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SHORT COMMUNICATION

Customising the length of the Montgomery T-tube whilst retaining a bevelled edge

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Abstract

Background: The Montgomery T-tube is used in a number of conditions that require safe tracheal stenting. Specific lengths of T-tube limbs are occasionally needed in patients with complex airway anatomy or differing neck proportions; this requires customisation of the T-tube limbs. This is done either by pre-ordering customised T-tubes from the manufacturer (which needs to be planned ahead of time) or using a tube cutter in the operating theatre. However, the latter does not provide a 'factory like' bevelled edge when shortened, which increases the risk of mucosal trauma and granulation formation.

Objective: This paper reports a novel technique for customising the length of existing Montgomery T-tubes, with preservation of the bevelled edges. This technique can be easily performed with basic equipment available in operating theatres.

Key words: Airway Obstruction; Tracheal Stenosis; Trachea; Larynx; Tracheostomy; Stents

Introduction

The Montgomery T-tube (Boston Medical Products, Westborough, Massachusetts, USA) was developed in 1964 by Dr William Montgomery.[1] It has been employed for numerous uses by ENT surgeons for an increasing number of conditions that require safe tracheal stenting. These include laryngotracheal reconstruction,[2] tracheomalacia or tracheostenosis, and any condition that affects the calibre and structural function of the tracheal architecture.[2,3]

The Montgomery T-tube is a three-limbed device that serves two functions: it serves as an effective tracheal stent and as a tracheostomy tube. The T-tube structure is commonly divided into the 'vertical' longer limb and the 'horizontal' shorter limb.

The vertical limb sits within the trachea, with its superior limits extending just inferior to the glottis.[4] The horizontal limb extrudes out of a tracheostoma to be visible in the neck of the patient. The external horizontal limb can be occluded or capped just like a formal tracheostomy tube. There are no inner lumens within the T-tube. Therefore, patients must be fully trained in excellent tube care.

We report a novel step-by-step technique, illustrated with clinical photographs, for customising the length of existing Montgomery T-tubes with preservation of the bevelled edges. This technique can be easily performed with basic equipment available in operating theatres.

Materials and methods

Figure 1 illustrates the equipment needed, namely: a number 11 scalpel blade; endotracheal tubes (ETTs) of varying diameter; a Montgomery T-tube of required internal diameter for the patient; and curved lockable forceps, used to aid placement of the vertical limb within the trachea.

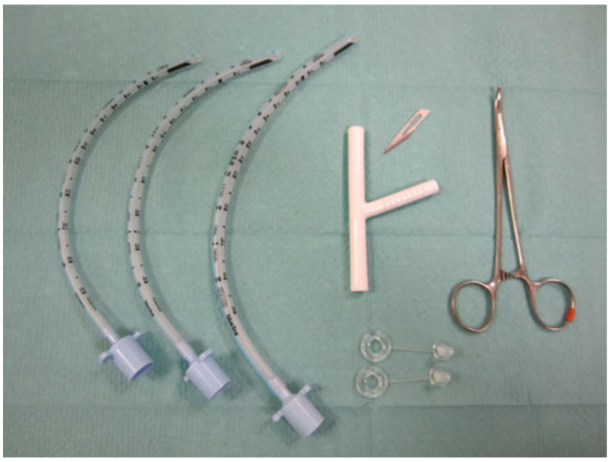

FIG. 1
Basic operating theatre equipment needed.

A suitably sized ETT is chosen; its diameter needs to be slightly less than the diameter of the T-tube limb that requires shortening (Figure 2). The ETT is then lubricated on its tip and inserted into the limb. A smaller sized ETT can be used if too much resistance is felt during insertion.

A number 11 blade is then inserted through the ETT at a 30–45° angle until the blade tip is seen protruding on the other side of the tube (Figure 3). The distance of the blade from the ETT is roughly around 4–5 cm; however, this is not a dogmatic length.

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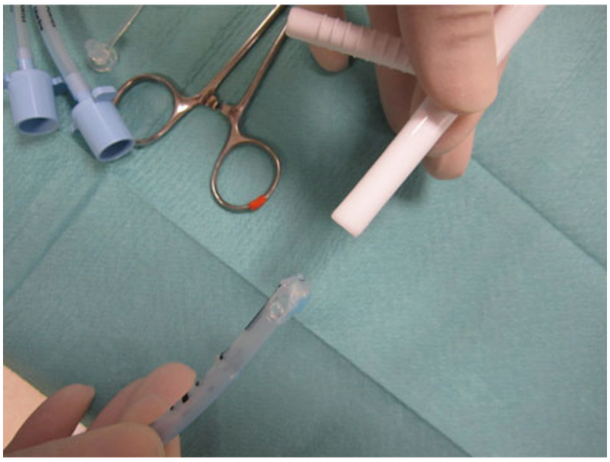

FIG. 2
Sizing of the endotracheal tube.

