sublaminar wire the concave side (PAD+SW).

Method: Three groups of vertebral model of Scoliosis Lenke I Synbone® is equipped with configurations of 15 samples posterior instrumentations divided into three groups of BPS, PAD, PAD+SW. Each of the static tests is given axial force gradually from 50N, 100N,150N, and 200N using Tensilon® AMD RTF-1310 from Japan, with dial indicator Mitutoyo, Japan. Total displacement was measured for each group. Stiffness was also analyzed using load-displacement ratio.

Results: BPS as the current gold standard showed minimal displacement, followed by BPS, PAD and PAD+SAW for 50N ($p<0.001$), 100N ($p<0.001$), and 200N ($p<0.001$) force, and was not significant for 150N ($p=0.086$). There was also significant difference between the stiffness of BPS, PAD and PAD+SW for 50N ($p=0.002$), 100N ($p<0.001$), 150N ($p<0.001$) and 200N ($p<0.001$) Conclusion. For biomechanical testing with static test, type of posterior instrumentations showed significance relationship with displacement and stiffness. BPS groups were more rigid compared to PAD+SW and PAD. Low density of pedicle screw resulted in the decrease of stiffness and posterior instrumentation sub laminar wire addition significantly added the strength.

Keywords: Posterior instrumentation, adolescent idiopathic scoliosis, Lenke I, In Vitro.

(1148) BEYOND THE BRAIN: A RARE PINEAL TUMOR PRESENTING AS CAUDA EQUINA SYNDROME

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Background: Pineal gland tumors are rare intracranial neoplasms, accounting for less than 1% of all primary brain tumors. Due to their proximity to cerebrospinal fluid (CSF) pathways, these tumors often metastasize within the central nervous system (CNS). Drop metastases, characterized by tumor cell dissemination through CSF, commonly involve the spinal leptomeninges and are frequently observed in malignant variants like germinomas.

Report: A 29-year-old male with a history of pineal gland tumor, previously treated with 30 fractions of radiotherapy in August 2024, presented with progressively worsening lower back pain, left-sided saddle paresthesia, symmetrical lower limb weakness, numbness, and urinary and bowel incontinence. Neurological examination revealed lower motor neuron signs, with the last recorded normal neurological status at the L1 level. Magnetic resonance imaging (MRI) of the spine identified multiple rounded intradural extramedullary lesions at C2, C3, C7, T11, T12, L1, and L2 levels. The lesion at L2 caused significant compression of the cauda equina nerve roots, correlating with the patient's neurological deficits.

Conclusions: This case underscores the critical need for vigilant long-term follow-up in patients with pineal gland tumors, even post-treatment, due to the potential for delayed metastatic spread. Symptoms of new-onset back pain, neurological deficits, or signs of cauda equina syndrome should prompt immediate evaluation for spinal metastases. Early detection and intervention are essential in preventing irreversible neurological damage and improving patient outcomes. A multidisciplinary approach involving neurosurgery, oncology, and radiology is pivotal for optimal management of spinal drop metastases.

(1172) SHATTERED BY THE CURE: THE HIDDEN DANGER OF CERVICAL BONE WEAKNESS AFTER RADIOTHERAPY: A CASE REPORT

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Background: Cervical bone fractures are a rare but serious complication following radiotherapy for nasopharyngeal carcinoma (NPC). The radiation can weaken the cervical spine, making it susceptible to fractures even in the absence of trauma. This case highlights the silent yet dangerous risk of cervical bone fragility in NPC survivors, underscoring the importance of monitoring and early detection to prevent debilitating outcomes.

Report: We present the case of a 60-year-old woman with a history of nasopharyngeal carcinoma (NPC) diagnosed 8 years ago, for which she completed radiotherapy in the same year. She presented with a 3-month history of neck pain and a 2-week history of limited neck extension. Radiographs revealed a kyphotic deformity at C6, while MRI showed destructive bony lesions at C5, C6, and C7, raising suspicion of metastasis. The patient was referred to the Otorhinolaryngology team, and following an endoscopic evaluation, no malignancy was found. She then underwent posterior instrumentation from C3 to T2, decompression of C6-C7, and anterior cervical plating from C4 to C7 with bone grafting. Histopathological examination of the samples revealed no evidence of malignancy, confirming the absence of metastatic involvement.

Conclusion: This case highlights the potential for cervical spine complications long after radiotherapy, often mimicking metastatic disease. Comprehensive evaluation, including imaging and histopathological analysis, is critical for accurate diagnosis and management. Surgical stabilization can effectively address spinal instability and restore function. Recognizing radiation-induced cervical spine fragility is essential for optimizing care in post radiotherapy survivors.

(1174) A SILENT BATTLE: UNMASKING TUBERCULOSIS SPONDYLODISCITIS IN THE SHADOW OF MULTIPLE MYELOMA: A CASE REPORT

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Background: The simultaneous occurrence of tuberculosis spondylodiscitis (TB spondylodiscitis) and multiple myeloma (MM) presents a diagnostic challenge. TB spondylodiscitis, a serious spinal infection caused by Mycobacterium tuberculosis, typically affects the intervertebral discs and adjacent vertebrae. In immunocompromised patients, such as those with multiple myeloma, the risk of opportunistic infections like tuberculosis is increased. This case highlights the diagnostic difficulties and therapeutic challenges of managing TB spondylodiscitis in a patient with concurrent multiple myeloma.

Report: We present a 52-year-old male with 4 months of neck pain and intermittent hand numbness. MRI revealed an aggressive C4 vertebral lesion causing spinal stenosis, myelopathy, and extension into the neural foramina, raising suspicion for an infection. A contrast-enhanced CT (CECT) of the thorax revealed multiple lytic bone lesions. The patient underwent anterior cervical corpectomy of C4 with iliac bone graft fusion, posterior instrumentation from C3 to C6, and C4-C5 decompression. Intraoperative histopathological examination confirmed multiple myeloma. However, tissue culture and sensitivity tests identified Mycobacterium tuberculosis, confirming a diagnosis of tuberculosis spondylodiscitis. The patient was promptly started on chemotherapy for multiple myeloma and anti-tubercular therapy for tuberculosis.

Conclusion: Tuberculosis spondylodiscitis is a rare but serious complication in multiple myeloma patients, who are at higher risk due to immunosuppressive treatments. TB spondylodiscitis often presents with nonspecific symptoms, making early diagnosis difficult. In cases with suspected spinal infection or pathological fractures, MTB culture should be included in the diagnostic workup. A multidisciplinary approach involving infectious disease specialists, oncologists, and orthopedic surgeons is essential for effective management. Early diagnosis, appropriate treatment, and surgical intervention are critical to preventing complications such as spinal deformities or neurological impairment. Further research is needed to optimize treatment and long-term outcomes for this high-risk group.

(1179) A CASE OF ANKYLOSING SPONDYLITIS WITH CONCURRENT LUMBAR CANAL STENOSIS:ENDOSCOPIC DECOMPRESSION

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Background: Ankylosing spondylitis (AS) primarily affects the annulus fibrosus and vertebral ligaments, leading to ossification and spinal fusion, resulting in the characteristic bamboo spine appearance. However, the nucleus pulposus is typically spared from ossification, allowing disc herniation to occur even in a heavily ossified spine.This paradox means that despite the rigidity of the vertebrae, patients with AS can still develop acute disc herniations, potentially leading to nerve root compression or myelopathy. Diagnosing disc herniations in AS is challenging due to chronic pain and limited spinal mobility, often requiring MRI imaging for proper assessment. Additionally, spinal rigidity increases the risk of unstable fractures, which may mimic or exacerbate symptoms of disc herniation.

Report: A 76-year-old retired lecturer presented with a stooped posture and low back pain persisting for 10 years, worsening over the past 2 years. The pain radiated to the right lower limb and was aggravated by prolonged standing.On clinical examination, the patient exhibited a kyphotic posture and an increased occiput-to-wall distance, indicating spinal deformity and reduced mobility. A positive Schober test (2 cm excursion). Despite these findings, neurological examination was normal, with no significant motor or sensory deficits.Imaging studies revealed osteophytes and a bamboo spine appearance, consistent with ankylosing spondylitis. MRI of the lumbosacral spine showed desiccated discs, worst at L4/L5, and spinal canal stenosis due to ligamentum flavum hypertrophy, leading to bilateral L5 traversing nerve root impingement.The patient underwent endoscopic decompression. Intraoperative findings revealed a thickened ligamentum flavum upon laminotomy. Following a flavectomy, the spinal cord became more visible. A contralateral flavectomy further improved visualization of the spinal cord and L5 nerve root. Postoperatively, radiculopathic pain significantly improved, and the patient reported better mobility and reduced discomfort with daily activities.

Conclusion: The ossification of spinal structures in AS, while sparing the nucleus pulposus, creates a unique pathological condition where disc herniation can still occur despite spinal fusion. This can lead to neurological complications, making early MRI imaging crucial for diagnosis and timely intervention.Recognizing this paradox in AS is essential to prevent neurological deficits and optimize patient outcomes. Minimally invasive procedures, such as endoscopic decompression, offer effective symptom relief while preserving spinal stability.

(1227) MULTIDRUG RESISTANCE SPONDYLITIS TUBERCULOSIS IN SAIFUL ANWAR HOSPITAL MALANG: A CASE REPORT

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Background: Ten percent of all tuberculosis patients may develop skeletal involvement, and spine is the most common anatomical location affected. Tuberculous spondylitis is further complicated by the resistance of the fast-acid bacilli to the usual chemotherapy regiment (multi drug resistant/MDR) and its complications. In this case series, we would like to present three cases of MDR tuberculous spondylitis effectively treated with tailored chemotherapy regiment and surgical intervention.

Case Report: A series of 3 patients with MDR tuberculous spondylitis is presented. All 3 patients presented with back pain, lump, and weakness of both lower extremities. These cases were resolved with a combination of chemotherapy regiment based on Indonesian Health Ministry's guideline and surgical debridement and posterior stabilization. Two cases were resolved completely, and only one patient had residual paraesthesia on his legs.

Conclusions: A combination of effective chemotherapy and surgical intervention could lead to an excellent outcome even in complicated MDR tuberculous spondylitis case.

Keywords: Chemotherapy; Multidrug resistance; Spondylitis; Surgery; Tuberculosis

(1228) SURGICAL MANAGEMENT OF SPINAL ARTERIOVENOUS MALFORMATIONS (AVMS): A CASE STUDY AND REVIEW OF FUNCTIONAL OUTCOMES

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Background: Spinal arteriovenous malformations (AVMs) comprise a rare and diverse set of abnormally formed spinal blood vessels. These vascular anomalies facilitate the shunting of blood from veins through an aberrant capillary bed into arteries. The resultant venous hypertension may lead to various neurological impairments, which arise from mass effect, disruption of normal spinal blood flow, and an increased risk of hemorrhage.

Case Report: A 56-year-old male presented to us with progressive weakness and numbness in both lower extremities, ultimately resulting in complete weakness over the preceding month. T2-weighted imaging demonstrated diffuse edema of the spinal cord, raising the suspicion of a spinal AVM at the T12-L1 level. The patient underwent decompression and posterior pedicle screw instrumentation from T12 to L1, during which the feeding artery was effectively coagulated and incised. The diagnosis of spinal cord arteriovenous malformation was conclusively established through an interdisciplinary clinical-pathological conference (CPC). Seven months following the surgical intervention, follow-up assessments of motor function were conducted utilizing the SF-36 and ODI scores. The outcomes were notably favorable, with an ODI score of 16 and the SF-36 results as follows: Physical Functioning: 90%, Role Limitations due to Physical Health: 75%, Role Limitations due to Emotional Problems: 100%, Energy/Fatigue: 55%, Emotional Well-Being: 72%, Social Functioning: 75%, Pain: 87.5%, General Health: 55%, Health Change: 100%. The patient has achieved the ability to walk with a walking aid and can perform essential daily activities.

Conclusions: The clinical presentation of spinal AVMs is contingent upon the specific spinal segment affected and the degree of malformation. In this case, the approach of decompression and posterior pedicle screw instrumentation, coupled with the coagulation and incision of the feeding artery, was selected, despite the prevailing practice of managing AVMs through embolization. The rapid identification, comprehensive investigation, accurate diagnosis, and timely management in this instance culminated in a favorable neurological prognosis.

(1231) MYELITIS ASSOCIATED SPINAL CORD NECROSIS MIMICKING SUBARACHNOID HEMATOMA; A CASE REPORT

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Background: Herein we report an extremely rare case of myelitis-associated spinal cord necrosis mimicking subarachnoid hemorrhage.

Report: A 19-year-old Japanese woman presented to our hospital with sudden-onset paraplegia. She had a history of systemic lupus erythematosus (SLE). MRI revealed findings consistent with myelitis, and medical intervention was initiated. However, a follow-up MRI one week after treatment initiation revealed an intradural extramedullary mass in the thoracic spinal cord, and she was referred to our department. Neurological examination revealed complete paraplegia classified as ASIA impairment scale (AIS) A. Magnetic resonance imaging (MRI) showed an intradural mass on the dorsal side of the spinal cord, which was T1-isointense, T2-high to isointense, and showed mild gadolinium enhancement. Subarachnoid hematoma due to vascular disruption associated with SLE was suspected, and surgical excision of the mass was performed. A T9-10 laminectomy was performed, and dural incision revealed that the intradural mass was not a hematoma but necrotic spinal cord tissue due to inflammation. After a subtotal resection, we identified the remaining spinal cord and a defect in the pia mater. Pathological examination confirmed spinal cord necrosis.

Conclusions: When an intradural mass is detected during the treatment course of myelitis, the possibility of myelitis-related spinal cord necrosis should be considered.

