

## Case Series

### Stent and stay suture

<sup>1</sup>A M Khoja, <sup>2</sup>C S Patel, <sup>2</sup>A Yannawar, <sup>2</sup>D Jain, <sup>2</sup>S Garde, <sup>2</sup>O Kajale

<sup>1</sup>Professor & Head, <sup>2</sup>Post Graduate Resident, Department of Pulmonary Medicine, Ruby Hall Clinic, Grant Medical Foundation, Pune, Maharashtra, India.

#### Abstract

Silicone stents are effective; however, one of its known complications is migration. To prevent migration of stent we used a different practical approach, of securing the stent in the trachea with non-absorbable poly-propylene suture material through trachea and silicone stent after skeletonizing trachea to prevent infection and better cosmetic result.

*Keywords:* Central airway obstruction, Stenosis, stent, stay suture

*(Thoracic Endoscopy 2016; 1: 119-122)*

#### Introduction

Central airway obstruction is defined, as the obstruction of the trachea and the principle bronchi.<sup>1</sup> In a small number of patients narrowing may be present in more than one anatomical location.<sup>2</sup> Benign tracheal stenosis may occur for a variety of reasons like trauma, Radiation or prolonged intubation.<sup>3,4,5</sup> Many corrective procedures have been developed of which bronchoscopic therapies for stenosis include; laser excision, balloon dilation, rigid bronchoscopic dilation, injecting corticosteroids, topical mitomycin-c and silicone stent placement.<sup>1,6,7</sup> Historical attempts at airway stenting began in the 19<sup>th</sup> century, and tracheostomy tubes and Montgomery tracheal T tubes have been extremely used to palliate benign and malignant strictures.<sup>3</sup> Silicone stents are effective at maintaining airway patency; however, one of its known complications is stent migration. Many novel techniques have been discovered to prevent migration of tracheal stent, but complications like infection have been reported.<sup>8</sup> To prevent migration of stent we used a different practical approach, of securing the stent in the trachea with non-

absorbable poly-propylene suture material through trachea and silicone stent under bronchoscopic visualization after skeletonizing trachea to prevent infection and better cosmetic result. We aimed to determine the safety and effectiveness of securing silicone stent in the proximal trachea with a stay suture.

#### Materials and Method

Between January 2012 and December 2012, 4 patients with surgically inaccessible benign proximal tracheal stenosis were observed prospectively. Of the four patients, 3 were male and 1 female. Silicone stent were placed to secure the airway depending on the location, size and initial presentation. A different approach of securing the stent to the trachea with stay suture was used in all the patients with repeated stent migration and the procedural outcome was observed.

General anesthesia was administered to the patient in supine position, after which a rigid bronchoscope was passed into the trachea to evaluate the stenosis.

Stenosis was corrected with balloon dilatation and/or with the rigid bronchoscope itself and

an appropriate size stent was deployed in the affected area and adjusted, if required, with rigid forceps.



**Figure 1.** Needle being passed through skeletonized trachea



**Figure 2.** Needle passed through stent

A Flexible fibre optic bronchoscope was passed through the channel of rigid bronchoscope for better visualization. A cutting body needle with 1.0 poly-propylene suture material was inserted through the trachea (Figure 1) and the wall of the stent (Figure 2). Under direct visualization with a fibre optic bronchoscope, the same needle was passed through the stent and the trachea

and the knot was tied outside, ensuring that it is tight enough to prevent migration (Figure 3). Skin layer was closed with sub-cuticular stitches using 3.0 ethilon. The subcuticular stitch was removed on Day 7 and bronchoscopic re-evaluation of the stent was done on Day 10.



**Figure 3.** sutured stent with trachea

### Result

In our study the male to female ratio was 3:1 and the mean age of presentation was 38. Silicone stent was used in all patients and common indication for stay suture was repeated migration. The procedure was well tolerated by the patients. Stay suture was accepted and was comfortable for the patients and there were no incidences of intolerance or complications (migration and/or infection) noted in the two months follow up session.

