

# Successful Awake Fiberoptic Intubation and Ultrasound Guided Epidural Placement in Anaesthesia Management of a Case of Ankylosing Spondylitis

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## ABSTRACT

Ankylosing spondylitis (AS) is a chronic autoimmune spondyloarthropathy involving spine and sacroiliac joints resulting in characteristic bamboo spine (fused and rigid spine). A 41yr old male patient with Ankylosing spondylitis with history of Left THR presented with periprosthetic fracture posted for ORIF with plating. He had a classical bamboo spine with cervical involvement, MPC- 3 and restricted neck mobility. Preoperative Ultrasound scan (USG) of lumbar region done to identify spinal spaces. Awake Fiberoptic Nasal intubation done to secure difficult airway and induction done with Propofol and Vecuronium. Epidural catheter inserted at L1-L2 space using paramedian approach under USG under General Anesthesia in lateral position and Epidural analgesia given with 1% Ropivacaine. Extubation was done uneventfully with Sugammadex 2mg/kg used as reversal at end of surgery. Anaesthetic challenges in AS were both difficult airway and difficult regional anesthesia which was successfully managed with detailed evaluation and planning with USG.

## Introduction

Ankylosing spondylitis (AS) is a chronic autoimmune spondyloarthropathy which progresses to involve entire spine and sacroiliac joints resulting in characteristic bamboo spine (fused and rigid spine) [1].

AS has always been a challenge to the anaesthesiologist due to either a difficult airway or a difficult to perform central neuraxial blockade. Fiberoptic bronchoscopy has been used successfully to secure the airway as central neuraxial blocks may not be easy to perform in such cases. The use of ultrasound guided central neuraxial and peripheral nerve blocks has helped in achieving predictable success. We report a case of male patient who had Ankylosing Spondylitis with history of total hip replacement [Left THR] with peri-prosthetic fracture and was posted for ORIF with plating.

## Case Report

We present a case of 41 years old male patient, weighing 50kg, k/c/o Ankylosing spondylitis, o/c/o Left THR presented with periprosthetic fracture after fall posted for ORIF with plating. He has history of multiple surgeries over years like right hip joint arthroplasty twice and left hip arthroplasty. Left THR was done 6yrs back. All previous surgeries were done under general anaesthesia with Awake fiberoptic intubation in view of difficult airway and attempts on regional anaesthesia failed. Patient also complained of Grade I dyspnoea, he uses 2 pillows to support his back, neck and head and had difficulty in lying straight or in lateral position due to AS and previous surgery on both hip joints. He had a classical bamboo spine with no mobility of cervical or thoracolumbar spine. On Airway Examination, mouth opening was adequate with MPC 3, with restricted neck mobility. X ray Neck AP and lateral showed no airway narrowing.

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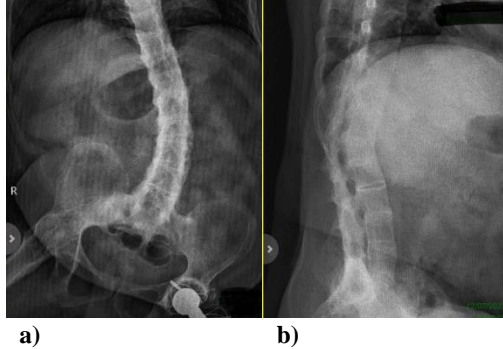
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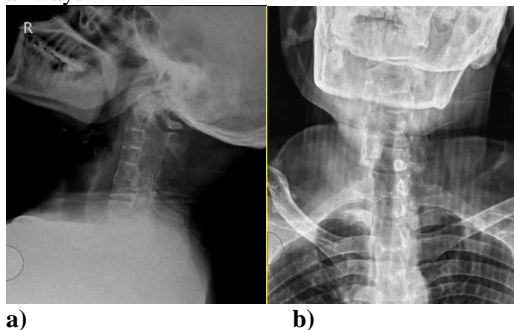
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Spine and Neck Xray showed classical Bamboo spine appearance involving cervical spine (Figure 1,2). Systematic examination showed normal vital signs, respiratory and cardiovascular system. Old Pulmonary function test showed moderate restriction, Arterial blood gas report was within normal limit. ECG ,2DEcho & Chest X ray were normal. All Lab investigation were normal. After detailed Pre anaesthesia checkup and evaluation patient was posted for ORIF and plating for Left periprosthetic fracture.