(1233) SINGLE STAGED ENBLOC SACRECTOMY IN GIANT CELL TUMOR OF SACRUM USING PRE OPERATIVE EMBOLIZATION : A CASE REPORT AND REVIEW OF LITERATURE

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Background: Giant cell tumor (GCT) is a benign tumor with progressive and destructive characteristics involving metaphysis, with extension to the epiphyseal tissue. GCT has a high risk of local recurrence despite surgery. Therefore, en-bloc resection surgery is the main choice for surgical treatment. The disadvantage of en bloc resection is the bleeding that can occur during surgery. Our case report will discuss en bloc resection with pre-operative embolization for the treatment of GCT in the sacrum to reduce the incidence of intraoperative bleeding.

Report: A 33-year-old woman came with complaints of low back pain radiating to the left leg that had been present 1 year prior to the visit to the hospital. Lumbosacral X-ray examination revealed a destructive osteolytic lesion involving the sacrum I-III and left iliac bones surrounded by soft tissue mass. There was also an osteolytic lesion on the right pubic bone. Lumbosacral MRI examination with contrast and histopathological examination suggesting an aggressive primary bone tumor with suspect of GCT. Interventional radiology team performed an embolization in the sacral region one day prior to the surgery on a branch of a. Internal iliac posterior segment with gelfoam slurry in the distal to static segment. The surgery was performed on the patient 24 hours later. The surgery included installing posterior pedicle screw instrumentation on the 3rd and 4th lumbar, iliac screw, and the use of bone cement. After that, we performed curettage on the mass and filled it with bone graft. During the operation, there was an iatrogenic lesion on sacral 1 and repair was performed.

Conclusion: En bloc resection with pre-operative arterial embolization for the treatment of GCT can be used to reduce the incidence of intraoperative bleeding.

E POSTER

(1250) EFFECTIVE CORRECTION OF SKELETALLY MATURED CONGENITAL SCOLIOSIS WITH T12 HEMIVERTEBRA USING SINGLE STAGE POSTERIOR PASSIVE CORRECTION AND FUSION: A CASE REPORT

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Background: The surgical management of congenital scoliosis is complex and determining the most ideal surgical option for the patient can be challenging. A myriad of surgical options is available; however, it differs based on patient's age of presentation, degree of deformity and type of associated anomalies.

In skeletally matured patients. a single-stage posterior passive correction and fusion (SSPPCF) using a pedicle screw system is deemed to be a feasible option, effectively avoiding the need of procedures such as osteotomies, hemivertebrectomy or vertebral column resection that would produce large correction, risking spinal imbalance. This approach offers a stable and more controlled correction.

Report: A 13-year-old girl presented with congenital scoliosis secondary to a T12 hemivertebrae. Clinically, she has a left sided thoracic hump, elevated right shoulder and plumb line shift of 3cm to the left.
Preoperatively, imaging showed both Cobb angle and kyphosis of 70 degree with no pelvic obliquity, T11 butterfly vertebrae, T12 hemivertebrae and no evidence of neuroaxial anomalies.

A short pedicle screw construct was placed proximal (T8-T10) and distal (L2-L3) to the abnormal vertebra (T11,T12); these two constructs were connected using a separate rod and connector system on the concave side, increasing its pullout strength and at the same time gradual distraction was performed until predetermined alignment and shoulder balance was achieved.
Post operatively, shoulder was balanced and truncal shift corrected with a Cobb angle of 38 degree.

Conclusion: In skeletally mature patients with congenital scoliosis, a single-stage posterior passive correction and fusion (SSPPCF) is sufficient to achieve optimal correction while maintaining a balanced spine. This approach offers the advantage of reduced operating time with less blood loss, while also negating the need for complex and technically challenging osteotomies and resections.

(1265) RGBD BASED SPINE CURVE MORPHOLOGY ANALYSIS

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Background: Adolescent Idiopathic Scoliosis (AIS), the most prevalent form of scoliosis, is traditionally diagnosed using radiographic imaging techniques, primarily X-rays. However, the repeated exposure to radiation poses potential health risks, particularly for patients who require long-term follow-up. In recent years, there has been growing interest in developing alternative approaches utilizing non-radiation imaging methods. Among them, Red-Green-Blue Depth (RGBD) imaging is being popular for spine assessment. Unlike conventional RGB images, RGBD cameras provide both color information and depth perception, enabling comprehensive three-dimensional (3D) morphology analysis of spine deformities.

Objective: The authors aim to analyze spine morphology through automated spine curve reconstruction using RGBD images.

Methodology: This study utilized a dataset collected from October 2020 to April 2021 at Queen Mary Hospital (QMH) and The Duchess of Kent Children's Hospital (DKCH), consisting of 2090 AIS volunteers. Depth information was captured by Azure Kinect DK camera, with full-spine radiographs serving as the ground truth (GT) for validation. The dataset was divided into three subsets: 1672 images for model training, 209 images for validation, and 209 images for testing. A U-Net architecture with focal loss function was implemented for spine curve reconstruction. To enhance model robustness, random horizontal flipping, random vertical flipping, and the addition of random Gaussian noise were applied to augment data. Model performance was quantitatively assessed using four evaluation metrics: accuracy, Intersection over Union, sensitivity, and specificity.

Results: The model was evaluated on a test set of 209 images, demonstrating outstanding performance with an Intersection over Union of 0.822, accuracy of 0.973, sensitivity of 0.902, and specificity of 0.984. To further validate the effectiveness of the proposed approach, a comparative analysis was conducted between RGB images and single depth images. The evaluation results shows that RGB images achieve an IoU of 0.813 and sensitivity of 0.894, while depth images achieve an IoU of 0.812 and sensitivity of 0.887. These findings suggest that RGBD images provide more comprehensive information for spine curve reconstruction.

Conclusion: In conclusion, this study aims to use RGBD to reconstruct the spine curve, providing a radiation-free and accurate assessment alternative.

(1272) FACTORS RELATED TO SELF URINATION WITH SPINAL CORD INJURY OF CONUS MEDULLARIS

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Background: The urinary function has a significant impact on quality of life in patients with spinal cord injury (SCI). In addition, urinary dysfunction occurs frequently with conus medullaris SCI. The purpose of this study was to investigate the rate of self-urination of patients with conus medullaris SCI at discharge and the factors associated with this.

Objective: We retrospectively analyzed the patients (34 males, 14 females, average age 52 years, mean hospitalization129 days) who presented with SCI due to spinal trauma at the T12-L1 level and operated in our hospital from 2012 to 2023.

Methodology: We investigated age, gender, period of hospitalization, ASIA motor score (MS), Frankel classification, and method of urination at discharge.

Results: The method of urination was self-urination in 31 patients (65%) and catheterization in 17 patients (35%) at discharge. 4/12 patients with AIS A at admission were able to urinate by themselves at discharge, but none of the 4 patients with AIS A and Frankel A (complete spinal cord and cauda equina paralysis). In AIS B, 6/14 were able to urinate by themselves, in AIS C, 7/8 were able, and in AIS D (14 patients), all patients were able to urinate by themselves. With the exception of AIS A and Frankel A, for which self-urination was not expected, and AIS D, for which self-urination was expected, we divided into the self-urination group (17 people) and the catheter group (13 people) and compared. There were no significant differences in L2 to L5 MS, DAP, VAC at admission, but there was a significant difference in the right S1 MS (1.9 vs. 0.7), left S1 MS (2.1 vs. 0.5), and the sum of S1 MS (4 vs. 1.2) ($p<0.05$). We created ROC curves with the sum of S1 MS and self-urination, the AUC was 0.74, and when the cutoff was 2.5, the sensitivity was 71% and the specificity was 85%.

Conclusion: S1 MS at admission is useful for predicting the self-urination at discharge after a conus medullaris SCI.

(1274) EFFECT OF DEXMEDETOMIDINE FOR POSTOPERATIVE SEDATIVE ANALGESIA IN SPINAL IMPLANT SURGERY

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Background: Dexmedetomidine is a α-2 adrenoceptor agonist which has been shown to possess analgesic and sedative properties with minimal respiratory depression. It is used extensively in the intensive care unit (ICU) and the operating room, and has been shown in several studies to have potential neuroprotective effects.

Objective: To determine whether postoperative administration of dexmedetomidine can reduce pain intensity and surgical complications following spinal implant surgery.

Methodology: This retrospective single-center study was conducted in 169 patients (aged 15 to 92 years) undergoing cervical and lumbar implant surgery. Postoperative Numerical Rating Scale (NRS) and complication data were collected after intravenous administration of dexmedetomidine (DEX group).

Results: A significant reduction in NRS scores at the first day after surgery and in nausea and vomiting (PONV) and delirium was observed in the DEX group. The white blood cells counts and C-reactive protein (CRP) levels were lower in the DEX group than in the control group (P<0.05). However, no adverse respiratory events occurred in either groups.

Conclusion: Postoperative dexmedetomidine administration is associated with less postoperative pain intensity and PONV, and delirium. It offered a comfortable and safe surgical experience for patients undergoing spinal implant surgery.

(1285) UNEXPECTED OUTCOME OF CERVICAL DISC REPLACEMENT: A RARE CASE OF PSEUDOARTHROSIS

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Introduction: Cervical disc replacement (CDR) is a motion-preserving alternative to anterior cervical discectomy and fusion (ACDF) for treating degenerative cervical disc disease. While pseudoarthrosis is a well-known complication of ACDF, it is rarely reported following CDR. This case report presents a 40-year-old female who developed pseudoarthrosis-like instability four years after undergoing CDR. This case underscores the challenges in diagnosing this rare complication and highlights the need for long-term surveillance in CDR patients.

Case Report: The patient initially underwent single-level CDR at C5/C6 to relieve cervical radiculopathy and experienced symptom resolution. However, within a year, she began experiencing progressive neck pain, mechanical instability, and recurrent radiculopathy. By the fourth postoperative year, imaging revealed abnormal motion at the operated level, segmental kyphosis, and osteolysis surrounding the implant—findings consistent with pseudoarthrosis-like instability rather than traditional fusion failure. MRI excluded heterotopic ossification and infection, while dynamic radiographs did not demonstrate significant motion at the affected segment.

Pseudoarthrosis is commonly associated with fusion-based cervical procedures, but its incidence following CDR is extremely rare, estimated between 0% and 2%. The primary complications of CDR typically involve implant subsidence, wear, or poor bony integration rather than nonunion. However, this case demonstrates that pseudoarthrosis-like instability can still occur due to factors such as implant subsidence, osteolysis, or inadequate endplate contact. Given the patient's persistent symptoms and radiological evidence of instability, she is scheduled for revision surgery with conversion to ACDF.

Conclusion: This case highlights the importance of extended follow-up in CDR patients, as pseudoarthrosis-like instability, though rare, can develop over time due to implant-related complications. Early recognition through imaging and symptom monitoring is crucial, as timely intervention may be necessary to prevent worsening instability. Surgeons should remain vigilant for this rare complication and consider revision surgery when conservative measures fail. Further research is needed to better understand the risk factors and refine surgical techniques to minimize pseudoarthrosis-like complications in CDR patients

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(1316) TRAUMA INDUCED VERTEBRAL FRACTURES IN A PATIENT WITH UNPRECEDENTED ANKYLOSING SPONDYLITIS: CLINICAL CHALLANGES AND MANAGEMENT

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Introduction: Ankylosing spondylitis(AS), a chronic progressive inflammatory disease affecting sacroiliac joints and axial skeleton causing fusion of facet joints and intervertebral discs responsible for typical kyphotic bamboo spine and spinal demineralisation, increasing risk of spinal fracture after minor trauma. These fractures can be difficult to detect due to altered spinal anatomy resulting in diagnostic delays.

Report: 43-year-old female with undiagnosed AS presented with back pain following a motor vehicle accident. Examination revealed cervico-thoracic kyphosis and mid- thoracic tenderness, with no neurological deficits. Plain radiographs showed typical bamboo spine, and CT scans showed fractures at T7 and T8 with ankylosis of facet joints, costotransverse and costovertebrae joints and syndesmophytes . The fracture went unnoticed during the initial emergency evaluation due to insufficiently conducted primary and secondary assessments. Imaging challenges often delay diagnosis, but CT is the gold standard for detecting fractures in these cases. AS patients have demineralisation within the vertebral bodies that requires multilevel anchoring. Given the instability of the fractures, minimally invasive stabilisation was performed with cemented screws spanning three vertebrae above and below the fractures for optimal stress distribution. Cementing the pedicle screw increases the strength of implant fixation and reduce risk of screw loosening.

Conclusion: AS patients are four times more likely to suffer spinal fracture than general population and around 5% to 15% of all AS patients experience a spinal fracture during their lifetime which are unstable and may involve all three spinal columns, increasing the risk of neurological complications thus require prompt diagnosis and treatment. They often exhibit a number of co-morbidities, include cardiovascular disease which increases mortality in the event of fracture. Surgical intervention often required to stabilise fractures and minimally invasive percutaneous fixation are safe and effective offering multilevel stabilisation and reducing complications like infection and implant loosening.

(1343) SOLITARY NERVE ROOT IMPINGEMENT WITH RADICULOPATHY POST POSTERIOR INSTRUMENTATION – A RARE COMPLICATION

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Background: Pedicle screws are widely used in spinal fixation, however it does not come without risk. The risk of perforation of pedicle cortex causing dural tear, neural injury and vascular complications are rare. I report a case in my centre whereby a solitary nerve root was injured due to pedicle wall perforation causing neurology.

Report: A 70year old gentleman with no known comorbids presented with a fall at home due to slippery floor for which he had pain over lower back. Upon examination, there was tenderness at lower back. Power of bilateral lower limb was 5 except for the bilateral hip which was 2 due to pain. Reflexes and sensation was normal. Imaging showed patient had L2 burst fracture. Posterior instrumentation and fusion was done from T12 to L4.

