A Novel Approach to Oropharyngeal Foreign Body Removal

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Sponsorships or competing interests that may be relevant to content are disclosed at the end of this article.

Abstract
Grill wire brush bristle foreign bodies most commonly embed in the oropharynx. Often these bristles can be removed in the clinic; however, on occasion, the patient requires general anesthesia for retrieval because of the gag reflex and difficulty with access and visualization. We report here on 2 cases of patients who underwent successful transoral robotic surgical retrieval of wire bristles from the base of tongue after unsuccessful direct laryngoscopy. Otolaryngologists should be aware of the use of robotic assistance for oropharyngeal foreign body retrieval.

Keywords
TORS, foreign body, wire brush bristle

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Grill wire brush bristle ingestions are increasingly described in the literature. In a recent study of consumer injury databases, 1698 bristle injuries were reported in emergency departments between 2002 and 2014, with the most common location being the oropharynx. Endoscopy with a local anesthetic can successfully aid removal. Many patients require general anesthesia for direct laryngoscopy (DL) or rigid esophagoscopy and, in rare cases, neck exploration.

Here we describe 2 patients who, over a 6-week period in the summer of 2016, presented with a bristle implanted in their base-of-tongue (BOT) tissue. After failed removal with DL, both patients underwent successful retrieval of the bristle via transoral robotic surgery (TORS). This study was approved by the institutional review board at the University of California San Francisco.

Case 1
A 38-year-old woman presented to the emergency room with globus sensation and odynophagia after eating a grilled hamburger. A grill brush foreign body was suspected. Examination results, including flexible laryngoscopy, were unremarkable. The patient was taken to the operating room for examination under anesthesia. DL with GlideScope, tonsil set, rigid endoscopes, and palpation did not reveal the bristle. Afterward, computed tomography of the neck showed a radio-opaque thin foreign body embedded in the right deep BOT (Figure 1a).

A referral was made to our tertiary care center for potential TORS retrieval. In the operating room, the patient underwent oropharyngeal exposure and suspension with the Fey Kastenbauer retractor. The patient had granulation tissue from the manipulations during the previous laryngoscopy, an otherwise normal-appearing oropharynx, and no definite evidence of the foreign body. The robot arms were used for several minutes to comb through the tissue. Then a right lateral partial lingual tonsillectomy was performed. The wire tip was visualized as being lodged within the deeper BOT musculature. The Maryland arm was used to grasp and extract the bristle (Figure 2). The patient was observed in the hospital overnight for possible bleeding or dysphagia and discharged the next day. She reported improvement in symptoms before discharge. She was doing well 2 weeks later, per telephone follow-up.

Case 2
A 75-year-old man presented with globus sensation after consuming grilled food. Flexible laryngoscopy results were unremarkable. Computed tomography of the neck showed the bristle in the right BOT (Figure 1b). DL was unsuccessful in visualization and retrieval. He was transferred to our center for a robotic attempt at removal. After suspension with the Fey Kastenbauer retractor, the endoscope and robot...
arms were used to comb through the lingual tonsil tissue. A pinpoint area of metal was visualized, and the Maryland grasper was used to remove the bristle. This patient was discharged the same day of surgery with improvement in symptoms. He was doing well on telephone follow-up 2 weeks after surgery with resolution of symptoms.

Discussion

To our knowledge, this report is the first in the literature of the use of TORS assistance to successfully extract a wire bristle from the oropharynx when laryngoscopic removal failed. The use of TORS in otolaryngology has enabled surgeons to perform procedures such as BOT tumor resections and lingual tonsillectomy in an easier, safer, and less morbid way when compared with traditional open techniques.\(^3\)\(^-\)\(^5\)

Many hospitals have adopted the use of the robot in head and neck surgery. The safety of TORS is well established.\(^4\)\(^-\)\(^5\)

Potential complications include bleeding, tooth injury, dysphagia, pain, and injury to the lingual or hypoglossal nerves. Therefore, the removal of difficult-to-visualize foreign bodies, wire brush or other, in the oropharynx is a natural extension of the use of TORS. If a patient has a thin and difficult-to-visualize foreign body in the lingual tonsil area, TORS is a viable option when direct laryngoscopy fails. Lingual tonsillectomy may also be performed to enable access to the embedded foreign body, although this may increase the risk of postoperative bleeding, dysphagia, and voice changes. Patients who undergo lingual tonsillectomy may require overnight observation, as our first patient did. Otherwise, patients can go home the same day if little manipulation of the tissue is performed. No adverse events were experienced in our patients; however, patients undergoing foreign body retrieval with the robot are subject to adverse events that have been described with other TORS procedures in the literature.\(^4\)\(^-\)\(^5\) Furthermore, with any foreign body removal technique, it is possible for foreign bodies to become dislodged. Patients should also be advised on and consent to a possible bronchoscopy, in case of dislodgment of the foreign body into the more distal airway.

This approach is limited by the availability of a surgical robot and TORS-trained surgeons. Not all practicing otolaryngologists are trained in using the surgical robot or have access to it. Therefore, its use requires the referral of a patient to a tertiary care hospital where a robot system and a trained otolaryngologist are available, with the added inherent time and costs.
Author Contributions
Madeleine P. Strohl, conception, design, acquisition, analysis, interpretation of data, drafting and revision, final approval; Nicholas A. Dewyer, conception, design, acquisition, analysis, interpretation of data, drafting and revision, final approval; Joshua Sckolnick, conception, design, acquisition, analysis, interpretation of data, drafting and revision, final approval; William R. Ryan, conception, design, acquisition, analysis, interpretation of data, drafting and revision, final approval.

Disclosures
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