

## Case Report:

# Airway management in a patient with severe Ankylosing Spondylitis

Dr Vikas Karne , Dr Nitin Sadavarte

Name of the Institute: Sahyadri Speciality Hospital, Erandawane, Karve Road, Pune , India

Corresponding author: Email ID: drvkarne@gmail.com

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### ABSTRACT:

Patients with Ankylosing Spondylitis may require surgical interventions for hip or spine pathology. They may necessitate use of general anaesthesia with secured airway in certain situations, despite the fact that airway management is a challenge owing to disease process itself. Here we report a case of severe Ankylosing Spondylitis posted for bilateral hip replacement under general anaesthesia with specific focus on airway management.

Keywords: Ankylosing Spondylitis, Bamboo Spine

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### INTRODUCTION:

Ankylosing spondylitis is a chronic progressive inflammatory disease of the axial skeleton with a peak age of onset between 20 and 30 years<sup>1</sup> and more common in males<sup>1</sup>.

It primarily affects the spine and sacroiliac joints with widespread development of annular fibrous-ossification involving the joint cartilage and disc spaces. It causes ankylosis (meaning fibrous or bony bridging) of the axial skeleton, eventually causing fusion and rigidity of the spine<sup>1</sup>.

Clinical course of the disease and effects on airway:

- 1) The symptoms usually begin with back pain and morning stiffness in the lower spine and bilateral sacroiliac joints (worse at rest but improves with exercise). With time, the back pain progress upwards the spine and also affects the rib cage. Once fused, the pain in the spine disappears, but the patient has complete loss of spine mobility.
- 2) The cervical spine is affected late in the course of the disease which causes fusion of the cervical spine and restricts neck movements.
- 3) In long standing cases, there is incidence of osteoporosis which makes bone more vulnerable to

fractures with trivial injury. These fractures are most common at cervical vertebrae<sup>2,3</sup>. This risk of fractures increases when excessive force is applied during manipulations to align upper airway axes during laryngoscopy and intubation. Fracture of cervical vertebra may eventually impose significant risk of neurological injury.

Also, neck extension can cause vertebro-basilar insufficiency as result of bony encroachment on the vertebral artery<sup>2</sup>. In addition, these patients are prone for atlanto-axial dislocation<sup>2</sup>.

4) Temporomandibular joint involvement causes limited mouth opening in 10% of patients and this increases to 30–40% patients with long standing disease.

#### Anaesthesia Implications:

1) Central Neuraxial anaesthesia:

Both spinal and epidural anaesthesia can be technically difficult owing to ossification of ligaments around the vertebral column and inability to achieve ideal position<sup>2,3</sup>.

The use of spinal anaesthesia has been reported with help of sonography assistance<sup>4</sup>, with mini laminotomy<sup>5</sup> and using different approach for lumbar puncture<sup>6,7</sup>. However, use of spinal anaesthesia

may have to be deferred owing to technical difficulty, failed attempt, unavailability of high-end equipments, long duration of procedure or procedure on the upper torso of body.

2) General Anaesthesia - Airway management:

Patients with severe ankylosing Spondylitis have difficult airway due to potential complexity in visualisation of glottis because of-

- 1) Inability to align oral-pharyngeal-laryngeal axes owing to fused cervical spine.
- 2) Inability to introduce conventional/bulky airway devices in oral cavity owing to restricted mouth opening.
- 3) Inability to apply excessive force during laryngoscopy considering risk of significant neurological injury<sup>8</sup>.

**CASE REPORT:**

A 57 year old male, a case of severe ankylosing spondylitis, was posted for bilateral hip replacement surgery. Patient appeared stooped in standing position as he was unable to straighten him or bend down or squat. He could not lie supine unless his head and neck is supported with pillows. The general and systemic examination was normal. Airway examination revealed restricted mouth opening with inter-incisor distance 1.9 cm, sternal-mental distance 10 cm, upper lip bite tests station zero and Malampatti grade IV. No flexion or extension of the neck was possible. Radiograph of cervical spine revealed complete ankylosis with formation of syndesmophytes and fusion of whole cervical spine in fixed position (Figure 1). Radiograph of lumbar spines also showed classical "bamboo spine" appearance. Difficult airway was predicted in view of fixed body posture, fused and fixed cervical spine and restricted mouth opening. Blood investigations and ECG were normal. Arterial blood gas analysis revealed mild respiratory alkalosis with hypoxia. There was

evidence of restrictive disease on pulmonary function testing.

We planned general anaesthesia with secured airway using Truview EVO2 (Truphatek, Israel) for laryngoscopy. In the operation theatre, difficult airway cart was prepared including tracheostomy and intubating fiberoptic bronchoscope. The patient was given 3 pillows below his back to support the head and neck, and 2 pillows below his knee joints and standard monitoring using pulseoxymetry, electrocardiogram and non-invasive blood pressure started.

