Gopal Chawla[1], Karan Madan[2], Hariharan Iyer[2], Pawan Tiwari[2], Vijay Hadda[2], Anant Mohan[2], Saurabh Mittal[2]

[1]All India Institute of Medical Sciences, Rajasthan, Jodhpur, India
[2]All India Institute of Medical Sciences, Ansari Nagar, Delhi, India

Removal of a self-expanding metallic Y stent in the management of reversible central airway obstruction due to mediastinal lymphoma

Dear Editor

In adults, central airway obstruction (CAO) can occur due to several benign and malignant etiologies either due to an endobronchial growth or extrinsic compression [1]. Mediastinal neoplasms may cause significant CAO due to extrinsic compression, and the clinical presentation is often accompanied by respiratory distress. Airway stenting is a well-established method for the immediate relief of symptoms as well as the restoration of airway patency in extrinsic lesions [1, 2]. Y-shaped self-expandable metallic stents (Y-SEMS) are commonly utilized in the management of malignant airway obstruction [3, 4]. The placement of SEMS in malignant CAO is usually with palliative intent with the expectation that the stent provides symptomatic relief during the expected duration of survival of the patient. SEMS, once deployed, are rarely removed in malignant CAO. Here, we describe a case where we were able to successfully remove a metallic stent in a patient treated for malignant airway obstruction following chemotherapy.

A 45-year-old male patient presented with a history of facial swelling for 15 days associated with voice hoarseness and rapidly worsening respiratory distress for two days. A chest radiograph (Figure 1A) revealed a well-defined homogenous opacity in the right paratracheal region. A CT scan of the thorax (Figure 1B and 1C) demonstrated a large heterogenous mediastinal mass encasing the superior vena cava causing narrowing of the lower trachea and bilateral proximal bronchi. A diagnostic flexible bronchoscopy examination with a pediatric bronchoscope revealed critical narrowing in the mid trachea. Because of rapidly worsening symptomatic CAO with a likely malignant etiology, a rigid bronchoscopy was performed under general anesthesia. A tracheobronchial Y SEMS (Ottomed, 18 mm × 60 mm) was deployed successfully and tracheobronchial luminal patency was restored. The patient had immediate relief of symptoms. Subsequently, a CT guided percutaneous biopsy of the mediastinal mass was performed and was suggestive of Non-Hodgkin's Lymphoma, B cell immune-phenotype (CD20+, BCL 6+). The patient was started on chemotherapy (CHOP-R regimen) and kept under close follow-up with serial radiographs and bronchoscopic examinations. After the 2nd cycle, the chest radiograph was suggestive of regression of the mass and the tracheobronchial lumen was seen entirely (Figure 1D). As the patient had clinical and radiological improvement, stent removal was planned. Rigid bronchoscopy was performed under general anesthesia. The patient was intubated with a size 12 mm tracheobronchoscope (Karl Storz, Germany), the proximal tracheal limb of the Y-SEMS was grasped with rigid stent placement forceps, gently twisted, and removed by proximal pulling. The stent was pulled into the lumen of the rigid bronchoscope with gradual, continuous rotating movements which separated

Address for correspondence: Saurabh Mittal, All India Institute of Medical Sciences, Ansari Nagar, Delhi, India; e-mail: saurabh_kgmu@yahoo.co.in
DOI: 10.5603/ARM.a2020.0146
Received: 09.06.2020

