ANAESTHETIC MANAGEMENT FOR MONTOGOMERY T-TUBE INSERTION IN A PATIENT WITH TRACHEAL STENOSIS

Sidhartha Mohanty[1], Surupa Deviprada[2]

HOW TO CITE THIS ARTICLE:
Sidhartha Mohanty, Surupa Deviprad. "Anaesthetic management for montogomery t-tube insertion in a patient with tracheal stenosis". Journal of Evolution of Medical and Dental Sciences 2013; Vol. 2, Issue 43, October 28; Page: 8247-8250.

ABSTRACT: A 23 year old male with history of prolonged intubation, presented with respiratory distress to the casualty. Sub-glottic stenosis was diagnosed and emergency tracheostomy done. Repair of stenosis and Montgomery T-tube placement was done under anaesthesia electively. After 3 months the T-tube was replaced with tracheostomy tube under anaesthesia. Intra-operative and post-operative period in either sitting went uneventful.
KEY WORDS: Montogomery T tube, Subglottic stenosis

INTRODUCTION: The Montgomery T-tube is designed to maintain an adequate tracheal airway as well as to provide support in the stenotic trachea that has been reconstructed. Once the perpendicular limb is plugged, the vertical limb allows for normal respiration and phonation. Insertion of this tube poses some difficulties for the anaesthetist such as loss of airway can occur during insertion, dilution of anaesthetic gasses, hypoventilation & awareness. This is because of the presence of open upper end of the horizontal limb of the tube and absence of a suitable adaptor at the perpendicular limb for a standard catheter mount to be connected.

CASE REPORT: A 23 year old male patient presented to the casualty with respiratory distress. Emergency tracheostomy was done under local anaesthesia. On questioning his father it was revealed that he was admitted to a local hospital after organophosphorus poisoning two months back. He was intubated and kept on ventilator for a period of three weeks. After complete recovery he was discharged. Four weeks later the patient reported with gradual respiratory distress. Tracheostomy under local anaesthesia was performed by the emergency team. A diagnosis of subglottic stenosis made. Repair of the stenosed trachea and Montogomery T-tube placement under anaesthesia was planned for the patient.

After a thorough pre-anaesthetic check-up, patient was posted for the surgery with the metallic tracheostomy tube in situ. Patient relatives were explained about the risk & consent was taken. Difficult airway cart was kept ready. NIBP, Pulse oximeter, End tidal carbon dioxide monitor, ECG was continuously monitored. Universal connector of 7size ET tube was threaded into the metallic tracheostomy tube and patient pre-oxygenated with the Bain's circuit. Patient was premeditated with Inj. Ranitidine 50 mg IV, Inj. Metoclopramide 10 mg IV and Inj. Fentanyl 100 µg IV. Lidocaine 4% was sprayed via the tracheostomy tube.

Induction was done with intermittent boluses of propofol and increasing concentration of isoflurane. Patient was anaesthetized to a deeper plane maintaining spontaneous regular respiration. Inside of the Trachea via the Metallic tracheostomy tube was gently suctioned & it was replaced with a size 7 cuffed, reinforced tubes via the tracheostomy stoma. Cuff was inflated, ventilation & bilateral air entry checked, ETT taped. Patient was paralyzed with vecuronium

0.1mg/kg & ventilation was controlled. Anaesthesia was maintained with Isoflurane in O_2 / N_2O mixture & intermittent boluses of vecuronium.

After cleaning and draping, stenosed segment was exposed & room was created for placement of the Montogomery T-tube. Due to the presence of three open ends unlike any other ventilating tube (tracheostomy or endotracheal tube which have only two open ends), the Montgomery T-tube poses problem in controlling ventilation. The absence of a cuff or universal adapter further magnifies the problem of having an adequate seal for controlled ventilation.

Hence prior to removal of ET tube from the tracheal stoma & placement of the T tube the pharynx was tightly packed with ribbon gauze. This formed a supra glottis air tight seal to enable positive pressure ventilation via the perpendicular limb of the T tube by connecting a no. 7 universal adaptor. Ventilation was continued via the perpendicular limb till wound closure & return of spontaneous respiration. The ribbon gauge was removed. Patient was kept in recovery room for observation and was later shifted to ward.

