Case Report

Anesthetic management of a patient with Montgomery t-tube in-situ for direct laryngoscopy

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Abstract
The Montgomery silicone t-tube used for post-procedural tracheal stenosis has advantage of acting as both stent and tracheostomy tube. The anesthetic management of patient with t-tube in situ poses a challenge. Safe management of such patients requires careful planning. We describe anesthetic management for direct laryngoscopy of a patient with t-tube in situ.

Key words: Laryngoscopy, stent, tracheal stenosis, tracheostomy tube, t-tube

Introduction
Montgomery t-tube was devised by William W. Montgomery in 1964 to prevent postoperative tracheal stenosis following reconstructive surgery on cervical trachea. It acts both as tracheal stent and tracheostomy tube. The t-tube has a vertical intraluminal (intratracheal) limb and a horizontal extraluminal end which protrudes through the tracheostomy orifice. The proximal and distal end of the intraluminal limb is tapered to prevent mucosal abrasions. The proximal end is shorter compared to distal end. It is available in sizes ranging from 4.5 to 16 mm external diameter for pediatric and adult use, respectively.

The management of patients with t-tube in situ poses difficulty in controlled ventilation as t-tubes are not provided with standard connectors to fit with anesthesia breathing circuits and the proximal upper open end causes loss of inspired gases. In surgeries involving the upper airway, sharing of surgical field with the airway is an additional challenge. Further, many anesthesiologists are unfamiliar with the device.

Case Report
A 60 kg, 23-year-old man was scheduled for DL assessment and further surgery. The patient had t-tube insertion done earlier for subglottic stenosis resulting as a complication of prolonged intubation and tracheostomy tube (TT) insertion, following head injury. The t-tube was needed, as 70° endoscopy had revealed the presence of a web between true and false vocal cords, which had reduced the glottis chink. All the relevant investigations were within normal limits.

The patient’s upper airway was anesthetized by 10% lignocaine vissus gargles and nebulization of 6 ml 4% lignocaine, using a tight fitting mask and standard nebulizer. Glycopyrrolate 0.2 mg was administered intramuscular as an antisialagogue.

After shifting the patient to OT, intravenous (IV) access was secured and standard monitors were applied. A No. 4 endotracheal tube (ET) connector was found to fit into the extraluminal limb of t-piece. Patient was preoxygenated with 100% oxygen through the Bain’s circuit connected to the extraluminal limb of t-tube with the ET connector and capnometer sampler attached. Patient was administered IV ranitidine 50 mg, metoclopramide 10 mg, midazolam 1 mg and fentanyl 100 mcg slowly. Anesthesia was induced by inhalation of 3-4% sevoflurane in 100% oxygen on spontaneous...
breathing and was maintained with 2-3% sevoflurane in oxygen and nitrous oxide mixture (50:50).

After ensuring adequate ventilation and depth of anesthesia, DL assessment was started without any significant change in hemodynamic parameters. During the procedure, surgeons blocked the upper open intraluminal end of the t-tube with a piece of ribbon gauze, sufficient to prevent air leak without compromising surgical view. The rest of the procedure was performed satisfactorily on assisted spontaneous breathing with minimal leakage of gas through upper open end.

At the end of procedure the ribbon gauze was removed from the upper end of t-tube. The anesthetic gases were discontinued and 100% oxygen was administered. The patient became conscious, was breathing adequately through the t-tube and maintaining oxygen saturation of 99% on room air. Patient was shifted to the recovery room with stable vital parameters.

Discussion

The unique design of t-tube poses challenges while managing the patients with t-tube in situ. Both the upper and lower ends of intraluminal limb are open; therefore, loss of inspired gases through upper end may lead to hypoventilation, inadequate depth of anesthesia and chances of awareness. Unlike standard ET and TT, the t-tube does not have standard connectors. A range of ET connectors should be available to connect the t-tube to the anesthesia breathing circuit. The anesthetic management for DL assessment of a patient with t-tube in situ is complicated by sharing of surgical field with the airway.

The patient with t-tube in situ can be ventilated through either the extraluminal limb or the intraluminal limb. If extraluminal limb of t-tube is used, plans to prevent upward escape of gases should be made. Montgomery used a Fogarty embolectomy catheter, passed through the extraluminal limb to the upper end, to occlude the end by inflating its balloon.[1] A suitable smaller size ET was then positioned in extraluminal limb next to Fogarty catheter. Other methods described in literature to prevent loss of gases through upper end are insertion of oropharyngeal pack[6] or laryngeal mask airway[3] (LMA) to occlude the lumen.