Operation table was given Trendelenberg position to bring oral axis perpendicular to ground to ease mask ventilation and laryngoscopy. It was impossible to achieve the sniffing position. Patient was premedicated with intravenous glycopyrrolate 0.2mg, and fentanyl 100mcg. After preoxygenation, anaesthesia was induced with 8% sevoflurane in 100% oxygen; supplemented with intravenous 50mg propofol. While patient breathing spontaneously, check laryngoscopy was attempted with introduction of Truview EVO2 in oral cavity in midline and by following curvature of tongue. A three chip camera was attached to eyepiece to display an enlarged image on monitor. As the tip of Truview EVO2 reached valleculi, a grade III Cormack-Lehane (Wilson modification) glottic view was revealed without any cervical manipulation (Figure 2A). We decided to proceed, 100mg suxamethonium intravenously administered while continuing mask ventilation with sevoflurane. Truview EVO2 was reintroduced and endotracheal intubation was attempted using No.8.0 endotracheal tube. Since it could not be accomplished, a gum-elastic bougie (GEB) was used to (Figure 2B) rail-road ETT over it (Figure 2C). ETT placement was confirmed. The whole process of induction and ETI took two minutes

without any episode of desaturation. The anaesthesia was maintained on O<sub>2</sub>, N<sub>2</sub>O, sevoflurane and atracurium with positive pressure ventilation. At the end of surgery, neuromuscular blockade was reversed and patient was extubated uneventfully after ensuring adequacy of breathing and awareness. Intra and Post operative course was uneventful and patient was discharged from the hospital on twelfth postoperative day.

#### **DISCUSSION:**

During airway management in patients with Ankylosing Spondylitis, following points needs to be given consideration (1) involvement of cervical spine and TM joint <sup>2,3</sup> (2) vulnerability of fracture at cervical spine during manipulations and (3) subsequent risk of neurological injury <sup>2,3</sup>. Hence, the type of laryngoscope employed for airway management in these patients should be (1) slim enough to be introduced through restricted oral aperture and (2) provide a glottic view with no/minimum cervical manipulation and without any application of excessive force.

Awake fiberoptic bronchoscopy is supposed to be a safest technique for suspected or diagnosed difficult airway patients, but it is technically demanding. Recently, use of modern digital airway equipments like Glidescope <sup>9</sup>, Bullard laryngoscope <sup>10</sup>, Pentax airway scope <sup>11</sup>, LMA Fastrach (ILM) <sup>12</sup> have been reported for laryngoscopy in Ankylosing Spondylitis patients with variable success rate.

Truview EVO2, one of the newer types of optical laryngoscope, has been successfully used in cases with restricted cervical spine movement <sup>13</sup> and other difficult airway scenario. It utilizes the optical principle of light refraction and improves the view of larynx in patients where a traditional laryngoscope provides poor view. It achieves 42 degrees refraction from the line of sight to provide

an enlarged optical view of the glottis without having to align the oro-pharyngo-laryngeal axes <sup>14, 15</sup> (Figure 3) and without applying significant force <sup>15</sup>. Also its slim blade design (12.8 mm) permits its use in patients with limited mouth opening.

(1) The published literature about application of TruviewEVO2, (2) its availability in our hospital and (3) our experience/familiarity related to its use were well convincing to extend its application in present case keeping fiberoptic bronchoscope stand-by. In addition, though our patient had severe AS with fixed-fused cervical spine, it was not a chin-on-chest deformity and hence it was justified to use it. We performed a check laryngoscopy using Truview EVO2 to assess the possibility of visualisation of glottis & if so, grade of Cormack Lehane classification and possibility of intubation. We preferred inhalational induction with sevoflurane to prevent sudden loss of airway. The muscle relaxant was administered only after confirming glottic view on check laryngoscopy. It provided reasonably acceptable glottic view without any need for any additional manipulation. We employed gum elastic bougie to accomplish faster and smooth intubation.

#### **CONCLUSION:**

To summarise, our case demonstrates that TruviewEVO2 may facilitate visualisation of glottis and aid intubation in severe Ankylosing Spondylitis patients. Thus it promises to be a part of difficult airway armamentarium for patients with restricted cervical mobility and/or limited mouth opening. However, a case specific strategy should be formed.

