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Tracheoesophageal fistula/esophageal atresia and its management

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Abstract

Tracheoesophageal fistula/esophageal atresia (TEF/EA) are serious congenital anomalies that present significant challenges in neonatal care. Infants present with problems like respiratory distress, feeding difficulties leading to choking and coughing and risk of aspiration which is causing pneumonia or other complications. After infancy their growth and development can be challenging due to the associated complications and the need for surgical intervention. Children who undergo surgery for TEF often experience slower growth compared to their healthy peers due to respiratory infections, anastomosis leakage, and gastroesophageal reflux (GER). Feeding difficulties and the risk of aspiration can lead to poor nutritional intake, affecting overall growth and development particularly in the first five years of life in areas such as social maturity and cognitive development. So, regular monitoring of growth parameters (weight, height, and weight-for-height) is essential to ensure that children are meeting their developmental milestones.

Keywords: ***Tracheoesophageal fistula/esophageal atresia (TEF/EA), Growth & developmental, post-operative complications***

Introduction

Esophageal atresia (EA), with or without tracheoesophageal fistula, is a developmental defect of the upper gastrointestinal tract in which the continuity between the upper and lower oesophagus is lost. EA can occur with or without tracheoesophageal fistula (TEF), an abnormal connection between the trachea and the oesophagus.(1) Oesophageal atresia and/or tracheo-oesophageal fistula are common congenital malformations occurring in approximately 1 in 2500 to 4500 births in which there have been several described anatomical variants.(2)

Esophageal atresia with tracheoesophageal atresia was first described in 1670 by William Durston and more elaborately by Thomas Gibson in 1697. It was many year later before success was recorded for the management of this condition.(3)

Tracheoesophageal fistula is considered to be a touch stone in paediatric surgery. TEF and EA are the surgical emergencies which are presented during the first week or early neonatal life and they are usually associated with other congenital anomalies. Five major manifestations of early neonatal period are congenital diaphragmatic hernia (CDH), Omphalocele, TEF, Intestinal obstruction and Meningomycele. First three are acute emergencies

while the remaining two are sub - acute in nature. They are usually complicated due to aspiration of gastric contents leading to pneumonia and respiratory distress.(4)

Embryogenesis

Embryologically trachea and oesophagus originates from an endodermal outgrowth of the ventral wall of the foregut at 3 weeks of gestation. The respiratory primordial grows in a caudal manner and the oesophagus in a cephalic manner. In this process, some side walls are formed that separate the two structures in front is the trachea, which are later on developed in cartilage rings and lungs primordias, and behind the oesophagus which extends from the pharynx to stomach. The origin of EA is unclear but it is considered to be an alteration in migration of the lateral folds or growth arrest at the time of outgrowth. In most cases, the posterior oesophagus does not completely separate from the trachea, which leads to different varieties or TEF or fissures. This alteration occur during 4^{th}- 5^{th} week of gestation.(4) Maternal perinatal history often revels polyhyramnios during pregnancy and premature labor. Although the APGAR score are usually good.

Classification

The classification of EA anomalies is based on the location of the atresia and the presence of any associated fistula to the trachea. According to this, five different types have been clinically described. The primary types of EA are EA with distal TEF (85%), isolated EA without TEF (8%), TEF without atresia or H-type TEF (4%), EA with proximal TEF (3%) and EA with proximal TEF (<1%). Figure 1 illustrates the classification of EA. An understanding to these anatomical variants is important to aid in medical, surgical and nursing management.(5)

