Isolated Pediatric Supraglottic Stenosis Managed Using Plasma Ablation: A Case Report

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ABSTRACT

We describe the technique of plasma ablation (PA) used for releasing supraglottic stenosis (SS). Supraglottic stenosis is associated with the history of airway manipulation or surgery causing chronic laryngeal edema and thereby stenosis. This usually manifests as decannulation failures and often associated with dysphagia and aspiration. A child presented to the emergency with distress following ingestion of green chillis and was intubated. Further developed aspiration pneumonia and fiberoptic endoscopy revealed cricopharyngeal stricture (CPS) and SS. Child was taken up for the release with PA and decannulated successfully. Supraglottic stenosis can be safely treated using PA as an alternative to LASER.

Keywords: Decannulation, Dysphagia, Plasma ablation, Supraglottic stenosis.

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INTRODUCTION

Supraglottic stenosis (SS) may be congenital or acquired. Congenital stenosis is due to laryngomalacia or webs while acquired is associated with trauma, surgery, radiotherapy, or autoimmune disorders. It is also common in children with associated history of airway manipulation or surgery causing chronic laryngeal edema.¹

Despite good results of endoscopic procedures, dense cicatricial scar and its tendency to recur require multiple procedures and thereby repeated decannulation failures. Multiple modalities have been tried for the release of such stenosis. One such modality has been discussed in the case report which can be used at centers not having the facility of LASER.

CASE DESCRIPTION

A 10-month-old male child presented to emergency with noisy breathing, sudden onset of paroxysmal cough, and vomiting following ingestion of green chillis. He was intubated and put on ventilator (inflamed and edematous cords); tracheotomy was done on the fifth day due to failed extubation followed by decannulation within 1 week.

Developed stridor after 1 month and was readmitted for aspiration pneumonia. Upper gastrointestinal endoscopy (UGIE) was done for suspected tracheo-esophageal fistula (TEF) but it showed severe cricopharyngeal and glottic stenosis and thereby tracheotomy was redone. Magnetic resonance imaging and bronchoscopy showed SS with patent airway.

Patient underwent dilatation of cricopharyngeal stenosis and was started and maintained on oral feeds.

After 9 months, patient underwent repeated bronchoscopy which showed extensive fibrotic tissue obscuring the entire view of larynx (Fig. 1A), but glottis and subglottis were normal as seen through a small opening of 3 mm.

Patient was planned for plasma ablation (PA)-assisted release of supraglottic adhesions. We used the four-hand technique. A 0° 4 mm Hopkins Rod nasal endoscope (Karl Storz, Germany), Millers laryngoscope blade, and PA (Smith and Nephew, USA) were used for this procedure.

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Intraoperatively, the right side of epiglottis and right arytenoid were found fused with lateral and posterior pharyngeal wall which was released using PA (Fig. 1B), thereby bringing the normal glottis into view (Fig. 1C). Airway was normal till carina (Fig. 1D). The patient was discharged after successful decannulation with significant improvement in aspiration.

DISCUSSION

The probable cause of stenosis in this case was either laryngeal edema caused due to ingestion of chillis or chronic aspirations associated with acid reflux or airway manipulation during intubation. There are reports of SS due to alkali or acid ingestion which are usually accompanied by strictures in the gastrointestinal tract.^{2,3}

It is accompanied with some degree of dysphagia, strictures, decreased pharyngeal contractions, and poor epiglottic retroversion.⁴

Treatment with LASER, either CO₂ or pulsed KTP,⁴ has been more successful as compared to cold instruments, dilatation, or mitomycin C application. Plasma ablation is a versatile and cheaper alternative to LASER and has been described in this case report. It gives the surgeon ablation, bipolar cautery, suction, and irrigation

Figs 1A to D: (A) Preoperative endoscopy showing stenosis at the level of supraglottis with small opening into the endolarynx; (B) Use of plasma ablation for releasing the adhesions. The figure shows a microlaryngeal wand; (C) Intraoperative view of coblation release bringing vocal cords (*) into view; (D) Normal glottis and subglottis

in a single sleek device. It creates a plasma field to break molecular bonds and remove tissue. Temperatures range between 40°C and 70°C with tissue penetration of 1 mm. Flexibility allows the surgeon to reach difficult to visualize areas. It has been successfully used in tracheal stenosis and other airway lesions like vallecular cysts.⁵⁻⁷ The use of a four-hand technique makes the surgery simpler, and the endoscope provides a panoramic view.⁸

CONCLUSION

Supraglottic stenosis can be safely treated using plasma ablation as an alternative to LASER. Advantages include no risk of airway fire, easy availability, cost effectiveness, and minimal collateral thermal damage. More cases and long-term follow-up are needed for this technique to be effectively compared to other time-tested modalities.

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