INTRODUCTION

Ankylosing Spondylitis (AS) is a chronic inflammatory disease that primarily affects the sacroiliac joint and axial and peripheral joints.1 Hip replacement surgery helps in restoring the functional capabilities of patients to a large extent. Patients with AS are always a challenge to the anaesthesiologist due to either a difficult airway or a seemingly impossible central neuraxial blockade.2

Due to bamboo spine, conventional methods of airway management are not feasible for endotracheal intubation so Fiberoptic Bronchoscopy (FOB) has been used successfully to secure the airway.3 The Aintree Intubation Catheter (Cook® Medical Inc., Bloomington, IN, USA) is a long hollow bougie with a fixed length of 56 cm and 4.8 mm diameter lumen that enables fiberoptic-guided intubation through a laryngeal mask airway.4

We are reporting a case of anticipated difficult intubation in a young male that suffered from severe AS and presented for Total Hip Replacement (THR).

CASE REPORT

A 26 years male, a known case of severe ankylosing spondylitis for the last 7 years, presented to orthopaedic clinic with complains of pain and difficulty in movement. Both the hip joints were totally fixed and he was even unable to sit for the last 3 years. X-ray of hip joints showed marked degenerative changes with ankylosis in lower lumbar spine and sacroiliac joints. The orthopaedic surgeon advised bilateral total hip replacement surgery and referred him to pre-operative anaesthesia clinic.

On history and examination, it was found that the patient had no mobility since 3 years. Airway assessment revealed no flexion, extension and jaw protrusion and he had classical bamboo spine with no mobility of cervical and thoraco-lumbar spine (Figure 1). The mouth opening was more than two fingers and thyro-mental and sterno-mental distances were reduced. Cervical spine X-ray showed bony ankylosis with reversal of cervical curvature. Patient and his family were explained in detail about anaesthetic technique, pros and cons of regional and general anaesthesia, and management options in anticipated difficult airway. The technique of fiberoptic intubation was explained and the patient was assured about the comfort for this procedure. Consent for emergency invasive airway management, in case of failure to intubate or ventilate situation, was also taken.

On the day of surgery, patient was re-assessed and investigations were reviewed. Injection glycopyrrolate 0.2 mg was given at the pre-operative area to dry airway secretions. A difficult intubation cart, (which had a selection of oropharyngeal and nasopharyngeal airway, gum elastic bougie, Laryngeal Mask Airway [LMA], fiberoptic bronchoscope and cricothyroidotomy set), was kept in operating room. As the patient's head and neck were fixed and unable to rest on table, 2 pillows were kept beneath.

With an aim to keep spontaneous breathing, patient was induced with inhalational anaesthetic sevoflurane until adequate bag mask ventilation ensured. Anaesthesia was further deepened and classic LMA size 4 inserted without any difficulty. The patient was allowed to breathe spontaneously. The Aintree intubation catheter...
was passed over fiberoptic bronchoscope (Olympus OD 4.3 mm) [Figure 2A]. One assistant stabilized the head so that undue manipulation of the head and neck could be avoided. The bronchoscope swivel adapter was placed and FOB along with AIC was passed through classic LMA (Figure 2B). Injection Propofol 10 - 20 mg was given in boluses to attenuate airway reflexes. When vocal cords were seen, the FOB along with AIC positioned and passed into trachea till carina was visualized. The FOB was then withdrawn and AIC was left in place (Figure 2C). Next step was to remove LMA over AIC and then cuffed endotracheal tube (ETT) size-8 was railroaded over AIC and then AIC was taken out (Figure 2E). The ETT placement was confirmed with bilateral chest auscultation and end-tidal CO₂. Anaesthesia was maintained with isofluorane 1 - 1.5% in a mixture of 40:60 oxygen and nitrous oxide and patient was kept on volume controlled ventilation. Dexamethasone 8 mg was given to prevent airway edema. Morphine was used for intraoperative analgesia and surgery lasted for 3 hours. The patient was extubated after ensuring adequate airway reflexes, breathing and following of commands. The patient's postoperative course was unremarkable.

**DISCUSSION**

Ankylosing spondylitis is an autoimmune spondyloarthropathy that is characterized by painful chronic inflammatory arthritis punctuated by exacerbations (flares) and quiescent periods. It primarily affects the spine and sacroiliac joints and eventually causes fusion and rigidity of the spine. The uniform development of widespread annular fibrous ossification and the formation of bony bridges are largely responsible for the classic radiographic appearance of the bamboo spine of end-stage ankylosing spondylitis. The initiating cause of AS is not known but environmental factors (unidentified bacterial or viral agents), susceptibility genes (HLA-B27), gender, age and ethnicity play a role. Ankylosing spondylitis can present significant challenges to the anaesthetist due to consequence of the potential difficult airway, cardiovascular and pulmonary complications, and the medications used to treat pain and control the disease. A thorough pre-operative assessment is essential to evaluate the severity of the disease; in particular, airway involvement and the extra-articular manifestations of the disease. Pre-operative neurological deficits should be documented. The range of movement of all joints should be assessed to plan optimal positioning of the patient. A pre-operative ECG is mandatory in view of the potential conduction defects. Difficult intubation is associated with AS involving the cervical spine and can be compounded further when the temporomandibular joint is involved. Radiological screening would assess neck movements in extension and flexion. There is a significant risk of neurological injury with any excessive neck extension in patients with chronic cervical kyphosis. A planned and unhurried fiberoptic intubation represents a safe and predictive alternative management strategy for patients with AS. Various other approaches are available for securing the airway in patients with AS, including blind nasal intubation, lighted stylet intubation, Bullard laryngoscope, retrograde intubation, intubating laryngeal mask airway, glidescope and tracheostomy.
For situations in which tracheal intubation is necessary and conventional method failed or difficult to perform, the Aintree Intubation Catheter (AIC) can be an important tool. The AIC, first described by Atherton et al. in 1996, is a ventilation exchange bougie that can be mounted on FOB to facilitate tracheal intubation with an ETT through an established airway. The AIC was designed to use with a classic LMA, but has also been successfully used and advocated with a ProSeal LMA. The FOB can be passed through the LMA and into the trachea with continued ventilation through the dedicated airway. The LMA can then be removed safely with the AIC remaining in the trachea, and an ETT can then be passed over the AIC and into the trachea. For situations that require a secure airway, anaesthetist can accomplish tracheal intubation facilitated by an AIC quickly and confidently with little experience in its use. The device has been used successfully in the context of high-risk patients with an anterior mediastinal mass, patient with cervical spine pathology with limited neck mobility, and patients who are extremely obese. Cook and colleagues reported a case series about non-conventional use of Aintree intubation catheter in management of the difficult airway in 14 patients. This series, 2 patients had severe ankylosing spondylitis and successfully managed with AIC. The device is commercially available in one size for all adult patients: 19 French, 56 cm long with an internal and external diameter of 4.7 mm and 7.0 mm, respectively.

REFERENCES