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Case Report

Awake Retrograde Intubation as a Practical Alternative to Fiberoptic Techniques in Cases of Severe Mouth Opening Limitation

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ABSTRACT

In instances with a complicated airway and limited mouth opening, retrograde intubation is a feasible option for airway management when a fiberoptic bronchoscope is inaccessible. This case illustrates the successful management of an airway challenge in a 54-year-old male patient weighing 45 kg, who presented with a mandibular fracture along with extensive trismus, employing a retrograde, guide-assisted intubation approach. In such scenarios, the primary goals are to safeguard sufficient oxygenation while minimizing airway injury.

Introduction

The management of a difficult airway presents a significant clinical challenge for anesthesiologists and emergency physicians, as delays in securing the airway can lead to serious, potentially irreversible complications. A thorough preoperative airway assessment is crucial, as it helps identify anatomical or physiological factors that could hinder standard airway management.

This evaluation facilitates the development of a personalized plan, the choice of suitable equipment, and the engagement of skilled personnel, thereby reducing perioperative morbidity and mortality. It is important to note that no predictive test is universally reliable; unexpected airway difficulties may still occur. Practitioners must be trained, vigilant, and prepared to manage unforeseen scenarios consistently [1].

The primary objective in instances of unforeseen complications after anesthesia induction is to prevent hypoxic injury. Constant oxygenation and ventilation are essential to prevent neurological injury related to hypoxemia while also reducing trauma to the airway structures from repeated or forceful intubation attempts. The execution of systematic, incremental strategies detailed in airway management guidelines enhances decision-making in high-pressure situations, reduces the risk of airway edema or bleeding, and leads to better patient outcomes.

Airway societies, such as the Difficult Airway Society (DAS), emphasize the value of contingency plans and cognitive rehearsal [2]. The structured algorithm facilitates a seamless transition among airway management options, thereby preventing delays that could jeopardize oxygenation.

This philosophy emphasizes the importance of preparedness: clinicians must be proficient with various airway devices and techniques to enable customized responses based on the clinical context.

Retrograde intubation is a valuable alternative among adjunctive techniques, especially in situations lacking specialized equipment like a fiberoptic bronchoscope. Learning this technique is straightforward, necessitating

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only fundamental instruments, and it can be critical in situations with limited mouth opening, altered airway anatomy, or upper airway obstruction.

Moreover, once acquired, the procedural skill demonstrates persistence over time, providing a dependable option for clinicians with minimal exposure to advanced airway technologies. With proper training and familiarity with these techniques, providers can markedly improve their capacity to handle challenging airways safely and efficiently [3].

Case Report

A 54-year-old Indian male patient, who weighs 45 kg and measures 150 cm in height, is classified as American Society of Anesthesiologists (ASA) I and is posted for an elective open reduction with internal fixation of the mandible.

Preoperative airway assessment demonstrated zero finger mouth opening, a thyromental distance of 7 cm, and a full range of neck motion. Bilateral nasal patency was deemed satisfactory.

Apart from the reduced mouth opening and severe trismus, no additional predictors of a difficult airway were identified. Therefore, awake retrograde guide-assisted nasal intubation was planned. In view of the unavailability of a fiberoptic bronchoscope, surgical tracheostomy was designated as a contingency strategy should the primary approach fail. The patient was thoroughly informed, and consent for a possible tracheostomy was taken.

Preoperatively, the patient was counseled & Inj. Hydrocortisone 100 mg was given to reduce airway edema and inflammation. Approximately 20 minutes before the procedure, IM glycopyrrolate 0.2 mg was administered to reduce secretions. Nasal patency was assessed, followed by the instillation of 2-3 drops of topical nasal Xylometazoline 0.1% into each nostril.

