

# Challenges in closure of long-term tracheostomy- prevention and management protocol

## ABSTRACT

Suprastomal granulation tissue can result in bleeding and difficulty in replacing tracheostomy tube. It delays decannulation and may interfere with the ventilation. Granulation tissue formation is generally a consequence of rather than a complication of tracheostomy. We present a pediatric and adult case who suffered from long term complications of tracheostomy. Purpose of these case studies is to highlight how we can prevent such complications and the management protocol. Suprastomal granulation in both cases were excised with help of RF ablation and stenosed segment of airway was subsequently dilated by airway balloon. Both patients were followed over a period of 6 months, with regular flexible endoscopy. After ensuring the healing and patency of the airway tract, they were decannulated as per protocol. Hereby we want to emphasize that tracheostomy tube care and decision to decannulate at right time must involve multispecialty experts including critical care team and otorhinolaryngologists.

**Keywords:** Airway balloon dilatation, decannulation, flexible endoscopy, granulation tissue, RF ablation, suprastomal, tracheostomy

## INTRODUCTION

The origin of the suprastomal lesions may be related to cartilage trauma during the procedure, friction from the tube itself, infection, or pooling of secretions in this area.<sup>[1]</sup> Although small, nonobstructing granulomas do not require removal given their high recurrence rate and the low morbidity associated with them. Larger granulomas are associated with a much higher morbidity, from bleeding, poor voice production to accidental decannulation.<sup>[2-4]</sup> Many techniques have been described for granuloma removal, including endoscopic with the help of laser, radiofrequency (RF) ablation, forceps, and open excision. There are challenges to all of these techniques, and one has not proven to be superior to the rest. The use of any laser brings an inadvertent risk of airway fire. Forceps and other techniques may be associated with increased bleeding as well as the possibility of tissue loss into the lower airways.

### Case 1

A 7-year-old child who came for plastic surgery could not be intubated due to Grade 1 glottic web. Tracheostomy

ventilation was used for multiple plastic procedures. Glottic web was released by an ENT team. Two months later, after multiple attempts of decannulation failed, he was referred to us. Virtual bronchoscopy CT of the neck was done which revealed a grade 3 glottic stenosis and a suprastomal granulation tissue, releasing the stenosis without injuring the vocal cords was a challenge [Figure 1a and b] Release of glottic stenosis, suprastomal granulation tissue excision with RF ablation and subsequent airway balloon dilatation were performed. Mitomycin C was applied over the vocal cords to prevent adhesions. After 10 days, second stage removal of the residual tissue with airway balloon dilatation

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was done. Regular flexible endoscopy was done in each visit up to 6 months, to look for healing and patency of the airway, he was safely decannulated and normal voice restored [Figure 1c].

### Case 2

A case of 58-year-old female with uncontrolled diabetes who was on prolonged tracheostomy for surgical treatment of carcinoma of the buccal mucosa. On flexible endoscopic examination, large obstructing suprastomal granulation tissue was noted [Figure 2]. CT neck was done which showed diffuse circumferential soft-tissue thickening of the proximal trachea, involving a 2.2 cm length of the trachea and causing moderate luminal narrowing. RF ablation-assisted airway surgery was performed. She was placed in a supine position with number 6 size nonfenestrated tracheostomy tube *in situ*. Laryngoscope was fixed in position, with the help of RF ablator, tissue was excised followed by balloon dilatation of the airway. The steroid was injected locally. The tracheostomy tube was downsized and eventually and safely decannulated in the subsequent visit. Regular flexible endoscopy was done in each visit upto 6 months, to look for healing and patency of the airway.

### DISCUSSION

Tracheostomy is a lifesaving procedure. But the procedure itself can have some immediate as well as late complications. The purpose of presenting this case series is to show how we can prevent these late complications under guidance of otorhinolaryngologist. In chronically ill patients with multiple medical problems on long term mechanical ventilation, the critical care team, nursing staff along with the ENT team must ensure that care of the stoma and tracheostomy tube is done on a regular basis. Following a protocol of regular tracheostomy tube changes may also

decrease the incidence of granulation tissue requiring operative intervention.

Tracheostomy tube elicits an inflammatory reaction because of its motion with swallowing and the positive pressure with mechanical ventilation. Debris which accumulates at the mucocutaneous junction at the stoma and around the tube, is a source of bacterial colonization, subsequently may lead to hemorrhage (especially in patients on anticoagulant therapy), difficulty in replacing the tracheostomy tube in instances of accidental dislodgement and a delay in decannulation, occasionally deaths have also been reported.<sup>[5]</sup>

In patients who have tracheostomy tube for more than a month, decannulation should be properly planned under guidance of otorhinolaryngologist. We recommend first to check airway patency with endoscope and ensure patient has no risk of aspiration. After that replace the cuffed tube with uncuffed smaller size tube or double lumen fenestrated tube. Then block the new tube for 24 hours and observe the patient. If patient tolerated well, plan removal of tracheostomy tube completely. When granulation tissue becomes obstructive, preventing ventilatory support, surgical intervention should be considered. Use of endoscopic equipment in conjunction with excision has been described as a safe, reliable method for removal of obstructing Suprastomal granulation tissue.

### CONCLUSION

Early detection of granulation tissue at the tracheostomy site can prevent serious airway complications. In patients with prolonged use of tracheostomy, good hygiene around the stoma and frequent tube change must be ensured. In case of pus from the stoma site, it should be evaluated and treated immediately. Once the patient is planned for decannulation, prior to that an airway assessment can be done to confirm

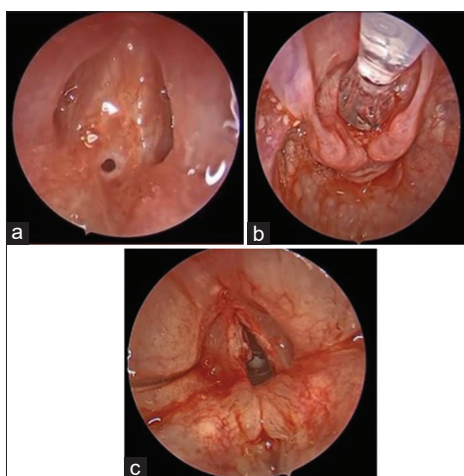


Figure 1: (a) Glottic stenosis, (b) After adequate dissection laryngeal balloon dilator used, (c) Postsurgery – Near-normal laryngeal opening

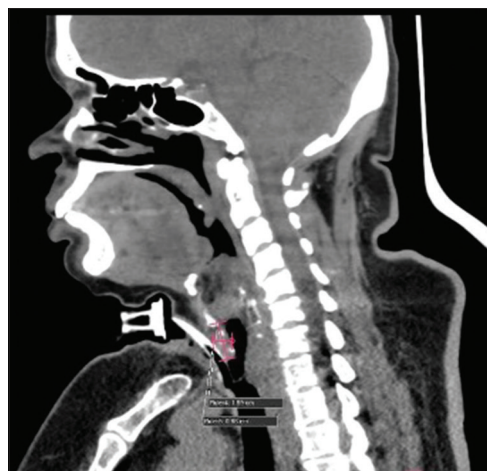


Figure 2: Suprastomal granulation tissue measuring 1.99 cm x 0.98 cm

the patency of the airway. Moreover, if the patient underwent airway surgery, periodic follow-up over 3 months is required to ensure that the tract is patent and healed.

#### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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#### Conflicts of interest

There are no conflicts of interest.

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