Airtraq® optical laryngoscope for tracheal intubation in patients with severe ankylosing spondylitis: A report of two cases

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ABSTRACT

Airway management in patients of ankylosing spondylitis remains a challenge for anaesthesiologists. Many new airway devices have been used for securing airway in these patients. The Airtraq® optical laryngoscope is one of the new rigid laryngoscopes with a proximal view finder that reflects an image transferred from the distal tip of the blade through a series of lenses, prisms and mirrors. We report two cases of ankylosing spondylitis who were scheduled for total hip replacement and subtotal thyroidectomy and were successfully intubated using the Airtraq® laryngoscope.

Key words: Airtraq®, ankylosing spondylitis, intubation

INTRODUCTION

Ankylosing spondylitis is a chronic, autoimmune and progressive spondyloarthropathy affecting the spine and sacroiliac joints.[1] Involvement of the cervical joints, temporomandibular joints and cricoarytenoid joints in these patients may cause difficulty during intubation. Although there are various options available for securing the airway in these patients, ranging from awake fibreoptic intubation to surgical tracheostomy, the management depends on the patient, the clinical setting and the skills of the anaesthesiologist. Awake fibreoptic intubation is the gold standard for known difficult airways, but patient refusal is a limitation for its use. Because the literature is scanty about the use of Airtraq in the airway management of patients with severe ankylosing spondylitis, these two reports of patients planned for general anaesthesia will reveal the further scope of airway management.

The Airtraq is a recently introduced optical airway device to facilitate tracheal intubation in patients with both normal and difficult airways. The device provides a high-quality view of the glottis without the need to align the oral, pharyngeal and tracheal axes. The blade of the Airtraq consists of two channels. One channel acts as a conduit for passing the endotracheal tube (ETT) while the other channel consists of an optical system that transfers the image from the illuminated tip to a proximal viewfinder. The Airtraq is anatomically shaped and standard ETT of all sizes can be used using different sizes of Airtraq. We describe two cases with severe ankylosing spondylitis who were successfully intubated using an Airtraq laryngoscope.

CASE REPORT

Case 1
A 40 year-old male, a known case of ankylosing spondylitis for 15 years, was scheduled for right total hip replacement for avascular necrosis of the head of femur. On pre-anaesthetic examination, the patient had thoracolumbar kyphosis with restriction of movements in the dorsolumbar and lumbosacral spine.
The patient was unable to lie supine and required pillows beneath the head and neck for support. X-ray lumbar spine revealed squaring of vertebra, calcification of anterior and posterior longitudinal ligaments and reduced interspinous spaces and fusion of the posterior elements at all levels.

Airway assessment revealed a restricted mouth opening with interincisor gap of 1.9 cm and Mallampati grade IV. He was unable to extend his neck, with a sternal distance of 10.2 cm and thyromental distance of 5.4 cm. The patient was planned for general anaesthesia as the patient did not give consent for awake fibreoptic intubation. The patient was explained the possibility of difficult airway and consent for possible surgical tracheostomy was taken. On the day of surgery, the patient was premedicated with intravenous (i.v.) midazolam 2 mg and intramuscular (i.m.) glycopyrrolate 0.2 mg. The patient was made to lie supine with the head supported with pillows and all the standard monitors were applied. A difficult airway cart was kept ready. The patient was induced with i.v. propofol 2 mg/kg i.v. and fentanyl 1 μg/kg. After confirming adequate bag mask ventilation, neuromuscular relaxation was achieved with 1.5 mg/kg of succinylcholine. The blade of the Airtraq laryngoscope was introduced into the oral cavity in the midline over the base of the tongue and the tip was positioned in the vallecula. The trachea was intubated with a size 7.0 mm tracheal tube in the first attempt after adequate visualisation of the vocal cords, which required minor adjustments of Airtraq. Anaesthesia was maintained with nitrous oxide (66%) and sevoflurane (1–2%) in oxygen and vecuronium bromide. The intraoperative course was uneventful and at the end of surgery neuromuscular blockade was reversed with i.v. neostigmine 2.0 mg and i.v. glycopyrrolate 0.4 mg. The patient had a smooth recovery and was shifted to the post-anaesthesia care unit.

Case 2
A 65-year-old female patient, a known case of ankylosing spondylitis for 25 years, was scheduled for subtotal thyroidectomy for colloid goitre. Airway examination revealed a restricted mouth opening with interincisor gap of 1.8 cm and Mallampatti grade III. Thyromental distance was 5.1 cm and steromental distance was 10.0 cm. Indirect laryngoscopy could not be performed due to restricted mouth opening and limitation of neck mobility. Routine pre-anaesthetic investigations were normal. X-ray cervical spine showed gross osteopenia with complete fusion of posterior elements with end-plate sclerosis and decreased joint space at the C5-C6 and C6-C7 levels. Patient was planned for general anaesthesia as she did not give consent for awake fibreoptic intubation. All the preparations were made for managing a difficult airway.