Post operatively patient had radiating pain to left knee and weakness of left knee extension (power-0) . Sensation was reduced at left knee. CT scan was done and showed L3 pedicle screw breaching the medial wall of pedicle. Revision surgery of L3 pedicle screw was done and neuromonitoring showed positive response. Post operatively patient's power of left knee improved to 2.

Conclusion: It is important to check with pedicle sound and to maintain the trajectory of pedicle screw insertion especially in osteoporotic patients.A high suspicious of pedicle wall perforation must always be in mind.

(1347) "A DISEASE PROGRESSION " SACRAL ALA METASTASIS SECONDARY TO RENAL CELL CARCINOMA

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Background: Metastases to bones from renal cell carcinoma (RCC) occur in up to 50% of patients and are usually rapidly expansile and extremely vascular (60–75%) Out of these, 15% are in the spine. Sacral involvement occurs in less than 2% of spinal malignancies.

Report: We present a case of 70 years old gentleman who is a known case of clear cell renal cell carcinoma which was diagnosed 2 years ago. Patient had a history of pathological fracture of T11 with cord compression 2 years ago. Patient then underwent embolization of T10 and T11 and underwent posterior decompression and laminectomy of T11, posterior spinal instrumentation T9-L1 and spinal cord tumor separation surgery. Patient this time presented back again with lower back pain and left sided buttock pain for past 2 weeks and pain is worsened upon movement. Xray noted lytic lesion over the left sacral ala region and Ct scan showed lytic lesion measuring 2.6x3.3x2.8 cm over the left sacral ala region causing cortical break. Patient underwent spinopelvic fixation of L2-L5 with bilateral iliac screws. Connectors was used to connect the new rods to the previous rods. Patient claims have significant pain relief post surgery

Conclusion: The management of metastatic sacral lesions is complicated as they are often large and destructive by the time they are diagnosed. Modern surgical techniques for lumbopelvic fixation include the modified Galveston technique ,use of dual iliac screws ,and use of a three or four-rod construct. The goals of surgery for symptomatic sacral metastases includes to maintain stability, relief of pain, radiculopathy and the preservation of function. Modified Galveston technique is proven to be an effective method for pain relief, regain postoperative mobility, and independence.

E POSTER

(1376) APPLICATION OF INTRAOPERATIVE NEUROMONITORING IN PERCUTANEOUS INTRA DISCAL PROCEDURES PERFORMED UNDER GENERAL ANAESTHESIA, A RETROSPECTIVE ANALYSIS.

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Objectives: To investigate feasibility of the application of multimodal Intraoperative Neuromonitoring (IONM) in percutaneous intra-discal procedures performed under general anesthesia (GA).

Materials and Methods: Multimodal IONM data comprises of Motor Evoked Potential (MEP) and Somatosensory Evoked Potential (SSEP) recorded waveforms in 28 percutaneous intradiscal procedures carried out between March 2022 and July 2024 were reviewed and compared against commonly adopted alarm criteria to predict post-operative neurological deficit. Results were prospectively analyzed, and correlation were made with patients' post-operative clinical outcome.

Results: From a total of 33 lumbar PDN cases, 31 cases (92.9%) showed no significant changes in recorded waveforms in comparison with assigned baseline, the patient-level incidence rate of Motor Evoked Potential changes (>50% amplitude reduction) was 3.0% (or muscle group-level incidence rate of 2.1%, n=141) whereas patient-level incidence rate for Somatosensory Evoked Potential changes (>10% latency delay) was 3.0%. None of the patients had post-operative sensory or motor deficits. This study reports a Negative
Predictive Value (NPV) of 100%.

Conclusions: This study suggests that multimodal IONM could be a valuable tool to be incorporated into percutaneous intra-discal procedures performed under general anesthesia due to high negative predictive value of neurological deficit postoperatively. However, there is insufficient data to report on positive predictive value (PPV) hence should be further investigated to truly assess the role of IONM in predicting true positive events for this procedure.

(1383) INNOVATIVE MESH CAGE MOLDING IN POSTERIOR LUMBAR FUSION: A NOVEL APPROACH TO SPONDYLODISCITIS MANAGEMENT

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Background: Spondylodiscitis, an infection of the intervertebral disc and adjacent vertebrae, leads to spinal instability and persistent pain. With a global incidence of 0.4–2.4 cases per 100,000 individuals annually, surgical intervention is necessary for cases with instability or refractory pain. While anterior approaches have been the standard, posterior instrumentation has emerged as an effective alternative with reduced morbidity. This report presents a 53-year-old Malay gentleman with L5-S1 spondylodiscitis, successfully managed with posterior lumbar interbody fusion using a precision-molded titanium mesh cage. PEEK cages were avoided due to infection concerns.

Case Report: A 53-year-old gentleman with poorly controlled diabetes mellitus presented with acute-onset severe lower back pain and intermittent fever. Neurological examination revealed no deficits. Imaging confirmed L5-S1 spondylodiscitis. Despite two months of antibiotic therapy, his symptoms persisted with instability pain, necessitating surgical intervention.

A standard posterior midline incision was made from L3 to S2. After pedicle screws and rods placement, L5-S1 discectomy and debridement were performed. The defect dimensions were carefully measured, and a titanium mesh cage was custom-molded using a large fragment plate bender for optimal anatomical fit and structural stability. The cage was filled with autologous bone graft and inserted into the L5-S1 interbody space, restoring alignment and support.

Postoperatively, the patient exhibited remarkable recovery with complete resolution of pain and no neurological compromise. She was discharged on postoperative day three in excellent condition.

Conclusion: This case underscores the efficacy of precision-molded mesh cage application in posterior lumbar interbody fusion for spondylodiscitis. The technique enables superior adaptation to anatomical defects, enhances mechanical stability, and minimizes surgical morbidity. As an innovative alternative to anterior approaches, posterior instrumentation utilizing custom-molded mesh cages offers a transformative solution for the surgical management of spinal infections with structural compromise.

(1387) OSTEOMALACIA INDUCED SEVERE SCOLIOSIS: A CASE STUDY HIGHLIGHTING THE IMPORTANCE OF DIETARY MANAGEMENT

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Vitamin D, calcium, and phosphorus are essential nutrients for bone development and mineralization. Deficiencies in these nutrients can result in rickets in children and osteomalacia in adults, due to defective mineralization. Rickets occurs before epiphyseal plate closure, while osteomalacia develops after. Nutritional rickets and osteomalacia remain a significant global health concern, particularly in developing countries.

We present the case of a 30-year-old woman, who presented with progressively worsening exertional dyspnea and shortness of breath over several years. She also reported a 10-year history of bilateral lower limb weakness requiring wheelchair use and the development of spinal curvature deformity. Physical examination revealed upper back hyperkyphosis, reduced height, and abnormal horizontal gaze. Neurological examination was normal, and there was no spinal tenderness to palpation. Radiographs of the entire spine revealed severe dextroscoliosis in the thoracolumbar region, hyperkyphosis of the thoracic spine, and codfish vertebrae. MRI of the whole spine showed a normal spinal cord and nerve roots. Due to the patient's poor bone quality, further investigation revealed low serum vitamin D and calcium levels, coupled with elevated parathyroid hormone, indicating secondary hyperparathyroidism. DEXA scan showed osteopenia of the spine, and pulmonary function tests revealed severe restrictive lung disease, correlating with her reduced effort tolerance. The patient was prescribed oral vitamin D supplementation (50,000 IU weekly for 8 weeks, then monthly) and calcium. Over 16 months of follow-up, her lower limb strength improved significantly, allowing her to ambulate independently. Serial x-rays showed no further progression of the spinal curvature.

This case report emphasizes the importance of public education regarding osteomalacia prevention and management. Untreated osteomalacia can lead to severe, irreversible complications, such as the severe spinal scoliosis observed in this patient. Adequate vitamin D, calcium, and phosphate intake are essential for bone health. Patients should be educated on dietary sources, benefits of safe sun exposure, and potential need for supplementation, especially in high-risk groups. Regular weight-bearing exercise and early recognition of symptoms like bone pain and muscle weakness are vital for prompt treatment and improved outcomes.

(1393) POSTOPERATIVE RIGHT L2 RADICULOPATHY AFTER SCOLIOSIS CORRECTIVE SURGERY: A CASE REPORT

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Background: Scoliosis corrective surgery improves spinal alignment and correct deformity, which carries the potential for complications such as neurological complications impact patient outcomes. This case report describes a rare instance of post-operative right-sided L2 radiculopathy following scoliosis corrective surgery. While neurological deficits following scoliosis surgery are more frequently associated with spinal cord injury or cauda equina syndrome, isolated radiculopathy, particularly at the L2 level, is less frequently reported.

Report: A healthy 17-year-old Malay lady presented with a one-year history of gradually worsening back deformity associated with lower back pain. She was diagnosed with adolescent idiopathic scoliosis (AIS), Lenke type 5CN, and subsequently underwent posterior scoliosis corrective surgery from the T10 to L4 levels. On day three post-operation, the patient complained of right anterior thigh numbness, without any lower limb motor weakness in either lying or standing positions. She also reported right anterior thigh pain when sitting. Tinel's sign was negative over the right lateral femoral cutaneous nerve region.
Repeated radiological investigations showed no obvious nerve root compression. The patient was discharged home with instructions for daily dermatome charting of the right lower limb and a prescription for gabapentin. Her symptoms subsequently improved at six months post-surgery.

Conclusion: L2 radiculopathy following scoliosis corrective surgery is uncommon and is not typically included in the standard operative consent process. Extra caution is advised for patients undergoing fusion surgery of more than four levels, as the incidence of postoperative radiculopathy is approximately doubled. Post-operative radiological examination, such as computed tomography (CT) or magnetic resonance imaging (MRI) is essential to rule out nerve root compression caused by misplaced implants or hematoma. Gabapentinoid can be prescribed to effectively manage neuropathic pain, and follow-up appointments are essential for ongoing monitoring of the patient's progress and recovery.

(1394) AN UNEXPECTED CAUSE OF PARALYSIS: LUMBAR INTRADURAL TUMOR MIMICKING POST ANESTHESIA COMPLICATIONS

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Background: Postoperative neurological deficits following lower limb orthopedic surgery are often attributed to anesthesia-related complications such as spinal cord ischemia or epidural hematoma. However, intrinsic spinal pathology, such as an intradural tumor, should be considered, especially in cases of delayed recovery.

Case Report: A 62-year-old woman with a history of hypertension and dyslipidemia sustained a right trimalleolar fracture with ankle subluxation, initially managed conservatively. Due to malunion, she underwent a right ankle fusion with hindfoot nailing under combined spinal-epidural (CSE) anesthesia. The procedure was uneventful, and the epidural catheter was removed six hours postoperatively.

However, 10 hours post-surgery, she developed bilateral lower limb weakness, severe radicular pain, and urinary retention, raising concerns for spinal cord compromise. Examination revealed complete motor paralysis (ASIA A) below L1 with sensory loss, and absent anal tone on per rectal exam.

Urgent MRI of the lumbar spine (Figure 1) revealed a aggressive behaving intradural tumor at T12-L2, causing significant compression of the conus medullaris and cauda equina. Case were referred to neurosurgical team for tumor excision.

Conclusion: This case underscores the importance of considering intrinsic spinal lesions in postoperative neurological deficits. While anesthesia-related complications are often suspected, MRI should be promptly performed to rule out structural causes, particularly in patients with atypical or progressive symptoms. Early surgical decompression remains crucial in optimizing neurological recovery.

(1400) SKELETAL MATURITY ASSESSMENT IN A TERTIARY HOSPITAL: A COMPARATIVE ANALYSIS OF RISSER AND SANDERS CLASSIFICATION

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Introduction: Accurate skeletal maturity assessment is essential in managing adolescent growth disorders. There is a close relationship between growth potential and curvature progression in adolescent idiopathic scoliosis (AIS). Determining growth potential is crucial, especially in planning AIS treatment. Skeletal maturity assessment plays a key role in deciding whether a patient requires nonoperative management or operative treatment. The Risser and Sanders classifications are widely used for skeletal maturation assessment, but their reliability varies. The study aims to compare these classifications and identify discrepancies in skeletal maturation assessment.

Methods: This descriptive and literature review study analysed retrospective data from a tertiary hospital, assessing skeletal maturity using Risser and Sanders classifications. A literature review was conducted using PubMed, Scopus, and Google Scholar, focusing on interobserver reliability, correlation with growth progression, and predictive accuracy. The primary outcome was to evaluate the advantages and limitations of the Risser and Sanders classifications in predicting skeletal maturity.

Result: A descriptive study was conducted on 16 individuals (2 males, 14 females) with a mean age of 14.25 ± 1.75 years. Risser and Sanders classifications were recorded and analyzed. No participants had Risser 0, while Risser I-V were distributed as 6%, 19%, 25%, 38%, and 13%, respectively. Sanders 7 was the most common stage (69% overall; 71% in females, 50% in males), while Sanders 8 was observed in 13%. No participants were in Sanders 2-4. Several individuals aged 12-13 years exhibited advanced skeletal maturity (Risser IV-V, Sanders 7), suggesting early skeletal maturation. No cases of delayed skeletal maturity were found in older participants (≥16 years).

Discussion: The analysis revealed discrepancies between Risser and Sanders classifications, with Sanders demonstrating greater precision in growth prediction. Literature review findings support Sanders as a more reliable and clinically useful tool compared to Risser.

Conclusion: Sanders classification provides a more accurate assessment of skeletal maturity than Risser, making it preferable for clinical decision-making in adolescent patients.

Keyword: Sanders, Risser, skeletal maturity, adolescent idiopathic scoliosis

(1406) OCCIPITOCERVICAL TUBERCULOSIS WITH PROGRESSIVE NEUROLOGICAL DEFICIT WITH SEVERE CERVICAL DYSTONIA

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Background: Occipitocervical tuberculosis is a rare entity, constituting less than 1% of spinal TB cases. While most cases can be managed non-operatively, neurological deficits and instability may necessitate surgery, posing challenges due to both surgical and patient-related factors.

