Assessment of metallic self-expandable tracheal stents in the management of chronic tracheal obstruction

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INTRODUCTION
Tracheal stenosis can present very insidiously or as a catastrophic near death episode requiring cardiopulmonary resuscitation. Dyspnea on exertion appears when about 50% of the airway is narrowed.1,2 The most common cause of tracheal stenosis is trauma, which can be internal as prolonged endotracheal intubation or as a result of tracheotomy.2,3 Other causes of tracheal chronic obstruction include neoplastic lesions. Tracheal tumors could be primary or, more commonly, secondary caused by direct extension of a local tumor into the trachea, such as thyroid carcinoma, lung cancer or esophageal carcinoma.2,3,4

The treatment of choice for tracheal stenosis is surgical resection with primary reconstruction.2,4 Tracheal stenting for symptomatic obstruction is reserved for those patients with lesions that are inoperable, due to local or general conditions.5,6 Basically there are two groups of stents: silicone and metal stents. The primary advantage of silicone stents is that they are easily adjustable and removable. However, one of their major disadvantages is that they disturb the physiological mucociliary function of the tracheobronchial epithelium and they have the potential to dislodge and become distorted.6,7 Conversely, the primary advantages of expandable metallic stents are their ease of delivery, their stability with minimal potential for stent migration, usage for lower tracheal obstruction, and they do not need tracheostomy. However, one of their major disadvantages is that they are difficult to be removed.6,8

AIM
Our aim was to evaluate the use of metallic self-expandable tracheal stents in the management of airway obstruction secondary to different tracheal pathologies.

METHODS
This study was conducted at the Otolaryngology Head and Neck Surgery Department of the Main Alexandria University Hospital, Egypt. Thirty three patients received self-expandable metallic tracheal stents from January 2003 to December 2014 were included. Patients were classified into two main groups: Group 1: 19 patients (57.5%) suffering of benign tracheal stenosis and Group 2: 14 patients (42.5%) suffering of obstructing inoperable malignant tracheal tumors.

After endoscopic and radiological evaluation, expandable metallic tracheal stents (SENS; Ultraflex tracheal prosthesis; Boston Scientific Corp, Watertown, MA, USA) were inserted under general anesthesia to relieve airway obstruction. (Video 1) Postoperative follow-up as regards improvement of respiration, tolerability of the stent and reporting of complications was done.

RESULTS
Conclusions:
We concluded that Ultraflex self-expandable stent could be considered as a therapeutic option for inoperable central airway lesions, especially in patients with medical co-morbidities, as well as in cases of long stenotic segment with intrathoracic extension or failed surgery. Also Ultraflex metallic selfexpandable stent is a good alternative for palliation of airway obstruction in cases of inoperable malignant tracheal tumors. Strict follow-up is mandatory for early detection and management of expected complications.

CONCLUSION
We concluded that Ultraflex self-expandable stent could be considered as a therapeutic option for inoperable central airway lesions, especially in patients with medical co-morbidities, as well as in cases of long stenotic segment with intrathoracic extension or failed surgery. Also Ultraflex metallic self-expandable stent is a good alternative for palliation of airway obstruction in cases of inoperable malignant tracheal tumors. Strict follow-up is mandatory for early detection and management of expected complications.

Figures:
1. Case of postintubation tracheal stenosis. a) Intraoperative endoscopic view showing narrowing of the trachea by external compression of esophageal tumor. b) Preoperative axial CT scan of the same patient. c) Bronchoscopy axial CT scan showing the stent dilating the tracheal airway. d) Postoperative CT with virtual bronchoscopy showing the lumen of the stent.

2. Case of malignant esophageal tumor compressing the trachea. a) Intraoperative endoscopic view showing narrowing of the trachea by external compression of esophageal tumor. b) Preoperative axial CT scan of the same case. c) Preoperative CT with virtual bronchoscopy. d) Endoscopic view after insertion of the stent, e) Postoperative axial CT scan showing the stent dilating the tracheal airway, f) Postoperative CT with virtual bronchoscopy showing the lumen of the stent.

3. Examples of complications of tracheal stents reported in our study: a) Bronchoscopy 6 months following insertion showing obstructing granuloma at the lower end of the stent, b) plain X-ray chest showing inferiorly displaced stent below the site of obstruction (arrow).