Case Report:

Airway management in a patient with severe Ankylosing Spondylitis

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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

INTRODUCTION:
Ankylosing spondylitis is a chronic progressive inflammatory disease of the axial skeleton with a peak age of onset between 20 and 30 years \(^1\) and more common in males \(^1\). 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 \(^1\).

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 vertabrae \(^2,3\). 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 \(^2\). In addition, these patients are prone for atlanto-axial dislocation \(^2\).
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 \(^2,3\). The use of spinal anesthesia has been reported with help of sonography assistance \(^4\), with mini laminotomy \(^5\) and using different approach for lumbar puncture \(^6,7\). 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\(^8\).

**CASE REPORT:**
A 57 year old male, a case of severe ankylosing
spondylitis, was posted for bilateral hip replace-
ment 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, stern-
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\(_a\). There was
evidence of restrictive disease on pulmonary
function testing.
We planned general anaesthesia with secured
airway using Truvie 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 preoxy-
genation, 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 Truvie 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 Truvie 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 sevofl-
urane. Truvie 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 O2, N2O, 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, (2) vulnerability of fracture at cervical spine during manipulations and (3) subsequent risk of neurological injury. 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, Bullard laryngoscope, Pentax airway scope, LMA Fastrach (ILM) 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 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 (Figure 3) and without applying significant force. 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.
REFERENCES:


