

ABSTRACT

An 18-year-old female was evaluated for biphasic stridor and diagnosed with subglottic stenosis (SGS) secondary to prolonged intubation three months prior to presentation. Initial management consisted of awake tracheostomy, balloon dilation, and resection of tracheal granuloma. Due to recurrent stridor, she underwent direct laryngoscopy, resection of subglottic scar using cold instruments and placement of a corticosteroid-releasing implant. This case highlights the current surgical and medical management options for acquired SGS and proposes a novel delivery method of adjunct corticosteroid therapy in this condition utilizing the Propel® stent.

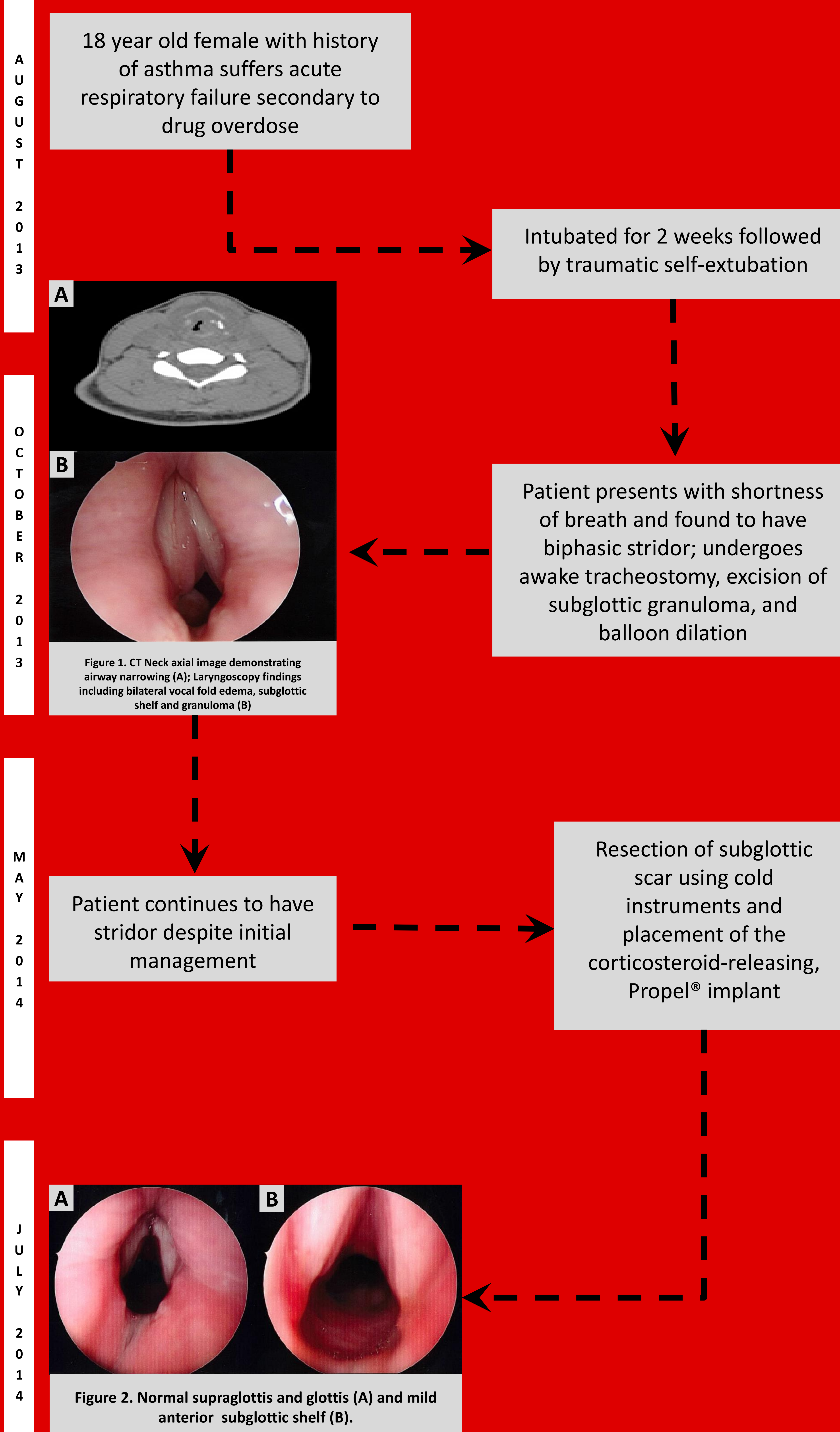
INTRODUCTION

No standardized protocol for the management of acquired subglottic stenosis (SGS) currently exists. Treatment options include various endoscopic interventions, including CO2 laser resection, balloon dilation laryngoplasty (LP), and open laryngotracheal resection (LTR) in conjunction with empiric medical treatment such as mitomycin C (MMC), 5-fluorouracil (5-FU), and/or corticosteroids. A dearth of prospective investigations on the peri- and post-operative medical management of SGS renders selection, dosage, and utilization of such pharmacotherapy relatively nebulous. Additionally, few, if any, studies have examined the best route of medication administration in the setting of SGS as it relates to inhibition of granuloma formation. Here we report the novel use of the Propel® Mometasone Furoate Implant [Intersect ENT, Inc., Menlo Park, CA], a corticosteroid-releasing implant traditionally used in sinus surgery, as adjunct therapy in the management of SGS.