Case Report: A 63-year-old female with severe cervical dystonia, neck pain for 10 years, and upper limb numbness for 3 months, was on anti-tubercular therapy for 3 months. Due to her age, neurological deficit, and comorbidity, she was initially managed conservatively with a cervical collar. However, progressive neurological deterioration, including bowel and bladder involvement, necessitated surgical intervention

Dilemma 1: Severe Cervical Dystonia Uncontrolled cervical dystonia caused excessive movement, threatening implant stability.

Solution: Botox injections were administered to posterior cervical muscles and sternocleidomastoids, and carbamazepine was initiated after neurological consultation, reducing dystonia intensity and frequency.

Dilemma 2: Severe Osteoporosis A DEXA scan (T-score -4.2) indicated high risk of implant failure.

Solution: A robust fixation was achieved using multiple anchor points, including C2 pedicle and laminar screws, cervical pedicle screws, and a dual rod construct. Long-term osteoporosis management included teriparatide.

Conclusions: Despite high risks—severe cervical dystonia, osteoporosis, and TB infection—a structured approach with interdisciplinary collaboration ensured a successful outcome. Dual rod constructs and multiple anchor points provided stability in osteoporotic bone. At 6 months follow-up, the patient showed no signs of implant failure, demonstrating the importance of tailored surgical strategies in complex cases.

(1408) HEMORRHAGIC LIGAMENTUM FLAVUM CYST IN THE ADJACENT LEVEL OF LYTIC SPONDYLOLISTHESIS – A CASE OF DIAGNOSTIC AND THERAPEUTIC DILEMMA

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Introduction: Occurrence of hemorrhagic cyst inside ligamentum flavum is a very rare phenomenon and presents with back pain, radiculopathy, or neurogenic claudication. Various causes reported in the literature are trauma, anticoagulant therapy, and increased micromotion in the setting of unstable and degenerated motion segment.

Case Report: We report a case of 41-year-old male patient who presented with claudication pain in both lower limbs for the past 6 months associated with bilateral calf atrophy. Plain radiograph with dynamic films showed lytic spondylolisthesis at L4-L5 level. Magnetic resonance imaging revealed a hemorrhagic cyst inside ligamentum flavum at the L3-L4 level occupying the posterior epidural space severely compressing the thecal sac. After a thorough diagnostic and therapeutic work up, we did a midline sparing decompression of L3-L4 level under microscope without fixing the listhetic segment. The patient had significant pain relief after surgery and doing well till now.

Conclusion: In general, hemorrhagic cyst of ligamentum flavum is seen in a degenerated lumbar spine at the areas of increased micromotion and instability. Our case has shown that it can also occur in an adjacent segment of spondylolisthesis or instability. The obvious finding like listhesis in the adjacent segment may hinder a spine surgeon from diagnosing the cyst component and may guide to a erroneous treatment outline. Hence, it should not be missed in the imaging.

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(100) The Unexpected Occurrence Of Bilateral Femoral Nerve Palsy After Severe Scoliosis Surgery A Case Report

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Severe scoliosis, a debilitating spinal condition, is marked by an exaggerated coronal curve of the spine, surpassing 90 degrees. Addressing this complex deformity often requires extensive osteotomy and fusion procedures, which come with a significant risk of complications. Neuromonitoring is commonly employed to mitigate the risks associated with complex spinal procedures, particularly during critical steps like pedicle screw placement and scoliosis correction maneuvers.

A 30-year-old man, morbid obesity, with no pre-existing neurological deficits underwent corrective osteotomy and fusion for severe thoracic kyphoscoliosis, cobb angle 95 degree. Deteriorating pulmonary function necessitates surgical intervention for him, despite initially deferring surgery at a younger age. The patient was positioned prone utilizing dome-shaped gel pads onto the chest wall and ASIS. Baseline MEPs demonstrated a decrease in the left lower extremity preoperatively. A further decline in signal strength was observed during the final stages of spinal correction. Postoperatively, the patient exhibited weakness in hip flexion and knee extension, accompanied by numbness consistent with femoral nerve distribution. Acute spinal cord injury was ruled out via immediate MRI. While nerve conduction study(NCS) proved inconclusive, the patient achieved full recovery within 6 weeks following a dedicated rehabilitation program.

Prone gel positioner can help preventing femoral nerve compression, especially in obese patients and expected lengthy surgeries like in this case. Comparatively, dome-shaped positioners, though commonly used, may carry a higher risk of focal pressure points. Intraoperative neuromonitoring changes were addressed according to established consensus-based guidelines, though baseline signals could not be reestablished. The pre-existing decreased baseline signals, in the setting of intact preoperative neurological function, suggest possible peripheral nerve compression related to positioning. Postoperative NCS was inconclusive regarding peripheral neuropathy, likely due to signal interference from the patient's significant subcutaneous fat

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(365) STREPTOCOCCUS SUIS SPINAL INFECTION: A CASE REPORT HIGHLIGHTING AN EMERGING PATHOGEN

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Being a multiracial country, Malaysia has been well positioned as a food paradise, serving a wide range of foods, including porks. While Streptococcus suis (S. suis), a facultative anaerobic gram-positive cocci, commonly colonizes the upper respiratory tract, gastrointestinal tract, and genital organs of various animals, especially pigs.[1] Recently, S. suis infections have emerged as a concern in several states, particularly Sabah. This report details the case of a patient who developed a cervical spine infection, outlining the clinical presentation, suspected mode of acquisition, and outcome. Given the ongoing public health threat posed by zoonotic infections like S. suis, priorities should include accurate epidemiological surveillance, regulation of pig farming and slaughtering practices, and continued promotion of safe pork handling and consumption.

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(370) DOUBLE TROUBLE, ONE SOLUTION: PEDIATRIC FLOATING KNEE TREATED WITH DUAL TITANIUM ELASTIC NAILS

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Background: Floating knee in the paediatric population, which involve simultaneous fractures of both the femur and tibia is uncommon, and a floating knee with segmental tibia fracture is even rarer. These complex injuries can lead to long-term functional impairment if not appropriately treated. The management of paediatric floating knee remains a complex and challenging issue. Careful selection of surgical modalities is crucial to minimize the violation of growth plates and soft tissue which may lead to future complications. The use of the titanium elastic nail system has shown promising results in the literature in the treatment of pediatric long bone fractures.

Report: This case report presents the successful treatment of a 9-year-old girl with a floating knee and segmental tibia fracture following a motor vehicle accident. The patient underwent closed reduction and fixation using the dual Titanium Elastic Nail System (TENS), which was applied to both the femur and tibia. Post-operative outcomes showed satisfactory alignment and fracture healing, with the patient achieving independent ambulation within six weeks.

Conclusion: The use of dual Titanium Elastic Nail System (TENS) can be an effective treatment strategy providing minimally invasive and stable fixation in the management of paediatric floating knee.

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(471) TRANSFORMING CURVATURE: SUCCESSFUL MANAGEMENT OF SEVERE SCOLIOSIS WITH GROWING ROD TREATMENT – A CASE REPORT

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Scoliosis, a three-dimensional spinal deformity, affects 2-3% of the population, with early-onset scoliosis (EOS) presenting a unique challenge due to growth potential and risk of severe complications. Conservative treatments like bracing often fail, while spinal fusion, once common, is now avoided due to its negative impact on spinal and lung development. Growing rod systems have emerged as an effective alternative, controlling spinal curvature while allowing growth.

Here we report a case of an 11-year-old female with progressive scoliosis and a severe thoracic curve of 100 degrees. Following MRI confirmation of idiopathic EOS, a dual growing rod system was selected. The surgery reduced the curve to 35 degrees. The outcome was positive, allowing the patient to resume normal activities.

This case underscores the importance of early intervention in EOS and highlights the effectiveness of growing rod systems in preserving growth.

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(600) SERIAL CASTING AND BRACING IN EARLY ONSET SCOLIOSIS

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Introduction: Early onset scoliosis is defined as a curvature of the spine more than 10 degrees in the frontal plane with onset before 10 years old of age by Scoliosis Research Society (SRS), which includes congenital, neuromuscular, syndromic, and idiopathic. The treatment of children with early-onset scoliosis is controversial and evolving. Lenke proposed brace treatment for patients with scoliosis with a degree between 25-60 in 2007. Yang et al proposed that bracing can maintain correction through serial casting in order to delay surgery. Casting is being used as a therapeutic strategy in mild to moderate cases of early-onset scoliosis management. The use of corrective casts is serial cast treatment which is a non-surgical treatment option for early-onset scoliosis.

Case Report: Two patients diagnosed with early-onset scoliosis were treated with serial casting. The first patient was a 16 months old boy who was diagnosed with early-onset scoliosis with a Cobb angle of 50 degrees. The patient was treated with serial casting. Casting was done and the patient Cobb angle was 50 to 12 degrees. The second patient was a 26-month-old boy who was treated for early-onset scoliosis with a Cobb angle of 80 degrees. The patient was treated with serial casting and it was applied under general anesthesia same as the first patient. The patient Cobb angle was 80 to 22 degrees. Both patients were well and compliant throughout the casting and bracing. No complications were shown during the casting.

Conclusion: Serial casting for early onset scoliosis has been shown to prevent curve progression and is able to fully correct spinal deformity with little inherent risk. The benefits of casting include reduced growth restriction, reduced invasiveness, and reduced risk of complications of surgeries.

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(783) LEARNING CURVE FOR INTERLAMINAR ENDOSCOPIC LUMBAR LAMINECTOMY FULL ENDOSCOPIC SPINE SURGERY VS BIPORTAL ENDOSCOPIC SPINE SURGERY

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Background: Microendoscopic spine surgery is the most commonly performed minimally invasive lumbar spine surgery in Japan. However, Full Endoscopic Spine Surgery (FESS) and Biportal Endoscopic Spine Surgery (BESS) are gaining global popularity, and we have gradually adopted FESS and BESS since 2018.

Objective: This study aimed to compare the outcomes of interlaminar endoscopic lumbar surgery for lumbar degenerative disease between FESS and BESS groups and report the learning curve of a single surgeon experienced in over 300 MEL cases.

Methodology: A total of 87 patients (FESS: 41, BESS: 46) were analyzed. Clinical outcomes were assessed using VAS and JOA scores preoperatively and at 3 months postoperatively. Reoperation rates and surgical complications were evaluated at the final follow-up. Radiological outcomes included the cross-sectional area (CSA) of the spinal canal at the intervertebral disc level measured on preoperative MRI and postoperative CT at 1 week. Secondary outcomes included a comparison of learning curves between groups.

Results: The mean operative time per vertebral segment was significantly shorter in the BESS group (49.9 minutes) than in the FESS group (96.7 minutes). Both groups showed significant improvements in VAS and JOA scores and increased spinal canal CSA postoperatively, with no significant difference in improvement rates. Reoperations occurred in six FESS and five BESS cases. Complications in the FESS group included three intraoperative spinous process fractures and one case of temporary postoperative BBD worsening. The operation time did not decrease with experience in either group, indicating similar learning curves.

Conclusion: BESS demonstrates shorter operative times and fewer complications compared to FESS. For experienced surgeons, the learning curve is minimal in both surgical techniques.

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(840) DIAGNOSIS DILEMMA: POTT'S DISEASE IN PREGNANCY

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Background: Spinal tuberculosis (Pott's disease) during pregnancy can be associated with destruction of the intervertebral disc and adjacent vertebrae that can lead to cord compression and thereby paraplegia or quadriplegia. Here we reported a case of spine tuberculosis in pregnancy that had dramatic neurology recovery despite being treated conservatively.

Report: A 36-year-old lady, G2P1, at 12 weeks of pregnancy, presented with complaints of worsening lower back pain, associated with bilateral lower limb weakness and numbness for 4 months and eventually resulting in being wheelchair bound. She also has urinary incontinence. She previously had long-standing lower back pain and was treated under District Hospital for a prolapsed intervertebral disc. Patient otherwise denied any constitutional symptoms, no family or history of pulmonary tuberculosis. The patient's antenatal follow-up was uneventful. Upon assessment there was, no midline tenderness, no gibbous nor step deformity noted, neurological examination shown, ASIA B at the level of T10. Her TB workup otherwise came out negative with only a raised ESR level. The patient was advised for an MRI; however, she refused as she was concerned it might affect her fetal health. After multiple consultations and counselling with multi-disciplinary team involvement, she finally agreed to an MRI in the 2nd trimester. MRI of the spine confirmed T9/10 spondylodiscitis causing cord compression. We offered the patient posterior stabilization and biopsy; however, she refused. Anti-TB treatment started at 19 weeks of pregnancy, and just after 5 weeks on treatment, her neurology improved from ASIA B to ASIA D.

Conclusion: In managing tuberculosis in pregnancy, many would encounter a dilemma in diagnosis. The importance of patient education and regular counselling with multi-disciplinary team involvement is required. Despite being treated conservatively, this patient has shown remarkable neurological improvement. This emphasized prompt TB treatment, if started early, can actually make a difference without surgical intervention.

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(846) NEUROLOGICAL RECOVERY AFTER NEGLECTED BURST FRACTURE OPERATION IN MALE 57 YEARS OLD

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Background: A burst fracture refers to a type of spinal injury, typically caused by high-energy trauma, in which the vertebral body is compressed and fragments can displace into the spinal canal. A neglected burst fracture occurs when the fracture is either undiagnosed or inadequately treated for an extended period, often leading to significant complications such as neurological deficits, deformity, and chronic pain. The recovery of neurological function following such an injury is complex and multifactorial, influenced by factors like the severity of the fracture, the timing of intervention, and the rehabilitation process.

