

## Esophageal Stent Migration as a Cause of Severe Upper Airway Obstruction

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### Abstract

Self-expandable metal esophageal stents (SEMS) are used to provide symptomatic relief of dysphagia, particularly in cancer patients. The advancement of covered SEMS stents has decreased the rate of tumor in-growth complications, unfortunately with the cost of increased migration rates. Complications involving both the airway and gastrointestinal tract have been observed and studied. To date there are no cases reported involving complete migration into the upper airway. We report the case of an elderly male presenting emergently with a severe upper airway obstruction caused by a self-expandable metal stent that migrated proximally into the pharynx. Airway obstruction due to SEMS migration represents a rare but possible cause of respiratory distress in a patient with an esophageal stent.

**Keywords:** Esophageal stent migration; Esophageal stent complication; Airway obstruction

### Introduction

Stenting of the esophagus with a self-expandable metal stent (SEMS) is commonly used to treat dysphagia related to recurrent carcinoma, or esophageal strictures secondary to chemoradiation therapy. Unfortunately, these SEMS have an incidence of delayed complications of approximately 50%. This includes migration of the stent, with rates of 5%-32% reported in the literature [1-4]. Stent migration has been previously reported to have compressed a bronchus with resulting distal airway obstruction. We report a rare case of proximal esophageal stent migration into the hypopharynx, causing severe, life-threatening proximal upper airway obstruction. Pharyngoscopy with a video laryngoscope allowed retrieval of the SEMS and immediate relief of respiratory distress.

### Case Report

A 72-year-old male presented to a small rural emergency department (ED) by emergency medical services (EMS) in severe respiratory distress and hypoxia. Upon arrival in the ED, the patient was alert, afebrile, had a heart rate of 75 beats per minute, and was mildly hypertensive (148/65 mm Hg). He was noted to be normoxic (100% O<sub>2</sub> saturation) while receiving 100% oxygen through a non-rebreather mask at 15 L/minute. Just prior to the activation of EMS, the patient's wife witnessed him having sudden onset of acute respiratory distress followed by cyanosis and a possible syncopal episode. Upon EMS arrival the patient was found to be alert but hypoxic with an oxygen saturation of 88%. Immediate therapy with 100% oxygen by non-rebreather mask increased his oxygen saturation

to 100%, an intravenous (IV) line was placed, and he was given two albuterol by nebulizer treatments en route to the hospital.

His previous medical history was significant for congestive heart failure, chronic obstructive pulmonary disease and cancer of the tongue. One year prior to his ED presentation, he had extensive oropharyngeal surgery with removal of the tongue cancer, a right-sided neck dissection, chemotherapy and radiotherapy. He subsequently developed a cervical esophageal stricture nine months post-surgery resulting in significant dysphagia. Treatment for the stricture (3 months prior to his ED presentation) involved the placement of a covered SEMS, allowing oral fluid and solid intake without difficulty. Further history revealed that he had complained of a worsening cough with dyspnea for the past week. A primary care physician had evaluated him the day before admission, diagnosed with an upper respiratory infection (URI), and discharged him home with antitussive medication.

On initial examination in the ED he was noted to be anxious, diaphoretic, and in obvious respiratory distress. He was sitting forward in a tripod position, tachypneic and had accessory muscle involvement for breathing. Examination of his chest revealed sinus tachycardia without a murmur, diffuse expiratory wheezing, and diffuse rhonchi. During the initial ED evaluation the patient had increasingly labored breathing and was complaining of fatigue. He did not complain of a sore throat or dysphagia.

Further treatment in the emergency department included, intravenous (IV) furosemide due to concern for a potential congestive heart failure (CHF) exacerbation, and a third nebulized albuterol treatment and IV methylprednisolone to treat for a potential COPD exacerbation. Ancillary studies included a complete blood count with differential (CBC), electrolytes, renal and liver function studies, a brain natrietic peptide (BNP) level, creatinine kinase MB fraction (CK-MB) and troponin I levels, a 12 lead ECG and a portable AP chest

radiograph (CXR). His studies were positive for a leukocytosis (White blood cell count (WBC) 17.5 K), and bilateral lower lobe sub-segmental atelectasis on his chest radiograph. Of note, the covered SEMS was not visible on the CXR, and the radiograph was of poor quality due to patient positioning. No additional laboratory or radiographic findings explained the cause of his dyspnea. It was then decided to transfer the patient via air medical transportation to a regional tertiary medical center and cancer center for further workup and diagnosis. His vital signs remained stable prior to transfer, with an oxygen saturation of 100% on 6 L/min O<sub>2</sub> by nasal cannula. However, he complained of further dyspnea and was noted to have increasing respiratory distress, hypoxia and stridor, especially when he would lay supine. Due to concerns to protect his airway prior to air transport, and further treat his respiratory distress, it was decided by the flight physician to intubate the patient.

