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CASE STUDY

CASE REPORT OF DIFFICULT INTUBATION IN A PATIENT WITH ANKYLOSING SPONDYLITIS WITH REVIEW OF LITERATURE

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ABSTRACT

Ankylosing Spondylitis is a chronic, progressive inflammatory disease of the axial skeleton and surrounding tissue causing widespread fibrous ossification of intervertebral joints and spaces leading to ankylosis. Extra articular involvement is common with severe AS manifesting as aortic insufficiency, conduction defects, restrictive lung disease and lung fibrosis. Anaesthetic challenges are plenty and compounded by the involvement of cervical vertebrae which make it arduous to manage with difficult airway and intubation protocol. After evaluating the predictors for difficult airway, the diverse modalities at disposal warrant meticulous preoperative examination and planning. Avoiding pitfalls while positioning and extubation, and managing unforeseen complications aggrandized by the pulmonary and cardiovascular involvement, make for a very intriguing study. We report a case of 50 year old male suffering from severe AS scheduled for corrective osteotomy in thoracolumbar area for correction of forward visual gaze.

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INTRODUCTION

Ankylosing spondylitis (AS) is a chronic, progressive inflammatory disease of the axial skeleton and surrounding tissue (Sieper *et al*., 2002). Anaesthetic challenges are mainly due to involvement of cervical spine, increased risk of fracture during positioning /manipulation (Simmon, 1972). There is temporomandibular joint involvement with ossification of ligaments causing difficulty in airway management and intubation along with cardiovascular and respiratory complications (Simmon, 1972; Sciubba *et al*., 2008). We report a case of a 50 year old male suffering from severe AS posted for corrective osteotomy and successfully managed with awake fibreoptic bronchoscopy.

Case

A 50 year old male, weighing 45 kg, diagnosed with Ankylosing Spondylitis 28 years ago was referred to the Orthopaedic department. As the disease progressed, patient was unable to look up as his gaze was fixed on the ground due to thoracolumbar kyphoscoliosis. Due to rigidity of the neck, the patient could only lie supine by resting his head against 3-4 pillows while maintaining a lateral posture while sleeping at night. The patient had no comorbidities or any history of hospitalization or surgery. There was no history of any neuromuscular disease in the family. Neck movements involved only minimal flexion, no extension and severely restricted antero-posterior and lateral movements. Airway assessment showed a normal mouth opening. Mandibular protrusion test was normal. Thyro-mental distance was 8cm. Indirect laryngoscopy illustrated a normal epiglottis and normal mobility of the vocal cords. Clinical examination revealed no abnormalities. Laboratory investigations were within normal limits. Electrocardiogram and 2D ECHO were normal. Arterial blood gas analysis revealed no signs of hypoxemia with other values within normal limits. CT scan of the chest revealed multiple large bullae and blebs in the right upper, lower and lingular lobes surrounded by areas of fibrosis, with deviation of trachea to the right. The lingular lobe showed calcified nodules and bronchiectasis. A severe kyphotic deformity of the spine in the upper and mid dorsal spine was noticed. Pulmonary function tests were indicative of severe restrictive pattern. Awake Fibreoptic Intubation (AFOI) was planned for this patient. The procedure of AFOI was explained in detail to the patient and his family, and an informed consent was obtained. Patient was kept NPO eight hours prior to the

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surgery. On the day of the surgery, nebulisation with lignocaine 4% and gargle with 10% lignocaine (viscous) were done preoperatively for airway preparation. Nasal orifices were prepared with Lignocaine 2% and Adrenaline soaked patties inserted in both nostrils. Monitors (ECG, NIBP, Pulse oximeter probe and temperature probe) were attached after shifting the patient to the OT. The patient was placed on the operating table in supine position with his head resting against two firm bolsters. A wide bore 16 Gauge IV access was secured on the left upper limb. Central venous access was achieved via the right subclavian route. Invasive arterial BP monitoring was established via left radial artery cannulation. The urinary bladder was catheterized with a No. 14 Foley's catheter and uroflow meter attached. A bolster and a pillow with two head rings were kept under the patient's head to stabilize his airway for intubation. The presence of a backup ventilation device and difficult airway ventilation trolley was confirmed and checked. Preparations for emergent tracheostomy in case of a failed intubation were also kept available.