Report: In our case report, male 57 years old came to outpatient department with chief complaint weakness in lower extremity and pain in his back since 2 month ago following fall from a roof. He didn't had complaint about micturition and defecation. After plain radiograph, and MRI of lumbal we found burst lumbal 2 with AO type L2: A4 ;N1; M1 and grading for neurological deficit was ASIA C. He underwent pre anesthesia check up and laboratory testing before surgery. We doing open decompression and stabilization from the T12 to L4. The dura was found rupture. We suturing the dura with fascia graft. After 2 month post surgery patient and routinely physiotherapy, the motoric is increasing well and become ASIA D.

Conclusion: Neglected case in our country is still higher. Most of it from the socioeconomic culture in our society. This cause late handling for the case and increase the morbidity. The management comprises surgical decompression of neural elements, stabilization, and fusion to provide a higher recovery rate from cord damage. Even in neglected case improvement for the neurological deficit can still be expected after good operative procedure

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(848) A TRIVIAL FALL, BUT A PERILOUS FRACTURE

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Background: Odontoid fractures, representing the most common cervical spine fractures, accounts for approximately 17-25% of acute cervical fractures. Favourable
outcomes could still be obtained despite conservative non-surgical management. This report presents a case of an odontoid fracture in a middle-aged
woman, highlighting its diagnostic challenges and treatment.

Report: A 43-year-old woman presented to emergency department with a complaint of neck pain for two days. A week earlier, she had a presyncopal attack, falling to the floor while doing chores, but denied direct impact onto the neck. She is a chronic smoker with epilepsy and adjustment disorder under treatment. Examination revealed tenderness in the upper cervical region but no neurological deficits. A cervical CT scan confirmed an Anderson and D'Alonzo type II odontoid fracture. A dedicated spine service consult was obtained and patient was put on Philadelphia collar with a head support extension.

Discussion: Odontoid fractures are uncommon in low-energy trauma among middle-aged individuals but are often seen in high- energy trauma in younger patients. Long-term usage of anti-epileptic drugs can cause osteoporosis, increasing fracture risk. In this case, the patient had a trivial fall likely resulted in the fracture due to osteoporosis from prolonged anti-epileptic usage.

Conclusion: This case highlights the risks of longterm antiepileptic usage. While beneficial for epilepsy, it may predispose to osteoporosis and increase the risk of fragility fractures. A high index of suspicion coupled with thorough examination and history taking is important to avoid missing such diagnoses which may have catastrophic complications if missed.

References: Johannes Kaesmacher, Osteoporosis Is the Most Important Risk Factor for Odontoid Fractures in the Elderly, Journal of Bone and Mineral Research, Volume 32, Issue 7, 1 July 2017, Pages 1582–1588.

(874) OUTCOMES COMPARISON OF CLOSED SYSTEM ABSCESS EVACUATION (CSAE) VERSUS OPEN DEBRIDEMENT IN SPINAL TUBERCULOSIS ABSCESS: A RETROSPECTIVE COHORT STUDY

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Background: Spinal tuberculosis abscess is one of the serious complications of tuberculosis infection that can lead to neurological damage and difficulty in eradicating the pathogen. Open debridement surgery is often chosen. However, minimally invasive techniques, including closed system abscess evacuation (CSAE), have been developed, although data remains limited.

Objective: This study was conducted to evaluate the clinical and laboratory outcomes of patients undergoing CSAE compared to open debridement. This study aims to compare the clinical and laboratory outcomes between the Closed Abscess Evacuation System (CSAE) technique and open debridement in spinal tuberculosis abscess cases.

Methodology: This retrospective study involved 48 patients who underwent one of the two techniques.

Results: Results showed that CSAE yielded lower postoperative pain (VAS 2 vs. 4; p<0.001) and smaller scar length (0 cm vs. 12 cm; p<0.001) compared to open debridement. Median hospital stay was shorter in the CSAE group, although not statistically significant (2 vs. 3 days; p=0.06). However, the recurrence rate was higher with CSAE (2 cases vs. 0). Both techniques showed similar results in C-reactive protein (CRP) levels and Oswestry Disability Index (ODI).

Conclusion: These findings suggest that CSAE offers a minimally invasive alternative with better clinical outcomes but requires attention to the risk of recurrence. Further studies are needed to validate these findings and evaluate the long-term safety of the CSAE technique.

(919) ANALYZING NOVICE SURGEON EXPERIENCES IN BIPORTAL ENDOSCOPIC SPINE SURGERY VS MICROSCOPIC DECOMPRESSION: A FOCUS ON SURGERY DURATION, LENGTH OF STAY, CLINICAL OUTCOME AND PROCEDURAL CHALLENGES

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Introduction: Herniated disc is a common spine problem that impairs quality of life due to pain and limited mobility. Surgical intervention is often required, with two main approaches being Biportal Endoscopic Spinal Surgery (BESS) and microscopic decompression. This study aims to compare the clinical outcomes, surgery duration, length of stay, and procedural shallenges.

Methods: A total of 52 patients diagnosed with single-level herniated disc were retrospectively analyzed. Patients were divided into two groups: 22 underwent BESS, and 30 underwent microscopic decompression. Surgery duration and length of stay were analyzed using the Mann-Whitney U test. Pain scores before and after surgery, assessed using the Visual Analog Scale (VAS), were compared using the Wilcoxon signed-rank test. A significance level of $p < 0.05$ was applied.

Results: The mean operative duration showed a significant lower duration ($p < 0.001$) in microdiscectomy (88.5 ± 17.7) compared to BESS (135 ± 33). However, the length of hospital stay was significantly shorter in the BESS group compared to the microdiscectomy group ($p < 0.001$). Both groups experienced significant reductions in VAS scores after surgery ($p < 0.001$).

Discussion: The findings suggest that BESS or Microscopic decompression offers good result for single level herniated disc. The shorter operative duration in BESS most likely achieved by a higher learning curve surgeon. This underscores the importance of surgical experience and proper training in optimizing outcomes for patients undergoing BESS.

Conclusion: BESS and microdiscectomy are effective in treating lumbar herniated disc. BESS is associated with shorter hospital stays. Shorter operative duration time for BESS most likely achieved by surgeon with high learning curve.

Keywords: Biportal Endoscopic Spinal Surgery, Lumbar Herniated Disc, Microscopic decompression, Surgical Outcome

(979) POSTERIOR SPINOPELVIC FUSION FOR SEVERE NEUROMUSCULAR SCOLIOSIS IN A PATIENT WITH CEREBRAL PALSY

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Cerebral palsy(CP) in children has significant risk of developing neuromuscular scoliosis(NMS) which brings significant morbidity and mortality. Surgical management of NMS is complex and requires a long posterior spinal fusion extending to pelvic to address the pelvic obliquity and trunk decompensation.

A 16-year-old girl with spastic diplegic cerebral palsy secondary to neonatal encephalopathy(GMFCS level IV) presented with progressive back deformity and secondary clubfoot since 10-year-old. She complains of back pain, hunch back, tilted pelvis and severe shoulder imbalance. The patient's ambulatory status progressively deteriorates rendering her wheelchair bound. Physical examination reveals a long flexible thoracolumbar kyphoscoliosis, right thoracic hump and significant pelvic obliquity. Upon sitting and standing, her body tilt to the right side with left shoulder elevated. Plain radiograph confirmed a thoracolumbar Cobbs angle (T6 to L1) of 128° and kyphosis of 51°. She has significant coronal imbalance with a global coronal malalignment(GCM) of 16cm and significant pelvic obliquity. Her skeletal maturity from radiograph reveals Risser 2 and closed triradiate cartilage. Computed tomography and magnetic resonance imaging of her whole spine reveals no abnormality. Multidisciplinary support from paediatric orthopaedic team, neuromedical team and neurorehabilitation team was obtained prior to operation. She underwent scoliosis correction and posterior spinopelvic fusion under general anesthesia. Pedicle screws and iliac screws were placed from T3 to the pelvis utilizing S2 ala-iliac screws. A bivalved custom thoracolumbar brace was applied postoperatively. Postoperative radiograph demonstrated improved thoracolumbar curve of 27° with an improved GCM of 4cm. Coronal balance of the patient has significantly improved allowing the patient to sit upright and stand straight with support.
NMS in children with CP is a challenging problem due
to the severity of spinal deformity and general medical condition requiring multidisciplinary approach. Due to significant trunk decompensation and pelvic obliquity in NMS, extension of spinal fixation to the sacral or pelvis needs to be considered. Ultimately, NMS is complex and will require an individualized surgical planning to achieve good functional outcome.

(1061) HALO GRAVITY TRACTION AS A PREOPERATIVE MANAGEMENT STRATEGY FOR SEVERE SCOLIOSIS

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Background: Severe scoliotic curvatures exceeding 100 degrees lack standardized surgical treatment options. Halo-gravity traction offers a potential approach for managing these complex deformities. This study aimed to evaluate the efficacy and safety of preoperative halo-gravity traction in patients with scoliosis of 100 degrees or greater, assessing radiographic outcomes and clinical complications.

Methods: This retrospective study analyzed six female patients with severe scoliosis (≥100 degrees) who underwent Ponte osteotomy and posterior spinal instrumented fusion with preoperative halo-gravity traction. The patients' median age was 14 years (range 11-15). Diagnoses included idiopathic (n=3), congenital (n=2), and neuromuscular (n=1) scoliosis. Lenke types were predominantly 2 and 4 (n=2 each), with one case each of type 1 and type 6. Four patients had a Risser sign of 4, one had a Risser sign of 2, and one had a Risser sign of 3. The average major curve measured 118.5 degrees (range 100-136 degrees). The average traction period was 23 days (range 17-34 days), with an average traction weight of 12.7 kg (range 5.25-17.5 kg), representing 29-55% (average 40%) of their body weight.

Results: Traction-related complications were encountered in 3 patients, namely posterior neck pain, diplopia, and pin site infection. They are limiting factors for further traction weight increment. Complications like diplopia and neck pain are reversed by simply reducing the traction weight, while pin site infection managed with increasing dressing frequency without debridement needed. Preoperative traction demonstrated average 7% correction of the major Cobb angle, 17 mm correction of apical vertebral translation, and 31 mm increase of T1-S1 length.

Conclusion: Corrective fusion surgery combined with preoperative halo-gravity traction is a safe and effective treatment strategy for patients with scoliosis of at least 100 degrees. This approach improves coronal plane deformity and trunk height without significant complications.

(1064) COMPARISON OF A MINIMALLY INVASIVE STEERABLE DISC RADIOFREQUENCY(RF) DECOMPRESSION DEVICE(YESDISC) FOR PROLAPSED LUMBAR DISCS VERSUS CENTRAL DISC NUCLEOPLASTY RF COBLATION

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Background: Back pain due to prolapsed intervertebral discs(PID) is common. When medical treatment is ineffective, radiofrequency(RF) disc ablation techniques can be used. Previous RF Co-blation(RFA) procedures only decompress the disc centrally.

Objectives: We present our experience with a newer Minimally Invasive Steerable Disc Decompression Device(Yesdisc) for herniated discs(Central/ Paramedian). This can be navigated to the disc herniation site, achieving a targeted decompression relieving both back pain/sciatica. We compare this with older Disc RF techniques(Arthrocare Wand).

Methodology: The study was a Single Spine Surgeon Prospective Study. Eighty seven(87) patients were involved. From November 2015 to September 2017, the author performed only central nucleoplasty decompression procedures. From October 2017 to 2022, the author performed steerable L-Disq RF procedures. From 2022 to date, the author uses the newer Yesdisc steerable RF Coblation catheter. This new catheter allows for better steerability and accuracy. The procedures were performed in the day surgery operating theatre with fluoroscopic c-arm guidance.

Results: There were a total of 87 patients. Thirty three(33) patient underwent the Yesdisc procedure, thirty four(34) patients underwent the L-Disq procedure, compared to twenty(20) patients who underwent the central disc nucleoplasty. For the Yesdisc group, a total of 40 levels were treated, as some patient had multiple PID levels. The best improvement in VAS was seen in the Yesdisc group(85% had statistically significant improvement at 3 months follow-up). For the L-disq group, results were also good at 75%. Only 1 patient in the Yesdisc group needed lumbar microdiscectomy surgery, compared to 4 patients in the L-disq group. In all 3 groups, there were no complications such as discitis/neural damage.
For the Central Disc Nucleoplasty group, there were 20 patients. 14 patients(70%) had significant improvement in pain. The average VAS at 3 months decreased from 7.5 to 1.5. One patient required lumbar microdiscectomy. There was 1 case of transient leg numbness, which improved.

Conclusion: The Yesdisc Coblation RF procedure had the best results for treating small to medium sized lumbar disc herniations(85% success rate, at 3 months). This is better than the 2 other groups. It is an effective MIS treatment for PID with a low complication rate.

(1068) DUAL DIAGNOSIS DILEMMA: SPINAL MULTIPLE MYELOMA MASQUERADING WITH EXTRAPULMONARY TUBERCULOSIS

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Background: Multiple myeloma, the second most common hematological malignancy, is marked by abnormal plasma cell proliferation in the bone marrow. The resulting immunocompromised state significantly increases susceptibility to infections, particularly tuberculosis (TB). Impaired cell-mediated immunity makes patients especially prone to extrapulmonary TB, which often presents significant diagnostic challenges. This case report highlights the complexities of diagnosing coexisting spinal multiple myeloma and extrapulmonary TB, emphasizing the need for a multidisciplinary approach for accurate diagnosis and optimal treatment.

