

OUR INSTITUTIONAL EXPERIENCE IN THE MANAGEMENT OF TRACHEAL STENOSIS – CASE SERIES

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Abstract

Tracheal stenosis is an unfortunate and rather complicated clinical condition due to its management difficulty. This study discusses managing tracheal stenosis patients admitted to the Department of Cardiovascular and Thoracic Surgery (CVTS) and the Department of Respiratory Medicine, Govt Rajaji Hospital (GRH) Madurai Medical College, Madurai. Six of the 22 patients included in this study had a tracheal injury, and 13 had post-intubation stenosis. Three patients post Montgomery tube insertion (pie chart 3). The average length of the trachea resected ranged from 3-4cm. Following resection, a tension-free end-to-end tracheal anastomosis was performed. First-line tracheal resection and primary anastomosis are safe options for treating tracheal stenosis. Most are best treated by segmental resection; up to 5 cm resection can be done without the tracheal release procedure, and up to 8 cm resection can be done with the tracheal release procedure.

INTRODUCTION

Tracheal stenosis is an unfortunate and complicated clinical condition due to its management difficulty caused by variable etiological factors. The commonest is an inflammatory complication of prolonged intubation or tracheostomy, requiring a multidisciplinary approach and well-trained personnel.^[1] Optimal management of tracheal stenosis, in general, is still a point of debate for open surgical techniques vs endoscopic procedures.^[2] In this study, we discuss the management of tracheal stenosis patients admitted in the Dept of CVTS and Department of Respiratory Medicine, Govt Rajaji Hospital (GRH) and Madurai Medical College, Madurai.

MATERIALS AND METHODS

TA retrospective study involved patients admitted to the Department of cardiovascular thoracic surgery and the Department of Respiratory Medicine in GRH Madurai to manage post-intubation tracheal stenosis from Nov 2018 to DEC 2022. Inclusion

criteria consisted of patients with a history of previous intubation or tracheal injury with a minimum of one episode of stridor and with CT confirmed significant tracheal stenosis. Patients with asymptomatic tracheal stenosis are excluded from the study.

Pre-Operative Assessment

All the patients presenting with stridor or respiratory difficulty are first assessed clinically, and then Computed tomography (CT) of the neck and chest with 3D reconstruction trachea is a valuable pre-operative imaging modality done in all patients.^[3] Patients are examined routinely using direct laryngoscopy to assess vocal cord mobility and to exclude glottic stenosis and Fibre Optic Bronchoscopy (FOB) for post-stenotic tracheal lumen assessment.^[4]

RESULTS

Totally 22 patients were admitted with the above criteria for four years. Of these, nine patients were female, and 13 were male (pie chart 1). The age was 17 to 65; the median was 38 years (pie chart 2). Six

of the 22 patients had a tracheal injury, and 13 had post-intubation stenosis. 3 patients post Montgomery tube insertion (pie chart 3). The average length of the trachea resected ranged from 3-4cm. Following resection, a tension-free end-to-end tracheal anastomosis was performed. The laryngeal release was not required in any of the patients.

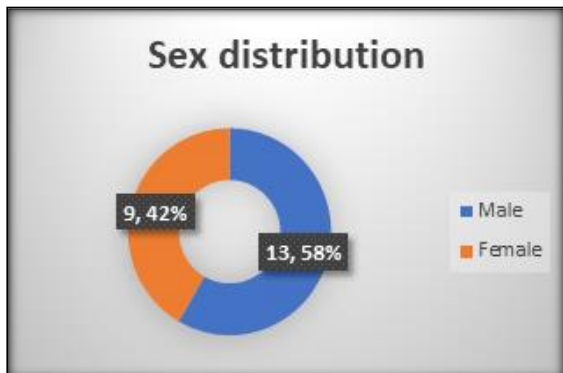


Figure 1: Sex distribution

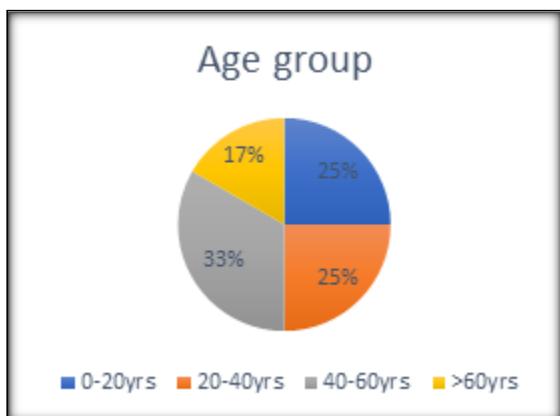


Figure 2: Age distribution

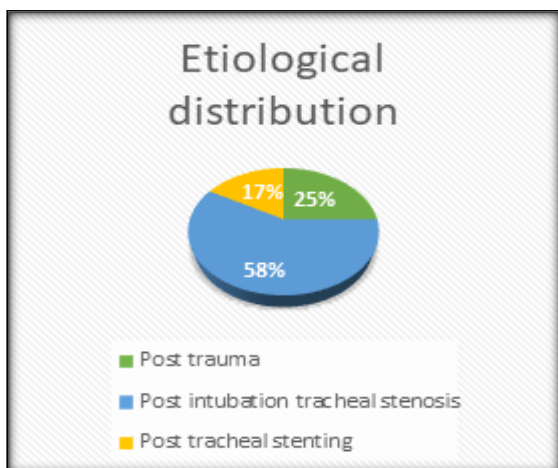


Figure 3: Etiology distribution

A guarding suture (GRILLO'S suture) from the submental crease of the chin to the pre-sternal skin was secured for seven days postoperatively for all patients to maintain neck flexion to avoid tension over the anastomotic site.

