Retromolar tracheal tube positioning for patients undergoing faciomaxillary surgery

To the Editor:
In patients undergoing complex faciomaxillary surgery, orotracheal [need for inter-maxillary fixation (IMF)] and nasotracheal intubations (nasal injury, skull base fracture, rhinoplasty) may be unsuitable.[1] Alternative options include: short-term tracheostomy (invasive, scar) and submental intubation (orocutaneous fistula)[2] but have their own limitations.

A closer observation by the author (S.S.S.) revealed that there is enough space in the retromolar region for an endotracheal tube (ETT) to be placed and allow IMF without tube compression or kinking. We successfully utilized tracheal tube positioning in the retromolar trigone[3] for short-term intraoperative use in 42 adult patients undergoing a variety of maxillofacial procedures.

After routine preoperative preparation (orodental examination, informed consent, aspiration prophylaxis, IM glycopyrrolate), anesthetic induction, skeletal muscle relaxation and orotracheal intubation with a reinforced tracheal tube are carried out in a standardized manner. While instituting IMF, the ETT is moved laterally along the buccal sulcus beyond the last molar and placed in the retromolar groove to be taken out at the angle of the mouth (Figure). On completion of the scheduled procedure, the IMF is cut open and usual orotracheal tube position is resumed. Adequacy of oxygenation, ventilation and tube patency (peak airway pressure) are monitored continuously.

FIGURE Retromolar placement of the tracheal tube with intermaxillary wire fixation in place.

"Retromolar" tracheal tube positioning offers the following advantages: it is noninvasive, easy to perform, non-traumatic and time efficient; tube patency can be easily monitored, and most importantly, an optimal intraoperative control of dental occlusion can be achieved. Though we did not encounter any difficulty or complication, the potential disadvantages could be: limited space, adjoining soft tissue and mucosal trauma, long buccal nerve palsy (loss of sensation on buccal mucosa), inadequate/difficult occlusion and accidental extubation. Furthermore, its applicability in cases with pre-existing temporomandibular pathology and efficacy for long-term postoperative use is questionable.

In conclusion, retromolar positioning of the tracheal tube is an attractive option for maintaining the airway in patients during faciomaxillary procedures.

Amitabh Dutta MD
Vivek Kumar MS
S. S. Saha MS MCH
Jayashree Sood MD FFARCS
R. K. Khazanchi MS MCH
Sir Ganga Ram Hospital, New Delhi, India
E-mail: duttaamitabh@yahoo.co.in

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Mainstem bronchial diameter for the left-sided Broncho-Cath® double-lumen tube: an in vitro study

To the Editor:
Adequacy of a double-lumen tube (DLT) size has been determined depending on whether the bronchial cuff volume required for isolation is > zero but ≤ the resting volume.[1,2] Recently, direct measurement of the left

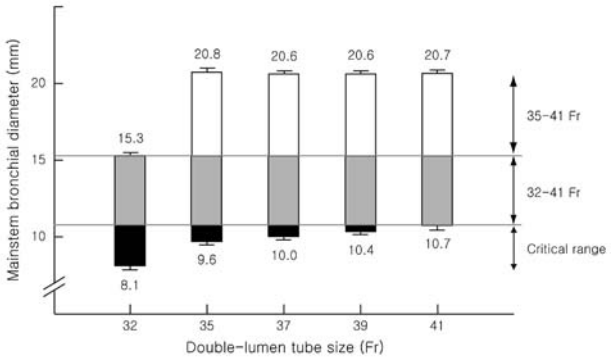

FIGURE Theoretical range of the left mainstem bronchial diameter that is indicated for each Broncho-Cath® tube size (mm). For bronchi in the range of the 'gray' column, a DLT of any size ≥ 32 Fr can be used. For bronchi in the range of the 'white' column, a DLT of any size ≥ 35 Fr can be used. In the critical range of the 'black' column, the lower limits of the allowable bronchial diameters varied depending on the DLT size. Whiskers above and below the box are SDs of the minimum and maximum limits.

mainstem bronchial diameter on plain chest radiographs or computed tomographic scans has been performed with the goal of establishing an objective criterion for DLT size.[3,4] The purpose of this study was to determine the maximum allowable mainstem bronchial diameter for left-sided Broncho-Cath® DLTs.

Left-sided DLTs (Broncho-Cath®; Mallinckrodt Medical Ltd., Athlone, Ireland) with sizes of 32, 35, 37, 39 and 41 Fr (n = 5 for each size) were tested as previously described.[2] The pressure-volume curve for each bronchial cuff was drawn by incrementally injecting 0.5 mL of air (0.25 mL for 32 Fr). Exponential curve fitting analysis was performed on the values of each pressure-volume curve using Matlab software (Mathworks Inc., Natick, MA, USA). The resting volume, where the slope of the tangential line is 10 mmHg/0.5 mL (Dcuff pressure/Dcuff volume), was calculated by differentiation on the fitted curve. The resting cuff volumes (mean ± SD) for 32–41 Fr DLTs were 0.6 ± 0.1, 2.5 ± 0.1, 2.2 ± 0.1, 2.0 ± 0.1 and 2.3 ± 0.1 mL, similar to those previously described.[2] To prevent ischemic bronchial injury, the intracuff pressure should be < 44 cm H_2O, at which pressure mucosal capillary perfusion reported to decrease.[5] The calculated cuff volumes (mean ± SD) at a cuff pressure of 44 cm H_2O on the fitted curve for each DLT size were 1.0 ± 0.2, 3.3 ± 0.1, 3.0 ± 0.1, 2.8 ± 0.1 and 3.0 ± 0.1 mL, respectively.

After inflating the bronchial cuff with the calculated volume at a pressure of 44 cm H_2O, we measured the outer diameter of the bronchial tube with a precision caliper (0.1-mm intervals) at the mid-cuff level. This largest allowable cuff diameter was regarded as the theoretical maximum bronchial diameter because the resultant intracuff pressure could be less than the critical pressure on the assumption that the bronchial cuff is in contact with the bronchus. Outer diameter of the bronchial tube with the cuff completely collapsed[4] was regarded as the theoretical minimum bronchial diameter (Figure).

Contrary to a common belief that a larger DLT should be used for patients with a larger bronchus, the upper limits of the bronchial diameters indicated for all the Broncho-Cath® DLTs ≥ 35 Fr seem to be the same regardless of DLT size (Figure). In spite of the fact that only two sizes of DLT (32 Fr and another larger one of any size) seem to suffice in all adult patients, what is the best DLT size for each patient remains to be determined.

Jae-Hyon Bahk MD
Ho-Geol Ryu MD
Jahng-Hyon Park PHD
Seoul National University Hospital, Seoul, Korea
E-mail: bahkjh@snu.ac.kr

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