

Preforming of a Nasal Endotracheal Tube to Avoid Obstruction

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We made a device to bend the nasal endotracheal tube (polyvinyl chloride) without narrowing of the bent portion. Use of this preforming tube will reduce the incidence of the tube obstruction and soft tissue damage along the airway.

Obstruction of nasally intubated endotracheal tubes frequently occurs at the intersection between the inferior nasal airway and pharyngeal wall, because the tube easily collapses on passing the acute angle of this point (fig. 1-1). In other cases, obstruction occurs at the bevel of a tortuous tube stopped by the tracheal wall (fig. 1-4). Prolonged compression by the tube does occasionally damage to pharyngeal wall (fig. 1-2) or larynx (fig. 1-3). Hemorrhage from surface of anterior tracheal wall occurs after frequent insertion of suction catheter via the same point of tracheal wall (fig. 1-5).

To prevent such troubles, we made a device that bends the endotracheal tube without reducing the sectional area of bent portion and without changing the sectional roundness. This device consists of two metal shafts, one of which has a spring on the end. The shafts are inserted into both ends of a vinyl endotracheal tube until they join, with the

spring positioned at the portion to be bent based on head X-ray findings from the lateral view. The tracheal tube is bent to more sharp angle than the desired angle and the bent portion is placed in the boiling water for about 30 sec, and then cold water. After cooling, shafts are pulled out from the tube, finally the tube are shaped as intended (fig. 2). Figure 3 shows an endotracheal tube that fits the contour of the airway passage. Figure 3-1 and 3-2 are bent portions.

This tracheal tube, not only prevents airway obstruction, but also decreases tissue damage of pharyngeal wall, larynx and tracheal wall due to prolonged compression by the tube. In addition, by rotating the patient's head, a catheter can be easily inserted into a bronchus for suction. A difficulty with this preformed tube is that the end of the tube can not easily be moved forward from the nasal cavity to pharynx when intubation performs, because the end of the tube bends backward. However, this problem was solved by using a preformed endotrol (Mallinckrodt) tube, so that the tube can be moved forward while pulling on the endotrol line. The following intubation method is same as usual.

Twenty patients were intubated this each individually preformed tracheal tube without troubles in our hospital. The shape of extubated tubes from each patients were

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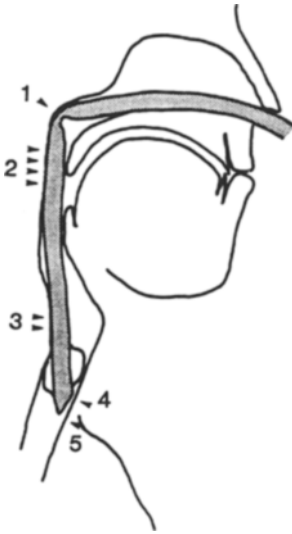


Fig. 1. Troubles due to nasally intubated endotracheal tube 1, tube obstruction due to folding 2, 3, 4, tissue damage of pharyngeal wall, larynx, tracheal wall respectively 5, airway obstruction due to close situation between bebel of the tube and tracheal wall.

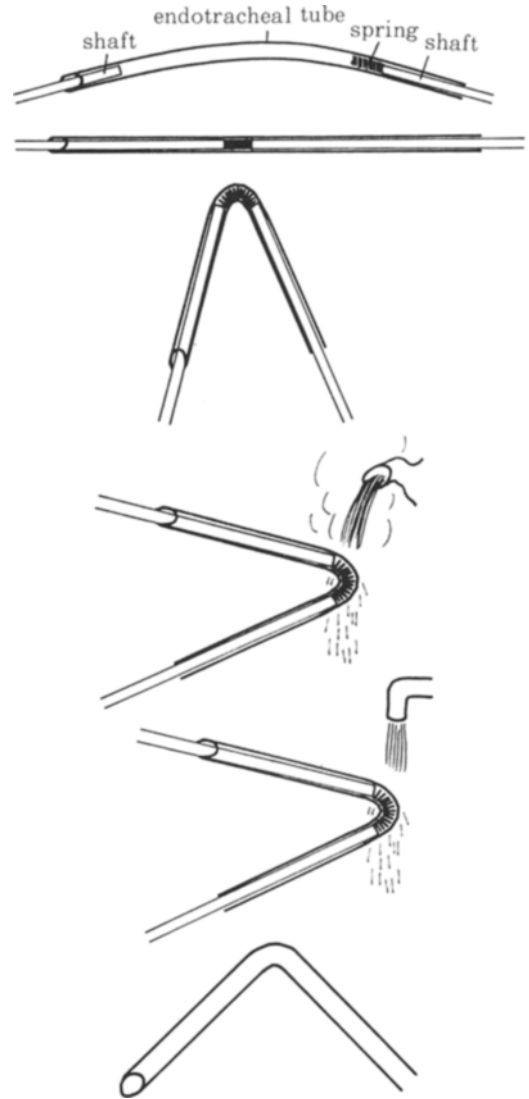


Fig. 2. How to bend the endotracheal tube.

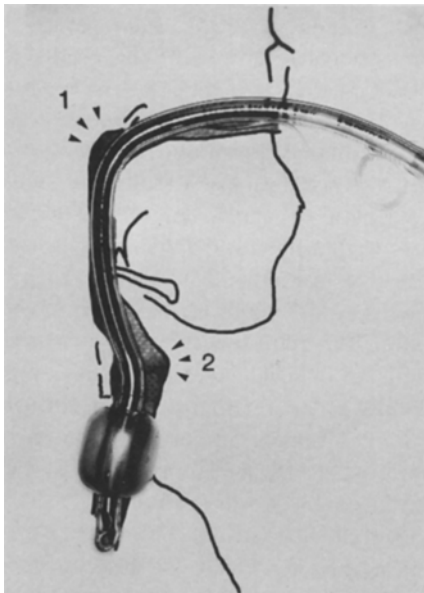


Fig. 3. An endotracheal tube that fits the contour of the airway passage.

not different from that before intubation.

Our preformed tracheal tube particularly applicable for patients scheduled for nasally intubated general anesthesia or long term respiratory care.

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References

1. Kemmotsu O, Matsuo Y, Takahashi T: Endotracheal intubation and airway obstruction. *Masui (Jap J Anesthesiol)* 20:259-264, 1971