Internal Fixation of High Tracheal Stents

R. Thomas Temes, MD, Jorge A. Wernly, MD, Joel D. Cooper, MD, Fabrizio M. Follis, MD, and Stuart B. Pett, MD

Division of Thoracic and Cardiovascular Surgery, Department of Surgery, University of New Mexico School of Medicine, Albuquerque, New Mexico, and Division of Cardiothoracic Surgery, Department of Surgery, Washington University, St. Louis, Missouri

A technique for internal fixation of a silicone elastomer tracheal stent is described. This technique allows the use of a short stent in situations where complex stent placement otherwise would be necessary. The procedure was used successfully to manage a postresection stricture in the subglottic trachea.


Tracheal resection is indicated as primary therapy for management of tracheal tumors and strictures in the majority of patients. However, poor medical condition, unresectable lesions, or prior extensive tracheal resection are contraindications to operation. In these situations tracheal stents provide good palliation. Although both metal mesh and silicone elastomer stents are available, silicone stents are more useful in malignant and inflammatory strictures where tissue ingrowth through the stent otherwise can occur [1]. However, these stents require a stoma and a lateral limb, a Y arm, external fixation, or a large surface area to prevent migration. We describe a new technique that was used successfully to anchor a silicone stent in a patient with a high subglottic postresection tracheal stricture.

Technique

Flexible and rigid bronchoscopy are used to measure and dilate the stricture in standard fashion with the patient under general anesthesia. The patient’s neck then is prepared and draped using povidone iodine. With the center of the stricture visualized, a 22-gauge needle is inserted percutaneously from the sterile field through the center of the stricture and used as a guide needle. Several attempts may be required to position the needle accurately. Once the location of the stricture is identified, a 14-gauge venous catheter is placed through it and the needle is removed (proximity to the innominate artery contraindicates this technique). The center of a 2-0 polypropylene suture is passed through the needle, grasped with forceps through the rigid bronchoscope, and delivered through the patient’s mouth (Fig 1A). This loop is wrapped around the center of the stent and the two strands are connected using a 3-0 silk tie adjacent to the stent. This results in a secure fixation of the stent within the polypropylene suture (Fig 1B). If necessary, an anchoring loop may be placed at each end of the stent.

The silicone bronchial-style customized stent (Hood Laboratories, Pembroke, MA) is loaded on the rigid bronchoscope and positioned in the stricture using standard technique [2]. Slack in both ends of the suture is removed. A 2-cm incision is made at the exit site of the suture through the skin. Each end of the suture is used to take a generous bite of fascial tissue, the two ends are tied, and the knot buried using a two layer subcutaneous and skin closure (Fig 2).

Although not previously done, the use of a suture such as polydioxanone is theoretically attractive. The eventual suture dissolution would prevent suture abscess, although the subsequent risk of stent migration is unknown.

Comment

The variety and complexity of tracheal disease requires a wide armamentarium of techniques for successful man-

Fig 1. (A) A 22-gauge needle and subsequently a 14-gauge venous catheter have been passed from the sterile field through the stricture into the airway lumen. A 2-0 polypropylene suture is passed through the venous catheter and retrieved using the bronchoscope. (B) The suture is brought through the mouth and secured to the stent. (Art. = artery.)
agament. When possible, surgical resection offers the best chance for cure or palliation. Stents are useful for management of airway compromise not amenable to resection. Silicone stents are best used in situations where tissue ingrowth is likely to occur.

We used the described technique in a 19-year-old woman who had undergone an extensive tracheal resection for a benign postintubation stricture. Early postoperatively a short, fibrotic, subglottic stricture developed.

Seven months after insertion of the stent, it remains in good position without migration or granulation. Previous attempts at insertion of this bronchial-style shouldered stent without suture fixation and a Dumon-style (Bryan Corp, Woburn, MA) tracheal stent were unsuccessful due to insufficient surface area between the stents and tracheal wall. Alternatives to the procedure described would require a long Y stent, a stoma, or external fixation [3, 4].

This technique is an alternative to previously described options for management of subglottic stenosis with less treatment-related morbidity. It should be considered in management of these patients.

References