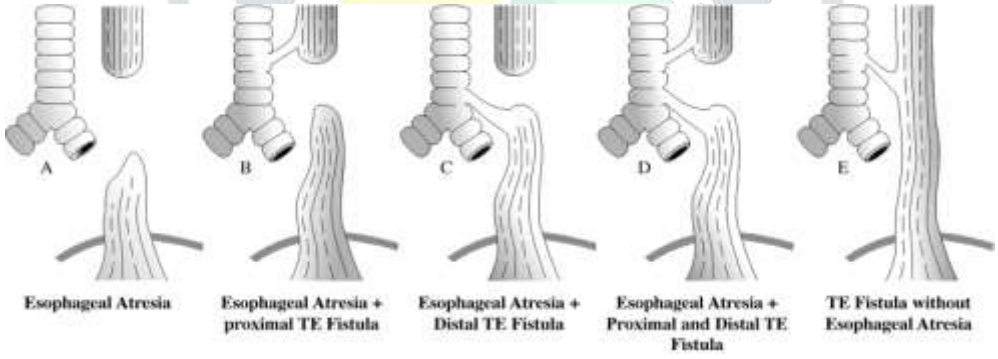

Figure 1. Classification of esophageal atresia/ tracheoesophageal fistula.

Diagnosis

A neonates with excessive nasopharyngeal secretions, choking, dyspnea, or cyanosis should be suspect for EA/TEF. Inability to pass a no. 8-10 French catheter into the stomach and /or feeding difficulties with regurgitation of all ingested fluid is diagnosed beyond any doubts of esophageal atresia. Clinical diagnosis of TEF/EA may be confirmed radiographically when an opaque catheter is passed and curls up in the proximal pouch. The length of the pouch can also be measured with the help of this diagnosis method. Abdominal distension, aspiration and subsequent pneumonitis are most likely indicating of distal TEF with proximal EA, the most common type of malformation.(5)

Surgical management

Primary reconstruction has become a standard for managing TEF/EA except long gap EA. Staged repair is recommended over primary reconstruction because of the rate of anastomotic stricture and postoperative leakage are lower. Esophageal banding help in gaining weight for several months. However, weight gain stopped when respiratory distress developed because of infection. Failure to choose appropriate timing for releasing of band is difficult which leads to pathological changes in esophagus. Improper absorption and age appropriate food intake leads to growth and development failure below 50th percentile.(7)

Growth and development

Poor growth has been shown to be an issue for some children with EA, particularly in the first few years of life. (6) These children are at special risk of mental retardation, emotional, cognitive and psychosocial problems.(5)(6) More than 50% of the parents are insufficiently advised regarding long term co- morbidities. High percentage of patients and families of EA/TEF require more intensive aftercare and support during the first year following primary reconstruction than previously thought.

Children age of gestation, associated anomalies play an important role in growth and development. Gastroesophageal symptoms including dysphagia and anastomotic site stricture so, children often present with failure to thrive and gastroenteritis after surgery. (2)

Nutritional status and growth assessment by weight and height and weight-for-age and height-for-age percentile chart, respectively should be done. It was found that survivals of the children born with EA have improved but face nutritional, respiratory, and gastroesophageal problems during their early childhood.(9) Feeding difficulties and the risk of aspiration can lead to poor nutritional intake, affecting overall growth and development particularly in the first five years of life in areas such as social maturity and cognitive development.(21)

Post-operative complications

Children with TEF/EA and major associated congenital anomalies that have been operated and ventilated as a new born may have dysphagia (45%), respiratory infections (29%) and GERD (48%) as long term sequelae of disease.(6) Reduced oral intake is likely to be attributable to many factors such as including GERD, dysphagia and oesophageal strictures.(8) Frequent respiratory infection, frequent choking, leak stricture, winging of scapula after surgical repair and developmental delay are the most common reported complications.

CONCLUSION

Tracheoesophageal fistula/oesophageal atresia is associated with prolonged hospitalization. Surgical correction, ventilator care and many more post-surgical complications for which child has repeated hospitalization. There has been significant improvement in survival of children born with TEF/EA, whereas these children face many physical, emotional, learning and behavioral problems. Physical complication includes dysphagia, frequent respiratory infection, gastroesophageal reflux disease, frequent choking, leak stricture and developmental delay. So, regular monitoring of growth parameters (weight, height, and weight-for-height) is essential to ensure that children are meeting their developmental milestones.

Decelerations

Ethics and Consent to Participate declarations: Clinical trial number not applicable

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Consent to publication
Not applicable

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Competing interests

The author declares no competing interest.

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