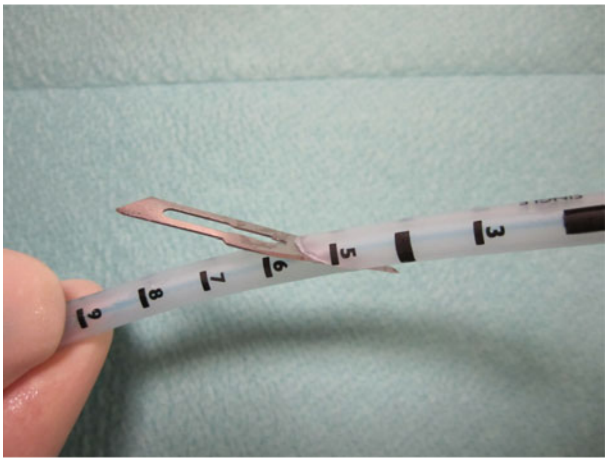

FIG. 3
Insertion of a number 11 blade at a 30–45° angle into an endotracheal tube.

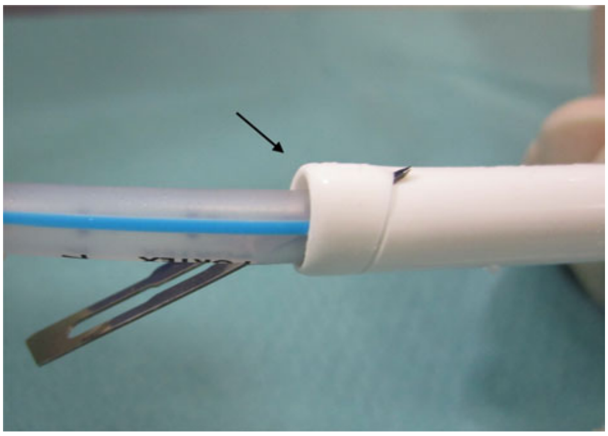

FIG. 4
Original bevelled edge of the T-tube during initial circumferential cutting (arrow).

The whole unit is then inserted into the T-tube limb and gently rotated to obtain an angled circumferential cutting mechanism (Figure 4). This action can be stopped when

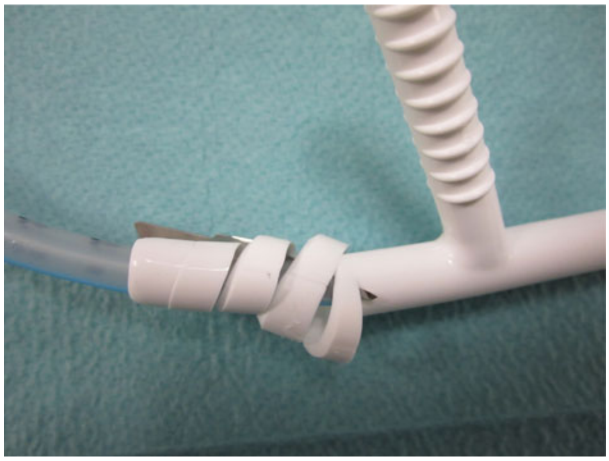

FIG. 5
Angled circumferential cutting mechanism on the T-tube.

FIG. 6
Shortened T-tube with a bevelled edge.

the desired length of the T-tube limb has been obtained (Figure 5). Note the original bevelled edge on the T-tube during the initial circumferential cutting (Figure 4).

This method allows a precise mechanism for shortening the T-tube and provides a bevelled edge to the limb (Figure 6).

Discussion

There are two important elements in the design of the Montgomery T-tube that reduce mucosal trauma, reaction and granulation formation.[5] Firstly, bio-inert soft silicone is used to reduce any tissue reaction. Secondly, the edges of the limbs are carefully bevelled, which reduces local trauma and mucosal reaction. The bevelled edges also reduce trauma inflicted during the initial insertion of the tube.

Specific lengths of T-tube limbs are occasionally needed in patients with complex airway anatomy or differing neck proportions. In such circumstances, T-tube manufacturers are able to provide T-tubes with bevelled edges that are customised to a specific length. However, this needs to be planned ahead of time by the surgeon and ordered accordingly. An alternative is to use the CK 1022 Tube Cutter (Boston Medical Products). The downside to this apparatus is the lack

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of the smooth ‘factory bevelled’ edges, which increases the risk of granulation formation and mucosal trauma.

Although factory customised T-tubes are available from the manufacturer, we find the method described in this paper effective as it allows easy customisation of T-tube length in the operating theatre. In addition, the angled circumferential cutting mechanism from within the lumen of the T-tube retains the bevelled edge, thereby reducing mucosal trauma.

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