Management of suprastomal tracheal obstruction following : a case report

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Abstract To demonstrate the importance of proper pre operative assessment of laryngotracheal stenosis especially if it acquired one. It also demonstrates the fact that the available treatment modalities for laryngotracheal obstruction can be easily modified as per the clinical presentation for better post operative results. Here we present a case of tracheal stenosis following percutaneous tracheostomy where there was suprastomal tracheal obstruction which was managed in an interesting way to give good post operative results. The obstruction was due to impaction of the first tracheal ring in the stoma which was fused to the posterior tracheal wall. The obstructing tissue was excised and tracheal lumen was established. New tracheostomy was made lower down and the previous stoma was closed. By proper pre operative evaluation and assessment of the unique pathomechanism of stenosis in this case we could operate the above case by simply excising the obstructing tissue and establishing a lumen instead of resorting to other demanding operations for stenosis of larynx that often lead to complications.

Keywords Percutaneous tracheostomy · Tracheal stenosis · Suprastomal obstruction · Laryngotracheal reconstruction

Introduction

Laryngotracheal reconstruction following laryngeal stenosis is one of the challenging operations of Otorhinolaryngology. Often the results of these operations are not very satisfactory due to multiple factors. There have been many procedures and equal number of modifications for the treatment of laryngeal stenosis which in itself shows that none of the procedures are standard and treatment options can vary according to the need of the patient. So many a times we have to improvise methods to suit a particular case. Here we are presenting a case of tracheal stenosis that had resulted post tracheostomy and was dealt with in an interesting manner.

Case report

A tracheostomised patient was referred to us from the intensive care medicine dept. for their inability to decannulate this patient. This patient was a case of Guillain-Barre syndrome and had been tracheostomised via the percutaneous technique in the critical care department of SGPGI two years before. At the time of presentation patient had gained enough respiratory strength and had been weaned off the ventilator. It was also noticed that patient was unable to phonate in spite of being tracheostomised by a 6 mm tracheostomy tube.

Flexible laryngoscopy of the patient revealed a soft tissue mass in the subglottic region which was completely occluding the tracheal lumen. On CT Scan no significant abnormality was detected in the suprastomal region. The vocal cords and the supraglottis was normal. These findings were also confirmed by Direct laryngoscopic examination. Having anticipated supra stomal obstruction based upon our endoscopic finding, we had planned to remove the obstructing mass and insert a silicon T-tube to maintain the patency and airway of the larynx while the healing occurred.

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Operative difficulties and its management

The larynx and upper trachea was exposed giving a Gluck Sorenson type incision. It was noticed that the tracheostomy was done just below the cricoid which was at a higher level than normal. To facilitate proper evaluation and dissection of the obstructing soft tissue a new tracheostome was made two rings below the previous stoma. The tracheostomy tube was shifted in this new stoma and the proximal stomal site was carefully inspected. It was observed that upper end of the stoma was completely occluded with fibrocartilagenous tissue. This tissue contained the 1st tracheal ring which had been pushed inwards and had fused with the posterior tracheal wall occluding the tracheal lumen completely (Fig. 1). Now with sharp dissection an opening was made through the obstructing soft tissue it was excised and the tracheal lumen was restored. An endoscope was then introduced through this opening and the subglottic region was inspected which was found to be normal (Fig. 2). Silicone T tube was then introduced in the lumen via the new tracheostomy site and its extra tracheal part was taken out from a different incision on the skin. The previous tracheal stoma was closed and the wound was closed in layers. On recovery the patient was able to breathe with the T tube closed and was able to phonate without any difficulty.

Discussion

Chronic laryngeal stenosis is said to be established if the airway is unsatisfactory 4 weeks after the injury [1]. It is an important condition which interferes with the speech, breathing and the ability to clear secretions from the lower airways [1–2]. Respiratory insufficiency following Guillain-Barre is managed by intubation or tracheostomy with assisted ventilation and positive end expiratory pressure. Laryngeal stenosis sometimes develop due to the scarring from the infectious process or high placement of the tracheostomy [3]. In the documented case above, the previous tracheostomy was done by percutaneous technique at the 1st and 2nd tracheal ring level which had displaced the 1st tracheal ring towards the posterior tracheal wall.

Percutaneous tracheostomy is an alternative to surgical tracheostomy, especially for physicians in ICUs. This technique has the advantage of being performed at the bedside, with a low incidence of complications. However, most series in the literature do not report medium-term or long-term follow-up. Cases have been reported where there was laryngotracheal stenosis following percutaneous tracheostomy [13]. The mechanism underlying these stenoses is fracture of the tracheal ring when the cannula is inserted. These cases are associated with difficult perforation of the trachea when the dilator and the cannula are inserted. and, with time, the flap becomes impacted against the posterior wall with synechia [13].

Fig. 1 Intraoperative picture showing the obstructing fibrocartilagenous anterior tracheal flap which was fused to the posterior tracheal wall thus occluding the laryngeal lumen at the initial tracheostomy site

Fig. 2 Endoscopic view after the surgery, showing the anterior edge of the obstructing soft tissue which was excised to establish tracheal lumen

Some of the treatments for Tracheal stenosis include:

- Serial dilations [1, 2, 9, 10, 11, 12]
- Endoscopic excision [9, 10, 11, 12]
- Anterior Cricoid Split (ACS) posterior cricoid split [4, 5, 6, 10]
- Laryngotracheoplasty (LTP) [1, 2, 6, 7, 9, 10, 11, 12]
- Cricoid framework expansion [4]
- Primary cricotracheal resection (PCTR) [1, 2]
- Single stage laryngotracheal reconstruction [8]

In our case the occluding fibrocartilagenous tissue was excised and a lumen was established which was kept patent using a silicon T-Tube. In this patient we could avoid a major operative procedure. The obstruction in this case was suprastomal and the stomal site was widely opened and

dissected, the obstructing lesion was intraluminal hence there was no need for performing any expansion procedures. Use of silicone T-Tube after having excised the obstructing soft tissue aided in better healing further making decannulation easier. T-tube is made up of silicone which is very well tolerated by the body and usually does not get obstructed with secretions or crust. It is thus easier to maintain it during post operative period.

Conclusion

The treatment of tracheal stenosis following tracheostomy has seen many modifications in recent times and many other modifications are still to come. The preoperative assessment by endoscopy and radio imaging is essential to know the site and extent of the stenosed segment. Some times though the radiology may not be confirmatory and so endoscopic findings are a must for planning of treatment modality. The selection of the operative technique will depend upon these factors.

The above case report shows how we can modify the available treatment modality according to the clinical presentation and at times a very simple surgical procedure can give good results as in this case. The mechanism behind the formation of the stenosis is also unique to this case.

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