Oral intubation was planned and a likely difficult intubation was anticipated due to the history of mouth cancer, radical surgery of the head and neck, and prior radiotherapy to the head and neck region. A semi-awake oral intubation using a video laryngoscope and 10 mg IV etomidate for sedation was attempted. Upon insertion of the laryngoscope into the oropharynx, no recognizable landmarks were identified. The video laryngoscope was recognized to be entirely within the SEMS lumen, which appeared to occupy the entire hypopharynx, obstructing the glottic opening. The SEMS foreign body was then easily removed using Magill forceps (Figure 1). After removal of the esophageal stent, the patient recovered quickly and completely, with resolution of respiratory distress symptoms. Oxygen therapy was quickly tapered and the patient was admitted to hospital for overnight observation. He had no further respiratory symptoms or complications.

Over the next year, at several follow-up visits by his physicians, he did not have any further respiratory complications. The treating physicians decided to not replace the SEMS and the patient instead had a gastrostomy tube placed for nutrition. At 14 months post-event, the patient was doing well without any further respiratory complications, able to work and participate in his usual activities of daily living.



**Figure 1:** Removed Esophageal Stent.

## Discussion

Self-expandable metal stents can be a useful treatment choice for patients with cancer related dysphagia; however, delayed complications can occur, including migration of the stent. We report the first case of severe upper airway obstruction due to migration of the SEMS from the esophagus into the hypopharynx with subsequent blockage of the glottic opening. It is important for the emergency medicine physician to be aware of this possible cause of respiratory distress in a patient with an esophageal stent. An awake or a mildly sedated approach to intubation is important in order to maintain patency of the airway during attempted intubation. The video laryngoscope and limited sedation allowed for spontaneous ventilation throughout the pharyngoscopy. We feel that paralytics should be avoided in this situation, as further collapse of the airway could lead to difficulty ventilating the patient.

Self-expandable metal stents are used to provide symptomatic relief of dysphagia, particularly in cancer patients. The advancement of covered stents has decreased the rate of tumor in-growth complications [4], unfortunately with the cost of increased migration rates [5]. Complications involving both the airway and gastrointestinal tract have been observed and studied. In a recent study of 888 patients with esophageal stent placement for stricture treatment, a stent migration rate of 7.9% was observed, with the stent migrating proximally in only 27% of those patients (19 patients) [3]. There have been reports of airway obstruction secondary to esophageal stent compression of a bronchus or through migration into the lower airways by a tracheoesophageal fistula, but we have found no cases of complete migration into the pharyngeal airway with obstruction of the glottic opening [6,7]. Several types of SEMS are available for use in the United States, including non-retrievable polyurethane-covered stents with shouldered ends, retrievable polyurethane-covered stents with shouldered ends, retrievable polyurethane-covered stents with flared ends, retrievable polytetrafluoroethylene-covered stents with shouldered ends, and separated stents (gastroesophageal stents); all stent types have been associated with migration [3]. The SEMS in this case was a retrievable polyurethane-covered stent with flared ends and this type of stent has been documented to have the highest stent migration rate (24%) [3]. It is possible that the patient's worsening cough over the week prior to presentation may have induced the proximal migration of the SEMS, but it is also possible that his coughing was related to a malposition SEMS.

Emergency physicians evaluating patients with a history of esophageal stent placement presenting with acute respiratory distress should be consider upper airway obstruction. As all SEMS types have documented migration, knowledge of the SEMS type should not influence diagnosis or management. Depending on the stability of the patient we would recommend either imaging or direct visualization of the upper airway to access for foreign body obstruction by stent migration. Employing an awake intubation combined with direct airway visualization with a video laryngoscope in the emergency department provided quick and safe diagnosis of the obstruction. This technique also provided efficient treatment and resolution of the patient's respiratory distress.

## Conclusions

Esophageal stents provide relief of dysphagia for many patients, but they may also migrate and cause acute airway obstruction. Stent migration causing airway obstruction is a rare but important

complication, as it represents an acute life-threatening event. This cause of airway obstruction may be managed efficiently in the emergency department with fast removal of the obstructing stent, allowing quick and complete resolution of the life threatening airway obstruction.

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