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Case report

The feasibility of pediatric TORS for lingual thyroglossal duct cyst☆

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ABSTRACT

A six-year-old boy who presented with symptoms of obstructive sleep apnea was found to have a midline tongue mass suspicious for lingual thyroglossal duct cyst (TGDC). Surgery was scheduled after workup confirmed the presence of functional, orthotopic thyroid tissue. The surgical robot was used to excise the mass endoscopically without removing any hyoid. He was extubated at the conclusion of the case. The child tolerated a soft diet and was discharged after an uneventful overnight stay in the ICU. Pathology confirmed TGDC. There have been no reported issues in eleven months of follow-up. Our report adds to the scarce literature on performing such a surgery in a child and demonstrates that with the correct circumstances, prompt extubation, discharge, and prolonged remission are possible.

1. Background

Thyroglossal duct cysts (TGDC) result from remnant epithelial rests of the thyroid gland as it descends through the tongue base during development [1]. While traditional TGDCs represent the most common congenital midline neck mass [2], in 0.6–3% of cases the cyst occurs at the base of the tongue [3]. The most common presenting symptom of such lingual thyroglossal duct cysts (LTGDC) is dysphagia, but symptoms suggesting of obstructive sleep apnea and even death have been reported [4,5]. Owing to their rarity, the management of this disease is controversial. The marked reduction in traditional TGDC recurrence when the Sistrunk procedure [6] is performed [7] led some authors to successfully utilize this transcervical approach for LTGDCs [8]. Others employ endoscopic marsupialization and/or excision with equal efficacy [9,4]. The rise of the da Vinci robotic system (Intuitive Surgical, Inc., Sunnyvale, CA) for base of tongue malignancies [10] has paved the way for surgeons to use this technique for non-cancerous growths, including lingual thyroid glands [11], and in one adult, a LTGDC [12]. A single case report for the robotic marsupialization of a LTGDC in a 2 month-old exists in the literature [13]. In this case report, we demonstrate a case in which the mass was completely excised in an older child with immediate post-operative extubation and reduced hospital stay, with a similar length disease-free follow-up.

2. Case report

A six-year-old boy presented to an outpatient pediatric otolaryngologist with symptoms of heroic snoring, daytime somnolence, and witnessed apneas that were suspicious for obstructive sleep apnea. He was found on physical exam to have a midline tongue mass concerning for lingual thyroid or lingual thyroglossal duct cyst (Fig. 1a). This mass abutted the soft palate when the child relaxed (Fig. 1b). Transnasal flexible fiberoptic laryngoscopy was performed after anesthetization of the nares with lidocaine and oxymetazoline spray, which revealed a widely patent airway distal to the mass. A CT scan with contrast was obtained that confirmed a 2.1 × 1.9 × 2.5 cm base of tongue mass as well as orthotopic thyroid tissue (Fig. 1c,d). Laboratory workup revealed normal TSH, free T4 and T3. The child was subsequently scheduled for surgical removal of the mass.

The airway was secured transnasally in the pediatric operating room utilizing a flexible pediatric bronchoscope. The patient was subsequently transported to the adult operating room, where the da Vinci surgical robot is located. An Aquaplast (WFR/Aquaplast Corp, Wyckoff, NJ) maxillary dental guard was fashioned, a thick silk suture was used to retract the tongue anteriorly, the Crowe-Davis retractor was placed and suspended on a Mayo stand, and the surgical robot was docked (Fig. 2a,b). The robot was equipped with a 30° up-going scope for visualization, a spatula tip Bovie in

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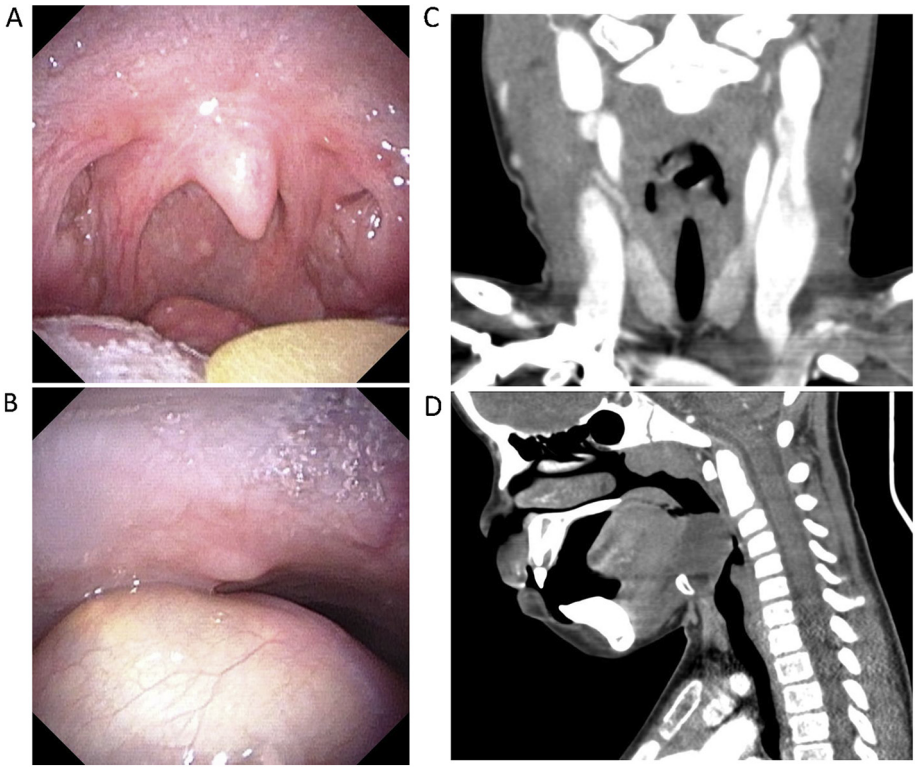