Case Report: A 56-year-old man presented with thoracic myelopathy symptoms over two months, alongside a left clavicular swelling. He had a history of TB exposure 20 years prior. On examination, there was noticeable swelling over the left sternoclavicular joint. Neurological evaluation revealed sensory deficits from T2 to S1, while motor function remained preserved. MRI of the spine revealed a large vertebral mass with paravertebral extension at T2, along with spinal canal narrowing and cord edema. A biopsy of the left sternoclavicular joint confirmed Mycobacterium tuberculosis (MTB) with a positive PCR result. Based on these findings, the patient was initially diagnosed with spinal tuberculosis and started on anti-TB therapy consists of Ethambutol/ Isoniazid/Rifampicin/Pyrazinamide (EHRZ). Subsequently, posterior instrumentation and fusion of C6 to T5 were performed, along with circumferential decompression at T2. Intraoperative samples sent for histopathological examination was consistent with plasma cell myeloma. The patient was later initiated on a chemotherapy regimen consists of Bortezomib/thalidomide/dexamethasone (VTD) while continuing anti-TB therapy.

Conclusion: Diagnosing extrapulmonary tuberculosis in patients with spinal lesions requires a high degree of clinical suspicion, especially in regions where tuberculosis is prevalent. Histopathological evaluation is crucial for confirming the diagnosis and ensuring appropriate treatment. In patients with myeloma, the immunocompromised state significantly increases the risk of both pulmonary and extrapulmonary tuberculosis, emphasizing the need for precise diagnosis and timely initiation of anti-tuberculosis therapy alongside chemotherapy.

(1160) "IDIOPATHIC" ATLANTOAXIAL DISLOCATION IN ADULT A CASE REPORT

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Background: Os odontoideum (OO) is a rare congenital anomaly of the axis vertebra defined by a rounded ossicle at the apex of odontoid process. The instability mechanism resembles a Type II odontoid fracture. While the aetiology of OO remains debated, proposed origins include congenital failed fusion of ossification centers or a chronic non-union fracture of the odontoid process. It is usually associated with congenital syndromes and commonly seen in males in the second and third decades. We are reporting a rare case of OO in a late middle age lady which was successfully treated with occiput-cervical-fusion surgery.

Report: A 56 year-old lady presented with gradual onset of neck pain for 2 months, associated with upper limb clumsiness, unsteady gait, numbness and weakness. Otherwise, no urinary or bowel incontinence, as well as constitutional symptoms. Further history revealed no preceding trauma, craniocervical infection, or chronic inflammation. Neurological examination was intact but myelopathy signs were positive bilaterally. Blood investigations were all normal. Cervical radiograph revealed C1/2 dislocation with CT and MRI cervical showed displaced C2 dens fracture, possible non-union with spinal canal stenosis and compressive myelomalacia. Skull tong traction was applied for 2 weeks however, no significant reduction achieved. Subsequently, she underwent posterior spinal instrumentation and fusion C0-C4. Patient showed significant improvement with Modified JOA score 12/18 from 9/18 pre-operative.

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Conclusion: OO is a relatively rare condition. Patients with OO can be asymptomatic and may present with acute clinical manifestation after a minor trauma without any precursors, or progressive neurological deficits that worsen over time. This patient denied any inciting trauma prior to the onset of myelopathy. We hypothesize that a minor, clinically insignificant craniocervical hyperflexion event may have precipitated the atlantoaxial dislocation. Evidence-based studies recommend surgical management in symptomatic patients and various surgical techniques were reported, occipitocervical fusion is less favorable as it reduces the range of motion. However, this method is indicated in irreducible and severe cervicomedullary compression as shown in our case. Hence, case-by-case approach can be considered depending on factors such as symptoms, age, activity level, medical condition and radiographic findings.

(1170) GROWING RODS: EXPERIENCE IN PENANG GENERAL HOSPITAL

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Background: Early onset scoliosis (EOS) is described as idiopathic scoliosis for children under 10 years old. EOS are challenging to manage as the spinal curve progresses rapidly which develops to severe scoliosis and increases the mortality and morbidity due to constraints at the thoracic cavity. Growing rod is a procedure done for EOS, which is a distraction based technique by using 2 types of rod; Traditional growing rod (TGR) and Magnetically Controlled growing rod (MCGR). Indication for the surgery is to allow for the growth of the thoracic contents, especially the lungs. Hence, large curves and very young age are considered due to rapid growth potential and curve magnitude.

Objective: Evaluate the effectiveness and challenges of using Traditional Growing Rod (TGR) and Magnetically Controlled Growing Rod (MCGR) in the treatment of Early Onset Scoliosis (EOS), with a focus on their impact on spinal curvature progression, patient outcomes, cost-effectiveness, and the frequency of surgical interventions required for each type of rod.

Methodology: Patients with EOS treated with a growing rod were retrospectively reviewed. Included patients were aged 8-10 years at the time of instrumentation and were followed up for a 1 year.

Report: Four patients were selected for growing rod surgery in our center since 2022, ages ranging 8-10 with a mean spinal curve of 85 degrees. Types of growing rod were chosen according to affordability of the patients. Both the growing rods were distracted 3 to 6 monthly. TGR needed re-operation for every distraction and much more cost effective. However we had some challenges and delays in distraction with TGR attributable to patient factor and operating setup. MCGR distraction was done bedside in our clinic setting by using an external remote controlled device. There was 1 patient with broken MCGR which needed a revision surgery to TGR and another patient with surgical site infection which resolved after debridement and antibiotics. Nevertheless both type of rods still needs a planned surgery for final fusion once the patient reached full growth potential.

Conclusions: Growing rod surgery is an effective treatment for early-onset scoliosis, allowing for spinal growth while managing curvature progression. Both TGR and MCGR have their advantages, with TGR being more cost-effective but requiring multiple surgeries and limited lengthening, while MCGR offers a less invasive approach with a high cost. Despite this, both techniques still require planned surgeries for fusion.

(1202) DIAGNOSTIC APPROACHES, EPIDEMIOLOGICAL INSIGHTS, AND CLINICAL CHARACTERISTICS OF SPINAL TUBERCULOSIS IN SABAH, MALAYSIA.

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Background: Spinal tuberculosis (STB), caused by Mycobacterium tuberculosis (MTB), occurs when MTB spreads, usually from the lungs to the spine, leading to deformity and neurological complications. In Malaysia, Sabah reports the highest tuberculosis cases. However, STB prevalence remains underexplored.

Objective: This study aims to investigate STB diagnostic approaches, socio-demographics, and clinical characteristics to enhance early detection strategies and identify key determinants in Sabah.

Methodology: This cross-sectional study, conducted from February 2023 to June 2024 at Queen Elizabeth Hospital, Kota Kinabalu, analyzed 63 suspected STB patients. Spinal biopsy samples were tested for MTB using traditional acid-fast bacillus (AFB) staining and the molecular GeneXpert method. Hematological data, including erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) were collected. The sensitivity and specificity of the diagnostic methods were calculated. Both the diagnostic methods and patient data, including epidemiological and clinical profiles, were analyzed using Pearson's Chi-square test, with a p-value of <0.05 considered statistically significant.

Results: Out of 63 patients, 21 were diagnosed with STB. The sensitivity and specificity of the diagnostic methods were as follows: AFB staining, 23.5% and 100% (p=0.003); GeneXpert, 100% and 100% (p<0.001); ESR, 100% and 9.5% (p=0.188); and CRP, 100% and 7.1% (p=0.289). Most of STB patients were male (52.4%), aged under 65 years (85.7%), Bumiputera (85.7%), Malaysian (95.2%), from rural areas (90.5%), and engaged in non-professional jobs (85.7%). The primary lesion sites in STB were the lumbar spine (47.6%) and thoracic spine (42.8%). Most cases involved multiple vertebral segments (61.9%) and para-vertebral abscesses (57.1%). Clinical and systemic symptoms in STB cases showed significant differences compared to non-STB cases, including para-vertebral shadow (38.1% vs. 7.76%, p<0.001), cold abscess (38.1% vs. 2.38%, p<0.001), and loss of anterior vertebra (33.3% vs. 7.14%, p=0.007). Non-significant symptoms included back pain (61.9% vs. 52.38%, p=0.473), neurological deficits (47.6% vs. 35.71%, p=0.363), spinal tenderness (42.8% vs. 30.95%, p=0.873), and joint space narrowing (38.1% vs. 23.81%, p=0.237).

Conclusion: GeneXpert provides the highest diagnostic accuracy for spinal tuberculosis, with significant clinical and systemic differences between STB and non-STB cases, crucial for diagnosis accuracy.

(1225) ONE YEAR FOLLOW UP OF FIRST REPORTED CERVICAL MULTIPLE HEREDITARY EXOSTOSIS IN EAST JAVA, INDONESIA : A CASE REPORT

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Background: Multiple Hereditary Exostosis (MHE), also known as hereditary multiple osteochondromas, is a rare autosomal dominant genetic disorder characterized by the development of multiple osteochondromas. It is caused by mutation of exostosin-1 (EXT1) and exostosin-2 (EXT2) gene. This case report aims to highlight the follow up of first documented Cervical involvement of MHE in East Java, Indonesia, emphasizing on its clinical presentation, diagnostic challenges, management strategies and prognosis.

Case Presentation: A 20-year-old male presented with multiple palpable bony masses on both his upper and lower limbs with family history of MHE. Paralysis that gradually worsening on four of his extremities was also reported by the patient. CT Scan examination reveals hyperdense lesion arising ventral side of C4 lamina. The patient underwent posterior C4 laminectomy. Post-operative recovery was remarkable with increasing motoric power by 2 points immediately post op, able to independently walk at three months post op, able to run at six and twelve months post op.

Discussion: Even though the majority of osteochondroma arises in the metaphyseal region of long bone, it can also affect axial skeleton including the cervical vertebrae. About 29.5% of all osteochondroma of the spine would cause radiculopathy, and 27% would cause myelopathy. The cervical spine osteochondroma is usually treated by en bloc resection through posterior approach. Good outcome commonly reported after the surgery performed.

Conclusion: This case underscores the importance of the need for increased awareness of spinal involvement of patients with MHE. Early recognition and intervention could prevent complications such as neurologic deficit and functional impairments. It also highlights and reports such cases in regions where genetic disorders are under-documented. Further studies are required to understand the genetic variations and long-term outcomes of MHE in diverse populations.

Keywords: Cervical Multiple Hereditary Exostosis, One Year follow Up, Case Report, East Java, Indonesia

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(1226) AGE AND GENDER RELATED VARIATION IN GLOBAL SPINAL ALIGNMENT (GS ALIGN), BODY COMPOSITION, AND THE RELATED PHYSICAL PERFORMANCE IN A HEALTHY POPULATION

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Background: Disorder of GS-Align are critical issues in aged populations. However, the normal variants by age have not been defined.

Objective: To investigate GS-Align difference and associations with Bone Mineral Density (BMD), Skeletal Muscle Mass Index (SMI), back muscle strength (BMS), and trunk sway (Tr-S). PATIENTS SAMPLES: A total of 357volunteers (143 Female, 214 Male).

OUTCOME MEASURES: GS-Align parameters; BMD and SMI; BMS defined as a maximum extension force at T5; Tr-S defined as a trajectory length of a gravity center for 60 seconds.

Methodology: Global spinal parameters on total spine radiograms, BMD and SMI using Dual Energy X-ray Absorptiometry, BMS measured by a dynamotor, and Tr-S measured by a balance device were analyzed. The Spearman correlation coefficient was used to examine correlations among various parameters. And relationship between age was evaluated with multiple regression analysis.

Results: In GS-Align, pelvic tilt (PT) and cervical lordosis (CL) increased with age. Regarding sex differences, C7 sagittal vertical axis (SVA) decreased in female, and thoracic kyphosis (TK) increased in male. In physical status, BMD, BMS and Tr-S decreased with age. Results of multiple regression analysis between age and each parameters showed that the standardized partial regression coefficients for the SVA (0.58), BMD (-0.53), BMS (-0.35), and Tr-S (0.38) in female, BMD (-0.43), FRT (-0.27), CL (0.22) in male.

Conclusion: In Elderly, PT malaligned in a retroversion, and was compensated by an increase of SVA and CL in Female, an increase in thoracic kyphosis and CL in Male.

Results of multiple regression analysis also demonstrated that the SVA, BMD, BMS, and Tr-S, are related to age in female, and BMD, CL in male.

(1241) SCIWORA: SURGICAL INDICATIONS AND PROGNOSIS A SYSTEMATIC REVIEW

Clint Guitarte

Background: Spinal Cord Injury Without Radiographic Abnormality (SCIWORA) refers to post-traumatic spinal cord injury (SCI) with neurological deficits in the absence of fractures or malalignment on plain radiographs and computed tomography (CT). Advances in magnetic resonance imaging (MRI) have improved the clinical evaluation of SCIWORA; however, the optimal treatment approach remains controversial, with ongoing debate between surgical and conservative management. This study systematically reviews the literature on surgical management of adult SCIWORA, evaluating surgical indications, imaging findings, and clinical outcomes.

Methods: A systematic review was conducted following PRISMA guidelines, utilizing PubMed and OvidSP to identify studies on adult SCIWORA cases managed surgically. Inclusion criteria: (1) traumatic SCI with neurological deficit, (2) absence of spinal fractures or dislocations, and (3) adult patients. Data on surgical indications, clinical and radiologic findings, and outcomes were extracted.

Results: A total of 20 studies (1999–2023) encompassing 806 patients (enrolment period: 1989–2021, mean age: 54.45 years, range: 20–93) were included. MRI findings were classified as extraneural or intraneural. Extraneural abnormalities (e.g., ligamentous injuries, intervertebral disc herniations) were the primary indication for surgery in 17 of 20 studies, typically managed via anterior cervical decompression and fusion (ACDF). Intraneural abnormalities (e.g., intramedullary hemorrhage, cord edema) were addressed with laminoplasty in three studies, while one study recommended durotomy with duroplasty to relieve intraspinal pressure.

