How I Do It

Transhyoid Approach to Excision of Recurrent Vallecular Pseudocysts

Shelby Leuin, MD; Michael Cunningham, MD; Mark S. Volk, MD, DMD; Christopher Hartnick, MD, MS EPI

Key Words: Vallecular cyst, pseudocyst, transhyoid approach.

INTRODUCTION

Vallecular pseudocysts are uncommon in infants and children, with a reported incidence of 18 per 100,000 live births. Although often asymptomatic in adults, vallecular pseudocysts can cause stridor, dyspnea, and feeding difficulties in infants and young children. Symptomatic vallecular pseudocysts are typically treated by transoral marsupialization under microscopic, endoscopic, or direct visualization. Patients who fail to respond to these traditional methods pose a surgical challenge to the otolaryngologist. A single previous report described a median laryngofissure approach for the excision of recurrent vallecular cysts. We describe a novel application of the transhyoid approach to treat recurrent vallecular pseudocysts in two pediatric patients. Our literature review suggests this is the first description of this surgical approach for this particular indication.

MATERIALS AND METHODS

The materials and methods used will be described within the following two case presentations.

Case 1

A 3.5-year-old female was referred by her pediatrician for the incidental finding of a vallecular cyst during transoral examination using a tongue depressor. She had had no airway issues and no difficulty feeding. She had complained of a foreign body sensation, which she would attempt to clear by coughing. Intraoral and fiberoptic examination revealed a vallecular cyst arising from the lingual surface of the epiglottis. Operative marsupialization under microscopic visualization was performed; pathology revealed a pseudocyst lined with histiocytes. Nine months later, the cyst recurred with symptoms of dysphagia. A more extensive microscope-guided marsupialization was repeated. Office fiberoptic endoscopic examination 2 months postoperatively again revealed cyst recurrence. A computed tomography (CT) scan was obtained that showed a 13 × 12 × 12 mm cystic lesion arising from the base of tongue and extending to the tip of the epiglottis, without evidence of deep submucosal invasion (Fig. 1). She was taken back to the operating room. At the time of this intervention, the pseudocyst was first decompressed in the operating room using needle aspiration and then unroofed and excised en bloc using a CO2 laser (Figs. 2). Five months after this third procedure, the child manifested nighttime cough and again cyst recurrence was documented on fiberoptic evaluation. A magnetic resonance imaging (MRI) study was performed that showed a cyst arising from the lingual tonsil and ascending into the vallecula (Fig. 3). The decision was then made to proceed with an external transhyoid approach for definitive cyst excision.

The patient was brought to the operating room for the fourth time. After the establishment of general anesthesia, direct laryngoscopy was initially performed to ensure there would be adequate space with which to enter the vallecula externally without inadvertently decompressing the cyst.

The transhyoid approach was then performed as follows. A horizontal incision centered at the midline was made at the level of the hyoid. The dissection was carried down through subcutaneous tissue and platysma muscle, with identification of the hyoid and its associated musculature. The suprathyroid musculature, specifically the mylohyoid and geniohyoid muscles, were released from cornu to cornu. A horizontal pharyngotomy was next made just superior to the hyoid, and the vallecular space was entered. A several millimeter cuff of muscle and mucosa was left attached to the hyoid to aid with closure. The cyst was densely scarred and found to be adherent to the perichondrium of the lingual surface of the epiglottis and the base of tongue (Fig. 4A). A wide excision was performed incorporating removal of the mucosa of the lingual surface of the epiglottis, stripping of the perichondrium (Fig. 4B), and eventual en bloc cyst removal from the base of tongue. The region was closed in two layers, with re-approximation of both pharyngeal muscle and mucosa. A drain was placed in the subplatysmal plane.

The patient was given intravenous steroids and antibiotics, kept intubated overnight for airway protection, and discharged without complications. The child was seen in follow-up 6 months postoperatively and was noted to have no stridor, dyspnea, or feeding difficulties. A computed tomography (CT) scan was obtained that revealed complete resolution of the prior vallecular pseudocyst (Fig. 4C). The child was subsequently lost to follow-up.

