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ANAESTHETIC CHALLENGES IN A CASE OF ANKYLOSING SPONDYLITIS: DIFFICULTY IN NEURAXIAL BLOCKADE AND AIRWAY MANAGEMENT

Anaesthesiology

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ABSTRACT

Background: Ankylosing spondylitis is a chronic inflammatory disorder primarily affecting the axial skeleton, leading to progressive spinal ossification and rigidity. The characteristic "bamboo spine" appearance reflects advanced disease. Anaesthetic management in such patients is challenging due to anticipated difficult airway, restricted cervical mobility, reduced chest expansion, and technical difficulty in performing neuraxial blockade.

KEYWORDS

Ankylosing spondylitis, bamboo spine, difficult airway, neuraxial blockade, spinal anaesthesia, restrictive lung disease, total hip replacement, perioperative anaesthetic management

INTRODUCTION

Ankylosing spondylitis (AS) is a chronic, progressive inflammatory disorder primarily involving the axial skeleton and sacroiliac joints. It leads to ossification of spinal ligaments, intervertebral discs, and facet joints, resulting in spinal rigidity and the classical radiological appearance known as the "bamboo spine." As the disease advances, patients develop marked restriction of cervical mobility, thoracolumbar stiffness, and kyphotic deformity.

From an anaesthetic perspective, AS presents significant challenges. Cervical spine fusion and limited atlanto-occipital extension make airway alignment difficult, increasing the risk of failed intubation and neurological injury during manipulation. In addition, ossified interspinous ligaments and distorted spinal anatomy complicate neuraxial blockade, often leading to technical difficulty or failure. Fusion of costovertebral joints may also cause restrictive lung disease, reducing chest wall expansion and pulmonary reserve.

Lower limb surgeries such as total hip replacement are commonly performed in advanced AS due to hip joint involvement. In such cases, regional anaesthesia is often preferred to avoid airway instrumentation; however, achieving successful neuraxial block can be technically demanding. Careful preoperative assessment, preparation for difficult airway management, and consideration of alternative neuraxial approaches are essential for safe perioperative management.

This case highlights the anaesthetic challenges encountered in a patient with severe ankylosing spondylitis undergoing total hip replacement and discusses strategies to overcome difficulties related to airway and neuraxial blockade.

Case Report

A 50-year-old male patient, weighing 65 kg and measuring 158 cm in height, with a known history of Ankylosing spondylitis for 20 years, was posted for elective left total hip replacement due to severe hip joint involvement and progressive functional limitation. He complained of gradually worsening stiffness of the entire spine and both hip joints, resulting in difficulty in sitting, standing, and walking comfortably. He was a known hypertensive for 5 years and was on regular treatment with Telmisartan 40 mg and Amlodipine 5 mg once daily, with adequate blood pressure control. There was no history of diabetes mellitus, ischemic heart disease, bronchial asthma, or previous anaesthetic complications. He was classified as ASA Physical Status II.

On general examination, the patient was conscious, cooperative, and oriented, with stable vital parameters. Airway assessment revealed adequate mouth opening; however, there was severe restriction of neck extension and flexion due to cervical spine fusion, suggesting an anticipated difficult airway. The patient had a fixed kyphotic posture with markedly reduced lumbar spine mobility. Chest expansion was decreased, consistent with restrictive involvement of the thoracic cage. Cardiovascular and abdominal examinations were unremarkable.

Preoperative investigations, including complete blood count, renal function tests, serum electrolytes, coagulation profile, chest X-ray, and electrocardiogram, were within normal limits. Radiological imaging of the spine demonstrated features consistent with advanced ankylosing spondylitis, including syndesmophyte formation and spinal fusion.

Considering the anticipated difficult airway and the risks associated with cervical spine manipulation, regional anaesthesia was planned to avoid endotracheal intubation. After explaining the risks and benefits of both general and regional anaesthesia, informed high-risk consent was obtained. A difficult airway cart, including oropharyngeal and nasopharyngeal airways, bougie, laryngeal mask airway, fibreoptic bronchoscope, and emergency cricothyrotomy and tracheostomy sets, was kept ready.

In the operating room, standard monitors were attached, including ECG, non-invasive blood pressure, and pulse oximetry. Intravenous access was secured, and preloading was done with crystalloid solution. Positioning the patient in the sitting posture was challenging due to spinal rigidity and hip involvement, but it was achieved with assistance and careful handling to avoid injury.