On the day of surgery, after written consent, the patient was premedicated with i.v. midazolam 2 mg and i.m. glycopyrrolate 0.2 mg. The patient was made to lie supine with the head supported by four pillows and all the standard monitors were applied. The patient was induced with i.v. propofol 2 mg/kg and i.v. fentanyl 1 μg/kg. After confirming adequate bag mask ventilation, neuromuscular relaxation was achieved with 1.5 mg/kg of succinylcholine. The blade of the Airtraq laryngoscope was introduced into the oral cavity in the midline over the base of the tongue and the tip was positioned in the vallecula. The trachea was intubated with a size 7.0 mm tracheal tube in the first attempt after centralizing the glottic opening in the view field, which required minor adjustments of Airtraq and side-to-side wrist movement. Anaesthesia was maintained with 66% nitrous oxide in oxygen and 1% sevoflurane and vecuronium bromide. Surgery was uneventful and at the end of surgery, neuromuscular blockade was reversed with i.v. neostigmine 2.0 mg and i.v. glycopyrrolate 0.4 mg. The patient had a smooth recovery and was shifted to the post-anaesthesia care unit for further management.

DISCUSSION

Ankylosing spondylitis affects about 1% of men and 0.5% of women, with a peak age of onset between 20 and 30 years.[4] Rheumatic manifestations include spinal symptoms and also extra spinal joint disease and enthesopathic lesions.[3] The cervical spine is involved late in the disease leading to restriction of the neck movement and head rotation causing non-alignment of the oral, pharyngeal and laryngeal axes. Moreover, involvement of the atlanto-occipital joint, temporomandibular joint and cricoarytenoid joints leads to a potentially difficult airway situation.[4] Various options are presently available for intubation in difficult airway, but these options get reduced in patients with restricted neck movements and limited
mouth opening.\textsuperscript{[5]} Awake fibreoptic intubation is considered the safest option; however, some patients may refuse being awake and prefer general anaesthesia during intubation.\textsuperscript{[6]} We initially planned for awake fibreoptic intubation in our cases, but the patients were apprehensive about the procedure and refused to remain awake.

Lai et al. reported Glidescope\textsuperscript{®} to be a useful device for visualising the larynx and facilitating nasotracheal intubation in patients with ankylosing spondylitis. In their study, Glidescope\textsuperscript{®} improved visualisation of larynx in 11 patients and intubation was successful in eight patients.\textsuperscript{[7]}

Airtraq laryngoscope is a newly introduced single-use intubation device, simple to use and has got an easy learning curve that does not require hyperextension of the neck hence is useful for patients with cervical spine injury also. It is inserted into the midline in the oral cavity loaded with polyvinyl chloride tracheal tube into the vallecula and after visualizing the glottic opening the Airtraq blade is adjusted with a fine wrist movement to centralize the glottic opening over the eyepiece of the Airtraq. It does not obstruct the endoscopic view of the vocal cord during laryngoscopy because of its inbuilt conduit for the tracheal tube.\textsuperscript{[8]} Studies have reported the effectiveness and utility of the Airtraq for tracheal intubation in patients with cervical spine immobilization and in morbidly obese patients.\textsuperscript{[9,10]} But, this device has got the limitation of inbuilt conduit meant for tracheal tube that cannot be manipulated in the conduit. Direct manipulation of the tube is not possible and the entire device has to be tilted and oriented with the tracheal tube in situ. Also, it cannot be introduced into a mouth opening less than 16 mm for size 2 Airtraq and 18 mm for size 3 Airtraq.

However, there is a relative scarcity of the literature on the use of this device for intubation in patients of ankylosing spondylitis. Dimitriou et al. in a case series of four patients with difficult airway reported successful awake intubation using Airtraq laryngoscope.\textsuperscript{[11]} Basaranoglu et al. also used Airtraq successfully as rescue device following failed awake fibreoptic intubation in a patient with severe ankylosing spondylitis.\textsuperscript{[12]} We used Airtraq successfully for intubation in our patient keeping in view restricted neck movements and non-alignment of the three axes, i.e. oral, pharyngeal and laryngeal. Neuroaxial anaesthesia was not planned in the first patient because of limited joint spaces and improper positioning of the patient. Neuroaxial anaesthesia in such patients may be technically difficult although not impossible due to limited joint mobility and reduced joint spaces.

**CONCLUSION**

We therefore conclude that intubation with Airtraq is a good alternative for elective intubation in patients of ankylosing spondylitis who refuse awake fibreoptic intubation or if functional fibreoptic bronchoscope is not available.

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