The patient then received nebulization with 3 mL of 4% lignocaine combined with 40 mcg of dexmedetomidine for topical airway anesthesia and sedation. Subsequently, a well-lubricated 7 no. A nasopharyngeal airway using lignocaine jelly was inserted into the left nostril to maintain patency and improve patient comfort. Standard ASA monitoring, comprising pulse oximetry, non-invasive blood pressure measurement, and electrocardiogram, was commenced immediately upon the patient's arrival in the operating theater. Oxygen supplementation via nasal prongs at a flow rate of 5 L/min was initiated. Before commencing the airway procedure, a 10% lignocaine spray was applied to the oral cavity and posterior pharynx to ensure sufficient mucosal anesthesia. A mild sedation regimen utilizing a 0.3 µg/kg/hour infusion of dexmedetomidine was set up to enhance tolerance during airway manipulation while preserving spontaneous ventilation.

The patient was then placed in a supine posture, with neck extended and head elevated to enhance airway alignment and accessibility.

Following stringent aseptic protocols and utilizing local anesthetic infiltration, the cricothyroid membrane was penetrated with an 18-gauge Tuohy needle. (Figure 1). Correct entry into the tracheal lumen was verified by air aspiration via a saline-filled syringe (Figure 2).

A sterile, flexible, straight-tipped guide wire (150 cm length, 0.020″ diameter) was then carefully advanced through the lumen of the needle and successfully directed cephalad to be retrieved from the left nostril (Figure 3). An 8.0 ID endotracheal tube (flexometallic) was then railroaded over the guide wire (Figure 4), and following verification of proper placement by the presence of an end-tidal carbon dioxide waveform, the guide wire was withdrawn, and induction of general anesthesia was subsequently carried out with Inj. Propofol 2 mg/kg IV, Inj. Fentanyl 2 mcg/kg IV & Inj. Vecuronium 0.1 mg/kg IV.

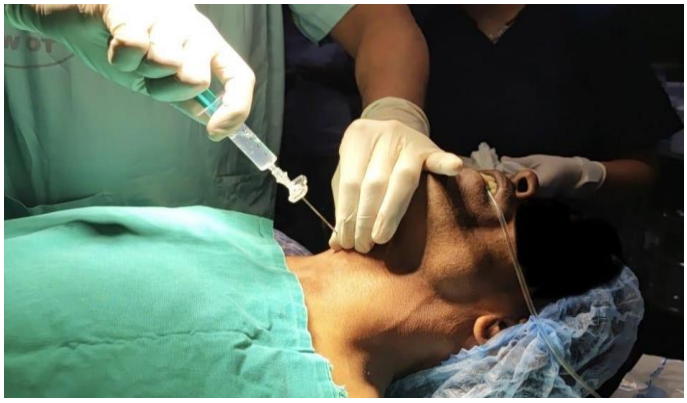


Figure 1- Cricothyroid Membrane Puncture

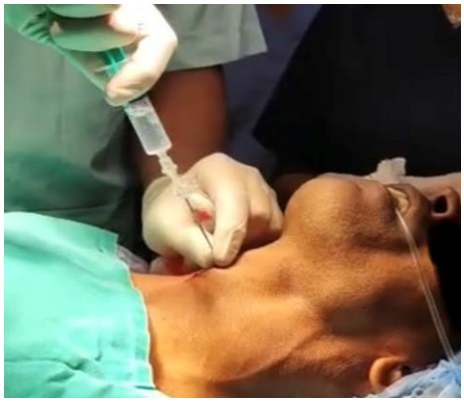
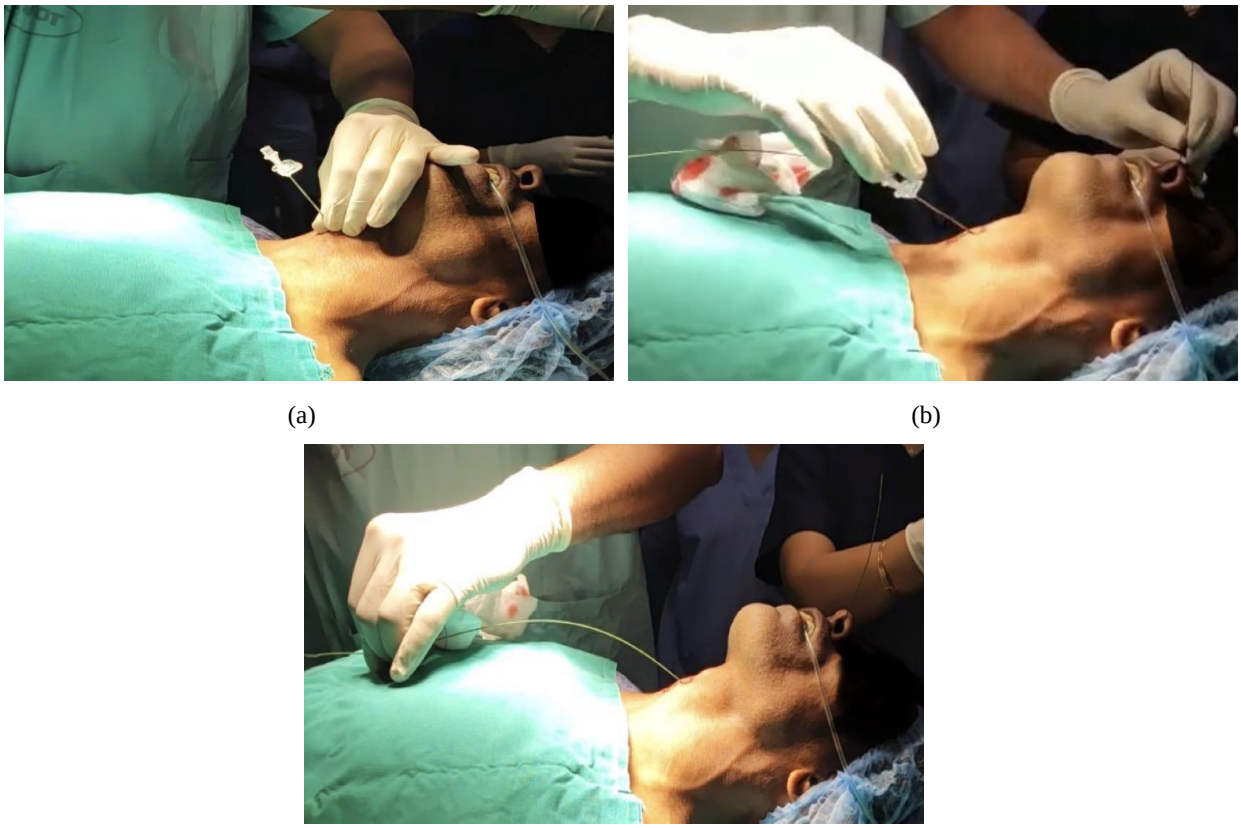


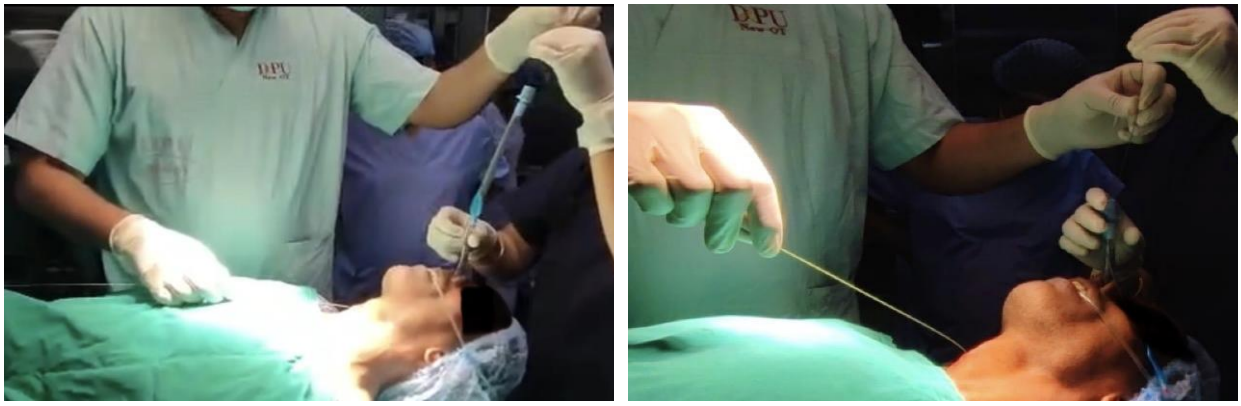
Figure 2- Tracheal confirmation



(a) (b)

(c)

Figure 3- (a) Touhy Needle in Trachea; (b) Guide-wire directed via left nostril; (c) Touhy needle removed



(a) (b)

Figure 4- (a), (b) Endotracheal tube railroading

Anesthesia was maintained with volume-control ventilation with oxygen, nitrous oxide, and sevoflurane (MAC 1). Upon completion of the procedure, residual neuromuscular blockade was antagonized with Inj. Neostigmine 0.05 mg/kg IV in combination with Inj. Glycopyrrolate 0.008 mg/kg IV. A dexmedetomidine infusion was maintained at a rate of 0.2 µg/kg/hour and continued until the period following tracheal extubation. Post-extubation, the patient was conscious and responsive to verbal instructions.

Discussion

The medical care of patients with maxillofacial trauma is complex due to the frequent compromise of upper airway anatomy. These injuries may be associated with

hemorrhage, inflammation, disrupted soft-tissue structures, and restricted access for standard airway devices. These conditions elevate the likelihood of airway obstruction, aspiration, and complications with mask ventilation or direct laryngoscopy. Thus, thorough evaluation and strategic planning are essential to avert hypoxic injury and safeguard patient safety [4].

Various airway management strategies can be utilized based on the clinical context. Methods include orotracheal or nasotracheal intubation, video laryngoscopy, awake fiberoptic intubation, retrograde intubation, placement of supraglottic airway devices, and surgical techniques such as cricothyrotomy or tracheostomy. The selection of technique is determined by airway anatomy, trauma severity, the accessibility of specialized equipment, and the providers' familiarity and proficiency with the intervention.

Retrograde intubation was first introduced by Butler and Cirillo in 1960, and the current literature has consistently emphasized its clinical utility in various airway management situations.

Retrograde intubation is an important technique in facilitating treatment of difficult airways, especially in clinical settings lacking advanced equipment like fiberoptic bronchoscopes. The procedure entails a percutaneous penetration of the cricothyroid membrane, followed by the insertion of a guiding wire through the larynx and pharynx, which facilitates the precisely controlled deployment of an endotracheal tube [5].

A significant advantage is its resilience in scenarios where visualization is hindered by blood or secretions, thereby elevating the risk of failed intubation and airway trauma [6]. Retrograde intubation is effective, as it does not necessitate continuous visual guidance, enabling spontaneous ventilation and minimizing excessive airway manipulation, which in turn reduces the risk of hypoxemia and collateral injury.

Conclusion

From a procedural perspective, retrograde intubation is straightforward to execute, necessitates limited equipment, and demonstrates a positive safety profile. The rates of complications are typically low and are often minor, such as transient sore throat, subcutaneous emphysema, or minor bleeding. In comparison to surgical tracheostomy, the level of invasiveness is significantly reduced, allowing for faster implementation and diminished postoperative care needs.

Notwithstanding these benefits, the technique is still not widely employed. This can be primarily attributed to insufficient familiarity, limited formal training, and inflated misconceptions about its complexity or invasiveness. This trend results in a paradox where a potentially lifesaving technique is rarely utilized, despite the unavailability or ineffectiveness of modern airway devices.

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