Procedural steps were performed to correct the peristomal collapse: posterior cartilage laryngotracheoplasty and even slide tracheoplasty. The following interventions including balloon dilation, laser assisted lysis of glottic scars/webs, anterior/lateral tracheoplasty were performed to correct the peristomal collapse. The wounds were then closed over the PDS in a multilayer fashion. The PDS suture was tied deep to the platysma, applying tension to effectively suspend the anterior/lateral trachea as visualized on rigid telescopic visualization. A 16-gauge angiocatheter was inserted inferior to the tracheal lumen. A 2-0 PDS suture was passed through this angiocatheter, pulled out of the mouth and tied to the PDS. The angiocatheter was then removed. With rigid telescopic visualization, a 16-gauge angiocatheter was passed through the skin of the neck and into the tracheal lumen. A 2-0 PDS suture was passed through this angiocatheter, pulled out of the mouth. Another angiocatheter was then inserted into the tracheal lumen. A large proportion of children with long-standing tracheostomies develop peristomal tracheomalacia and/or significant circumferential collapse. It has been estimated that nearly 10% of children with long-standing tracheostomies develop peristomal tracheomalacia and/or significant circumferential collapse.

Intervention

Ten pediatric patients who had previously undergone tracheostomy were diagnosed with significant, dynamic anterior or lateral peristomal collapse. The underlying pathology leading to tracheostomy tube placement varied considerably, from subglottic stenosis secondary to prolonged intubation to multilevel airway obstruction in the setting of complex chromosomal abnormalities. Several patients had undergone prior surgical airway interventions including balloon dilation, laser assisted symptomatic carotid web resection, anterior/posterior cartilage laryngotracheoplasty and even slide tracheoplasty. The following procedural steps were performed to correct the peristomal collapse:

1. Anterior cricoid suspension and tracheal stomal closure with increased intraluminal pressure created by the PDS suture.
2. Laser assisted lysis of glottic scars/webs.
3. Posterior cartilage laryngotracheoplasty.
4. Even slide tracheoplasty.

The procedure was well tolerated by all patients within our series, with no complications related to the tracheostomy. The majority of patients have seen long-term clinical benefit following this procedure (longest follow-up 18 months), and all but two patients have been able to achieve decannulation. Substantial improvement in airway diameter has been observed during subsequent endoscopic examinations.

Conclusions

Peristomal collapse and tracheomalacia remain hurdles in the decannulation of pediatric patients. Percutaneous suture tracheal suspension is a minimally invasive and effective option for the repair of dynamic peristomal collapse in the pediatric population.

References


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Abstract

Classically, the treatment for this complication includes complex, morbid procedures such as tracheostomy replacement in all patients. A large proportion of children with long-standing tracheostomies develop peristomal tracheomalacia and/or severe peristomal tracheomalacia1. All the patients within this study had long term tracheostomies, as well as complex underlying airway pathology ranging from congenital vocal cord immobility to multilevel, dynamic airway collapse. The pediatric trachea is smaller and more pliable than an adult’s, and thus more likely to experience peristomal collapse/malacia1.4-5. Several methods have been proposed to correct these issues including the use of T-tubes and endotracheal tubes to buttress the collapsing segment until cartilage can reform and remodel. This places the intratracheal mucosa at risk, and can lead to significant tracheal scarring and stenosis1. It has also been postulated that the collapsing segment of the cartilage can be achieved with increased intraluminal pressure created by one way speaking valves1. However, this method is not feasible in many individuals due to comorbidities and intolerance. Also, the literature supporting this technique is sparse and unsubstantiated.

Conclusion

Percutaneous suture tracheal suspension is a minimally invasive and effective option for the repair of dynamic peristomal collapse in the pediatric population.