ISSN 2451–4934

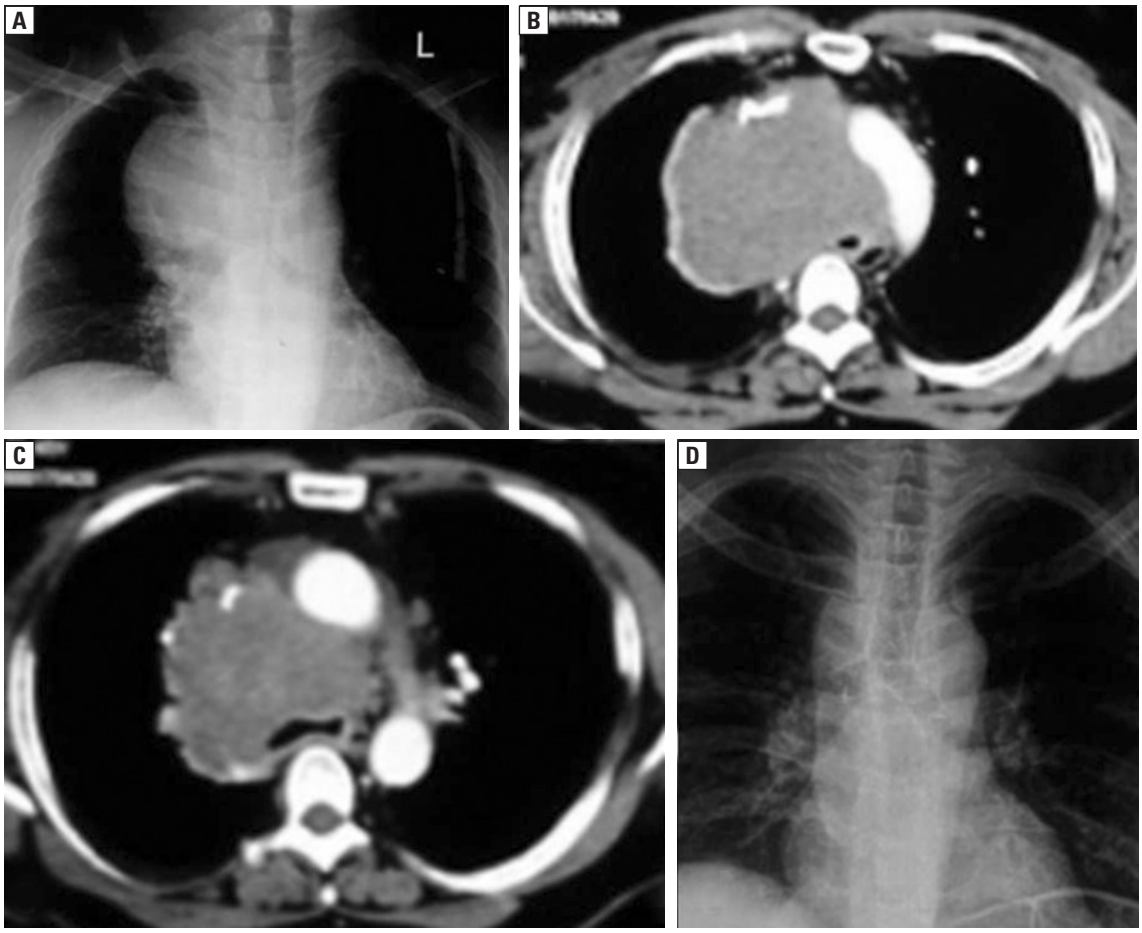

Figure 1. A. Baseline chest radiograph showing a large right paratracheal mass with tracheal compression; **B.** and **C.** CT thorax (mediastinal window) demonstrating a large mediastinal mass causing compression of the lower trachea and proximal main bronchi; **D.** Chest radiograph following chemotherapy showing reduction in the size of the right paratracheal opacity with clearly visible tracheal and both main bronchial lumina

the stent from the tracheal wall. Subsequently, the retrieved stent, which was in the lumen of the rigid bronchoscope, was removed fully along with the bronchoscope. A flexible bronchoscopy examination following removal of the stent showed minimal granulation tissue in the right main bronchus with complete luminal patency of the distal segments. The patient completed the chemotherapy cycles and was free of respiratory symptoms.

