CASE REPORT

Subglottic Stenosis: A Real Nightmare for Anaesthesiologist, Occurred In a Newborn with Tracheoesophageal Fistula

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Abstract:

Subglottis stenosis is a real nightmare situation for anaesthetist more so in a neonate. We came across such an emergency of unanticipated difficult intubation in a case of type D tracheoesophageal fistula. We managed the situation with surgical tracheostomy with use of endotracheal tube. There are limited references of managing such emergency in a newborn in the present literature. We have also discussed other means of managing such situation.

Keywords: Unanticipated Difficult Airway, Tracheostomy, Neonate

Introduction:

Unexpected subglottic stenosis in patients of Tracheoesophageal Fistula (TEF) repair is a nightmare for the anaesthesiologist as it is difficult to diagnose this condition with preoperative predictors of difficult airway, more so in a neonate. A neonatal subglottic stenosis is more challenging than adults because of limitation of the rescue modalities available. Emergency tracheostomy in a neonate is a challenge in itself for the surgeon. There are limited guidelines and references in the present literature for such situation arising in a case of TEF repair of a neonate hence the report.

Case Report:

A two days old male neonate, weighing 2.1 kg, second child of a non-consanguineous marriage, born of a full-term caesarean delivery was referred to our hospital for repair of TEF. On examination, baby's cry, tone, activity was normal, color was pink. The baby had a heart rate of 150 per minute, respiratory rate of 60 per minute, capillary refill time < 2 seconds, peripheral pulses well felt.

Auscultation of heart revealed normal cardiac sounds without any murmur and on auscultation of the chest, there were wheezes in bilateral basal regions with subcostal retractions. The on air saturation of baby was 70% and with oxygen supplementation in an oxygen hood it was around 95%. Laboratory evaluation was within normal range. A primary repair of TEF by right thoracotomy and extrapleural approach was planned. Injection Glycopyrrolate 10mcg, injection Ondansetron 20 mcg were given intravenously as premedication. After preoxygenation and thorough oral suction, spontaneous inhalational induction with sevoflurane by incremental method was done. After sufficient muscle relaxation was achieved, endotracheal intubation was attempted with the help of a Miller 0 blade and 3.0 Endotracheal Tube (ETT). A Cormac-Lehane grade 1 view was obtained on direct laryngoscopy but 3.0, followed by 2.5, followed by 2.0 ETTs were not been able to be negotiated beyond the vocal cords. Inability to intubate with smallest size ETT led us to suspect subglottic stenosis. And emergency of unanticipated difficult intubation was announced.

A rescue ventilation with laryngeal mask airway of size 1.0 was tried and failed. Finally rescue mask ventilation was started but unfortunately it was found to be insufficient to maintain saturation above 90%. The surgical tracheostomy was planned after discussion with surgeons and relatives. Because of unavailability of appropriate size tracheostomy tube at that very moment, a 3.0 ETT was inserted with the help of stylet through the tracheostomy. Patient was very well ventilated through the aforementioned assembly. Surgeons decided to go ahead with a diversion gastrostomy and esophagostomy during which it was noticed to be a type D of tracheoesophageal fistula which is a very rare variety of tracheoesophageal fistula. After the completion of surgery, the ETT passed through tracheostomy was replaced by 3.0 tracheostomy tube. Patient was then shifted to Neonatal Intensive Care Unit (NICU) for elective ventilation.

Fig. 1: 3.0 ETT Inserted through Tracheostomy

Discussion:

The incidence of congenital Subglottic Stenosis (SGS) is 5%. SGS in the full-term infant is defined as subglottic airway diameter of less than 4 mm at the level of cricoids cartilage, and less than 3 mm in the premature infant. This narrowing can be compared with the reference point of a neonatal endotracheal tube. The outer diameter of a 2.5 endotracheal tube is 3.6 mm and that of a 3.0 tube is 4.2 mm. The airway stenosis is graded as follows [1]:

- Grade 1, less than 50% obstruction;
- Grade 2, 51-70 % obstruction,
- Grade 3, 71-91% obstruction
- Grade 4, no detectable lumen.

Supraglottic devices [2, 3] are generally indicated in management of SGS but in our case, it was not possible to manage the patients as the goal of intubation was to have the tip of endotracheal tube beyond the TEF fistula but proximal to carina. Asai [4] reported a similar case report in a infant in which size 2 mm ID ETT tube failed to pass, subglottic stenosis was dilated using 7 fr percutaneous transluminal coronary angioplasty catheter with balloon under fluoroscopy and passing size 3 mm ETT through the glottis and surgery was performed after 2 days. But same was not possible in our case due to lack of fluoroscopy as it was an unanticipated difficulty of intubation. Keeping the tip of ETT above the stenosis in a neonate of SGS, presenting for an abdominal surgery has been reported. However, intra-operatively, the tube was dislodged, re-intubation attempts were unsuccessful and patient developed cardiac arrest [4]. Kundal [5] and associates have reported a similar emergency where in they have made use of a 6 Fr infant feeding tube passed beyond the vocal cords. They attached a Jackson rees' modification of Ayre's T-piece to this infant feeding tube with the help of connector of a 3.5 ETT and completed a primary repair of TEF with such assembly used for ventilation. The airway

management of such patients is extremely challenging for anaesthesiologist as the nature of surgery demands lateral positioning of patient and ETT is the only safe option of maintain the airway. Kerai S [6] has reported a similar case managed with surgical tracheostomy in an anticipated difficulty in intubation. Our case was more challenging as the subglottic stenosis was only suspected after induction of anaesthesia and it was failure of both intubation as well as ventilation. Having said above all, insertion of a 3.0 ETT through tracheostomy was a novel approach to this nightmare situation and was a life saver rescue for the baby.

Conclusion:

Although tracheostomy in neonates is not desirable, it is the only safe option available for SGS after failure to pass smallest ETT to trachea. Other plans of keeping tube above stenosis or using infant feeding tube or laryngeal mask airway have a risk of dislodgement with disastrous consequences and should be used only if an emergency condition arises.

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