**Figure 1- Spine X-ray (a) AP view; (b) Lateral view showing classical Bamboo spine appearance.**

We anticipated airway to be difficult because of the lack of any extension of cervical spine and MPC 3. To find out feasibility of regional anaesthesia we did Preoperative Ultrasound scan (USG) of lumbar region to identify spinal spaces. This procedure was difficult due to fracture and positioning as both hips and spine were rigid. We were able to locate a spinal space at L1-L2 level. After detailed discussion, our plan of anesthesia was Awake Fiber- optic intubation (FOI) with USG guided Epidural catheter placement in view of difficult airway.



**Figure 2- Neck X-ray (a) Lateral view & (b) AP view showing cervical spine involvement.**

A difficult airway cart with tracheostomy set was kept ready along with a flexible fibreoptic bronchoscope. Patient was explained about the procedure of Awake FOI. Written informed consent was obtained and nil by oral status was confirmed. Patient was taken inside the OT, all the standard ASA monitors like ECG, pulse oximeter, Non-invasive BP were attached. Wide bore 18 G IV access taken & RL started.

Premedication in form of Inj Glycopyrrolate (0.2mg) iv, Inj Midaz (1mg) iv, Inj Fentanyl (50mcg) iv and Inj Dexmedetomidine 30mcg iv bolus given. Oxygen supplementation was provided throughout the procedure. Patient positioned in a comfortable posture(semi-sitting) by keeping three pillows were kept under his back to compensate for the rigid spine. The airway was prepared with nebulization with 4% lignocaine, Airway blocks and 10% Lignocaine spray. Awake Nasal Fiberoptic intubation was done with cuffed Endotracheal Tube no.7. After confirming bilateral Air entry is equal and Etco<sub>2</sub>, Endotracheal tube was secured. Induction done with inj. propofol 100mg IV given and Inj Vecuronium 4mg iv. Patient was maintained on Maintained on O<sub>2</sub>, Air (50:50) and Sevoflurane (1%–2%) on Volume AC mode. Patient was then given right lateral position; this position was maintained with minimum stress on spine keeping in view of possibility of iatrogenic fracture.

The patient's lumbar spine was scanned with a SonoSite Edge II USG system (SonoSite, Bothell, WA) portable ultrasound unit and a low-frequency (2-5 MHz) curved-array transducer. With the ultrasound beam oriented in a longitudinal parasagittal (LP) plane, we were able to identify the intervertebral levels between the L2 and L3 vertebrae. The location of the neuraxial midline and the L4-5 intervertebral level was marked on the patient's skin. Under all aseptic precaution Epidural catheter was placed in L1-L2 space via paramedian approach. After securing the epidural catheter, supine position was given with appropriate support and padding was done. Epidural test dose with 2% Lignocaine 3 cc after negative aspiration of Blood and Cerebrospinal Fluid given. Intra-operative Epidural analgesia given with titrated doses of Inj Ropivacaine 1%. Vigilant monitoring with ECG, SpO<sub>2</sub>, NIBP, EtCo<sub>2</sub>, Train of Four (TOF) monitor done. All hemodynamic parameters were stable throughout surgery. The surgery proceeded uneventfully. At the end of surgery when TOF >0.9, reversal of neuromuscular blockade was done with Inj Sugammadex (2mg/kg) intravenously with TOF monitoring. The patient was extubated uneventfully and shifted to post anesthesia care unit and monitored. Postoperative Analgesia provided with Epidural Infusion with 1% Ropivacaine and Inj Paracetamol 1gm iv according to Hospital protocol. Patient recovered well and discharged uneventfully after one week.

## Discussion

AS involves axial skeleton in which the inflammatory process starts from the sacro-iliac joints and spreads cephalad to affect cervical spine along with costo-vertebral joints. It is more common in males with a strong association with HLA B 27 and has an incidence of 1% and a peak onset at the age of 20 -30 years. Cardiac involvement with aortic & mitral valve damage along with restrictive respiratory functions may be present [1]. Peripheral joints including Temporo-mandibular joint

and arytenoid cartilages may also be affected making tracheal intubation impossible. With Cervico- thoracic spine involvement, even a slight manipulation can result in nerve compression, cervical fractures, vertebrobasilar insufficiency and neurological complications. This makes mask ventilation and direct laryngoscopy aided intubation difficult in these patients.

Anaesthesia challenges in our case were Difficult Airway along with difficult Regional Anesthesia (Technical difficulty, risk of intraosseous injection, Spinal/Epidural Hematoma, High Spinal block). One of the major concerns was positioning, due to Osteoporosis and rigid skeleton they are more prone to compression fractures & nerve compression during positioning.

