

Retrograde Intubation An Alternative Way For Endotracheal Intubation Using Epidural Catheter As A Guide – A Case Report

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Received: October 2019

Accepted: October 2019

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ABSTRACT

Patients having restricted mouth opening and limited movement of temporomandibular joint present as difficult airway scenario. Fibre-optic assistance is a gold standard technique for anticipated difficult intubation, but its availability and expertise still is a challenge at most of places worldwide especially in developing countries. The retrograde intubation technique can be an alternative and less invasive than other emergency surgical airway options for such cases. We present a case of difficult intubation, successfully managed with the help of retrograde intubation.

Keywords: Difficult airway, Retrograde intubation, Epidural catheter.

INTRODUCTION

Difficulty in airway management is a major cause of morbidity and mortality in anaesthesiologist practice. The ability to identify patients at risk of difficult tracheal intubation is important especially in patients with apparently normal airways. Difficult laryngoscopy (poor glottis visualization) is considered a surrogate indicator of difficult intubation.^[1] Flexible fiber optic intubation is currently the technique of choice for managing a difficult airway. However, restricted availability and higher cost of the instrument make its usage limited, especially in developing countries. Retrograde intubation (RI) is an alternative option to manage such an airway, though the success rate depends highly on personal expertise and the technique utilized. This technique can be performed despite the presence of blood or secretions in the upper airway. It is a good choice in patients with short, obese, or anatomically distorted necks where fiberoptic is not available.

CASE REPORT

A 55 years male, presented to emergency department with sign and symptoms of acute abdomen

diagnosed to be a case of intestinal obstruction. Patient was conscious, oriented with a pulse rate of 122 beats per minute, blood pressure 124/67mm Hg, air entry was decreased at bases in chest and heart sounds were normal. Patient was a chronic smoker and tobacco chewer for last 30 years. The mouth opening was two fingers (2.5cm), Mallampati grading was- III, Thyromental distance was 7cm and neck movements were normal. Difficult airway cart was kept ready with different blades, bougie, supraglottic devices and instruments for surgical airway access. All standard monitors attached and intravenous(i.v.) access was secured with 18G cannula. Nasogastric tube was in situ and suctioned before induction. After adequate preoxygenation, Modified Rapid Sequence Intubation attempted using suxamethonium, after checking for adequacy of ventilation with gentle bag and mask ventilation in view of anticipated difficult airway. On direct laryngoscopy, Modified Cormack- Lehane score was 3 and endotracheal intubation was not successful even with the use of adjuvants. Once spontaneous breathing was achieved, the patient was awakened. Then awake retrograde intubation was planned using an epidural catheter as guide inserted through the cricothyroid (CT) membrane via 16G i.v. cannula. After local infiltration of 1 ml of 2% lignocaine and lignocaine 10% spray in pharynx, to avoid gagging, 16G cannula was inserted through the CT membrane at 90 degree with bevel facing in cephalad direction. Tracheal lumen was confirmed using air aspiration technique. After this the angle of cannula insertion

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decreased, needle withdrawn and catheter left in trachea. 2 ml of 2% lignocaine sprayed into the trachea through this catheter after reconfirmation of its position. An epidural catheter 18G was advanced through this 16G catheter until it comes out through the mouth then a suction catheter railroaded anterograde over epidural catheter to decrease discrepancy in the size and ultimately endotracheal intubation was done successfully with a 6.5(ID) ETT, using the rail road technique with a suction catheter as a guide. During all this procedure para-oxygenation was done using a nasal cannula. Perioperative period remained uneventful. At the end of surgery after full awakening and complete reversal of neuromuscular block, patient was successfully extubated.



DISCUSSION

Retrograde catheter intubation is well known alternative for securing the airway in difficult airway algorithm when the intubation is unsuccessful but ventilation is possible. Butler and Cirillo first described RI in a neck surgery in 1960.^[2] They used the tracheostomy tube (in situ) to pass the catheter retrograde in mouth and endotracheal intubation was done over this guide. Later on, in 1963, waters described RI and passed a plastic tube as guide for intubation through the cricothyroid membrane.^[3]

For RI, neck should be kept in extended position for better palpation of cricoids cartilage. However, it can be performed in normal position also. Ultrasound can be used to locate cricothyroid membrane in difficult conditions. The puncture can be done at either cricothyroid membrane or between the cricoid cartilage and first tracheal ring. The puncture at cricothyroid membrane has several advantages over other as there are no blood vessels, so less chance of bleeding and fewer chances of subglottic edema and stenosis, but it has low margin of safety during intubation because it is only 1cm below the vocal cords.^[4] Although the ETT can be directly advanced over the guidewire but a catheter advanced over guidewire then sliding the ETT over catheter is more useful to reduce the discrepancy in diameter between the guide-wire and the ETT. It helps the ETT to pass through the vocal cords smoothly and does not catch the arytenoids.

Retrograde intubation kits are available in many North American countries.^[5,6] Several modifications of this technique have been used with varying success. It can be used in awake, obtunded or comatose patients who have an anticipated difficult airway. Indications include failure to view the vocal cords by blood, secretions, or any anatomic derangement; and in difficult intubation conditions like suspected cervical spine injury, ankylosing spondylitis, facial trauma, or trismus. RI is also used as an alternative to Fiber-optic assisted intubation due to non availability of the later in some places.^[7] The commonest complications of RI are trauma to the larynx from the needle or wire, bleeding and hematoma formation, puncture of esophagus, oral or nasal trauma from the wire or passage of the endotracheal tube. Retrograde intubation should be avoided in unfavourable anatomy in cricothyroid area like landmarks not clear, pre-tracheal growth, flexion deformity of the neck, laryngotracheal pathology, coagulopathy, and infection.

A number of technical and procedural problems may occur during retrograde intubation. Due to unavailability of retrograde intubation set, we used epidural catheter with 16 i.v. cannula which is available everywhere. In some studies, J tipped vascular guide wire and modified tracheal tube guide with side eye were used for retrograde intubation to avoid laryngeal trauma. In our study we did not find any difficulty in retrieving epidural catheter via retrograde route.

Since RI would potentially be less invasive than cricothyrotomy or tracheostomy, so RI would be a reasonable intervention before cricothyrotomy or tracheostomy. In a simulated RI study, Van Stralen et al reported that RI on a mannequin required a mean time of 70 seconds. Although, simulated patient models are important for teaching purpose, they are not useful in stressful conditions of difficult airway management. Models also do not show the anatomical variation in airway and bleeding

complications that occur in difficult airway conditions in humans⁸. Hence, in difficult airway situations where orotracheal intubation is technically impossible, Retrograde tracheal intubation may be of particular use only in experienced hand.

CONCLUSION

Despite the complications and conditions described, the usefulness of retrograde intubation is there in difficult situations like blood and secretions in the airway, trismus, congenital anomalies, joint disorders such as rheumatoid arthritis, ankylosing spondylitis, limited mouth opening, and airway tumours or failed intubation with the direct laryngoscopic technique.

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How to cite this article: Preet A, Singh AK, Verma S, Kaur A. Retrograde Intubation An Alternative Way For Endotracheal Intubation Using Epidural Catheter As A Guide – A Case Report. *Ann. Int. Med. Den. Res.* 2019; 5(6):AN07-AN09.

Source of Support: Nil, **Conflict of Interest:** None declared