Fig. 1. Preoperative clinical and radiological assessment of a lingual thyroglossal duct cyst in a child. A) A midline base of tongue mass is seen when the child's tongue is depressed. B) This mass abuts the soft palate when the child is resting without tongue protrusion. C) Coronal cut of a CT scan with contrast that revealed orthotopic thyroid tissue in the child. D) A 2.1 × 1.9 × 2.5 cm hypodense mass is visualized at the base of tongue in this sagittal cut of a CT scan with contrast.

the right arm, and a Maryland dissector in the left. Dissection began at the superior anterior aspect of the cyst (Fig. 2c). Electrocautery was used to incise into the tongue until muscle was seen. We proceeded inferiorly along this muscle/cyst border, taking a cuff of tongue muscle with the mass. Laterally, coagulation cautery was utilized to control feeding vessels. At the level of the hyoid bone, the apex of the mass was confirmed. There was a definitive plane between the mass and the hyoid and the decision was made not to enter the neck externally, nor to resect hyoid bone (Fig. 2d). Floseal (Baxter, Deerfield, Il) was placed into the wound bed, dentition was inspected and found undamaged, and the patient was successfully awakened and taken to the pediatric ICU for overnight monitoring. Total operative time was 49 minutes, including docking, post-operative irrigation and inspection, and removal of the robot from the field. Docking time was not recorded by staff, but is estimated at 15 minutes, including patient positioning and dental splint molding. Surgical time was 28 minutes, and estimated blood loss was less than 5 mL. Total anesthesia time was 190 minutes, including induction at the children's hospital, transportation to the robotic suite in the adult hospital, post-procedure return to the children's hospital, and extubation. The morning after surgery, the child was successfully started on a soft diet and discharged home. Pathologic examination subsequently confirmed the mass was a thyroglossal duct cyst. In the eleven months since surgery, there have been no reported complications, nor recurrence of the cyst.

3. Discussion

The use of the surgical robot in the head and neck followed years of success in urologic and cardiothoracic surgery [14]. Traditional transcervical exposure to the tongue base for malignancies often necessitated mandibulotomy and pharyngotomy, resulting in poorer functional outcomes compared to chemoradiation [15]. The robot allows for superior, three-dimensional visualization, a wide operating field compared to operating through a laryngoscope, tremor reduction, and reduced bleeding. The improved working space is especially beneficial when working in a confined space, whether due to trismus or, in our case, a patient's size. Benign neoplasms are being increasingly managed with the robot, provided the equipment and expertise is available. When comparing TORS to traditional transoral laser surgery for base of tongue malignancies, Weinstein et al. highlight the benefit of en bloc resection, as opposed to piecemeal removal [10]. Although this is more applicable in oncologic surgery, excising the entire cyst does become more difficult if it is not intact.

A limitation in our case was the prolonged anesthetic time, lasting significantly longer than surgery due to lack of a dedicated robotic suite at the children's hospital. Because the pediatric anesthesiologist was not comfortable inducing or extubating in the adult OR, the child was transported between buildings twice, adding significantly to procedure time. As our team becomes more experienced with pediatric TORS cases, we expect anesthesia time, docking, and surgical time to decrease.

The patient presented to our office with a CT scan obtained at an outside hospital. Although an MRI may provide superior soft tissue imaging for such soft tissue lesions, the family members accompanying the child were not interested in delaying the case to obtain an MRI, which would necessitate additional anesthesia and increased cost. The information provided by clinical examination, history, and existing was sufficient for this particular case.

LTGDCs have been managed endoscopically for years, but the data on outcomes varies. Zhang et al. published a case series of seven patients with LTGDCs whose cysts recurred a median 60 days after marsupialization and/or complete excision. These patients