All the patients were extubated in ICU after stabilization on the same day of surgery. All patients were followed with post-op CT neck.

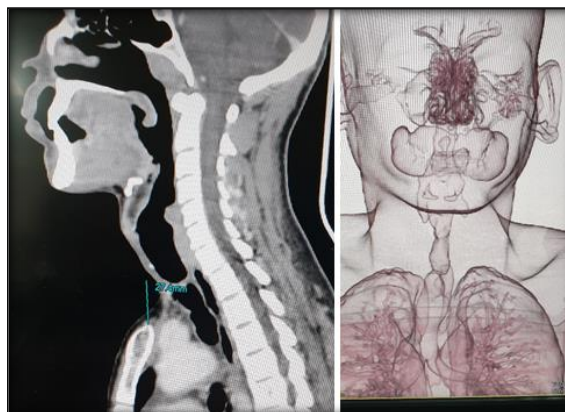


Figure 4: Pre-operative 3D CT showing Tracheal stenosis



Figure 5: Intraoperative picture



Figure 6: Post-operative picture showing GRILLO'S stitch



Figure 7: Post-operative CT showing normal size tracheal lumen



Figure 8: Patient with Montgomery T-Tube in situ

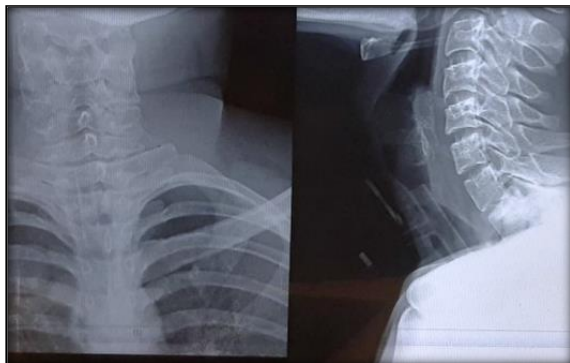


Figure 9: Patient X-ray showing Montgomery T-Tube

DISCUSSION

Most of the tracheal stenosis is due to post-intubation tracheal caused by regional ischaemic pressure necrosis of the airway. Stenosis can occur anywhere from the level of the ETT tip up to the glottic and subglottic area, but the most common sites of stenosis are where the ETT cuff is in direct contact with the wall of the trachea.

In our study, adult patients' respiratory symptoms become apparent when the tracheal lumen size (internal diameter) is decreased to approximately 50%- or 8 mm. Inspiratory stridor starts appearing at

rest when the tracheal lumen size is further reduced to 5–6mm.

One of the important complications in tracheal surgery is postoperative granulation tissue formation. As this occurs in proportion to the traction at the anastomosis site choosing an appropriate type of suture is important.^[8,9] We prefer absorbable 3-0 polyglactin (Vicryl) interrupted sutures. Suture tension should be minimal, and the suture knots should be placed outside the tracheal wall to prevent granulation tissue formation. The lateral dissection should be minimal (less than 1 cm from margins), thereby preserving the blood supply to the tracheal anastomotic site to prevent anastomotic site dehiscence while excising the stenotic segment.

CONCLUSION

First-line tracheal resection and primary anastomosis are safe options for treating tracheal stenosis. Although some mild strictures may be satisfactorily managed by endoscopic dilatation, it needs repeated dilation. Few cases may need Montgomery T tube insertion, stent placement, or long-term metal tracheostomy tubes. Most are best treated by segmental resection; up to 5 cm resection can be done without a tracheal release procedure. Up to 8 cm resection can be done with a tracheal release procedure.

REFERENCES

1. George M, Lang F, Pasche P, Monnier P. Surgical management of laryngotracheal stenosis in adults. *Eur Arch Otorhinolaryngol* 2005; 262:609–15.
2. Marques P, Leal L, Spratley J, Cardoso E, Santos M. Tracheal resection with primary anastomosis: 10 years experience. *Am J Otolaryngol* 2009; 30:415–8.
3. Nair S, Mohan S, Mandal G, Nilakantan A. Tracheal stenosis: our experience at a tertiary care centre in India with special regard to cause and management. *Indian J Otolaryngol Head Neck Surg* 2014; 66:51–6.
4. Sathe NU, Srinivas A, Ahmed S, Magdum R. Management of intrathoracic tracheal stenosis: a challenge. *Egypt J Otolaryngol* 2022;38.
5. Nouraei SAR, Ma E, Patel A, Howard DJ, Sandhu GS. Estimating the population incidence of adult post-intubation laryngotracheal stenosis: Correspondence. *Clin Otolaryngol* 2007; 32:411–2.
6. Zias N, Chroniou A, Tappa MK, Gonzalez AV, Gray AW, Lamb CR, et al. Post tracheostomy and post-intubation tracheal stenosis: report of 31 cases and review of the literature. *BMC Pulm Med* 2008; 8:18.
7. Hassan FH, Goh BS, Kong MH, Marina MB, Sani A. Tracheal resection and anastomosis: an 11-year management outcome. *Rawal Med J* 2013; 38:177–180.
8. Wright CD, Grillo HC, Wain JC, Wong DR, Donahue DM, Gaiassert HA, et al. Anastomotic complications after tracheal resection: prognostic factors and management. *J Thorac Cardiovasc Surg* 2004; 128:731–9.
9. Behrend M, Klempnauer J. Influence of suture material and technique on end-to-end reconstruction in tracheal surgery: an experimental study in sheep. *Eur Surg Res* 2001; 33:210–6.
10. Montgomery WW. Manual for the care of the Montgomery silicone tracheal T-tube. *Ann Otol Rhinol Laryngol Suppl* 1980; 89:1–8.