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ANAESTHETIC MANAGEMENT OF CONGENITAL TRACHEO ESOPHAGEAL FISTULA(TEF) / ESOPHAGEAL ATRASIA(EA)

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ABSTRACT

This article reviews
(a) risk factors and preoperative considerations of the patient with tracheoesophageal fistula,
(b) anesthetic management, including
(i) airway management,
(ii) induction of anesthesia and monitoring and
(iii) postoperative disposition, (c) considerations for concomitant congenital heart disease,
(d) considerations for thoracoscopic repair and
(e) long-term outcomes and considerations of the patient with repaired esophageal atresia/tracheoesophageal fistula.

Key words: Anaesthesia for TEF, Esophageal atresia(EA), Tracheo esophageal fistula(TEF).

Study period & place: NHLM mesical collage & VS hospital. Since 1997, author had managed
50 cases of Anaesthesia for various types of TEF/EA.

Introduction

Advances in surgical practice and neonatal intensive care mean that neonates with congenital esophageal atresia/tracheoesophageal fistula (EA/TEF) often present with minimal lung pathology and excellent lung compliance.

Many pediatric anesthesiologists routinely paralyze these patients following demonstrated adequacy of bag-mask ventilation and position the endo-tracheal tube (ETT) well above the fistula, without compromising ventilation. Perioperative mortality con-tinues to fall, and yet, these repairs can be fraught with complications. Critically, anesthesiologists must recognize those patients at additional risk: those with coexisting complex congenital heart disease (CHD), weight <2 kg, poor pulmonary compliance, large, pericarinal fistulas and those scheduled for thoracoscopic repairs. Rigid bronchoscopy to characterize airway anatomy helps guide advanced airway strategies and decisions regarding postoperative disposition.

Risk factors and preoperative considerations

Congenital EA/TEF has an incidence of 1 : 2500–3000 live births and is described by two major anatomic classification systems: Gross and Vogt (Figure 1) (1). The common form is EA combined with a distal fistula (C/IIIb). The surgical management is right thoracot-omy or thoracoscopic primary repair; occasionally, staged repair is indicated for long-gap atresia. Isolated TEF (E/H-type) is managed with a right cervical dissection (occasionally thoracotomy or thoracoscopic surgery if the fistula is low) (2,3) or with minimally invasive, rigid bronchoscopic application of tissue adhesive or fibrin glue (also indicated for recurrent fis-tulas). Low success rates with endoscopic therapy mean that definitive closure often requires a second attempt (4,5). Isolated EA (A/II) is managed by gas-trostomy, with repair in 2–3 months. Without a fistulous connection to the trachea, these patients pose fewer challenges.

Diagnosis & pathophysiology

Unlike many anomalies, TEF does not lend itself to prenatal diagnosis (6). Nonspecific ultrasound signs (polyhydramnios, absent or small stomach bubble) have a positive predictive value of 44%, leaving clinical suspicion the key to diagnosis. Clinicians watch for excessive

salivation, choking with feeds and the inability to pass a suction catheter more than 9–10 cm into the esophagus. A radiogram of thorax and abdomen is requisite because, typically in EA, the presence of gas below the diaphragm indicates TEF. Although isolated TEF is often diagnosed in the newborn period, a high index of suspicion is required to recognize cyanosis with feeds, recurrent lower respiratory tract infections and intermittent abdominal distension and to obtain radiologic or endoscopic confirmation (7,8).

Preoperative accessment,risk factors & morbidity

Early experience with repair of EA/TEF was characterized by high mortality rates. Waterston introduced prognostic classification in the 1960s. His three determinants were weight, pneumonia and associated congenital anomalies. In the 1990s, Spitz recognized the congenital anomalies affecting prognosis were cyanotic heart disease requiring palliative or corrective surgery, or noncyanotic heart disease requiring medical or surgical management. Pneumonia was so rare as to be removed from the classification. Okamoto used stepwise logistic regression and receiver-operating characteristic (ROC) curves of birth weight to statistically extrapolate the 'at-risk' weight group as <2 kg.

Anaesthetic considerations for Challanges of intraoperative management;

Basicaly in TOF patients O2 from the trachea may bypass the lungs and exit through the stomach leading to loss of effective ventilation. In low resource settings, however, where bronchoscopy may not be available, following inhalational induction and spontaneous respiration, the surgeon routinely performs a gastrostomy. This is then followed by endotracheal intubation under deep inhalational technique or using muscle relaxant technique and gentle manual ventilation. The initial gastrostomy allows gas to be vented out and thus prevents gastric distension and minimizes the risk of aspiration.

Once the airway is secured by endotracheal tube of appropriate size and intravenous access is obtained, the patient is positioned in the lateral decubitus position and pressure points are carefully padded. Maintenance of adequate oxygenation can be a major intraoperative problem. Accumulations of blood or secretions in the endotracheal tube can lead to airway obstruction, requiring frequent tracheal suctioning. Surgical airway manipulation and collapse of the upper lung due to use of retractors can also lead to episodes of marked hypoxemia.

Continuous temrature monitoring, fluid management, postoperative oxygenation,& advanced neonatal care make overall success & Enhance Recovery After Surgery.(ERAS)

Close communication with the surgical team is of paramount importance, and intubation equipment should be readily available in case of accidental extubation and the need for emergent re-intubation.

gastroesophageal symptoms are severe, surgical intervention may be required via Nissen Fundoplication. In addition, many TEF/EA patients have oesophageal dysmotility, which may lead to the development of oesophageal obstruction and growth failure.

Delayed complications

A rarer complication, but one that can define long term outcomes after TOF/OA repair is tracheomalacia. Tracheomalacia can cause collapse of the airway resulting in stridor, apnea or recurrent pneumonia. Tracheomalacia tends to improve after the first 3 to 5 years of life, but if severe may require treatment with tracheopexy or aortopexy 7,8 .

Postoperative recovery

Overall, mortality rates are less than 10% in developed countries. The Spitz system predicts the prognosis of patients with TOF/OA based on their birth weights and the presence or absence of major congenital heart disease. Low birth weight infants who have cardiac anomalies have the highest morbidity and mortality rates.3

In primitive low-resource settings, mortality rates remain high and vary from 40% to 80%.(6) The high mortality rates have been attributed to late presentation which is often

associated with aspiration and pneumonia. Other factors which contribute to mortality include minimal supportive care such as lack of neonatal intensive care and parenteral nutrition for early feeding. Early postoperative complications include sepsis and respiratory failure. Late postoperative complications in survivors are the same as those described in developed countries. (9) As with other congenital anomalies, children with TEF/EA require long term supportive multidisciplinary care with follow up to minimize further complications. (10)

Conclusion

In nutshell, Prompt diagnosis of type of fistula, anaesthetic management of
Posture, airway, fluid, temperature, communication among surgical, anaesthesia & neonatal team, advanced neonatal critical care can lead to overall success of operation of TEF & or EA.

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