Silicone Y stent placement at secondary left carina for malignant central airway obstruction

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The Y silicone stents are shaped with long tracheal and left main bronchial limbs and a shorter right main bronchial limb. These stents can be used for patients with fixed or dynamic central airway obstruction from benign or malignant disease. More often, these stents are used for patients with extensive tumor involvement in the lower trachea and mainstem bronchi. To our knowledge, their use specifically for unilateral central airway obstruction has not been previously published. In this report, we describe the indication, method, and outcome of Y stent insertion at the level of the secondary left carina separating the left upper and lower lobe bronchi, to restore airway patency of the left lobar bronchi in a patient with primary squamous cell lung cancer.

CLINICAL SUMMARY

A 73-year-old man with hemoptysis was found to have a left infr hilar mass involving the distal left main bronchus and the entrance of the lobar bronchi (Figure 1). Rigid bronchoscopy, neodymium:yttrium-aluminum-garnet laser photocoagulation and debulking was performed under general anesthesia with assisted spontaneous ventilation using a 13-mm Efer-Dumon rigid ventilating bronchoscope (Bryan Corporation, Woburn, Mass). Tumor infiltration, cartilaginous collapse, and extrinsic compression prompted insertion of a Y silicone stent (16-mm-diameter tracheal, 12-mm-diameter bronchial limbs) within the left main bronchus. The left bronchial limb was shortened to 1.5 cm using a scalpel prior to loading the longitudinally folded stent into a large, rigid, stent introducer tube. The stent was then deployed into the entrance of the left upper lobe bronchus. While the stent was still partially folded along its long axis, rigid forceps were used to grasp the stent and pull it proximally into the distal left main bronchus, allowing unfolding of the right bronchial limb into the relatively straight left lower lobe bronchi. Forceps were then used to push the stent down onto the secondary left carinal spur. The right limb of the Y stent was thus directed into the left lower lobe bronchi while the left limb was shortened to provide access into the left upper lobe bronchus (Figure 2). There were no perioperative complications. The patient received chemotherapy and radiation therapy. Bronchoscopy 4 months later revealed patent airways and no evidence of stent-related complications. At 1-year follow-up, the patient’s airways remain patent.

DISCUSSION

A variety of stents are available to improve dyspnea and quality of life in patients with central airway obstruction that is unresectable because of anatomic limitations, metastatic disease, or significant comorbidities. These stents come in various sizes and shapes and are made of a variety of different materials. When made of silicone, they can be shortened by tapering the distal extremities to allow ventilation to the lobar bronchi. In general, the largest stent possible should be selected for insertion to reduce the possibility of migration. Y stents are usually deployed using the "push" or the "pullback" techniques. In the push technique, the stent is ejected from the bronchoscope above the carina and then is pushed with an open forceps placed at the stent bifurcation. In the pullback technique, both bronchial limbs are placed within one bronchus and the stent is pulled until the shorter limb pops into position in the contralateral bronchus. The stent can then be adjusted by using forceps.

Distal left main bronchial deployment of silicone Y stents obviously risks bronchial perforation, laceration of secondary left carina, or vascular disruption because of the proximity of large vessels. Complete bronchial obstruction can occur if stents do not satisfactorily unfold, and hypoxemia can be related to inadequate right lung ventilation because the rigid bronchoscope is deep within the distal left main bronchus. Intraoperative complications can be avoided by ensuring the selection of an appropriately sized stent, optimizing oxygenation, and using careful bronchoscopic technique whereby the rigid bronchoscope and stent are correctly aligned within the airway lumen before stent deployment. Airway laceration and even perforation can occur, especially if resistance is felt as the deploying stent is pushed out of the introducer tube. Over the long term, persistent cough, dyspnea, or postobstructive pneumonia by stent obstruction from...
secretions, granulation tissue, or tumor overgrowth may require repeat bronchoscopic intervention.

There are several potential limitations of Y stent deployment at the level of the secondary left carina. For example, the bifurcated stent may not fit well onto the spur between the left upper and left lower lobe bronchi, causing partial airway obstruction. It may also be necessary to reshape the stent by shortening one of its limbs prior to insertion. Finally, long-term efficacy may be limited by disease progression causing segmental airway obstruction distal to the stent.

In conclusion, we suggest that for patients with tumor in the distal left main bronchus extending to the secondary left carina and the lobar bronchi, an adequately sized Y stent can provide good palliation.

References