### Discussion

Laryngotracheal stenosis refers to abnormal narrowing of the central airway. This can occur at the level of the larynx, trachea, carina or main bronchi.<sup>1,5,9</sup> The most common cause of benign tracheal stenosis continues to be trauma, which can be internal or external. Internal causes include; prolonged intubation, result of surgery, irradiation and endotracheal

### Stent and stay suture

burn. External causes include; blunt or penetrating neck trauma.<sup>6,11</sup> In some cases, a short segment stenosis can be treated with surgical resection. Complex, long and stenosis occurring at the very proximal portion of the trachea are not effectively treatable with surgical resection and therefore require treatment via a rigid or flexible bronchoscope. Bronchoscopic therapies for stenosis include laser excision, balloon dilation, rigid bronchoscopic dilation, injecting corticosteroids, topical mitomycin-c and silicone stent placement.<sup>1</sup> Silicone stents are effective at maintaining airway patency; however, one of the known complications is stent migration.<sup>1</sup> One known solution to prevent stent migration is the incorporation of a plurality of protrusion or studs on the outer surface of the stent. Tracheal stent is very prone to migration prior to seating of the studs. Different novel techniques have been developed to secure stent in the trachea like airway anchor suture, PEG-tube fastener etc.<sup>3</sup> Here we used a practical approach to prevent migration - using a stay suture. We observed that this method was easy to perform and feasible. It was accepted and well tolerated by the patients. No case of stent migration was noted while the suture was in place. There was no evidence of infection or any complication noted on the regular follow ups two months later. As the skin layer was closed with subcuticular stitches, better cosmetic results were achieved. Thus, this technique was proven to be safe and effective in prevention of migration with less chances of complication and good cosmesis. This was an observational study and cannot be compared with other techniques due to small sample size.

### Conclusion

In our small prospective sample, securing silicone stents in the proximal trachea with

the stay suture was feasible and practical. We did not encounter any complications during or after the procedure. It was successful at preventing migration and was proven to have a less chance of infection and better cosmetic result.

### References

1. Grillo HC, Donahue DM, Mathisen DJ, Wain JC, Wrigth CD: Postintubation Tracheal Stenosis. Treatment and results. *The Journal of Thoracic and cardiovascular surgery* 1995, 109(3):486-492.
2. Majid A, Fernandez-Bussy S, Kent M, Folch E, Fernandez L, Cheng G, Gangadharan SP. External fixation of proximal tracheal airway stents: A modified technique. *Ann Thorac Surg* 2012;93:e167-e169.
3. MacEwen W: Clinical observations on the introduction of tracheal tubes by the mouth instead of performing tracheostomy or laryngotomy. *Br Med J* 1880;2:122-124.
4. Davis N, Madden BP, Sheth A, Crerar-Gilbert AJ. Airway management of patients with tracheobronchial stents. *Brit J Anaesth*. 2006;96(1):132-5.
5. Galluccio G, Lucantoni G, Battistoni P et al. Interventional endoscopy in the management of benign tracheal stenosis: Definitive treatment at long-term follow up. *Eur J Cardiothorac Surg* 2009;35:429-34.
6. Iliadis K, Misthos P, Garbis D, Hatzinis A, Agianidou K, Adam A, Kontaxis A. Airway stenting for malignant and benign tracheobronchial stenosis. *Pneumon* 2006, 19(3):245-51.
7. Jabbarjarjani H, Kiani A, Sheikhi N. Argon plasma coagulation in treatment of post intubation tracheal stenosis. *J Lasers. Med Sci*. 2011;2(2):49-53.
8. K. Jensen , A. I. Musani , M. Weyant , K. Garces , J. Mitchell. Novel Use Of a PEG-Tube fastener for securing Silicone tracheal Stents in patients with proximal benign tracheal stenosis. *Am J Respir Crit Care Med* 181;2010:A5850.
9. George M, Lanf F, Pasche P, Monnier P. Surgical management of laryngotracheal

**Stent and stay suture**

- stenosis in adults Eur Arch Otorhinolaryngol. 2005;262:609-15.
10. Gillbe C, Hillier J. Anesthesia for bronchoscopy, tracheal and airway surgery. Anaesthesi and ICM.2005;6(12):422-5.
  11. Grillo H. Development of tracheal surgery: a historical review. Part 2: Treatment of tracheal diseases. Ann Thorac Surg 2003;75:1039-47.