DOI: 10.7860/JCDR/2016/15567.7525

Case Report

Anaesthesia Section

Innovative Application of a Microlaryngeal Surgery Tube for difficult Airway Management in a Case of Down's Syndrome

MICHELL GULABANI[1], AKHILESH GUPTA[2], NEERJA GAUR BANNERJEE[3], RAJESH SOOD[4], PRASHANT DASS[5]

ABSTRACT

An 11-year-old male child, known case of down's syndrome with congenital oesophageal stricture was posted for oesophageal dilatation. Preoperative airway assessment revealed a high arched palate, receding mandible and Mallampati Score of 2. During surgery, after loss of consciousness which was described as loss of eyelash reflex and adequate jaw relaxation, direct laryngoscopy and endotracheal intubation was attempted with a cuffed endotracheal tube number 5.0mm ID (internal diameter). The endotracheal tube could not be negotiated smoothly, so 5.0mm ID uncuffed endotracheal tube was used which passed through easily, but on auscultation revealed a significant leak. Later, intubation via a Micro Laryngeal Surgery (MLS) cuffed tube 4.0mm ID was attempted. The MLS tube advanced smoothly and there was no associated leak on positive pressure ventilation. Thus by innovative thinking and avant-garde reasoning, a definitive airway device could be positioned with no other suitable alternative at hand.

Keywords: Endotracheal intubation, Mallampati Score, Oesophageal stricture, Trisomy

CASE REPORT

An 11-year-old male child, known case of Down's Syndrome (DS) with congenital oesophageal stricture was posted for oesophageal dilatation under general anaesthesia. The patient was diagnosed with hypothyroidism and was on tablet Levothyroxine (Eltroxin) 50 µg once a day for the past one year. In the pre-anaesthesia check-up all associated congenital malformations (such as atlanto-occiptal joint instability, macroglossia, microcephaly, sub-glottic stenosis and sleep apnea) were ruled out [1]. Preoperative airway assessment revealed a high arched palate, receding mandible and Mallampati Score (MPS) of 2. An echocardiogram was within normal limits. Neck radiographs showed no atlanto-occipital joint malformation (indicator of difficult intubation).

Based on our preoperative findings of anticipated difficult airway, we planned to proceed with the surgery under general anaesthesia with inhalational induction using sevoflurane and cuffed endotracheal tube insertion.

The patient was shifted to the operating table and routine monitoring in the form of 3 lead electrocardiogram (ECG), non-invasive blood pressure (NIBP) and oxygen saturation (SpO_2) probe attached. Intravenous access was already in situ.

Induction was achieved with sevoflurane upto 7% in 100% oxygen in less than 2 minutes. After loss of consciousness, (which was described as loss of eyelash reflex and adequate jaw relaxation) direct laryngoscopy and endotracheal intubation was attempted with a 5.0 cuffed endotracheal tube.

The endotracheal tube could not be negotiated smoothly, so 5.0 uncuffed tube was used which passed through easily but on auscultation revealed a significant leak. Cuffed endotracheal tube number 4.5 was notavailable for use.

Therefore another option for intubation via employing a micro laryngeal surgery (MLS)cuffed tube number 4.0 was attempted. The MLS tube advanced smoothly and there was no leak on positive pressure ventilation. Thus by innovative thinking and avant-garde reasoning, a definitive airway device could be positioned.

The scheduled surgical procedure progressed and the trachea was extubated uneventfully after completion. The patient's post-operative condition was later appraised and was determined satisfactory.

DISCUSSION

Down's syndrome (DS) is a genetic disorder also known as trisomy 21. It is distinguished by characteristic facies, mental retardation, single palmar crease, neonatal hypotonia, short stature, congenital heart defects, Intelligence Quotient (IQ)< 50 and reduced life expectancy. Incidence of DS worldwide is estimated to range from 1/100 to 1/1000 being as high as 1/30 in mothers more than 45 years of age [2]. In India, it is estimated that the frequency of DS is approximately 1/1150 [3].

Patients suffering from DS possess an almost 30-times increased risk of having an oesophageal stricture [4]. A study by Bertrand et al reveals that patients with DS and concurrent respiratory symptoms have an increased incidence of airway anomalies than patients without DS [5].

Patients suffering from DS provide a wide array of challenges to the Anaesthetist. Airway problems are diverse in DS due to anatomical features like atlanto-occiptal joint instability, macroglossia, microcephaly, sub-glottic stenosis and sleep apnea [1]. Anaesthetic considerations include, keeping a difficult airway cart ready, using smaller size endotracheal tubes, awake extubation and cervical collar if instability is documented preoperatively. Theoretical know-how coupled with the technical expertise of the anaesthetist is of utmost importance in the management of patients with DS owing to both anticipated and unanticipated obstacles.

DS exhibits a plethora of airway complications and requires due diligence from the anaesthetist during airway management. Studies such as those conducted by Gupta et al., report that MPS does not accurately predict a difficult intubation in the paediatric population [6]. A scenario such as this puts the anaesthetist in a tough situation and increases the probability of encountering an unanticipated difficult airway.

A study conducted by Kim JH et al., concluded that paediatric endotracheal tubes require a higher pressure to prevent air leak [7]. This increased pressure is associated with its own set of complications. An MLS tube is a flexible and kink-resistant tube which is available with ID ranging from 4-6mm [8]. However, the cuff diameter resembles an 8mm ID tube. This helps in the central

placement of the tube in the trachea. The MLS tube is employed for use in patients undergoing microlaryngeal surgery or those patients demonstrating a significant stenosis of the airway. Our patient of DS with tracheal stenosis, benefited from the MLS tube due to its smaller internal diameter, which provided easy negotiation through the vocal cordsin addition to optimum ventilation.

CONCLUSION

Any case of management of DS associated with tracheal stenosis presents with itself a wide array of risks and possibilities. The anaesthetist needs to be prepared to navigate and oversee all aspects of the case management. This method of airway establishment with an MLS tube can be employed in situations of unanticipated and anticipated difficulty, such as the one encountered above.

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PARTICULARS OF CONTRIBUTORS:
1. Senior Resident, Department of Anesthesiology and Critical Care, Ram Manohar Lohia Hospital, New Delhi, India.
2. Associate Professor, Department of Anesthesiology and Critical Care, Ram Manohar Lohia Hospital, New Delhi, India.
3. Senior Specialist, Department of Anesthesiology and Critical Care, Ram Manohar Lohia Hospital, New Delhi, India.
4. Professor and Head, Department of Anesthesiology and Critical Care, Ram Manohar Lohia Hospital, New Delhi, India.
5. Post Graduate Resident, Department of Pharmacology, M R Medical College, Karnataka, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. Michell Gulabani,
C-35, 2nd Floor, Malviya Nagar, New Delhi-110017, India.
E-mail: michellgulabani@gmail.com

FINANCIAL OR OTHER COMPETING INTERESTS: None.

Date of Submission: **Jul 05, 2015**
Date of Peer Review: **Sep 17, 2015**
Date of Acceptance: **Oct 08, 2015**
Date of Publishing: **Apr 01, 2016**