Prognosis & Implications: MRI findings are critical predictors of neurological recovery, with occupancy ratio, increased signal intensity (ISI) classification, and spinal cord damage extent significantly influencing outcomes. MRI remains the gold standard for SCIWORA evaluation, providing essential diagnostic, prognostic, and surgical decision-making insights. Adoption of MRI-based classification systems may improve comparability and standardization in future research.

Conclusion: Surgical intervention in adult SCIWORA is primarily indicated for extraneural spinal cord compression and, in select cases, for intraneural abnormalities. MRI plays a pivotal role in diagnosis, prognosis, and surgical planning, guiding early intervention strategies for optimizing neurological recovery. Further studies utilizing standardized MRI-based classification systems are warranted to refine treatment algorithms.

Keywords: Spinal Cord Injury, SCIWORA, Adult, Cervical Spine

(1245) SPINAL GIANT CELL TUMOR – A RARE CASE REPORT

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Background: Giant cell tumor (GCT) of the spine is a rare, locally aggressive benign tumor that can present with symptoms mimicking infectious or inflammatory conditions. This case highlights a diagnostic challenge where patient was initially treated for Tuberculous spine before histopathological examination confirmed a giant cell tumor.

Report: A 39-year-old man presented with bilateral lower limb numbness that progressively worsened over time. He also experienced right loin pain. Initial ultrasound of the abdomen revealed a retroperitoneal mass or collection, and contrast-enhanced computed tomography (CECT) of the thorax, abdomen, and pelvis (TAP) suggested Tuberculosis (TB) of the spine with vertebral compression and a paravertebral collection.

Subsequent magnetic resonance imaging (MRI) supported the diagnosis of tuberculous spondylodiscitis with paravertebral collections extending anteriorly into the abdomen and posteriorly into the spinal canal. Empirical anti-TB treatment was initiated.

Due to progressive neurological deterioration, the patient underwent Posterior Spinal Instrumentation and Fusion (PSIF) from T9 to L3, along with transpedicular debridement from T11 to L1 and kyphosis correction. Postoperatively, the patient continued anti-TB medication.

Histopathological examination (HPE) of the T12 vertebrae bone revealed as Giant Cell Tumour. Patient was started on Denosumab therapy, administered every three months.

Two years after the initial operation, embolization of the Giant Cell Tumour was performed. Follow-up MRI showed stable tumour size and morphology, indicating effective disease control.

Conclusions: This case underscores the importance of histopathological confirmation in cases of suspected spinal tuberculosis, as misdiagnosis can lead to unnecessary prolonged treatment. Giant cell tumor of the spine, though rare, should be considered in the differential diagnosis of vertebral lesions. Denosumab and embolization play key roles in the non-surgical management of spinal GCT, contributing to tumor stability and improved patient outcomes.

(1249) DIFFERENCE OF GLOBAL SPINAL ALIGNMENT, BMD, SMI, AND PHYSICAL PERFORMANCE BETWEEN NON ELDERLY AND ELDERLY FEMALES.

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Background: Change of GS-Align is important in females with aging.

Objective: To investigate GS-Align difference and associations with BMD, SMI, back muscle strength (BMS), and trunk sway (Tr-S) between non-elderly and elderly females. PATIENTS SAMPLES: A total of 126 female volunteers. OUTCOME MEASURES: GS-Align parameters; BMD and SMI using Dual Energy X-ray Absorptiometry; BMS defined as a maximum extension force at T5; Tr-S defined as a trajectory length of a gravity center for 60 seconds.

Methodology: Between Non-Elderly (N=82, mean; 42yrs, range; 18-64) and Elderly (N=44, Mean; 72yrs, range; 65~85), global spinal parameters on total spine radiograms, BMD and SMI using Dual Energy X-ray Absorptiometry, BMS measured by a dynamotor, and Tr-S measured by a balance device were analyzed.

Results: The mean value of cervical lordosis (mean±S.D. ; 4.3±11.4 vs. 10.3±3.5°*). pelvic tilt (13.0±0.8 vs. 17.0±8.0°**), PI-LL mismatch (-3.5±11.0 vs. 3.2±13.0°**), and SVA (-13.0±22.0 vs. 13.0±27.0mm**) were significantly smaller in Non-Elderly than Elderly. The mean value of BMD (0.596±0.108 vs. 0.725±0.013g / cm^2 **), BMS (276±96.0 vs. 201±81.5N**), and Tr-S (362±106 vs. 430±113mm **) were significantly lower, weaker, and longer in Elderly than Non-Elderly despite of no difference in SMI (6.25±0.12 vs. 6.27±0.68kg/m^2). (* P< 0.05 and ** <0.01).

Conclusion: In Elderly, the lumbo-pelvic portion malaligned in a retroversion, and was compensated by an increase of CL. SVA forwardly shifted in association with a decrease of BMD and BEMS, and increased Tr-S.

(1268) COMPARATIVE STUDY OF TWO RECONSTRUCTION PROCEDURES FOR OSTEOPOROTIC THORACOLUMBAR VERTEBRAL FRACTURE WITH NEUROLOGIC DEFICITS: POSTERIOR SINGLE APPROACH VERSUS ANTERIOR AND POSTERIOR APPROACH.

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Background: Osteoporotic vertebral fractures sometimes cause delayed neurological symptoms due to progressive vertebral compression. Surgical techniques for osteoporotic vertebral fractures are still controversial, but in cases of vertebral endplate damage, severe vertebral body collapse or severe local kyphosis deformity, anterior column reconstruction is required.

Objective: The aim of this study is to compare surgical invasion, clinical and radiological outcomes 2 years after surgery between two reconstruction procedures for osteoporotic thoracolumbar vertebral fracture with neurologic deficits; posterior single approach with posterior vertebral column resection, and anterior/posterior combined surgery.

Methodology: The study design was a retrospective cohort study. The subjects were 38 patients (74.7 ± 7.2 years, 6 males and 32 females) who underwent anterior column reconstruction for osteoporotic vertebrae in the thoracolumbar transition (Th10-L3) with neurological symptoms at four associated hospitals in Akita Prefecture from January 2011 to October 2022 and followed up over two years. Medical record data were used for a retrospective study. 22 patients underwent anterior and posterior combined surgery (group X) and 16 patients underwent posterior alone (group P). Patients with high-energy trauma, pathological fractures, vertebroplasty or previous thoracolumbar spine surgery were excluded. Re-operation rate within two years after surgery, surgical complications, clinical outcomes (operative time, blood loss, Frankel classification, activities of daily living [ADL]), and sagittal alignment were investigated.

Results: The re-operation rate within two years after surgery was 9.1% (2 cases) in group X and 12.5% (2 cases) in group P. Intraoperative blood loss was significantly lower in group X (297.5 ± 244.4 ml) than in group P (408.4 ± 235.5 ml). There were no significant differences in operative time, local kyphosis angle, angle of corrected loss, ADL and Frankel classification at preoperative, postoperative and 2 years postoperative.

Conclusion:
Anterior/posterior combined surgery might be less invasive than posterior single approach with posterior vertebral column resection, but there was no difference in post-operative results between the two procedures. It was considered useful to understand the characteristics of each technique and to use both techniques in different cases.

(1273) POSTERIOR SPINAL INSTRUMENTATION WITH CEMENTED SCREWS AND DECOMPRESSION USING A HYBRID OPEN AND MINIMALLY INVASIVE SURGERY (MIS) APPROACH FOR SPINAL METASTASIS

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Background: Spinal metastases are the most common tumors of the spine which presents with instability pain, weakness and neurological deficit as a consequence to spinal canal invasion and cord compression. This case report outlines a hybrid surgical strategy that integrates open and minimally invasive surgery (MIS) methods, utilizing cemented screws for posterior spinal instrumentation and fusion (PSIF) along with decompression in a patient diagnosed with metastatic spine disease.

Report: A 58-year-old female with underlying breast cancer presented with severe back pain and progressive lower limb weakness for 1 year. Radiographic evaluation shows metastatic lesions in T6 and L1 causing spinal cord compression and instability. Patient's neurological examination demonstrated weakness in both lower extremities (Grade 2/5) with sensory deficits.

A combined open and minimally invasive procedure was outlined, involving simultaneous open posterior instrumentation T4 to T7 and MIS posterior instrumentation T9 to L1. T6 level open decompression was done as the lesion was compressing the cord. Mini open decompression of L1 with MIS posterior instrumentation L2 to L3 cemented screws was performed in view of osteopenia at the level.

After a year, the patient is satisfied with the outcome of the surgery as the neurological function improved significantly, with muscle strength of grade 4/5 in both lower extremities and able to ambulate with a walking stick without instability pain. Surgical sites have healed well without any complication.

Conclusions: The hybrid surgical approach combining open and minimally invasive techniques effectively addressed spinal cord compression and instability in this patient with metastatic breast cancer. Significant neurological improvement, pain relief, and functional recovery were achieved, demonstrating the success of this tailored strategy in managing complex spinal metastasis.

(1292) VERTEBRAL BODY TETHERING OUR FIRST EXPERIENCE IN SABAH

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Adolescent idiopathic scoliosis (AIS) is a three-dimensional spinal deformity with lateral curvature, vertebral rotation, and reduced thoracic kyphosis. Surgery is recommended for spinal curves more than 45° due to risk of progression even in skeletally mature patient. Posterior spinal fusion with pedicle screws is usually done for AIS and drawback is limited mobility of the spine post fusion. In patient that is skeletally immature, option of like vertebral body tethering (VBT) allow spinal growth modulation using the Hueter-Volkmann principle without fusion of the spine. VBT can be used in children with some growth potential (Sanders 2–5).

This case report is our first experience done in Sabah. Miss N is 13 years old girl who had adolescent idiopathic scoliosis. Her parent noted her back to be uneven when patient around 11 years old. Otherwise, patient was asymptomatic. Patient attained menarche at the age of 12 years old. Clinically both shoulder is equal level and her neurological examination is normal. Cobb's angle at mid thoracic T6 to T11 is 48 degrees. Pelvic x ray show Risser 2 while the left-hand x ray show Sander 5. Surgical option was discussed and patient and parent agree for main thoracic vertebral body tethering. Vertebral body tethering from T5 to T11 was done. On day 1 post op, chest tube was removed and patient able to ambulate without aids. Cobbs angle post op is 18 degrees. Patient was discharged home well.

Vertebral body tethering is a relatively novel technique having advantages of correcting spinal scoliosis without spine fusion. However, complication can occur with VBT such as pulmonary complication, tether breakage, overcorrection needing reoperation. Further follow up is needed to monitor the patient progress. Overall, Miss N shows good progress post op and no complications noted till date.

E POSTER

(1341) PEDICLE SCREW INSERTION FOR CONCAVE SIDE OF PROXIMAL THORACIC CURVE IN ADOLESCENT IDIOPATHIC SCOLIOSIS

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Background: Insertion of the pedicle screws (PS) into the proximal thoracic spine is occasionally challenging owing to the small size of the pedicles and the proximity to the spinal cord. An appropriate anchor placement method for the concave side of the proximal thoracic curve has not been established yet.

Objective: This study aimed to evaluate the pedicle size and position of PS on the concave side of the proximal thoracic curve in patients with adolescent idiopathic scoliosis (AIS).

Methods: Forty consecutive patients with AIS who underwent correction and fusion with all PS constructs, including the proximal thoracic curve in the fusion area, were included. After identifying the screws inserted on the concave side of the proximal thoracic curve, the preoperative morphology and postoperative position of the inserted PS, including the end vertebrae, were analyzed using computed tomography (CT). Screw perforations were categorized into four grades depending on the degree of perforation from the pedicle wall on postoperative CT and were classified using an outcome-based classification.

Results: A total of 109 screws were inserted on the concave side of the proximal thoracic curve. The average width of all pedicles was 3.5 ± 1.1 mm. The width of 90 pedicles (83%) was < 4.5 mm. Based on categorization by the degree of perforation, there were only 17 screws with Grade 0 (no perforation). Perforation was found in 92 pedicles (84%), including Grade 1 in 76 screws, Grade 2 in nine screws, and Grade 3 in seven screws. In the outcome-based classification, 101 screws (93%) were classified as Type I (acceptable) and eight screws as Type II (unacceptable). None of the screws were classified as Type III (grievous).

Conclusion: Perforations were found in 84% of the PS on the concave side of the proximal thoracic curve; however, 93% of the PS were considered acceptable in the outcome-based classification. Thus, we conclude that the in-out-in technique may be both feasible and effective.

(1373) EPIDURAL HEMATOMA: RARE BUT DEBILITATING POST OPERATIVE COMPLICATION

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Background: Post- operative spinal epidural spinal epidural hematoma (SHE) is rare but serious complication of spinal surgery, potentially leading to permanent neurological deficits due to cauda equina and nerve root compression. Early identification of high-risk patients is crucial. Diagnosis is based on clinical symptoms and MRI confirmation, and urgent evacuation is required to prevent irreversible damage

Report: A 73-year-old male with lumbar spinal stenosis and radiculopathy developed worsening right lower limb weakness and sensory loss within 24 houtrs following L4/L5 and L5/S1 medial laminectomy and neurolysis. Examination revealed weakness in right ankle dorsiflexion and plantar flexion (MRC grade 2) and loss of extensor hallucis longus function (grade 0), with sensory loss at L5 and S1 dermatomes.

Emergency evacuation of a 5x4cm epidural hematoma at L4/L5 and L5/S1 was performed. No nerve root injury, dural tear, or active bleeding was observed. A Radivac drain was inserted, remaining static at 150cc post-operatively and removed on day two. The patient showed significant motor improvement and ambulated with walking frame before discharge.

Conclusion: Symptomatic SHE is rare (0.10-0.69%) but can cause rapid neurological decline if left untreated. It originates from epidural venous plexus and is associated with multilevel surgery, coagulopathy, hypertension, prolonged surgery, and non-steroidal anti-inflammatory drugs (NSAID) use. Though often symptomatic ans self-limiting, hematoma accumulation can compress neural structures, necessitating early intervention.