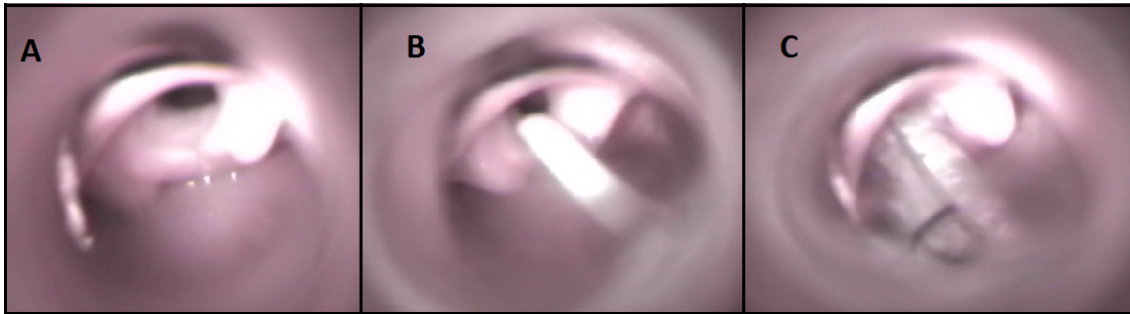
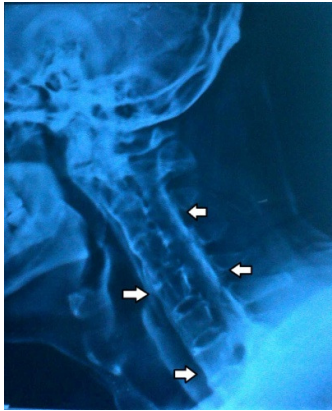


Figure 1 - Fixed rigid cervical spine with classical changes of Ankylosis

Figure 2 - glottic view through truviewEVO2

**REFERENCES:**

1. Sieper J, Braun J, Rudwaleit M, Boonen A, Zink A. Ankylosing spondylitis: an overview. *Ann Rheum Dis* 2002; 61(Suppl III):iii8 - iii18
2. Woodward L. J, Kam P. C. A. Ankylosing spondylitis: recent developments and anaesthetic implications. *Anaesthesia* 2009; 64: 540–548
3. Saringcarinkul A. Anesthetic considerations in severe ankylosing spondylitis. *Chiang Mai Med J* 2009; 48(2): 57-63.
4. Chin K. J, Chan V. Ultrasonography as a Preoperative Assessment Tool: Predicting the Feasibility of Central Neuraxial Blockade. *Anesth Analg* 2010; 110: 252–3.
5. Leung K. H, Chiu K. Y, Wong Y. W, Lawmin J. C. Spinal anesthesia by mini-laminotomy for a patient with ankylosing spondylitis who was difficult to anesthetize. *Clin Orthop Relat Res.* 2010 Dec; 468(12): 3415-8.
6. Kumar C. M, Mehta M. Ankylosing spondylitis: lateral approach to spinal anaesthesia for lower limb surgery. *Can J Anaesth* 1995; 42(I): 73-6
7. Jindal P, Chopra G, Chaudhary A, Rizvi AA, Sharma JP. Taylor's approach in an ankylosing spondylitis patient posted for percutaneous nephrolithotomy: A challenge for anesthesiologists. *Saudi J Anaesth.* 2009 Jul;3(2):87-90.
8. Sciubba D. M, Nelson C, Hsieh P, Gokaslan Z. L, Ondra S, Bydon A. Perioperative challenges in the surgical management of ankylosing spondylitis. *Neurosurg Focus* 2008; 24(1): E10.

9. Lai H. Y, Chen I. H, Chen A, Hwang F.Y , Lee Y. The use of the GlideScope for tracheal intubation in patients with ankylosing spondylitis. *Br J Anaesth* 2006; 97: 419–22
10. Gorback M. S. Management of the challenging airway with the Bullard laryngoscope. *J Clin Anesth.* 1991 Nov-Dec; 3(6): 473-7.
11. Cheng W. C, Jimmy-Ong, Lee C. L, Lan C. H, Chen T. Y, Lai H. Y. Pentax-AWS Airway Scope for tracheal intubation breaks through the limitation of neck motion in an ankylosing spondylitis patient wearing halo vest-a case report. *Acta Anaesthesiol Taiwan* 2010 Dec; 48(4): 180-1.
12. Ping Lu P, Brimacombe J, Angie C.Y, Hwang Shyr M, Liu H.P. The intubating laryngeal mask airway in severe ankylosing spondylitis. *Can J Anesth* 2001; 48(10): 1015–1019.
13. Gotou M, Inoue T. Application of the Truview EV02 optical laryngoscope to patients with cervical spinal disease. *May 2007; 21(2): 295-296.*
14. Rai E, Ramamani, Jacob R. Turview EVO2 Laryngoscope. *J Anaesth Clin Pharmacol* 2009; 25(2): 199-202
15. Lieberman N, Hakim AR, Lemberg L, Berkenstadt H. Trueview Blade Improves Laryngeal View When Compared to Macintosh Blade. *Anesthesiology* 2003; 99: A565.

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