Salvage of Critical Tracheal Stenosis Post-tracheal Reconstruction

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ABSTRACT
Tracheal resection and primary anastomosis is the treatment of choice for a short-segment stenosis. However, the procedure does carry the risk of two potentially fatal complications: Anastomotic breakdown and anastomotic leak. We describe a case of 24-year-old man who was treated for a 4 to 5 cm tracheal stenosis secondary to a prolonged intubation and tracheostomy after organophosphorus poisoning. The patient underwent a tracheal resection and primary anastomosis under general anaesthesia with the use of 7.5 mm tracheotracheal tube. The patient was extubated postoperatively after 2 days of controlled ventilation. After 25 days, patient came with tachypnoea, stridor and respiratory distress in emergency department, which was dealt by tracheal dilatation and tracheal stenting. Patient was discharged the next day, with the advice of stent removal after 6 weeks. Even after 1 year, patient did not attend the follow-up clinic, but he communicated to us stating that he has no problem.

Keywords: Tracheostomy, Tracheal stenosis, Tracheal tube, Endotracheal tube, Restenosis.

INTRODUCTION
Post-intubation tracheal stenosis is the most common indication for tracheal resection and reconstruction. The main aim is to provide adequate ventilation throughout the peri-operative period. This article discusses the successful management of a patient undergoing a high tracheal resection followed by tracheotraceal reconstruction and post-operative complication management. Common post-operative complications of tracheal reconstruction include granulation, dehiscence of the anastomosis, restenosis, vocal cord paralysis, tracheomalacia and infection. The incidence of one of these complications like suture line granuloma has decreased, since the use of absorbable synthetic sutures (e.g. vicryl) and the submucosal placement of sutures has become more common place.

CASE REPORT
A 24-year-old man, with a history of stridor, difficulty in breathing, who was referred to the cardiothoracic unit with a diagnosis of tracheal stenosis after a prolonged intubation and having metallic tracheal tube in situ.

Three months earlier, he had sustained acute renal failure and acute respiratory distress syndrome (ARDS) after the ingestion of organ phosphorus compound. He was mechanically ventilated through an oral tracheal tube followed by tracheostomy.

Patient was transferred to high dependency unit receiving nebulised bronchodilators, intravenous hydrocortisone, aminophylline, antibiotics and routine monitoring.

Indirect laryngoscopy revealed that both vocal cords were mobile. Computed tomography of the neck revealed a proximal tracheal stenosis. The patient was scheduled for primary resection and anastomosis of the tracheal stenosis.

ANAESTHETIC MANAGEMENT
Patient with metallic tracheal tube (TT) shifted onto the operating table with all routine monitoring. A total of 4% xylocaine infiltrated into the metallic tube to desensitised the distal trachea and blunt the cough reflex. Guide wire was passed through the metallic TT and the metallic tube removed. After this, a Portex disposable TT (7.5 mm) was railroaded into the trachea over the guide wire. Then guide wire was then removed, Portex TT bulb inflated and connected to ventilator with spontaneous ventilation. After this, patient was induced with fentanyl, propofol and muscle relaxation achieved with rocuronium. His tidal volume was kept to 500 mls with respiratory rate of 12 with I:E ratio 1:2. All vital parameters were well maintained intraoperatively.

Neck exploration, sternotomy and tracheal dissection done. The stenotic segment was isolated. It involved the distal cricoid cartilage and proximal trachea. The stenotic segment was circumferentially mobilised up to carina and four tracheal rings resected. The tracheo-tracheal tube was replaced with a flexometallic 9 mm endotracheal tube (ETT) through the neck incision. The posterior wall was reconstructed with interrupted vicryl sutures. After the posterior wall was repaired, the patient was reintubated orotracheally with the same 9 mm flexometallic tube used distally for ventilation. The tube then slided under the anastomosis to the distal part of trachea after that the anterior wall was repaired with interrupted vicryl sutures and sternum was closed with wires with mediastinal drain. The strap muscles were closed at the midline and the skin was closed after the subcutaneous space was drained.
All precautions to provide adequate oxygenation and carbon dioxide elimination during tracheal tube advancement were taken.

Post-operatively, the patient was kept in a position of head flexion by putting pillow under the head, so as to reduce tension on the suture line. The patient was not extubated immediately in the postoperative period. Chest physiotherapy, antibiotic, analgesic, endotracheal suctioning and nebulisation were carried out regularly. The patient was successfully extubated on the third postoperative day so as to allow adequate healing of the sutured trachea. Patient discharged 5th post-operative day.

After 25 days, patient came to emergency room with complain of difficulty in breathing, tachypnoea and stridor. There was indrawing of chest wall suggestive of upper airway obstruction. Patient was hemodynamically stable with SpO2 86% on room air. SpO2 improved after putting patient on O2 mask with 10 litre flow. The patient underwent CT scan that revealed a tracheal narrowing (Fig. 1). Patient then shifted to ICU. After sometime, patient had gradual decrease in SpO2 to 60%. ABG revealed pO2 – 40 mmHg and pCO2 – 67 mmHg. This warranted emergency intubation and ventilation. Patient was induced with midazolam and propofol and mask ventilated. The muscle relaxation was achieved with succinylcholine. Mask ventilation done, but intubation was difficult because of limited extension of neck and critical narrowing of trachea. ETT was able to pass the vocal cord but we were not able to pass it further because of narrowing of trachea ahead. Cuffed ETT size 7, 6, 5.5 and 5 were used successively to achieve intubation but failed. Finally, with difficulty, we were able to inubate the trachea 5 mm uncuffed ETT (Fig. 2). There was no air leak. Patient was ventilated with I:E ratio of 1:3. After 5 minutes, thereafter 20 minutes interval, ABG revealed improved pO2 and pCO2. The patient was shifted to operative room where he underwent tracheal dilatation (Fig. 3) and silicon stenting (Fig. 4) under general anaesthesia.

**DISCUSSION**

Though circumferential resection with primary end-to-end anastomosis, when possible, is the treatment of choice for tracheal stenosis, the high level of tolerance and the efficacy of silicone endoprostheses in the maintenance of airway patency has been extensively documented. Silicone tracheobronchial stents are effective in the maintenance of airway patency and are associated with good tolerance and infrequent complications that are rarely life-threatening. Airway stenting with silicone or expandable metal stents provides reliable and durable palliation in 80 to 95% of properly selected patients.

The major advantages of silicone stents are the ease of customization, repositioning and removal, with the major drawbacks being stent migration or stent obstruction. Expandable metal stents have the advantage of ease of...
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When patient came for tracheal reconstruction with metal tracheostomy. It is a challenging case for anaesthetist to maintain the airway, to induce and ventilate the patient for surgery. But the most challenging part was to manage post-surgical complication. As the patient had decreased trend of SpO₂ and increased PaCO₂ with signs of severe upper airway obstruction, it was wise to intubate and manage patient on ICU and then plan for stenting afterwards.

One should have a high index of suspicion of the complication of tracheal stenosis in patients presenting with respiratory failure post-tracheal reconstruction.

REFERENCES


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