Close monitoring in the first four hours post-operatively is essential as mot symptomatic cases present within 24-48 hours. Magnetic Resonance Imaging (MRI) is the key for early diagnosis, and timely surgical decompression significantly improves neurological recovery. Rapid evacuation is associated with better outcomes, highlighting the importance of vigilance and prompt management in high-risk patients.

(1390) CLINICAL, FUNCTIONAL AND RADIOLOGICAL OUTCOMES OF ONE STAGE POSTERIOR ONLY HEMIVERTEBRA RESECTION, DEFORMITY CORRECTION AND SHORT SEGMENT FUSION FOR CONGENITAL KYPHOSCOLIOSIS.

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Background: Congenital kyphoscoliosis due to fully segmented or semi-segmented hemivertebrae is a progressive deformity that requires surgical correction and fusion by resection of hemivertebrae to prevent progression to severe deformities and its ensuing complications. We analyzed the outcomes of hemivertebra resection and deformity correction through a single-stage posterior only approach for congenital kyphoscoliosis.

Methods: Fourteen patients (8 males, 6 females) with fully segmented or semi-segmented hemivertebrae with congenital kyphoscoliosis were treated with hemivertebra resection and instrumented deformity correction and short segment fusion through a single-stage, posterior approach. Operative time, intraoperative blood loss, magnitude of deformity correction, functional outcomes(SRS-22r scores) and postoperative complications were recorded.

Results: The mean follow-up was 27.3+/-2.6 months. The mean operative time and intraoperative blood loss were 271.8+/-63.3min, (range 190 – 410 min) and 393.8+/- 138.2 ml, (range 270 – 620 ml) respectively. The mean segmental scoliosis and kyphosis correction rates were 76.2% and 71.3% respectively. The was a significant improvement in the global sagittal and coronal alignment which was maintained till the last follow-up. The SRS-22r scores showed a significant improvement [pre-op (2.3+/-0.5) vs final follow-up (4.1+/-0.6)]. There was one case of superficial wound infection and one case of neurological deficit.

Conclusion: Hemivertebra resection, deformity correction and short segment fusion through one-stage posterior-only approach offers good functional and radiological outcomes with minimal complications at a mean follow-up of 27.3+-2.6 months. However, a longer follow-up will enable a better understanding of the long-term outcomes of this procedure.

(1404) NON SURGICAL MANAGEMENT APPROACH FOR AGGRESSIVE RECURRENT SPINAL GIANT CELL TUMOR: A CASE REPORT

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Background: Giant cell tumor (GCT) of bone, though benign, can be locally aggressive with a high recurrence rate. Spinal GCT is rare and often presents aggressively (Enneking Stage 3). While radical excision is the preferred treatment to prevent recurrence, it carries a significant risk to neurological function. Here, we present a case of recurrent thoracic spinal GCT post-surgical excision, managed with non-operative treatment protocol consisting of subcutaneous Denosumab and tumor embolization, demonstrating its potential efficacy in otherwise inoperable scenarios.

E POSTER

Case Report: A 37-year-old woman with a history of T4-T6 spinal GCT and right upper lobe lung infiltration underwent tumor resection and right upper lobectomy in 2016. 8 years post operation, she developed progressive bilateral lower limb myelopathy over a month, eventually losing the ability to walk. On examination, she had sensory loss below T3 and weakness in both lower limbs (L2-S1 myotomes). MRI showed a heterogeneous mass with vertebral destruction from T3-T8 and intraspinal extension, consistent with Campanacci Grade 3 Spinal GCT, causing spinal cord compression. Due to the extent of the tumor and high surgical risks which impose permanent neurological deficit, she was started on weekly subcutaneous Denosumab for one month (total four doses), followed by tumor angioembolization. She then transitioned to monthly maintenance denosumab with scheduled three-month reassessments. Within the first month of maintenance therapy, she showed significant neurological improvement, regaining sensory function and motor strength (MRC Grade 4, L2-S1 bilaterally). However, she later defaulted on treatment, leading to an acute neurological decline upon her return.

Conclusion: While surgical resection remains the standard treatment for spinal GCT, non-operative management can be an effective alternative in inoperable cases. Denosumab, a monoclonal antibody targeting the receptor activator of nuclear factor kappa-B ligand (RANKL), has shown positive clinical outcomes when combined with tumor angioembolization or radiotherapy. However, due to the aggressive nature of spinal GCT and its high recurrence rate, adherence to the treatment protocol is crucial for optimal outcomes.

(1409) POSTERIOR SUPERIOR ILIAC SPINE (PSIS) AS AN ALTERNATIVE PIN PLACEMENT FOR HALO PELVIC RING FIXATION

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Background: Halo- pelvic ring fixation (HPRF) is a well-established technique for correcting severe spinal deformities, such as high-grade kyphoscoliosis and spondylolisthesis. Commonly, iliac crest or anterior superior iliac spine (ASIS) pins are used for pelvic fixation, but posterior superior iliac spine (PSIS) pin placement offers an alternative with improved biomechanical stability and fewer soft tissue complications.

Case Report: A 14-year-old male with severe kyphoscoliosis presented with progressive spinal deformity and compromised pulmonary function. The surgical team opted for supracetabular anterior pins and PSIS to provide stable fixation. Under fluoroscopic guidance, 6.5mm Schanz screws were inserted bilaterally at thirty degree cranial and 15-degree medial angle to maximize bone purchase. The procedure was uneventful. However, post-operation computerized tomography scan (CT scan) showed right posterior pin penetrated into inner table about 4cm, however, no internal injuries noted and patient was stable. Pin placement was corrected and traction was continued. Patient underwent gradual spinal correction and no complications such as pin site infections, interference with hip motion were observed.

Conclusion: PSIS pin placement offers several advantages over traditional iliac crest pinning. The thick cortical bone in this region enhances fixation stability, reducing the risk of loosening. Additionally, avoiding anterior iliac crest placement minimize discomfort and soft tissue irritation, improving patient compliance. While PSIS pin placement is not yet widely adopted, it presents a valuable alternative for patients with previous pelvic surgeries or compromised iliac crest integrity. Further research is needed to standardize this technique and evaluate long- term outcomes

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(927) OUTCOME OF COABLATION NUCLEOPLASTY FOR TREATMENT DISCOGENIC CERVICAL PAIN IN 28 PATIENTS.

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Background: Patients with axial cervical pain @ discogenic pain is usually successfully treated with non-surgical means. However, in some patients, the pain persist and disturbs the daily activities of chronic neck pain sufferer. Cervical nucleoplasty (coablation) is traditionally indicated for cervical radicular pain and not axial pain. Nucleoplasty works by debulking the nucleolar material and changing the biochemical milleau of the disc space.

Methodology: Between January 2021 and April 2024, 28 patients with principally axial neck pain were treated with modified cervical coablation nucleoplasty techniques. They consisted of 12 females and 16 males with ages ranging from 26 y-o to 58 y-o with a minimum of 6 months of followup.

The procedure were performed under sedation and local anaesthesia in a clean/ sterile operating theatre condition with the patient supine. The standard method was modified to treat the posterior one third of the disc only. This was done to preserve the disc height and prevent disc degeneration.

Results: Retrospective review of these patients showed that 96 percent of patients experience marked reduction of the neck pain with 71 percent of the patient achieved a complete relief of pain. No infection or nerve injury and disc degenerations were detected. None of the patients required post operative physiotherapy.

Conclusion: In conclusion, a limited cervical nucleoplasty procedure is a safe and effective method to treat patient with discogenic neck pain in who conservative treatment failed.

(1113) A DESCRIPTIVE STUDY ON THE CLINICAL PROFILE, MANAGEMENT, AND OUTCOMES OF PEDIATRIC PATIENTS WITH POTT'S DISEASE AT THE PHILIPPINE GENERAL HOSPITAL

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Background: Pott's disease, or spinal tuberculosis, remains a significant cause of morbidity in developing countries, particularly among pediatric populations. Delayed diagnosis and treatment can lead to severe complications such as kyphotic deformities and neurological deficits. However, data on the clinical characteristics, diagnostic challenges, treatment modalities, and outcomes of pediatric Pott's disease remain scarce, particularly in the Philippine setting.

Objective: This study aims to describe the clinical profile, diagnostic approaches, treatment strategies, and outcomes of pediatric patients with Pott's disease at the Philippine General Hospital (PGH). It seeks to identify risk factors associated with neurological deterioration and the need for surgical intervention, as well as analyze imaging findings as predictors of disease progression and treatment response.

Methods: This is a retrospective descriptive study of pediatric patients (aged 0–18 years) diagnosed with Pott's disease at PGH. Data will be collected on demographics, clinical presentation, diagnostic modalities (radiologic, microbiologic, and histopathologic findings), treatment approaches (pharmacologic and surgical), and patient outcomes (neurological status, functional recovery, and complications). Descriptive statistics will be used to summarize patient characteristics, while logistic regression will assess potential predictors of neurological decline and surgical intervention.

Expected Outcomes: The study aims to provide a comprehensive understanding of pediatric Pott's disease, contributing to improved diagnostic and treatment strategies. Findings will support the development of evidence-based protocols to enhance early detection, optimize management, and reduce long-term complications in affected children.

Conclusion: This study will provide valuable insights into the management of pediatric Pott's disease, guiding early diagnosis and effective interventions to reduce morbidity and improve patient outcomes.

Keywords: Pott's disease, spinal tuberculosis, pediatric patients, clinical profile, treatment outcomes, neurological deterioration, Philippines

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E POSTER

(1378) IS DELTA FIXATION A SAFE AND EFFECTIVE OPTION IN ADULT HIGH GRADE DYSPLASTIC LUMBOSACRAL SPONDYLOLISTHESIS: OUTCOMES AT FIVE YEARS FOLLOW UP

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Background: The surgical management of high-grade (Meyerding grade III or more) dysplastic lumbosacral spondylolisthesis (HGDSL) with regional spinopelvic imbalance (SDSG Class 5) in adults is challenging due to the difficulty in achieving reduction of slip and restoring the global sagittal spinal alignment without causing neurological deficits. There is a paucity of studies which have reported the midterm outcomes of surgical treatment using delta constructs (transsacral transvertebral screw fixation) for adult HGDSL.

Methodology: We analyzed the clinical, functional, and radiological outcomes of 11 patients (2 males, 9 females) with L5-S1 HGDSL SDSG Class 5 treated with insitu fusion using L5-S1 transdiscal screw constructs.

Results: The mean age at presentation was 36.7+/-9.4(range, 21 to 55) years. All patients presented with instability type back pain with normal neurology with 60% presenting with concomitant radiculopathy. At a mean follow-up was 50.5+/-17.4 months(range, 38 to 96 months), the meanVAS score[pre-op: 8.4+/-1.2(7 to 9) vs post-op: 2.2+/-1.0(0 to 3) and ODI score [pre-op: 57.9+/-9.6 vs post-op: 14.9+/-3.8] showed significant improvement, p<0.05.CT scan showed evidence of fusion at a mean of 9.3+/- 4.1 months(range, 9 to 12 months), with no evidence of progression in slip percentage or slip angle at the final follow-up. There were no neurologic deficits, implant failure or pseudoarthrosis at final follow-up. There was one case of superficial wound infection which settled with antibiotics.

Conclusions: In-situ fusion with posterior lumbosacral transfixation using transdiscal screws (delta fixation) is a safe and effective technique, in the treatment of L5-S1 HGDSL as evidenced by the good clinical, functional and radiologic outcomes at mean follow-up of 50.5+/-17.4 months.

(1407) TRACHEO ESOPHAGEAL FISTULA A RARE COMPLICATION OF CERVICODORSAL SPINE SURGERY: CHALLENGES IN DIAGNOSIS AND MANAGEMENT

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Background: Esophageal injury(0.25%) and tracheal injury are rare complications following anterior cervical spine surgery. However, tracheoesophageal fistula(TEF) following cervical spine surgery has not been previously reported in literature. We present the challenges in the diagnosis and management of a case of TEF complicating a cervicodorsal spine surgery for tuberculous spondylodiscitis of the cervicothoracic junction and its resourceful management.

Report: A 23-year-old female with D2-D3 tuberculous spondylodiscitis with neurodeficit(ASIA C) was managed with C6 to D5 posterior instrumented stabilization followed by anterior debridement and reconstruction with clavicle autograft through a medial clavicle resecting approach. From the fourth postoperative day onwards, the patient developed recalcitrant cough following oral intake, dysphagia, and hoarseness of voice. A computed tomography(CT) of chest, oesophagoscopy, and bronchoscopy revealed a TEF situated 18cm distal to the pharyngeal opening. To prevent aspiration of feeds and pneumonitis the patient was managed with a feeding jejunostomy and kept on total parenteral nutrition. Feeds and antitubercular chemotherapy were given through the feeding jejunostomy for 5 months, which allowed for healing of the fistula. Feeding jejunostomy was removed by the end of the fifth month. Patient was gradually transitioned from Ryle's tube feeding to oral feeds. Patient was followed up at regular intervals while on antitubercular chemotherapy (for 14 months). After 8 months of antitubercular chemotherapy, a CT scan of the thorax, oesophagoscopy and bronchoscopy revealed complete healing of the fistula. After 14 months of chemotherapy, plain radiographs and CT scan of the cervicodorsal spine reveled complete healing of the lesion with complete neurological recovery.

Conclusions: We report the first case of a TEF following cervicodorsal spine surgery and its resourceful management. A high index of clinical suspicion of TEF is essential in any patient with cough and dysphagia after an anterior approach to the cervicodorsal junction. A meticulous work up is mandatory to diagnose this condition. An undiagnosed TEF can lead to fatal complications like pneumonia, mediastinitis and ARDS. A multidisciplinary team approach is essential to successfully manage this complication.