Long-term placement of airway SEMS may be associated with a complication such as granulation tissue formation, and the incidence of complications such as these increases over time. Metal stents often incite exuberant granulation tissue growth which itself can lead to obstruction at either end of the stent. Because of the risk of stent-associated airway complications, it is generally advised that airway stent insertion should be considered as a last option (some authors comment that the best stent is one that was never placed). Of the available stents (SEMS and Silicon), advantages of SEMS include ease of placement (may be performed under conscious sedation using a flexible bronchoscope), lower incidence of migration, and better adaption to irregular and compressed airways. Disadvantages of SEMS include possible complications like formation of granulation tissue, stent obstruction, fracture, erosion into surrounding tissue, and bacterial colonization. Lemaire et al. retrospectively reviewed the use of SEMS in a single institution and reported complications in 23 of 172 stent placements for malignant airway obstruction (tumor growth in nine, excessive granulation in seven, stent migration in five, and restenosis in two) [5]. These complications may require stent removal. Stent removal in the setting of stent-associated complications is difficult and potentially hazardous to the patient. Their removal can induce further serious complications such as a mucosal tear, hemorrhage, retained stent fragments, pneumothorax, re-obstruction, and ventilation failure in severe cases. In a sin-

gle-institution review of the placement of covered SEMS for benign airway disease, complications requiring stent removal were reported in 10 out of 39 patients [6]. Granulation tissue formation was the most common complication and required repeated interventions.

In this patient, considering the clinical scenario and urgency, Y-SEMS insertion was performed. Placement of a silicone stent could have been an option, but the diagnosis of lymphoma was not known at the time of SEMS placement. At the same time, insertion of silicone Y stents has particular problems in significant airway obstruction, as in this patient. The silicone stent is technically difficult to place in a complex airway as it requires the negotiation of a large rigid bronchoscope across the stenosis [7]. The advantage of a silicone stent is low granulation tissue and ease of removal if required.

In conclusion, the reversibility of the underlying pathology and the potential for stent removal should be considered at the time of stent placement. This case highlights the role of SEMS placement and removal in a patient with suspected malignant airway obstruction in a clinical situation where the underlying malignancy is adjudged to be well responsive to therapy.

Conflict of interest

None declared.

References:

1. Ernst A, Feller-Kopman D, Becker HD, et al. Central airway obstruction. Am J Respir Crit Care Med. 2004; 169(12): 1278–97.
2. Ost DE, Ernst A, Grosu HB, et al. Therapeutic bronchoscopy for malignant central airway obstruction: success rates and impact on dyspnea and quality of life. Chest. 2015; 147(5): 1282–1298, doi: 10.1378/chest.14-1526, indexed in Pubmed: 25358019.
3. Madan K, Dhooria S, Sehgal IS, et al. A multicenter experience with the placement of self-expanding metallic tracheobronchial y stents. J Bronchology Interv Pulmonol. 2016; 23(1): 29–38, doi: 10.1097/LBR.0000000000000250, indexed in Pubmed: 26705009.
4. Madan K, Shrestha P, Garg R, et al. Bronchoscopic management of critical central airway obstruction by thyroid cancer: Combination airway stenting using tracheal and inverted-Y carinal self-expanding metallic stents. Lung India. 2017; 34(2): 202–205, doi: 10.4103/0970-2113.201297, indexed in Pubmed: 28360477.
5. Lemaire A, Burfeind WR, Toloza E, et al. Outcomes of tracheobronchial stents in patients with malignant airway disease. Ann Thorac Surg. 2005; 80(2): 434–7; discussion 437, doi: 10.1016/j.athoracsur.2005.02.071, indexed in Pubmed: 16039180.
6. Noppen M, Stratakos G, D'Haese J, et al. Removal of covered self-expandable metallic airway stents in benign disorders: indications, technique, and outcomes. Chest. 2005; 127(2): 482–487, doi: 10.1378/chest.127.2.482, indexed in Pubmed: 15705985.
7. Sehgal IS, Dhooria S, Madan K, et al. Placement of tracheobronchial silicone Y-stents: Multicenter experience and systematic review of the literature. Lung India. 2017; 34(4): 311–317, doi: 10.4103/0970-2113.209241, indexed in Pubmed: 28671160.