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Anaesthetic Management of a Patient with Tracheal Stenosis Posted for Tracheo-Tracheal Anastomosis: A Case Report

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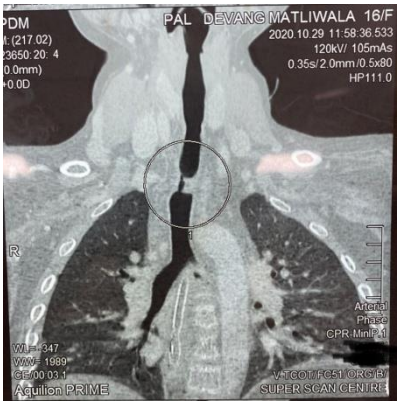
Introduction:
Tracheal stenosis is a narrowing of the trachea caused by various factors such as trauma, infections, tumors, or iatrogenic factors, including prolonged intubation or tracheostomy. This narrowing leads to progressive airway obstruction, presenting as coughing, stridor, and difficulty in breathing. In severe cases, tracheal resection and reconstruction offer a definitive solution to alleviate airway obstruction. Managing anaesthesia in these patients requires special attention due to the challenges posed by their compromised airways. This case report outlines the anaesthetic management of a patient undergoing tracheo-tracheal anastomosis.

Case Report:
A 35-year-old male presented with complaints of stridor and difficulty breathing for one month. The patient had a history of a road traffic accident (RTA) in 2017, which led to rhabdomyolysis, acute kidney injury (AKI), and acute respiratory distress syndrome (ARDS). He required 10 days of intubation followed by 14 days of tracheostomy. Post-discharge, he developed recurrent symptoms of airway obstruction and underwent laser excision and tracheostomy during two separate hospitalizations. Upon his recent admission, imaging studies revealed a 70-80% stenosis of the trachea, leading to the decision for surgical intervention with tracheo-tracheal anastomosis.

General Examination:
The patient was conscious, moderately built, and well-nourished with no signs of cyanosis. His vital signs were stable: Pulse rate 106/min, blood pressure 118/70 mmHg, respiratory rate 20/min, and oxygen saturation 99% on room air. He had stridor with bilateral air entry and generalized decreased air entry.

Investigations:
- Blood investigations: All within normal limits.
- Chest X-ray (CXR): No abnormalities detected.
- ECG: Sinus tachycardia.

- CT Neck and Thorax with Virtual Bronchoscopy: Revealed focal stenosis of the trachea (70-80%) located 80 mm from the carina, with a length of 15 mm.



Anaesthetic Management:

The anaesthetic plan was based on careful preoperative assessment and intraoperative considerations:

- Preoperative Fasting: Nil by mouth (NBM) for 6 hours before the surgery.
- Informed Consent: A detailed informed consent was obtained.
- Monitoring: Standard ASA monitoring was applied, including ECG, pulse oximeter, non-invasive blood pressure, and capnography.
- IV Access: A 20G intravenous line was established for fluid administration and drug delivery.
- Preoperative Nebulization: The patient was nebulized with Budesonide to reduce airway inflammation and prevent spasm.

Premedication:

- Inj. Glycopyrrolate 0.2 mg IV to reduce airway secretions.
- Inj. Ondansetron 4 mg IV as antiemetic drug.
- Inj. Fentanyl 100 µg IV as analgesic drug.
- Inj. Hydrocortisone 100 mg IV for anti-inflammatory action.
- Inj. Dexona 8 mg IV to minimize airway edema.

Induction and Intubation:

- Preoxygenation was carried out using 100% oxygen via Bain's circuit at 8-10 L/min for 3-5 minutes through the tracheostomy tube.
- Induction was achieved with 200 mg of Inj. Propofol IV, followed by confirmation of adequate ventilation.
- Muscle relaxation was induced with Inj. Succinylcholine 100 mg IV, followed by a loading dose of Inj. Atracurium 25 mg IV.

Maintenance and Intraoperative Ventilation:

- Anaesthesia was maintained using Sevoflurane and 100% oxygen.
- Tracheal Resection and Anastomosis: After removing the tracheostomy tube, jet ventilation was initiated for optimal oxygenation during surgery. Jet ventilation involves using a high-pressure oxygen source delivered in short bursts through a small catheter, allowing continuous oxygenation while the surgical site is being manipulated . This technique minimizes airway obstruction and facilitates access for the surgical procedure.- After the anastomosis, the small-sized endotracheal tube was removed, and jet ventilation continued to maintain oxygenation. A small-sized flexometallic tube was inserted through a laryngoscope for the final anastomosis.

Postoperative Care:

- Oral and endotracheal suctioning was performed post-surgery to remove secretions.
- The patient was ventilated with Bain's circuit until spontaneous respiration was established.
- Neuromuscular Reversal: Reversal of neuromuscular blockade was achieved with Inj. Glycopyrrolate 0.4 mg IV and Inj. Neostigmine 3.5 mg IV.
- Postoperative Medication: The patient was nebulized with Budesonide and adrenaline for 10 minutes to prevent postoperative stridor and airway distress.

Discussion:

The management of the airway during tracheal resection and reconstruction is complex, requiring effective anaesthetic techniques and careful planning. Jet ventilation is a commonly used technique during procedures involving the trachea, as it allows for ventilation without obstructing the surgical field . It works by creating high-pressure bursts of oxygen, which are delivered into the trachea, ensuring adequate gas exchange while the airway remains open for surgical interventions.

Complications associated with jet ventilation include barotrauma, pneumothorax, and subcutaneous emphysema, although these did not occur in this patient. Intraoperative communication between the anaesthesiologist and surgeon is vital to ensure the patient's safety and optimal management of the airway during the procedure.

Conclusion:

This case emphasizes the challenges and complexities of anaesthetizing patients undergoing tracheal resection and anastomosis. Thorough preoperative assessment, careful anaesthetic management, and effective communication between the surgical and anaesthesia teams are crucial for a successful

outcome. Jet ventilation, when used correctly, is an effective method for managing the airway during such surgeries.

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