The ventilation through intraluminal limb requires occlusion of extraluminal limb and delivery of anesthetic gas mixture at upper open end. Wouter et al.,[5] passed a microlaryngeal tube, using awake fibrescopy, through the entire intratracheal limb of the t-piece, in a patient of acute intestinal obstruction. For induction of anesthesia, Guha et al.,[4] utilized both extraluminal and intraluminal limb using a modified breathing circuit consisting of a Y-piece connected to the end of a Bain’s circuit. One end of Y-piece was connected to standard face mask and other to extraluminal limb of t-piece. After induction of anesthesia, t-tube was removed and a 6.5-mm endotracheal tube was inserted through the tracheostomy stoma.

Feldman et al.,[7] described spontaneous ventilation or insufflation technique and supraglottic jet ventilation technique for laryngeal endoscopic procedures. Though not reported in literature this can be extended to patient with t-tube in situ after occluding extraluminal limb. However the success would depend on the equipment and experience of the anesthesiologist.

In our case, since the patient was for DL assessment and proceed, insertion of LMA or an oropharyngeal pack, to prevent loss of gases at upper end of intraluminal end, were unsuitable as they would have compromised the surgeon’s vision. The use of Fogarty catheter for occlusion and subsequent insertion of smaller ET carried drawbacks of difficulty in directing the catheter upwards and increased resistance in ventilation.

The preoperative preparation of airway with lignocaine and IV administration of fentanyl and midazolam helped to reduce pressor response during procedure and decreased the anesthetic requirement.[8] Inhalational induction of anesthesia was chosen since transient apnea caused by IV induction agents or respiratory paralysis with neuromuscular blockers, without means to prevent the upward loss of gases, would have been hazardous.

The use of assisted spontaneous ventilation using either inhalational or IV agents has the advantage of providing control of airway but some amount of gas leak occurs through the upper end. For short duration procedures such as DL assessment, despite some gas leak, the strategy of assisted spontaneous breathing, with local anesthesia of airway, is acceptable.

The other options for managing this case would have been removal of t-tube and insertion of a small-size TT or J-shaped laryngectomy tube and reinsertion of t-tube on completion of DL assessment. However the insertion of TT or ET, as it is would have enlarged the tracheostomy stoma and may have caused difficulty in weaning. Loss of airway control while removing or reinserting t-tube and kinking of t-tube at junction of extraluminal and intraluminal part, could have led to complete obstruction.

The judicious premedication and preoperative anesthetic upper airway preparation combined with spontaneous breathing using either inhalational or IV agents is a tailored anesthesia technique for short-duration procedures such as DL assessment in patients with t-tube in situ.
References

1. Montgomery WW. Manual for care of the Montgomery silicone tracheal t-tube. Ann Otol Rhinol Laryngol Suppl 1980;89:1-7.
2. Wahidi MW, Ernst A. The Montgomery t-tube tracheal stent. Clin Chest Med 2003;24:437-43.
3. Agrawal S, Payal YS, Sharma JP, Meher R, Varshney S. Montgomery t-tube: Anesthetic management. J Clin Anesth 2007;19:135-7.
4. Guha A, Mostafa SM, Kendall JB. The Montgomery t-tube: Anaesthetic problems and solutions. Br J Anaesth 2001;87:787-90.
5. Wouters KM, Byreddy R, Gleeson M, Moley AP. New approach to anaesthetizing a patient at risk of pulmonary aspiration with a Montgomery t-tube in situ. Br J Anaesth 2008;101:354-7.
6. Uchiyama M, Yoshino A. Insertion of the Montgomery T-tube. Anaesthesia 1995;50:476-7.
7. Feldman MA, Patel A. Anesthesia for eye, ear, nose and throat surgery, Miller’s Anesthesia. In: Miller RD, Eriksson LI, Fleisher LA, Wiener-Kronish JP, Young WL, editors. 7th ed. Philadelphia: Churchill Livingstone; 2010. p. 2373-4.
8. Rosenberg MI, Young TJ. Anesthesia for flexible fiberoptic bronchoscopy, Flexible bronchoscopy. In: Wang KP, Mehta AC, Turner JF Jr, editors. 2nd ed. Ann Arbor MI: Blackwell Science; 2004. p. 39-44.

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