Case 2

A 12-month-old female was referred to our otolaryngology clinic for a pseudocyst arising from the lingual tonsil and ascending into the vallecula (Fig. 4D). A computed tomography (CT) scan was obtained that revealed a 12 mm cystic lesion arising from the base of tongue and extending to the tip of epiglottis. A magnetic resonance imaging (MRI) study was performed that showed a cyst arising from the lingual tonsil and ascending into the vallecula. The child manifested dysphagia and again cyst recurrence was documented on fiberoptic evaluation. In the operating room, the child manifested dysphagia and again cyst recurrence was documented on fiberoptic evaluation. In the operating room, the pseudocyst was first decompressed in the operating room using needle aspiration and then unroofed and excised en bloc using a CO2 laser (Figs. 2). Five months after this third procedure, the child manifested nighttime cough and again cyst recurrence was documented on fiberoptic evaluation. A magnetic resonance imaging (MRI) study was performed that showed a cyst arising from the lingual tonsil and ascending into the vallecula. A computed tomography (CT) scan was obtained that showed a 13 × 12 × 12 mm cystic lesion arising from the base of tongue and extending to the tip of the epiglottis, without evidence of deep submucosal invasion (Fig. 1). She was taken back to the operating room. At the time of this intervention, the pseudocyst was first decompressed in the operating room using needle aspiration and then unroofed and excised en bloc using a CO2 laser (Figs. 2). Five months after this third procedure, the child manifested nighttime cough and again cyst recurrence was documented on fiberoptic evaluation. A magnetic resonance imaging (MRI) study was performed that showed a cyst arising from the lingual tonsil and ascending into the vallecula. The decision was then made to proceed with an external transhyoid approach for definitive cyst excision.

The patient was brought to the operating room for the fourth time. After the establishment of general anesthesia, direct laryngoscopy was initially performed to ensure there would be adequate space with which to enter the vallecula externally without inadvertently decompressing the cyst.

The transhyoid approach was then performed as follows. A horizontal incision centered at the midline was made at the level of the hyoid. The dissection was carried down through subcutaneous tissue and platysma muscle, with identification of the hyoid and its associated musculature. The suprathyroid musculature, specifically the mylohyoid and geniohyoid muscles, were released from cornu to cornu. A horizontal pharyngotomy was next made just superior to the hyoid, and the vallecular space was entered. A several millimeter cuff of muscle and mucosa was left attached to the hyoid to aid with closure. The cyst was densely scarred and found to be adherent to the perichondrium of the lingual surface of the epiglottis and the base of tongue (Fig. 4A). A wide excision was performed incorporating removal of the mucosa of the lingual surface of the epiglottis, stripping of the perichondrium (Fig. 4B), and eventual en bloc cyst removal from the base of tongue. The region was closed in two layers, with re-approximation of both pharyngeal muscle and mucosa. A drain was placed in the subplatysmal plane.

The patient was given intravenous steroids and antibiotics, kept intubated overnight for airway protection, and discharged without complications. The child was seen in follow-up 6 months postoperatively and was noted to have no stridor, dyspnea, or feeding difficulties. A computed tomography (CT) scan was obtained that revealed complete resolution of the prior vallecular pseudocyst (Fig. 4C). The child was subsequently lost to follow-up.
home on postoperative day 3 after drain removal. The pathologic specimen was a 2.7 × 0.9 × 0.7 cm partially cystic soft tissue lesion. It consisted histologically of skeletal muscle, seromucinous glands, squamous mucosa, pseudocyst lined by granulation tissue, and focal areas of histiocytes and mild chronic inflammation. She is currently asymptomatic without evidence of cyst recurrence 12 months postoperatively.

**Case 2**

A 9-year-old male presented with a several year history of dysphagia for both solids and liquids. He would turn his head to comfortably swallow. He also snored and had difficulty with speech intelligibility. Flexible fiberoptic laryngoscopy revealed a large cyst emanating from the vallecula and occupying most of the hypopharynx. CT scan confirmed a 3 × 4-cm vallecular cyst.

Initial surgical management began with flexible fiberoptic intubation, which was performed with difficulty secondary to partial airway obstruction by the mass; the cyst was then marsupialized using a CO₂ laser. Pathology showed pseudocyst lined by granulation tissue, consistent with mucocele. At the 1-month follow-up visit, fiberoptic examination showed a residual cystic mass in the vallecula. He was taken back to the operating room and the mass re-excised with the CO₂ laser. He initially did well, but by the 5-month follow-up visit had recurrence of dysphagia with again a vallecular cyst on flexible fiberoptic examination. The patient was returned to the operating room, and the cyst was unroofed using a microdebrider, the contents evacuated, and the base cauterized. An MRI study obtained 1 month later to assess for recurrence showed a mass located superiorly and posteriorly to the hyoid bone, which was bright on T2-weighted imaging; its radiographic signal characteristics argued against a lingual thyroid, and the position of the mass made it unlikely to be a thyroglossal duct cyst. He was taken to the operating room a fourth time where he underwent a transhyoid excision of the mass in a similar fashion to that described in case 1. His postoperative course was uneventful. A barium swallow obtained on the first postoperative day showed no extravasation of barium outside the pharynx. Drain removal and discharge occurred on postoperative day 2. The pathology specimen consisted of a 3.5 × 1.3 × 0.5 cm soft tissue fragment; histology was consistent with mucocele with adjacent fibrosis and a small amount of salivary gland fragments. There were no thyroid follicles to suggest a thyroglossal duct cyst. There has been no recurrence of the mass now nearly 4 years postoperatively.
RESULTS
The two pediatric patients described had no recurrence of their vallecular pseudocysts at 12-month and nearly 4-year follow-ups, respectively, after undergoing transhyoid excision. The procedure was well-tolerated without associated complications.

