

## Case Report

# Simple strategy of anesthesia for the neonate with tracheoesophageal fistula: a case report

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**Abstract:** A 3-day-old neonate, given a diagnosis of esophageal atresia (EA) with tracheoesophageal fistula (TEF), which is large and just above the carina, was scheduled for TEF repair. Routine anesthetic management focuses on adequate ventilation and avoidance of gastric distension during positive pressure ventilation. Using a balloon-tipped embolectomy catheter or a Fogarty catheter to block the fistula under the guidance of fiberoptic scope has been described. In most of the medical centers, however, the pediatric fiberoptic scope may not be available. We present a case of a newborn undergoing type C EA/TEF repair and describe a simple intra-operative technique that could temporarily occlude the gastroesophageal junction, allowing stable vital signs of patient and definitive repair of the tracheoesophageal fistula.

**Keywords:** Esophageal atresia (EA), tracheoesophageal fistula (TEF), repair, occlude, ligation

## Introduction

Perioperative airway management in the neonate undergoing tracheoesophageal fistula (TEF) repair could be a challenge for anesthesiologist. We need to place the tip of the endotracheal tube (ETT) below the fistula but above the carina to ensure airway protection, adequate ventilation and avoid gastric dilatation during positive pressure ventilation (PPV). The difficulty lies in maintaining proper position of the ETT during surgical manipulation especially in Gross type C, with esophageal atresia (EA) and a large fistula just above the carina. To prevent gastric dilatation of newborns, application of a balloon-tipped embolectomy catheter [1, 2] or a Fogarty catheter [3] with the aid of fiberoptic bronchoscope is recommended to occlude the TEF. In most medical center in China, however, the pediatric fiberoptic bronchoscope may not be available and this procedure is time consuming. There is an urgent need to find out an alternative strategy to solve this problem. We present a case of a newborn undergoing type C EA/TEF repair and describe a simple intra-operative technique that temporarily occludes the fistula and the reflux it causes, allowing stable vital signs of patient and definitive repair of the tracheoesophageal fistula.

## Case report

The patient was 3-day-old, 3010 g, male, born after 37 weeks' gestational age by vaginal delivery. A nasogastric tube could not be passed into the stomach, and progressive abdominal distention was noticed. The patient was given a diagnosis of tracheoesophageal fistula (Gross type C) with a large fistula (diameter of 5 mm) just above the carina. No other anomalies exist. The baby was scheduled for surgical correction. General anesthesia was induced with up to 4% sevoflurane without muscle relaxant. After topical anesthesia with lidocaine, an endotracheal tube was inserted and gradually pushed until breath sounds can be heard both left and right, which means the tube was in its right position. Then the patient was placed into the left lateral position. Surgery begun under general anesthesia maintained with sevoflurane. Two additional doses of fentanyl (0.5 µg/kg) were given (dose of 3 µg) for supplement of perioperative anesthesia, until the patient did not react to thoracotomy while maintained autonomous respiration. Instead of routine exposure and fistula ligation, the surgeon immediately clamped the lower end of esophagus just above the stomach with a bulldog clamp. The whole procedure was accomplished within 5 min. Then muscle relax-

ant and normal PPV were given. No gastric dilatation or any significant hemodynamic changes were noticed throughout the operation. The patient recovered and discharged one-week later.

### Discussion

Neonate born with esophageal atresia and tracheoesophageal fistula often requires intubation and mechanical ventilation. Too much gas enters into gastrointestinal tract would cause gastric dilatation, which often leads to newborn death. Rapid control of the fistula is imperative to improve ventilation efficiency and relieve gastric dilatation, which is essential for complete surgical repair. Techniques include awake intubation, avoidance of muscle relaxants and excessive PPV until the fistula has been controlled [4]. The critical part is the correct positioning of the endotracheal tube. In terms of patient with type C, special attention should be paid to intubation because the fistula is just above the carina and the tip of the tube may easily enter into the fistula during surgical process. Physician suggested occluding the fistula using a Fogarty catheter under the guidance of fiberoptic bronchoscope. As for hospital without this equipment, anesthesia practice would be difficult. Good intubation condition can be achieved with deep volatile agent, but maintaining adequate ventilation and surgical conditions including thoractomy, exposing and ligating the fistula without relaxant could be challenging. On the contrary, the lower end of esophagus is easy to get access. As shown in this case, this procedure could be completed within 5 minutes and vital signs of the patient were successfully maintained stable after temporarily occluding the low end of esophagus (the gastroesophageal junction), while the fistula were equally closed. This alternative strategy provided a new simplified way to manage patient with EA/TEE, especially in hospital without pediatric fiberoptic bronchoscope.

### Conclusion

We report a simple technique that we have found useful for occluding the fistula. In our case, clamped the lower end of esophagus before exposing and ligating the fistula for the neonate with EA/TEE (type C), was proved safe and effective, especially in hospital without pediatric fiberoptic bronchoscope.

### Disclosure of conflict of interest

None.

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