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Case Report

Anaesthesia for bougie dilatation of subglottic stenosis: report of two cases

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ABSTRACT

Subglottic stenosis is a rare but life-threatening condition characterized by narrowing of subglottis. Airway dilatation (balloon/bougie) has become very effective for correction of stenosis. Anaesthesia management for bougie or balloon dilatation of subglottic stenosis needs proper planning, team work and efficient utilization of resources. Airway management options include apneic pause technique, supraglottic jet ventilation, THRIVE (transnasal humidified rapid insufflation ventilatory exchange) and cardiopulmonary bypass/extracorporeal membrane oxygenation in emergency scenario. Total intravenous anaesthesia along with airway anaesthesia remains the best anesthetic management option as it provides excellent conditions for shared airway surgery.

Keywords: Bougie, Dilatation, Mitomycin C, Subglottic stenosis

INTRODUCTION

Subglottic stenosis is a rare but life-threatening condition characterized by narrowing of subglottis. It can be congenital or acquired. Although accurate prevalence is unknown, an incidence of 4.9 cases per million per year is estimated for postintubation stenosis. Airway dilatation (balloon/bougie) has become very effective for correction of stenosis.[1,2]

Anaesthesia for airway dilatation in subglottic stenosis is extremely challenging and here we report our experience with anaesthetic management of two such patients along with relevant review of literature that provides ideal anaesthesia management options for such patients.

CASE REPORT

Case 1

53-year-old male presented with post-intubation stridor following COVID pneumonia and invasive mechanical ventilation from which he was weaned off a month back. Video-laryngoscopy showed grade II subglottic stenosis. He was posted for bougie dilatation by ENT surgeon. He had no other comorbidities. Biphasic stridor was present at rest and he was shifted to theatre with oxygen supplemented via mask. Vitals were stable and oxygen saturation was 98%. Airway anaesthesia was achieved with nebulization using 4% lignocaine. After adequate preoxygenation, patient was premedicated with incremental doses of intravenous midazolam and fentanyl.

Total intravenous anaesthesia (TIVA) using propofol and fentanyl infusion was employed maintaining spontaneous ventilation. Oxygen was administered via face mask and breathing circuit, with intermittent pauses during bougie dilatation. Oxygen was also administered continuously via nasopharyngeal catheter allowing passive diffusion. The stenosis was successfully dilated with serial insertions of Hegar dilator in three attempts taking 10 minutes and it was followed by application of topical mitomycin

Post-procedure patient was monitored in the ICU and was comfortable on nasal prongs. Intravenous dexamethasone was given perioperatively to reduce laryngeal oedema.

Case 2

3-year-old boy with postintubation subglottic stenosis presented with stridor and grade II stenosis. After preoxygenation, patient was induced with propofol and fentanyl and anaesthesia was maintained on dexmedetomidine and lignocaine infusion. Spontaneous ventilations were assisted manually using mask and Jackson- Rees' circuit. Stenosis was serially dilated using oesophageal dilator with intermittent apnoeic pauses during dilatation. Procedure was over in two serial dilatations taking five minutes followed by mitomycin C application. Oxygen was also continuously administered via nasal prongs. Post-procedure patient was stable.

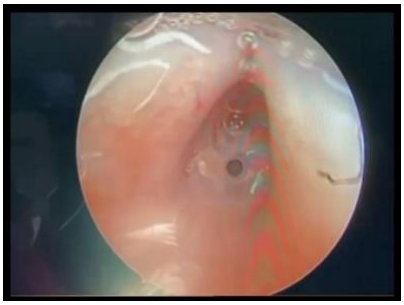

Figure 1: Case 2 pre dilatation.

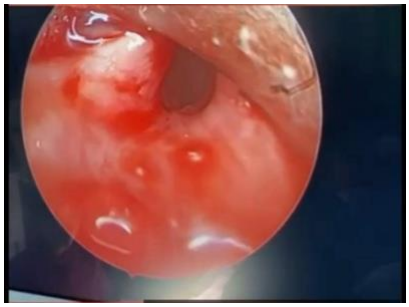

Figure 2: Case 2 post dilatation.

DISCUSSION

Subglottic stenosis can be congenital or acquired. The majority of acquired subglottic stenosis cases are because of prolonged intubation or airway infection with overt inflammation response. Congenital subglottic stenosis is diagnosed for a subglottic diameter ≤4 mm in term newborns or ≤3 mm in pre-term.[3-5] The Cotton-Myer classification is used to classify the degree of the stenosis. 6 grades I and II stenoses are considered for endoscopic treatment.

