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Case report

KTP laser ablation of extensive tracheal hemangiomas

Anais Rameau, Karen B. Zur *

Division of Pediatric Otolaryngology, The Children's Hospital of Philadelphia, USA

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ABSTRACT

We are reporting the case of a female child presenting for the management of symptomatic extensive tracheal hemangiomas who was successfully treated with multiple ablative procedures using KTP laser. This is the first description in the English literature of the use of KTP laser as primary treatment modality for the endoscopic ablation of tracheal hemangiomas in a child. We review treatment recommendations for symptomatic airway hemangiomas in the pediatric population, highlighting the advantages of KTP laser for tracheal lesions.

1. Introduction

Hemangiomas represent the most common tumors of infancy. They follow a self-limiting course, occasionally requiring medical and/or surgical intervention. Among such cases are airway hemangionas, which are rare but potentially life-threatening lesions. Although over 50% of these vascular tumors appear on the head and neck, only a small number affect the airway [1]. The subglottis is by far the most common affected site for reasons that have not yet been elucidated. Extensive tracheal hemangiomas, without involvement of the subglottis, are an uncommon presentation that has seldom been described. As a result, the literature offers very few descriptions of possible management options for distal hemangiomas. To the best of our knowledge, this is the first description in the English literature of the use of KTP laser as primary treatment modality for the endoscopic ablation of tracheal hemangioma in a child.

2. Case report

A 2 months old female presented to an outside facility with a recent onset of intermittent noisy and laborious breathing at rest, exacerbated with feeding and crying and not improved with an empiric treatment of albuterol nebulizer. The child was the product of a full term, uncomplicated pregnancy and delivery. At 2 weeks of life, she had developed tachypnea and respiratory distress, with a work-up revealing VSD, ASD, PDA and questionable partial anomalous pulmonary venous return. She was subsequently noted to have a right tracheal bronchus, which imaging studies and lung biopsies revealed to be associated with right upper lobe congenital cystic adenomatoid malformation type 2. This lesion was resected with a lobectomy and the child stabilized. She then presented to the pulmonary service at our institution with significant high-speed inspiratory stridor at rest, in the absence of a respiratory tract infection.

A cutaneous capillary hemangioma in the right temporal region and questionable small hemangiomas at the base of the neck were observed. The remainder of the head and neck exam was normal, including a flexible laryngoscopy. The ASD was noted to be patent on cardiac exam, possibly requiring surgical revision.

Initial flexible bronchoscopy by pulmonary services exposed a suspicious obstructive airway hemangioma, presumably located in the subglottic region. The procedure was aborted; the patient was started on a course of dexamethasone and transferred to the pediatric intensive care unit (PICU). She was then referred to the otolaryngology service for a rigid bronchoscopy and possible surgical excision of the lesion.

On initial microlaryngoscopy and rigid bronchoscopy (MLB), an obstructing posterior tracheal wall hemangioma with a slit-like entrance into the distal tracheal was revealed immediately below the cricoid cartilage. The Hopkins rod exposed a normal caliber distal trachea, with diffuse hemangiomas along its wall extending to the carina. A non-obstructing small polypoid sessile hemangioma was noted on the posterior surface of the distal tracheal. More bulky disease at the level of the carina was observed, with partial

* Corresponding author at: Division of Pediatric Otolaryngology, The Children's Hospital of Philadelphia, Richard D. Wood Center, 1st Floor, 34th and Civic Center Blvd., Philadelphia, PA 19104-4399, USA. Tel.: +1 215 590 3440; fax: +1 215 590 3986.
E-mail address: Zur@email.chop.edu (K.B. Zur).

