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Case Report

Anaesthesia Section

Retrograde Intubation in a Challenging Airway Scenario: A Case Report

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ABSTRACT

Retrograde intubation is a valuable technique for airway management in situations where conventional intubation is difficult or when fiber-optic bronchoscopy is unavailable. It involves introducing a guidewire through the cricothyroid membrane and retrieving it via the mouth or nostril to facilitate endotracheal tube placement. Initially described by Butler and Cirillo in 1960 and refined by Waters in 1963, it remains a practical option in select clinical scenarios. This case report describes a 35-year-old male with carcinoma of the buccal mucosa involving the gingivobuccal sulcus and retromolar trigone, who had a 15-year history of tobacco chewing. He was scheduled for commando surgery with a pectoralis major myocutaneous flap. Airway assessment revealed restricted mouth opening (0.5 cm), Mallampati grade IV, and patent nostrils, rendering standard oral intubation unfeasible. Under mild sedation, retrograde intubation was planned. An 18G Tuohy needle was inserted through the cricothyroid membrane, and a soft-tip ureteric guidewire was passed and retrieved through the nostril. A 7.0 mm cuffed flexometallic endotracheal tube was threaded over the guidewire. Successful placement was confirmed by capnography and chest auscultation. The patient remained stable and cooperative throughout the procedure and was extubated uneventfully the following day. This case highlights retrograde intubation as an effective and safe alternative for managing anticipated difficult airways when other advanced tools are unavailable.

Keywords: Airway management, Anaesthesia, Endotracheal intubation

CASE REPORT

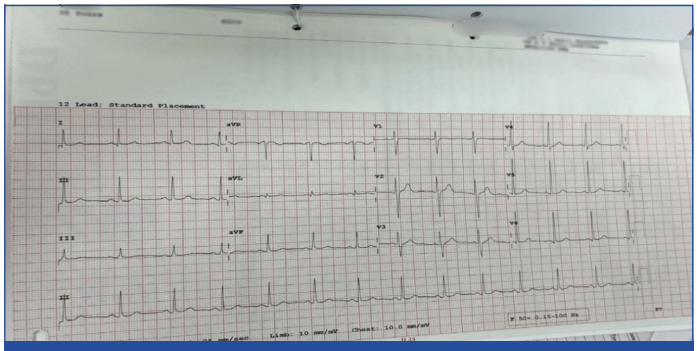
A 35-year-old male was admitted to our hospital in the department of oncosurgery with carcinoma of the buccal mucosa, involving the inferior gingivobuccal sulcus and retromolar trigone. The patient had been consuming Gutka, averaging 2-3 packets per day for the past 15 years, and was diagnosed with cancer six months ago. It began with a small growth, approximately peanut-sized, which gradually increased. He did not have any other medical, surgical, or family history.

His vital signs on examination were as follows: pulse rate - 80 bpm (regular), blood pressure-120/70 mmHg, SpO_2-99% on room air, and the rest of the systems were normal. Airway examination showed a normal set of teeth, reduced mouth opening of 0.5 cm [Table/Fig-1], Mallampati grade IV, adequate neck movements, a thyromental distance of 6.5 cm, and a laryngeal handshake could be performed. Both nostrils were patent.

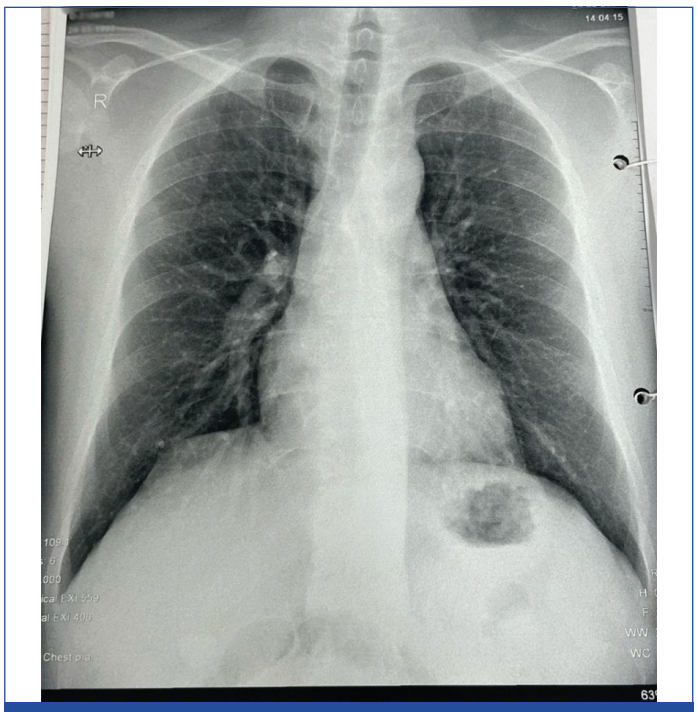
[Table/Fig-1]: Reduced mouth opening of 0.5 cm.

Blood investigations were within normal limits. The ECG [Table/Fig-2] and chest X-ray [Table/Fig-3] were also within normal limits, and the Two-Dimensional (2D) echocardiogram showed an ejection fraction of 60% with no regional wall motion abnormalities and trivial tricuspid regurgitation.

Retrograde intubation was planned for this patient under mild sedation. The risks and the possibility of a tracheostomy were



[Table/Fig-2]: Electrocardiogram (ECG) of the patient.



[Table/Fig-3]: Chest X-ray of the patient.

explained to the patient and their relatives [1]. Written and informed consent was obtained for the procedure. The patient was premedicated with glycopyrrolate (0.2 mg IV), ondansetron (4 mg IV), and fentanyl (50 mcg IV). Routine American Society of Anaesthesiologists (ASA) standard monitors were attached, and all precautions to prevent Coronavirus (COVID-19) infection (plastic cover sheets, masks, PPE kits, and face shields) were implemented.

Topical anaesthesia with a decongestant was achieved using xylometazoline (0.1%) in the right nostril, along with 2% lignocaine jelly. A 15% lignocaine spray was instilled over the posterior pharyngeal wall. Under all aseptic precautions, a superior laryngeal block was administered with lignocaine (2%, 2.0 mL) after negative aspiration for blood on both sides of the hyoid cornu. Transtracheal infiltration was performed with 4 mL [2] of lignocaine (2%) using a 24G 1.5-inch needle.

After local anaesthesia, an 18 G epidural Tuohy needle was passed cranially through the cricothyroid membrane, with the position confirmed by air aspiration in a saline-filled syringe. A ureteric guide wire with a soft tip was passed through the epidural needle, and it successfully came out through the nostril without difficulty due to the patient's cooperation in following the directions given before the procedure (to place the tongue against the palate as the wire advanced in the throat).

A 7.0 mm cuffed flexometallic endotracheal tube was passed over the guide wire through its Murphy eye. The ET tube was further advanced to intubate the patient, with correct placement confirmed by bilateral air entry, adequate chest expansion, and capnography. The guide wire was then removed. Throughout the procedure, the patient remained awake and cooperative. After confirming the tube placement, the patient was induced; the surgery was uneventful, and the patient was hemodynamically stable in the perioperative period.

After the procedure, the patient was reversed with neostigmine (2.5 mg) and glycopyrrolate (0.4 mg), and the tube was kept in situ while the patient was shifted to the ICU. He was extubated the next day in the ICU over an Airway Exchange Catheter (AEC) without complications.

DISCUSSION

Over the ensuing years, retrograde intubation did not gain widespread clinical acceptance due to its invasiveness and the potential complications related to puncturing the cricothyroid membrane [3]. However, this case supports its use in select situations, especially when other advanced tools are unavailable. Our experience aligns with findings by Prasad TK et al., who also encountered anatomical difficulties in locating the cricothyroid membrane and used ultrasound guidance for confirmation [4]. In both cases, retrograde intubation proved successful and safe in anticipated difficult airway scenarios.

The technique involves the introduction of a wire through the cricothyroid membrane using a Tuohy needle, followed by retrograde retrieval via the mouth or nose. Subsequently, a tracheal tube is guided antegrade over the wire into the trachea. The wire is then removed, and proper tube placement is confirmed. In our case, we used a soft-tip ureteric guidewire, known to minimise trauma, which was easily retrieved through the nose with the patient's cooperation. This technique is comparable to that described by Tiwari T et al., where a flexible bougie was passed over the guidewire and the endotracheal tube was railroaded over it [1].

Retrograde intubation can be performed using a variety of instruments, such as a ureteric guidewire, angiocatheter, epidural catheter, or Seldinger's wire, depending on availability. Our selection of a soft-tip catheter aligns with literature recommendations to reduce trauma [5]. Bagam KR et al., reported the use of a central venous catheter guidewire passed via a 16G needle, with the entire intubation completed in 145 seconds, demonstrating the technique's efficiency [6]. These cases reinforce the idea that retrograde intubation is effective, particularly in urgent or resource-limited situations.

In summary, retrograde intubation has advantages over fiberoptic bronchoscope-guided intubation, especially in the presence of blood or secretions in the upper airway or when time is limited [4]. It is also less invasive than surgical alternatives, such as needle or surgical cricothyrotomy. If the intubation or ventilation scenarios are not feasible, it can achieve the primary objective of oxygen delivery to the trachea [7]. Despite its variable success rate, our case and the published literature suggest that with proper technique and patient cooperation, retrograde intubation is a reliable and valuable tool for managing difficult airways.

CONCLUSION(S)

This case demonstrates that retrograde intubation is a reliable and safe technique for managing anticipated difficult airways, especially when fiber-optic equipment is unavailable. Using a soft-tip ureteric guidewire facilitated smooth nasal retrieval and successful intubation with minimal trauma. Proper patient counselling and adequate topical anaesthesia played a crucial role in the success of the procedure. Retrograde intubation remains a valuable option in resource-limited or emergency settings, and it certainly helps prevent many complications, such as hypoxia, airway trauma, and the need for tracheostomy.

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