Anaesthesia management for bougie or balloon dilatation of subglottic stenosis needs proper planning, team work and efficient utilization of resources. Presence of preoperative hypercapnia even in patients without other respiratory diseases strongly indicates the potential for failure of both spontaneous as well as mechanical ventilation during general anaesthesia. Adequate preoxygenation is a must to create alveolar oxygen reservoir.

The procedure is commonly performed under general anaesthesia on a non-intubated airway. Therefore, general TIVA with spontaneous ventilation is preferred.[2] The child should be deep enough to allow the procedure to be performed but not too deep so as to abolish spontaneous respiration. This balance is an art that requires continuous communication between the surgeon and anaesthesiologist. Propofol and fentanyl were routinely used for TIVA along with dexmedetomidine (0.2-0.7 µg/kg/hour) or preservative free lignocaine (1-4 mg/minute) infusions. TIVA along with airway anaesthesia remains the best anesthetic management option as it provides excellent conditions for shared airway surgery. Airway anaesthesia in adults can be achieved with preoperative nebulization with 4%lignocaine. 10% lignocaine spray to the glottis can also be considered.

Neuromuscular blockade may be reserved for indicated patients only.

Instrumentation of airway, especially paediatric airway requires a dedicated airway management team. Airway management options include apneic pause technique, supraglottic jet ventilation, THRIVE and cardio-pulmonary bypass/extracorporeal membrane oxygenation in emergency scenario.[7,8] Apneic pause technique carries risk of hypercapnia. Supraglottic jet ventilation is a standard approach but carries risk of barotrauma. THRIVE is an emerging technique that can be used in apneic or spontaneously ventilating patients. It avoids the complication of neuromuscular blockade and hypercapnia.

THRIVE can deliver high flow rates (20 to 70 l) of humidified oxygen via nasal cannula. Benefits include FiO_2 95-100%, respiratory support through decreased dead space and positive airway pressure, little room air entrainment when high flow rates are used, positive airway pressures are maintained and this allows for CO_2 washout even during apnea and the diffusion of oxygen into alveoli, reduced airway resistance and work of breathing.[9]

CONCLUSION

Endoscopic airway dilatation for subglottic stenosis needs meticulous planning. General anesthesia using TIVA maintaining spontaneous ventilation along with topical anesthesia of airway is the best anesthetic management plan. THRIVE, apneic pause technique and jet ventilation are the airway management options which can be

employed as per institutional practices and availability of resources.

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REFERENCES

1. Liew YT, Yong DJ, Somasundran M, Lum CL. Management experience of subglottic stenosis by endoscopic bougie dilatation with mitomycin C and review of literature: case series. Indian J Otolaryngol Head Neck Surg. 2015;67:129-33.
2. Wasserzug O, DeRow A. Subglottic stenosis: current concepts and recent advances. Int J Head Neck Surg. 2016;7(2):97-103.
3. Marston AP, White DR. Subglottic stenosis. Clin Perinatol. 2018;45:787-804.
4. Uzun S, Arun O, Ocal T. Unexpected subglottic stenosis in a newborn in anaesthesia induction. J Anesth. 2014;22:223-5.
5. Jefferson ND, Cohen AP, Rutte MJ. Subglottic stenosis. Semin Pediatr Surg. 2016;25:138-43.
6. Myer CM, O'connor DM, Cotton RT. Proposed grading system for subglottic stenosis based on endotracheal tube sizes. Ann Otol Rhinol Laryngol. 1994;103:319-23.
7. Knights RM, Clements S, Jewell E, Tremper K, Healy D. Airway management in patients with subglottic stenosis: experience at an academic institution. Anesth Analg. 2013;117(6):1352-4.
8. To K, Harding F, Scott M, Milligan P, Nixon IJ, Adamson R, et al. The use of transnasal humidified rapid-insufflation ventilatory exchange in 17 cases of subglottic stenosis. Clin Otolaryngol. 2017;42(6):1407-10.
9. Patel A, Nouraei SA. Transnasal humidified rapid-insufflation ventilatory exchange (THRIVE): a physiological method of increasing apnoea time in patients with difficult airways. Anaesthesia. 2015;70(3):323-9.

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