Fig. 1. Lateral view, sitting position

Fig. 2. Supine Position

Fig. 3. CT Scan showing deformity of the spine

Fig. 4. Positioning of the patient for intubation

Patient was premedicated with Inj Glycopyrrolate 4 mcg/kg, Inj Midazolam 20 mcg/kg and Inj Fentanyl 2mcg/kg. after spraying bilateral nostrils with Xylometazoline spray, awake nasal fibreoptic intubation was performed uneventfully with Endotracheal tube size 7.5mm. Air entry was checked bilaterally to confirm the correct placement of the ET and a capnograph attached to ensure $ETCO_2$ monitoring following which tube was fixed at 26cm mark. Patient was induced with Inj Propofol 2 mg/kg and Inj Atracurium 0.5 mg/kg (22.5mg). Maintenance of anaesthesia was achieved with Sevoflurane and a mixture of Nitrous oxide and oxygen in the ratio of 60:40. Intraoperative relaxation was attained with an infusion of Inj. Atracurium (0.125mg/kg/hr), Fentanyl (1mcg/kg/hr) and Midazolam (20-100mcg/kg/hr). After induction patient was shifted back to the transfer trolley while the OT table was prepared with bolsters to match the curvature of the patient's

spine in discussion with the surgical team. Patient was secured in prone position with the help of straps and adhesive tape. Care of the eyes, nose and pressure points was taken with adequate padding. A C-shaped cushioned head ring was placed under the head to prevent kinking of the ET tube. The surgery lasted 5 hours with intraoperative blood loss of 500ml which was replaced with 500 ml of colloid (Hydroxyethyl starch) while maintaining the CVP between 8-11 cm of NS and mean arterial pressure between 65-75 mm of Hg. Blood sugars were monitored 2 hourly to ensure euglycemia. It was decided to electively ventilate the patient post operatively to ensure adaptation of lungs to the changes in shape of thoracic cavity owing to corrective surgery.

DISCUSSION

Ankylosing spondylitis (AS) is a chronic, progressive inflammatory disease of the axial skeleton and the surrounding tissue. It has a peak age of onset between 20 and 30 years of age (Sieper *et al*., 2002), more common in the male population. (Sieper *et al*., 2002) Mortality of the patients with AS is 1.5-4 times higher than the general population. (Shaikh, 2007) In severe AS, fixed cervical flexion can result in chin on chest deformity, leading to difficulty with forward vision. Extra articular involvement is common with severe AS manifesting as aortic insufficiency, conduction defects, restrictive lung disease and lung fibrosis (Peters *et al*., 2004). Surgical correction is the definitive treatment for the severe kyphosis. These surgical procedures present a wide variety of challenges to the anaesthesiologist. A thorough preoperative assessment is essential to evaluate the severity of the disease in particular airway involvement and the extra articular manifestations of the disease. Peri operative neurological deficits should be documented, since rib involvement leads to decrease in lung capacity and cervical spine immobility restricts neck movement and head rotation. The range of movement of all joints should be assessed to plan optimal positioning of the patient. Difficult intubation associated with AS involving the cervical spine is compounded further when the TM joint is involved.[2] Evaluation of neck mobility is mandatory during preoperative examination, which includes radiographs of the cervical spine. The criteria that predict difficult airway should be reviewed, such as the Mallampati test, thyromental distance, sternomental distance, degree of head and neck movement and mouth opening.

Chest Radiograph can show restrictive changes in the lungs as well as osteophytes (Michael and Hastings, 1998; Sciubba *et al*., 2008) distorting the airway or impairing visualization of the larynx. It is essential to screen for restrictive lung diseases with Pulmonary Function Tests. Evaluation should be done for respiratory insufficiency and the need for postoperative mechanical ventilation in the ICU. Baseline Blood gases should be undertaken as they provide vital clues to patient's baseline respiratory function. Forced movements of the neck should be avoided due to the increased risk of fractures owing to osteoporotic vertebrae (Viitanen *et al*., 1995) and a possibility of vertebro-basilar insufficiency (Woodward and Kam, 2009).
Once the difficulties in tracheal intubation are determined, the anaesthesiologist should choose a method of intubation. Awake Fibreoptic Intubation is the method of choice in patients with advanced deformity of the cervical spine. The use of other safe options such as blind nasal intubation, Retrograde intubation, oral intubation with the aid of a light probe, Bullard laryngoscopy (Gorback, 1991), glidescope (Lai *et al*., 2006), Pentax airway scope (Cheng *et al*., 2010), LMA Fastrach (Ping *et al*., 2001), Percutaneous Transtracheal Jet Ventilation (Smith *et al*., 1975) etc have been reported with variable success rates. The same precautions regarding patient positioning and neck movement apply at emergence from anaesthesia as with intubation. Physiotherapy, breathing exercises and early mobilisation should be instituted in the immediate post op period because patients are at increased risk of respiratory complications. Our patient had to be managed from the point of view of his severe ankylosing spondylitis. It prevented him from lying supine and also restricted his neck movements thus making the intubation difficult. Hence we decided to perform awake fibreoptic intubation. Because of the prolonged surgery and anaesthesia, and restrictive nature of lung disease, there was increased risk of further deterioration of hypoxaemia with complication of CO_2 retention. Hence we planned to electively ventilate in the postoperative period.

Conclusion

Our case demonstrates that Awake Fibreoptic Intubation remains the preferred choice of anaesthesiologists in cases of Ankylosing Spondylitis especially when severe cervical deformities are present. However a discussion with the orthopaedic team should be encouraged and a case specific strategy should be formed. Proper positioning of the patient circumvents many of the challenges of intubation. Monitoring of the patient during the surgery as well as in the postoperative period alongwith elective ventilation is crucial in reducing further complications.

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