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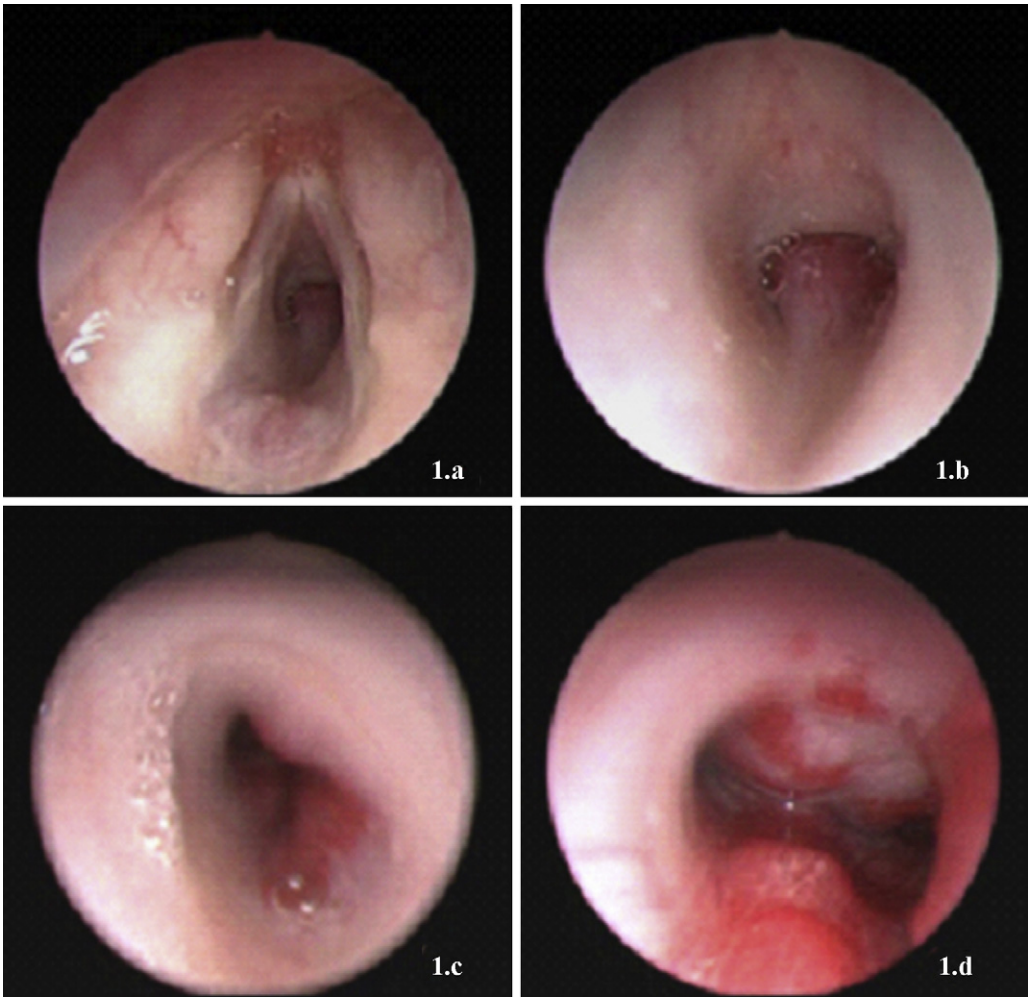

Fig. 1. (a) Normal vocal folds. (b) Obstructing upper tracheal hemangioma emanating from the posterior common party wall. (c) Mid tracheal bulky hemangiomas on the right lateral wall. (d) Distal trachea with multiple bulky and flat hemangiomas involving the carina and bilateral mainstem bronchi.

obstruction of both mainstem bronchi. Visualization of the glottic and subglottic areas revealed a normal anatomy, with unremarkable epiglottitis and arytenoids as well as mobile and intact vocal cords. A flat non-obstructing hemangioma lining the posterior pharyngeal wall was also noted and it remained stable during subsequent exams (Fig. 1).

Surgical intervention was cancelled after the discovery of the tracheal location of the vascular tumors. Tracheotomy was ruled out at this point due to the risk of irritation to the diseased tracheal wall and consequent bleeding. Furthermore, the patient had displayed a fair response to steroids and her symptoms were deemed to be mild so far. KTP laser ablation was considered as an option in case of symptom exacerbation, but was postponed at this point because the obstructing hemangioma was located on the posterior tracheal wall, therefore in the common party wall with the esophagus, representing a risk of esophageal perforation with laser intervention. The child was transferred extubated and on a continued course of systemic steroids to the PICU.

In the PICU, despite aggressive steroid dosing, the patient continued to require respiratory treatments with racemic epinephrine and the decision was made to proceed with KTP excision of the proximal obstructing tracheal hemangioma. In the operating room, a 0.4 mm flexible fiberoptic KTP laser in non-contact mode set at 2 W, continuous firing (Laserscope) was passed through the suction port of the rigid bronchoscope and was used to decompress about half of the obstructing proximal posterior tracheal hemangioma. Further ablation was not performed to prevent scarring or perforation of the trachea. Better visualization of the distal trachea revealed bulky submucosal hemangiomas on the distal right lateral tracheal walls and confirmed narrowing anteriorly and posteriorly at the carina, although it remained undetermined if this narrowing was caused by extrinsic or intrinsic compression. The patient was uneventfully extubated in the PICU on post-operative day 1. She was discharged three days later with a prescription for dexamethasone and ranitidine, breathing comfortably on room air.

A planned repeat MLB two weeks following the initial endoscopic ablation demonstrated a well-healed and now non-obstructive proximal lesion. KTP laser was applied to the distal right lateral tracheal wall hemangioma and to the posterior lesion right above the carina. The patient was stable to return home on post-operative day 3. The diagnosis of PHACES (Posterior Fossa malformations, Hemangiomas, Arterial anomalies, Cardiac defects, Eye abnormalities and Sternal clefting or Supraumbilical raphe) syndrome was made during this hospitalization by the dermatology team, in light of the patient's large segmental facial hemangiomas and her cardiac anomalies. An ophthalmologic exam was ordered and was unremarkable. MRI/MRA of the head and neck revealed no intracranial or carotid vascular malformations. A large lesion along the medial aspect of the right jugulocarotid axis, causing lateral displacement of the internal