DISCUSSION
A vallecular cyst is an epithelial-lined cystic structure, often associated with lymphoid tissue. Dilatation of a crypt of the lingual tonsil is considered a possible etiology. Pseudocysts, by definition, have no histologically identifiable epithelial lining. Vallecular pseudocysts may represent true vallecular cysts with epithelial disruption secondary to infection or trauma or may alternatively occur because of extravasation of secretory material from minor salivary glands in the vallecular region. This distinction may have some therapeutic relevance because true cyst excision requires complete removal of the epithelial lining, whereas pseudocysts should be amenable to simple marsupialization.

There are several reports describing the evaluation and treatment of vallecular cysts.\textsuperscript{1–7} No distinction is made in these reports between vallecular cysts and vallecular pseudocysts. Discussion of the surgical management of recurrent vallecular cysts is limited to only one prior publication.\textsuperscript{1}

Literature review strongly suggests that vallecular cyst aspiration alone is not an effective treatment modality because of frequent cyst recurrence.\textsuperscript{1,2} The principal recommended primary treatment is transoral surgical removal or marsupialization using laser, cautery, or cold instrument dissection with endoscopic, microscopic, or loupe magnification assistance.\textsuperscript{1,3–7} Cyst excision with the CO\textsubscript{2} laser has been reported to be of additional benefit because vaporization of the epithelial lining may decrease the risk of recurrence.\textsuperscript{3} A recent case report described the novel use of the Da Vinci robot to assist in the excision of a vallecular cyst by cautery marsupialization; however, the extensive duration of time for setup may limit its practical application.\textsuperscript{8} Endoscopic removal is usually well tolerated, although there are reports in the literature of the need for airway intervention prior to marsupialization, including cyst puncture and tracheostomy.\textsuperscript{1,4,9}

Surgical access to base of tongue masses can be achieved transorally, but greater exposure is provided via transcervical procedures using a mandibulotomy, lateral pharyngotomy, or transhyoid approach.\textsuperscript{10} The use of such an external approach for the excision of a vallecular cyst in a child has been reported once previously by Mitchell et al.,\textsuperscript{1} who described an infant with a recurrent vallecular cyst treated via a median laryngofissure.

We describe a novel application of the transhyoid approach to the base of tongue for removal of recurrent vallecular pseudocysts. Also known as the suprahypoid approach, the transhyoid approach is a procedure that has been primarily described in the literature for resection of cancers of the tongue base and tonsil.\textsuperscript{11–13} Carrat et al.\textsuperscript{14} reported a case of pediatric vallecular acinic cell carcinoma accessed in this fashion.

To our knowledge, the two cases described in this paper constitute the first reported use of the transhyoid approach for this particular indication. The transhyoid approach allows for a small pharyngotomy to be made yet still provides adequate access to the pseudocyst. The muscle pedicle on the hyoid bone is preserved, facilitating a multilayered closure of mucosa and muscle, thereby decreasing the risk of pharyngocutaneous fistula. A potential limitation of the transhyoid approach is the risk of pseudocyst puncture and decompression on entry into the vallecula, which may compromise definitive removal. This latter problem can be minimized by dissecting through the suprahypoid musculature in layers until the pharyngeal mucosa is encountered. Once this is visualized, a laryngoscope may be placed transorally just above (on the lingual side) of the lesion by a second surgeon. The first surgeon then enters the pharynx by cutting down onto the tip of the laryngoscope. Once the pharyngotomy is performed in this manner, the vallecular cyst or pseudocyst can be visualized transcervically and resected.

CONCLUSION
Recurrent vallecular pseudocysts in the pediatric population are a rare occurrence. We report two pediatric patients with recurrent vallecular pseudocysts in which the transhyoid (suprahypoid) approach to the base of tongue was demonstrated to be a safe and effective definitive treatment.
BIBLIOGRAPHY