After 3 months, once again the patient was electively posted for removal of the T-tube. The surgeons plan was to replace it with a metallic tracheostomy tube and subsequent closure of tracheal stoma. The procedure involved a risk of intra-tracheal bleed due to formation of granulation tissue in the tract and collapse of the tracheal wall after the T-tube removal.

Patient was premedicated with Inj. Glycopyrrolate 0.2 mg IV, Inj. Ranitidine 50 mg iv, Inj. Metoclopramide 10 mg iv and Inj. Fentanyl 100 µg iv & inj. Dexamethasone 8mg. Perpendicular limb of the T-tube was blocked. Patient was pre-oxygenated and induced with incremental propofol maintaining spontaneous respiration. Size 4 proseal LMA was placed & anaesthesia was maintained by N2O O2 & Isoflurane.

Pt was spontaneously breathing throughout the procedure as adequate depth of anesthesia was being maintained with high concentration of inhalational agent and intermittent boluses of propofol. Following the T-tube removal, cuffed tracheostomy tube #6.0 was inserted through the stoma & the anaesthetic circuit connected. LMA was removed & patient was awakened by discontinuation of anaesthetic gases & administering 100% oxygen. At the end patient was comfortably breathing and maintaining O2 saturation on room air. The portex tracheostomy tube was then changed over to metallic tracheostomy tube after 48 hrs.

DISCUSSION: Subglottic stenosis is the narrowing of the subglottic airway. Although it is relatively rare, it is the third most common congenital airway problem (after laryngomalacia and vocal cord paralysis). It can present as a life-threatening airway emergency in both children and adults. Subglottic stenosis can be of two forms, namely congenital subglottic stenosis and Acquired Subglottic stenosis. The condition usually presents as respiratory distress with the requirement of emergency tracheostomy many times. The management of the condition requires tracheal reconstruction with the introduction of Montgomery t tube.

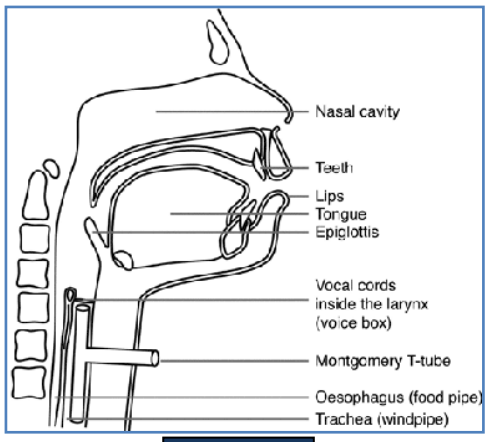

Figure 1

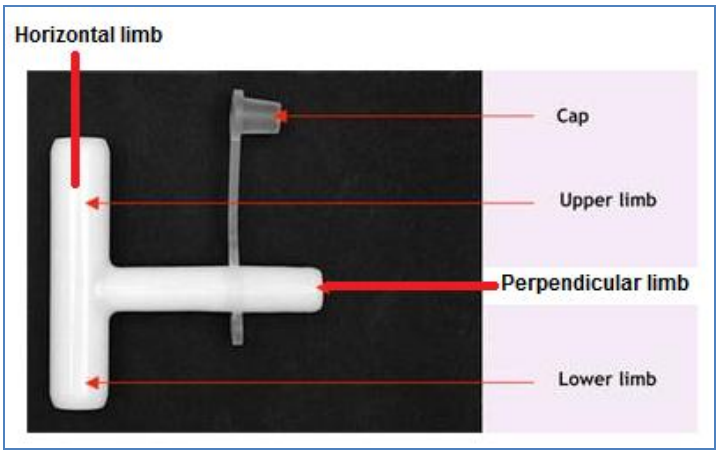

Figure 2

The Montgomery T Tube was developed by Dr. William Montgomery in 1965. This tube, shaped like the letter T, is made of silicone. . It is available in sizes from 4.5 to 16 mm (external diameter). It is used for keeping the tracheal airway open after repair of tracheal stenosis (Stenting the trachea).The T-tube is inserted with the long limb in the trachea and the short perpendicular limb projecting through the tracheostomy stoma.