CASE REPORT

An 18-year-old female with a history of asthma was initially evaluated by the otolaryngology service for persistent biphasic stridor. Flexible fiberoptic laryngoscopy revealed poor bilateral vocal cord mobility with edema extending inferiorly from the true vocal cords and a subglottic granuloma (Figure 1). Three months earlier, she had suffered acute respiratory failure related to a drug overdose; she remained intubated for two weeks and subsequently self-extubated. The patient presented to the emergency room (ER) with acute shortness of breath and stridor. A CT Neck obtained by the ER revealed narrowing of her subglottic airway (Figure 1). Due to her acute respiratory distress, she was managed with an awake tracheostomy, balloon dilation, and excision of granulomatous tissue. However, six-months after this intervention, the patient had recurrent stridor. On direct laryngoscopy, the subglottis was found to be patent posteriorly but with anterior scarring. She underwent resection of subglottic scar using cold instruments and placement of the corticosteroid-releasing, Propel® implant. Postoperative care included regular saline nebulizer treatments. The patient was reevaluated two months postoperatively and found to have significant improvement in her airway with only a very small anterior scar that was excised with cold instruments (Figure 2). The distal airway was normal. The patient was subsequently successfully decannulated.

RESULTS



DISCUSSION

Acquired SGS is most commonly precipitated by iatrogenic trauma such as prolonged intubation or tracheotomy, but may also present secondary to foreign body impaction, external trauma, and infection.¹ The incidence of post-intubation and post-tracheotomy SGS has been reported to be as high as 21%.² A meta-analysis of retrospective cohort studies by Yamamoto et al.³ examining procedural therapeutic management for acquired SGS found LTR to be significantly more successful than both LP with or without grafting as well as endoscopic intervention. They recommend that 1) LTR be utilized to treat stenosis fewer than 4 cm without involvement of the glottis, 2) LP is indicated in longer stenosis, particularly those involving the glottis, and 3) at most two attempts via endoscopic mechanisms be undertaken for small (<1 cm) lesions without framework destruction followed by more invasive intervention in cases of treatment failure.³ Nevertheless, acquired SGS remains a particularly complex condition to manage both surgically and medically, requiring physicians to evaluate their individual comfort level with procedure type and to rely on their clinical acumen to best manage SGS patients on a case-by-case basis.

Various pharmacologic agents are employed as adjuvant therapy peri- and post-procedurally. Trials with murine and rabbit models have shown systemic glucocorticoid injections and MMC, an antineoplastic agent, to suppress formation of granulation tissue and inhibit the development of subglottic stenosis following both mechanical and chemical injury.^{4,5} Similarly, topical and intralesional injections of corticosteroids have been used in both adult and pediatric populations to prevent fibrosis via inhibition of the inflammatory cascade following iatrogenic injury experienced during intervention for SGS.^{1,6-8} Here, we report, to our knowledge, the first instance of a corticosteroid-releasing implant in the management of SGS.

The Propel® mometasone-releasing implant is a Food and Drug Administration (FDA) approved bioabsorbable, drug-eluting device indicated in endoscopic sinus surgery (ESS). The device locally releases 370 µg of mometasone furoate over one month, helping to maintain patency of the sinus ostia by limiting edema and inflammation.⁹ Following resection of the subglottic scar of the patient discussed in this report, a Propel® stent was placed at the site of intervention. On subsequent evaluation two months post-operatively, the patient's airway was found to be patent with mild residual stenosis. Due to the success observed, we believe that the placement of long-term corticosteroid-releasing stents in the management of acquired SGS merits further investigation.

CONCLUSION

In part due to the lack of a universally accepted protocol for the treatment of acquired SGS, its management remains a particular challenge for otolaryngologists, general surgeons, and pulmonologists. Further, the role of corticosteroids in the peri- and post-operative period has not yet been elucidated by prospective studies. The successful utilization of a corticosteroid-releasing implant in this case reveals its potential for use in the treatment of SGS, though its definitive benefit should be determined with future prospective analysis.

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