Our patient presented with difficult airway with MPC3 and severely restricted neck movement. In our patient we did not proceed only with regional anesthesia due to technical difficulty [ sclerosed space], positioning was difficult due to fracture and previous hip surgeries and chances of epidural and spinal hematoma due to multiple pricks. Also securing the difficult airway during any complications for example high or total spinal or inadequate or failure of block can be risky in our patient. In an interesting case reported by Batra. YK .et .al [2], author faced total spinal anesthesia after giving epidural test dose in a patient of AS, they were not able to ventilate by face mask, first intubation attempt failed, they were able to ventilate with LMA and subsequent intubation attempt was successful. They concluded that giving regional anesthesia in difficult airway does not solve the problem of difficult airway.

Different approaches for securing the airway in patients with AS, includes blind nasal intubation, McCoy laryngoscope, lighted stylet intubation, retrograde intubation, intubating laryngeal mask airway (ILMA), Video laryngoscope (Glideoscope), fibreoptic bronchoscope and tracheostomy [3-6]. Providing safe anesthesia was our primary goal. Awake Fiberoptic intubation is considered as gold standard in management of Difficult Airway with cervical involvement [7]. So, we planned awake fiberoptic intubation to secure difficult airway in our patient and then proceeded with epidural placement under USG guidance.

Due to presence of Difficult airway, any residual neuromuscular blockade should be avoided as reintubation in emergency can be challenging. Sugammadex has been showed to reduce postoperative residual recurarization when compared with neostigmine [8]. So, we used Inj Sugammadex (2mg/kg) with TOF monitoring (TOF > 0.9) for adequate reversal and successful Extubation.

Pre-procedural neuraxial ultrasound helps to identify the desired intervertebral space and give an accurate estimation of the preferred insertion site of the spinal or epidural needle [9]. We consider USG guided placement of Epidural catheter as critical step in providing Epidural

Analgesia resulted in successful extubation and good postoperative recovery. With the advent of airway gadgets like fiberoptic bronchoscopes, USG in OT and availability newer drugs like sugammadex, providing safe anesthesia in difficult cases like ankylosing spondylitis has become more feasible.

We successfully managed our patient with Ankylosing Spondylitis by combining the use of fiberoptic bronchoscope along with USG guidance Epidural placement, we were able to provide safe anesthesia and excellent perioperative analgesia.

## Conclusion

Patients with Ankylosing spondylitis present with many anaesthetic challenges like difficult airway and difficult regional anaesthesia which can be successfully managed with detailed evaluation, planning to secure difficult airway and help of ultrasound guidance to provide regional anaesthesia.

## References

- [1] Woodward LJ, Kam PC. Ankylosing spondylitis: Recent developments and anaesthetic implications. *Anaesthesia*. 2009; 64(5):540-8.
- [2] Batra YK, Sharma A, Rajeev S. Total spinal anaesthesia following epidural test dose in an ankylosing spondylitic patient with anticipated difficult airway undergoing total hip replacement. *Eur J Anaesthesiol*. 2006; 23(10):897-8.
- [3] Subedi A, Tripathi M, Bhattarai B, Pokharel K, Dhital D. Successful intubation with McCoy laryngoscope in a patient with ankylosing spondylitis. *J Nepal Health Res Counc*. 2014; 12(26):70-2.
- [4] Raval C, Patel H, Patel P, Kharod U. Retrograde intubation in a case of ankylosing spondylitis posted for correction of deformity of spine. *Saudi J Anaesth*. 2010; 4(1):38-41.
- [5] Herman AG, Mahla ME. Awake intubating laryngeal mask airway placement in a morbidly obese patient with ankylosing spondylitis and unstable thoracic spine. *J Clin Anesth*. 2016; 32:62-4.
- [6] Lai HY, Chen IH, Chen A, Hwang FY, Lee Y. The use of the GlideScope for tracheal intubation in patients with ankylosing spondylitis. *Br J Anaesth*. 2006; 97(3):419-22.
- [7] Kumar N, Bindra A, Mahajan C, Yadav N. Airway management in a patient of ankylosing spondylitis with traumatic cervical spine injury. *Saudi J Anaesth*. 2015; 9(3):327-9.
- [8] Hristovska AM, Duch P, Allingstrup M, Afshari A. Efficacy and safety of sugammadex versus neostigmine in reversing neuromuscular blockade in adults. *Cochrane Database Syst Rev*. 2017; 8(8):CD012763.

- [9] Sidiropoulou T, Christodoulaki K, Siristatidis C. Pre-Procedural Lumbar Neuraxial Ultrasound-A Systematic Review of Randomized Controlled Trials and Meta-Analysis. *Healthcare (Basel)*. 2021; 9(4):479.