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Ankylosing Spondylitis and Anaesthetic Management – A Case Series

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Abstract
Background: Anesthetic challenges including difficult regional as well as general anesthesia and way to overcome these difficulties are important task in patients with ankylosing spondylitis (AS), which is an inflammatory disease affecting mainly axial skeleton & later involving spine. Regional anesthesia is preferred over general anesthesia to avoid complications of later. But if general anesthesia and tracheal intubation is essential, meticulous preparation is required. Inadequate preoperative preparation and optimization can lead to increase in mortality or morbidity in patients with ankylosing spondylitis.

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Introduction: Ankylosing spondylitis (AS) is an inflammatory disorder that primarily affects the axial skeleton, peripheral joints & extra articular structures. It begins in second & third decades with 3:1 male: female prevalence. Sacroiliac joints affect primarily, cephalad spread to involve cervical spine is a late manifestation.[1] Human Leucocyte Antigen B27 (HLA B27) association is independent of disease severity. Radiological findings may show bamboo appearance of spine that is formation of bony bridges or syndesmophytes between vertebrae, squaring of vertebrae & pseudo-widening of joint spaces. Challenges to anesthetists for Regional or general anesthesia are increased due to structural abnormalities in patients with Ankylosing spondylitis.[1]

Case Presentation
We reported total six patients with ankylosing spondylitis posted for various surgical procedures, challenges encountered due to variation in spinal anatomy & its management. We successfully managed these cases including three cases posted for Total Hip Replacement (THR), two for hernioplasty and one for spine implant removal & debridement. All patients posted for surgeries were male, three patients posted for THR & two for hernia presented with lower back pain which was aggravating in the morning hours. Patient posted for spine implant removal came with complaints of discharge from operative site.

Case 1
A 29-year male weighing 55 kg presented with pain in Right hip since two years and Left hip since six months, posted for left total hip replacement. He had a history of road traffic accident four years ago for which he took conservative management and symptoms were relieved.
His General, systemic examination and blood investigations were within normal range.
On Airway examination his mouth opening was adequate, Mallampati score III with zero degree flexion and extension at neck & positive Phantom pillow sign that is Hanging neck. His 70 degree endoscopy showed bilateral equal and mobile vocal cords. Decreased intervertebral spaces - not suggestive of classical bamboo spine (Figure 1), on x ray. On lumbar spine examination inter-spinous spaces were fused.
Although mouth opening was more than 3 cm, the airway was anticipated to be difficult due to restriction in extension of cervical spine.

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Figure 1: Lumbar spine x ray (not suggestive of Bamboo spine)

Patient was thoroughly counselled a day prior about both difficult regional anaesthesia and awake fibreoptic bronchoscopic guided intubation with proper consent.
The plan was to first attempt a spinal and/or epidural block and in case of difficulty or failure, the alternative was general anaesthesia.
Inside operation room patient was supported in sitting position for combined epidural and spinal technique.And under all aseptic precautions block was performed in L2 - L3 intervertebral space using midline approach. With a single attempt epidural space was identified but because of lack of feel of a proper epidural space due to calcified ligaments, there was accidental dural puncture & it was then converted to a successful spinal block. Throughout surgery patient was comfortable and stable hemodynamically and surgery went uneventful.

Case 2
A 20 year male weighing 42 kg, case of bilateral hip arthritis secondary to ankylosing spondylitis, posted for right total hip replacement. He had low backache increased in morning since three years. He was an operated case of left hip synovial biopsy and debridement two years back and left Total hip replacement in last year under regional anaesthesia.
His General, systemic examination and blood investigations were within normal range & he was HLAB27 positive.
His airway examination showed adequate mouth opening & grade III Mallampati score with restricted flexion and extension at neck. Interspinous spaces were fused on lumbar spine examination.
Patient was thoroughly counselled a day prior about both difficult regional anaesthesia and awake fibreoptic bronchoscopic guided intubation with proper consent.
Patient offered sitting position with support and under all aseptic precautions, epidural block was performed in L2 - L3 space and subarachnoid block in L3 - L4 space successfully (Figure 2).

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Figure 2: Combined spinal epidural block.

Throughout surgery patient was comfortable and stable hemodynamically and surgery went uneventful.

Case 3

A 33 year old male, 50 kg, diagnosed case of ankylosing spondylitis since 11 years, with complaints of low backache increased in morning since six years, with right hip arthritis posted for right total hip replacement. Past history of left total hip replacement three years back, where neck movements were normal and regional anaesthesia was successful.

His General, systemic examination and blood investigations were within normal range & he was HLAB27 positive.

On airway examination mouth opening was adequate, Mallampati score II with zero degree flexion and extension at neck with Phantom pillow sign that is Hanging neck positive. His 70 degree endoscopy showed bilateral equal and mobile vocal cords. His X-ray spine was suggestive of Bamboo spine.

On lumbar spine examination inter-spinous spaces were fused.

Patient was thoroughly counselled a day prior about both difficult regional anaesthesia and awake fibreoptic bronchoscopic guided intubation with proper consent. Due to cervical spine involvement as well as bamboo spine appearance of lumbo-sacral spine, we anticipated difficult subarachnoid block. Patient offered sitting position with support and under all aseptic precautions, Epidural & Spinal anaesthesia was attempted but as it was unsuccessful. We went ahead with awake fibre optic intubation (Figure 3), though it was difficult due to fixed neck, it was successful in first attempt. Patient was then extubated after adequate neuro-muscular recovery. Thus surgery was done in general anaesthesia uneventfully.

Figure 3: Fibreoptic intubation

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Case 4

A 54 year old male, 72 kg, diagnosed case of ankylosing spondylitis since 15 years, with right sided complete inguinal hernia posted for right hernioplasty. His General, systemic examination and blood investigations were within normal range.