The tube is inserted into the upper trachea or larynx following trauma or surgery to serve as a mean to maintain the tracheal airway as well as serving as a stent. It is usually placed for 4-6 weeks and after examination of the healing by surgeon, decision of replacement of Montgomery t tube with temporary tracheostomy.

The anaesthetic challenge is difficulty in maintaining controlled ventilation as the three limbs of the T tube are open. Positive pressure ventilation & delivery of anaesthetic gases after placement of the T tube is impossible unless the upper limb or the perpendicular limb is occluded. Further, unlike standard tracheostomy tubes, the Montgomery T-tube has the disadvantage of not taking standard catheter mount connectors. Therefore the anaesthetist must devise ways of delivering volatile agents and carrier gases for maintenance of general anaesthesia during such critical periods.

Guha et al took the help of a LMA to ventilate the patient after the placement of the t tube and succeeded in doing so (1). They had the advantage of being able to confirm the correct placement of the t tube intratracheal with the help of a flexible fiberscope passed through the LMA. The procedure involved the risk of improper placement of the LMA and inability to ventilate and the usual disadvantages of LMA.

In another patient with the t tube in situ Guha et al used a modified Bain's circuit and Y piece connector to maintain depth of anesthesia in a spontaneously breathing patient. The t tube with a no. 6.5 cuffed tracheal tube was changed with the patient breathing spontaneously.

Chonchubhair et al railroaded the T-tube into the trachea over a boogie (2). Once in place, the tracheal tube was advanced through it. This method suffers several disadvantages. Though there is a continued presence of a tracheal tube during the insertion of the T- tube, ventilation is discontinued. There is a further risk of dislodging the T- tube and injuring reconstructed tissue during the process of advancing the tracheal tube through it.

Sichel et al have described a variation of this technique using a nasogastric tube to railroad the T- tube. (3) Due to the open intratracheal upper end of the T tube, hypoventilation and air dilution of anaesthetic gases are two major problems. Montgomery suggested passing a Fogarty embolectomy catheter through the extratracheal lumen up to the upper stem of the T-tube and occluding the open upper end by inflating the balloon of the catheter. A suitably sized tracheal tube could then be placed in the extratracheal lumen of the T-tube adjacent to the catheter and ventilation can be continued. In order to deal with the above problems during insertion of the tube, continuous I.V. anaesthesia and insufflation of oxygen into the lungs using a fine catheter can be used.

Uchiyama and Yoshino occluded the top end of the LMA, continued ventilation via the extratracheal portion of the T tube (4). This method provided an option of ventilating the patient via LMA whenever required and providing a leak proof seals compared to any other ingenious methods.

REFERENCES:

1. Guha A, Mostafa SM, Kendall JB. The Montgomery t-tube: Anaesthetic problems and solutions. Br J Anaesth 2001; 87:787–90.
2. Chonchubhair AN, O'connor T, O'Hagan C. A novel approach to insertion of the Montgomery T-tube. Anaesthesia 1994; 49: 605-07.
3. Sichel JY, Eliashar R, Dano I. Insertion of a Montgomery T tube. Laryngoscope.1998; 108:1107–1108.
4. Uchiyama M, Yoshino A. Insertion of the Montgomery T-tube. Anaesthesia. 1995; 50:476.

AUTHORS:

1. Sidhartha Mohanty
2. Surupa Deviprada

PARTICULARS OF CONTRIBUTORS:

1. Professor, Department of Anaesthesiology, Institute of Medical Sciences and SUM Hospital, Bhubaneswar, Odisha.
2. Consultant, Department of Anaesthesiology, Kalinga Hospitals, Bhubaneswar, Odisha.

NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Sidhartha Mohanty,
Professor,
Department of Anaesthesiology,
Institute of Medical Sciences and SUM Hospital,
Kalinga Nagar, Ghatikia,
Bhubaneswar, Odisha, PIN: 751003.
Email – mohantydrs@gmail.com

Date of Submission: 04/10/2013.
Date of Peer Review: 05/10/2013.
Date of Acceptance: 11/10/2013.
Date of Publishing: 22/10/2013.