

Diagnosis and surgical management of recurrent tracheoesophageal fistulas

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SUMMARY. Recurrent tracheoesophageal fistula (TEF) is difficult to diagnose and even more difficult to repair. The key to the diagnosis is an adequate contrast study and bronchoscopy. The key to the repair is complete separation of the esophagus from the trachea, with the placement of viable tissue between the two suture lines. I have presented a personal experience with 38 consecutive repairs of recurrent TEFs. The original series of 26 patients had three recurrences, all of which were re-repaired successfully. My more recent experience with the last 12 patients, who were far more complex, was also successful in ultimately repairing the recurrent TEFs.

KEY WORDS: management, recurrence, tracheoesophageal fistula.

INTRODUCTION

Recurrent tracheoesophageal fistulas (TEFs) occur in 6–10% of all large series of esophageal atresia/tracheoesophageal repairs. The majority of cases present with respiratory symptoms, often associated with feeding difficulties. The diagnosis is initially missed because routine contrast studies may not show the recurrent fistula. The definitive diagnosis must be made before a surgical attempt at repair is done because the operation is complex and can result in serious complications. The steps in making the diagnosis are as follows: An initial contrast study of the esophagus with the patient prone and a nasogastric tube placed in the stomach. The tube is slowly pulled back with contrast injected. If this does not demonstrate the fistula, the rigid or flexible bronchoscopy is carried out and an attempt to intubate the fistula is made. If this is unsuccessful, then dilute methylene blue is injected into the old pit of the initial TEF division with a gastroscope placed in the esophagus. This latter test has been 100% positive in all my cases of recurrent TEF. There have been no false positives. Once the diagnosis is made, the operation should be carried out electively, but relatively soon thereafter to stop the continual contamination of the lungs. All these patients have varying degrees of pulmonary

insufficiency prior to surgery. Therefore, preoperative vigorous pulmonary toilet is critical.

OPERATIVE APPROACH

The anesthesiologist must be aware of significant ventilation runoff into the fistula following intubation. This can cause significant hypercarbia and respiratory acidosis. Once the patient is stable under anesthesia, a rigid (preferable) or flexible bronchoscope is passed and a glide wire or thin catheter is passed through the fistula into the esophagus. Following the previous maneuver, a flexible pediatric gastroscope is passed into the esophagus and the wire is grasped and pulled out of the mouth. The end of the wire in the trachea is then pulled out of the mouth and both ends of the wire are clamped with a hemostat. This maneuver allows the anesthesiologist to pull on the clamp once the chest is open to help identify the site of the recurrent TEF. The patient is then positioned for a right lateral thoracotomy with the right neck also prepped and the right arm prepped in the field. This is done because in a few cases one has to also open the neck to find the recurrent TEF. The right chest is opened transpleurally and the significant adhesions to the lung are lysed. In all cases, the esophagus is plastered to the entire membranous trachea, and sometimes to the membranous portion of the right bronchus. In cases of recurrent, recurrent fistulas or fistulas that have been treated with endoscopic closures unsuccessfully, the scarring and inflammation

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are the worst. In spite of the dense scarring, the esophagus must be completely separated from the trachea, and this maneuver must be carried out sharply and without electrocautery because blunt dissection can result in tears in the trachea. In order to facilitate this part of the operation, pulling the two ends of the glide wire intermittently by the anesthesiologist is very helpful. Once the fistula is fully identified, it is divided and sutured on both ends. Often the end of the fistula in the esophagus is in an area of stricture. This frequently requires a resection of the stricture and an end-to-end anastomosis of the esophagus. The next step is critical in the operation and involves placing viable tissue between the two suture lines. The best tissue is a pedicled flap of pericardium. However, if the fistula is too high, this cannot be used and the next preferred option is a pedicled flap of pleura. If neither of these tissues is available, as can happen when multiple previous thoracotomies have been done, then any available vascularized tissue is used. Often this will be a lymph node with its blood supply.

POSTOPERATIVE CARE

A nasogastric tube is left in place for 7 days. At postoperative day 7, a proper contrast study is carried out. Because most of these patients have significant gastroesophageal reflux (GER), which may not have been managed with a fundoplication, intense antacid therapy is required. If a fundoplication is not in place, one must consider placing a gastrostomy and feeding the patient by a gastrojejunostomy tube. This may need to be followed by a fundoplication or a redo

fundoplication if the initial one has failed. The importance of preventing continual reflux with bathing of the new esophageal anastomosis with acid cannot be overemphasized. Often, the recurrent strictures of the new esophageal anastomosis, a result of significant GER, will require repeated dilation, which can sometimes disrupt the repair of the recurrent TEF or can lead to an esophageal perforation with the development of a new recurrent TEF.

CLINICAL EXPERIENCE

Over the past 30 years, the author has personally repaired 38 recurrent TEFs. The initial experience of 26 cases was published in 2010.¹ Since that report an additional 12 cases were treated, most of whom had multiple recurrences and were significantly more complicated than the original 26. In the initial series of 26 patients, there were three recurrences, two of which underwent a successful re-repair. The third patient had a severe associated esophageal stricture and ultimately underwent an esophagectomy and gastric transposition. In the last 12 patients, six underwent a successful repair of the recurrent fistula, three underwent a successful second repair of the fistula, one child with a button battery injury underwent endoscopic repair of the recurrent fistula, and two children ended up with an esophagectomy and gastric transposition.

Reference

- 1 Bruch S W, Hirschl R B, Coran A G. The diagnosis and management of recurrent tracheoesophageal fistulas. *J Pediatr Surg* 2010; 45: 337–40.