On airway examination his mouth opening - adequate, Mallampati score III with zero degree flexion and extension at neck with Phantom pillow sign that is Hanging neck positive. His 70 degree endoscopy showed bilateral equal and mobile vocal cords. His X-ray spine was suggestive of Bamboo spine.

On lumbar spine examination interspinous spaces were fused.

Patient was thoroughly counselled a day prior about both difficult regional anaesthesia and awake fibreoptic bronchoscopic guided intubation with proper consent.

Spinal anaesthesia was attempted but as it was unsuccessful. We went ahead with awake fibreoptic intubation followed by general anaesthesia with routine non-invasive monitoring throughout the procedure. Ultrasound guided right sided illio-inguinal block (Figure 4) was given for post -operative analgesia. Patient was extubated after adequate neuromuscular recovery. Thus surgery was done in general anaesthesia uneventfully.

Figure 4: Right sided Illio-inguinal nerve block.

Case 5

A 36 year old male,52 kg, diagnosed case of ankylosing spondylitis since 10 years, with right inguinal hernia posted for right hernioplasty. His General, systemic examination and blood investigations were within normal range.

On Airway examination his mouth opening - adequate, Mallampati score II with zero degree flexion and extension at neck with Phantom pillow sign (Figure 5) that is Hanging neck positive. His 70 degree endoscopy showed bilateral equal and mobile vocal cords. His X-ray spine was suggestive of Bamboo spine.

On lumbar spine examination interspinous spaces were fused.

Patient was thoroughly counselled a day prior about both difficult regional anaesthesia and awake fibreoptic bronchoscopic guided intubation with proper consent.

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Figure 5: Phantom pillow sign

The plan was to attempt a subarachnoid block and in case of difficulty or failure, the alternative was general anaesthesia.
Patient offered sitting position with support and under all aseptic precautions, subarachnoid block was performed in L2-L3 space successfully in second attempt.
Throughout surgery patient was comfortable and stable hemodynamically and surgery went uneventful.

Case 6
A 57 year old male, 55 kg, a case of infected lumbar spine with implant in situ ,a known case of ankylosing spondylitis ,posted for implant removal with debridement, came with complaints of discharge from the operative site since eight days.He was an operated case for lumbar fracture with implant in situ (Figure 7) 30 years back & total hip replacement done nine years back.
His General, systemic examination and blood investigations were in normal range.
On Airway examination his mouth opening was adequate, Mallampati score II with zero degree flexion and extension at neck with Phantom pillow sign (Figure 6) that is Hanging neck positive. His 70 degree endoscopy showed bilateral equal and mobile vocal cords.
Patient was explained & counselled about the fibreoptic bronchoscopic guided intubation with proper consent..

Figure 6: Phantom pillow sign

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Figure 7: Lumbar implant in situ

Discussion

Axial skeleton, peripheral joints & extra articular structures are mainly involved in Ankylosing spondylitis (AS) which is an inflammatory disorder. Enthesis that is site of ligamentous attachment to bone, thought to be the primary pathological site for AS. Sacroilitis is usually one of the earliest manifestation with features of both enthesitis & sinuvitis. Cytokines like TNF alpha plays a central role in immune pathogenesis of AS. Neck pain & stiffness from cervical spine involvement are usually late complications. Disappearance of pain at the involved site indicates complete bony fusion. Sudden pain at these sites is mostly due to fracture at that site. Most serious complication of spinal disease is spinal fracture & cervical spine being the most common to be involved. No lab tests are of diagnostic value in AS but about 90 % patients shows association with HLA B 27 antigen which is independent of disease severity. Radiological findings may show Bamboo appearance of spine, squaring of vertebrae & pseudo-widening of joint spaces.[1,2]

Restrictive pulmonary diseases caused due to forward curvatures of thoracic spine resulting from chronic spondylitis and ankyloses and decreased lung capacity due to rib involvement leads to diaphragm dependent respiration in patients with AS.[3]

Anesthesiologists concerns in severe AS patients should focus on disease extension, difficult airway, Cardio - Pulmonary involvement, Difficult positioning of patient for regional as well as for general anesthesia. Difficult tracheal intubation can result from stiffness of the cervical spine, atlanto-occipital, temporo-mandibular, and cricoarytenoid joints.[4]

Regional anesthesia is always preferred over general anesthesia to avoid complications of later whenever possible. Though it was tough we performed spinal and or epidural anesthesia in these patients preferably, except one patient with spine implant in situ, fibreoptic guided intubation was planned & performed that is general anesthesia. We successfully performed fibreoptic bronchoscope guided intubation for general anesthesia when we failed in either combined spinal epidural block or spinal block alone due to spinal abnormalities associated with AS like ossification & syndesmophytosis.

We failed for epidural anesthesia in two patients, one of which was converted to spinal blockade successfully & other to fibreoptic guided intubation due to failure of combined spinal epidural block. USG guided central neuraxial blockade has more success rate comparative to traditional palpation technique in such patients reported in a study conducted by Chin et al..[5]

Hyperextension of cervical spine can lead to fracture and complications, unstable atlanto-occipital joints and spinal stenosis.[6,7] Sciubba DM et al. recommend that radiographic studies be conducted prior to intubation of any patient with AS, so that the presence of obstructive

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entities can be determined.[6] AS patients usually have no problem with face mask ventilation, but can have diiffcult laryngoscopy and intubation.

Conclusions

Difficulty in anesthetic procedures - Regional or general anesthesia in patients with Ankylosing spondylitis with chronic spine involvement poses challenges to anesthetists. We performed both regional and general anesthesia in our patients successfully and this success depends mostly on meticulous preoperative evaluation, proper plan & technique of anesthesia and availability of all emergency equipment and drugs.

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