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The use of the Montgomery T-tube in difficult paediatric airways

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Summary

Objective: We report our experience of using Montgomery T-tubes in children.
Method: A retrospective review of medical records was performed. Data collected included particular clinical circumstances, the details of usage of the tube, and the eventual outcome.
Results: Between January 1999 and October 2003, our unit performed 293 tracheostomies, 76 laryngotracheal reconstructions and 31 other major airway procedures in children. 10 children have had a Montgomery T-tube inserted. Nine were boys. In eight cases, the T-tube was used because of severe granulations and subsequent fibrotic narrowing in the subglottis after laryngotracheal reconstruction surgery. These children had undergone between one and four major procedures prior to T-tube placement. In the other two cases, the T-tube was used to stent severe glottic and supraglottic stenosis (due to previous laser surgery for papillomas in one case and congenital ectodermal dysplasia in the other). At the time of T-tube placement the children were aged 2—18 years (median 8 years). The tube was initially fitted so as to protrude above the glottis in all cases. In one case, the T-tube was removed on the first post-operative day. One tube was removed after a week due to severe crusting. One tube blocked after 2 weeks. One child had re-stenosis in the supraglottis necessitating the placement of a T-tube with a longer upper limb. Two children have subsequently died from non-airway causes. Two children still have their T-tube in situ, one of whom is due to have it removed in the next few weeks. Six have been successfully decannulated and are well.
Conclusions: The Montgomery T-tube provides a useful adjunct to the management of a small number of children with the most difficult airway problems. Its use can be problematic, however, and requires awareness of its specific complications. We have confined usage to complex stenoses where a reconstruction would be inappropriate, or (in one instance) to stent an unsupported larynx after revision reconstruction (tracheal resection).

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1. Introduction

Surgery for paediatric laryngeal stenosis has come a long way since the introduction of the laryngotracheoplasty for subglottic stenosis by Evans and Todd in England [1], and Fearon and Cotton in the USA [2]. The success rate for the surgery of subglottic stenoses has markedly improved [3,4]. However, many challenges remain, and it is still difficult to obtain good results from surgery in children with multilevel obstruction. Treatment of these stenoses often involves the need to stent the airway at some stage.

There are limited stenting options available for paediatric airways. Zalzal describes a variety of methods for primary stenting in surgical repair of laryngotracheal stenosis in children [6]. The use of an endotracheal tube was described by Birck (1970) [7]. Silastic sheet rolls ('Swiss Rolls') [8] have also been used. The roll has a constant tendency to unroll, producing general pressure on the mucosa. This pressure allows obliteration of any dead space and allows mucosal regeneration to occur. However, because of its propensity to form granulation tissue, the silastic sheet was largely superceded by the Teflon Aboulker stent [9].

Zalzal noted that the Aboulker stent is made of highly polished Teflon, which minimizes irritation and granulation tissue formation compared to other stents. However, he also notes broken Aboulker stents in 3 of 17 children who had received them in his series [10]. Stern (1998) noted that the Montgomery T-tube seemed to cause less granulation than the Aboulker stent, in particular at the lower end of the stent [11].

The Montgomery T-tube is a soft silicone tube with three limbs. When used for paediatric laryngeal stenosis, the upper limb stents the larynx, the lower stents the upper trachea and the anterior limb provides access through the neck for suctioning, and can be used as an airway if required (Fig. 1). It has ridges and grooves to allow a ring washer to be attached to help prevent displacement. The tube is designed to maintain an adequate airway, whilst at the same time providing support to the larynx and trachea [5]. One of the advantages of the tube is that its length permits the stenting of obstructions at various levels. Another is the flexibility offered by the three lumens in allowing the patient to breathe in different situations. Patients usually wear the tube with the anterior limb plugged, breathing and phonating through the mouth and nose in the normal way, with this anterior limb acting as stent, suction channel and emergency airway.

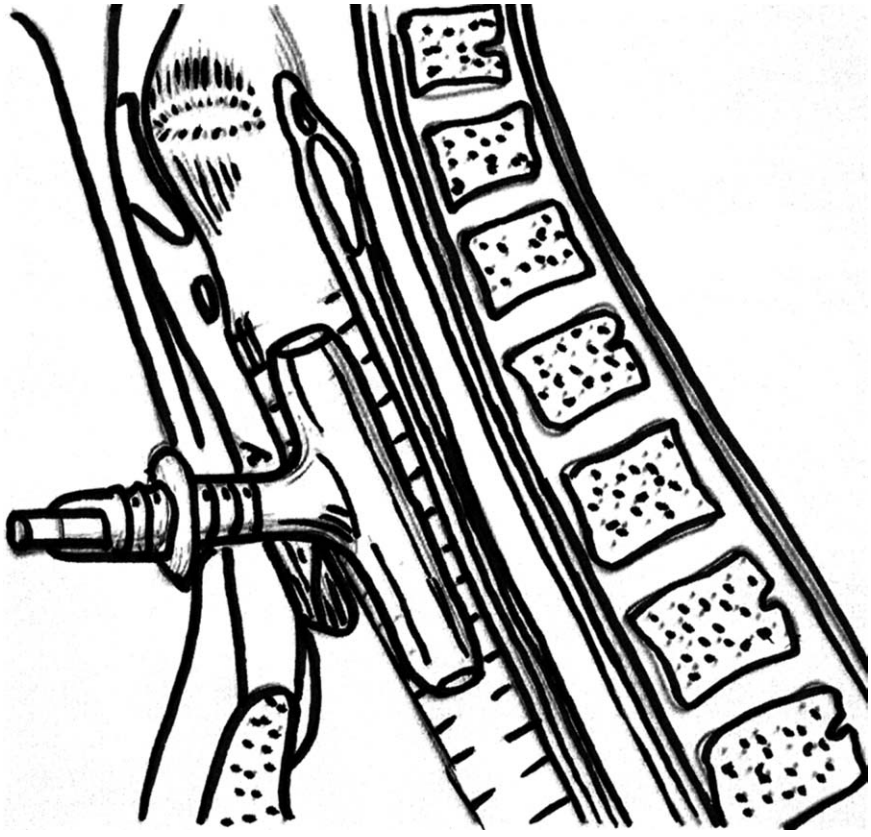

Fig. 1 The position of the Montgomery T-tube.