A combined spinal–epidural technique was initially planned; however, epidural catheter placement was unsuccessful due to difficulty in identifying landmarks and probable ossification of the interspinous ligaments. Subsequently, a subarachnoid block was attempted using a paramedian approach with a 22-gauge Quincke spinal needle. After obtaining free flow of cerebrospinal fluid, 3 ml of 0.5% hyperbaric bupivacaine along with 30 micrograms of clonidine was administered intrathecally. Adequate sensory and motor blockade was achieved, and the surgery proceeded uneventfully.

Throughout the intraoperative period, the patient remained hemodynamically stable, and no airway intervention was required. Oxygen supplementation was provided via face mask. There were no episodes of hypotension, bradycardia, or desaturation.

Postoperatively, the patient was shifted to the recovery room with stable vital signs. Analgesia was maintained using a buprenorphine transdermal patch applied for 72 hours, along with multimodal analgesics. The postoperative course was uneventful, and the patient was mobilized on postoperative day two with mild pain and good functional recovery.

This case demonstrates that despite significant anatomical challenges

posed by ankylosing spondylitis, successful neuraxial anaesthesia can be achieved using alternative approaches such as the paramedian technique, thereby avoiding airway manipulation and its associated risks.

DISCUSSION

Ankylosing spondylitis is a progressive inflammatory disorder characterized by ossification of spinal ligaments, intervertebral discs, and facet joints, leading to spinal rigidity and deformity. Advanced disease produces the classical "bamboo spine" appearance and may involve the cervical spine, thoracic cage, and hip joints. From an anaesthetic perspective, these anatomical and physiological changes significantly increase perioperative risk.

One of the major concerns in patients with ankylosing spondylitis is airway management. Fusion of the cervical spine and reduced atlanto-occipital extension prevent optimal alignment of the oral, pharyngeal, and laryngeal axes. Even minimal forceful manipulation can precipitate cervical spine fracture or neurological injury because the ankylosed spine behaves like a long brittle bone. Fibreoptic intubation is considered the gold standard in anticipated difficult airway; however, it requires expertise, patient cooperation, and equipment availability. In the present case, avoiding airway instrumentation was prioritized due to severe restriction of neck movement, and therefore regional anaesthesia was planned.

Another important challenge is neuraxial blockade. Ossification of interspinous ligaments, calcification of the ligamentum flavum, and narrowing of interlaminar spaces make identification of landmarks difficult and increase the risk of multiple attempts, traumatic tap, or block failure. The midline approach may not be feasible in advanced disease. The paramedian approach bypasses the supraspinous and interspinous ligaments and allows access through a less ossified pathway, thereby increasing the success rate. In this case, epidural catheter placement failed likely due to distorted anatomy, but spinal anaesthesia was successfully achieved using the paramedian technique.

Respiratory involvement is another critical consideration. Fusion of costovertebral and sternocostal joints leads to reduced chest wall expansion and restrictive lung disease, characterized by decreased total lung capacity and vital capacity. These patients may have reduced pulmonary reserve and are at higher risk of postoperative pulmonary complications under general anaesthesia. Regional techniques therefore offer the advantage of preserving spontaneous respiration and minimizing respiratory depression.

Hemodynamic stability is also an important aspect. Although spinal anaesthesia can cause hypotension due to sympathetic blockade, careful fluid management and monitoring can mitigate this risk. In this patient, intrathecal administration of hyperbaric bupivacaine with clonidine provided adequate surgical anaesthesia without significant hemodynamic compromise.

Total hip replacement is commonly required in advanced ankylosing spondylitis due to hip joint ankylosis and deformity. Regional anaesthesia in such patients not only avoids airway manipulation but also provides effective intraoperative anaesthesia and postoperative analgesia, facilitating early mobilization.

This case highlights the importance of thorough preoperative assessment, preparation for difficult airway management, and selection of appropriate neuraxial technique. The successful use of the paramedian spinal approach in this patient demonstrates that, despite significant anatomical challenges, regional anaesthesia can be a safe and effective option when performed with meticulous planning and preparedness for conversion to general anaesthesia if required.

CONCLUSION

Ankylosing spondylitis poses major anaesthetic challenges due to anticipated difficult airway, distorted neuraxial anatomy, and restrictive pulmonary physiology. Careful preoperative assessment, readiness for difficult airway management, and selection of an appropriate regional technique are essential for safe perioperative care. In this case, spinal anaesthesia via the paramedian approach was successfully performed, avoiding airway manipulation and its potential complications. Meticulous planning and preparedness for conversion to general anaesthesia remain crucial in managing such patients effectively.

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