Laparoscopically harvested omental flap for recurrent tracheoesophageal fistula in a newborn baby

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Congenital esophageal atresia (EA) and tracheoesophageal fistula (TEF) are common surgical congenital abnormalities. In approximately 75% of patients, the EA repair can be done during the first days of life to repair the atresia and fix the TEF. Respiratory issues are usual in the postoperative course and may be related to tracheomalacia and gastroesophageal reflux. Recurrent TEF can occur in 10% to 15% of EA repairs¹ and remains challenging to treat. Several surgical solutions have been proposed, such as use of glue, diathermy,² and surgery. When surgery is required, some authors have reported the use of natural flap tissue between the esophageal anastomosis and the sutured trachea.³⁻⁵ We report an original technique using an omental flap as a natural tissue harvested previously to the TEF repair with a laparoscopic approach.

Clinical Summary

We report the use of an omental flap tissue brought over the tracheal closure and sutured between the trachea and the esophagus for 2 patients with recurrent TEF. The flap was dissected and taken down before the TEF repair with a laparoscopic approach. The data are shown in [Tables 1](#) and [2](#).

PATIENT 1: A female infant born at 36 weeks of gestation, with a birth weight of 2360 g, was diagnosed after birth with EA and TEF. The EA and TEF closure was performed at 2 days of age. The patient recovered from the postoperative course, and the first feeding was started soon after she was discharged from the intensive care unit (time unknown). She had several episodes of desaturation and bradycardia after feeding. An endoscopic examination and a contrast study were performed, showing a recurrent TEF. She underwent reoperation for fistula closure. In addition, a pleural flap was sutured between the trachea and the esophagus.

The immediate postoperative course was uneventful, but she rapidly presented a second recurrence of TEF. The patient was then transferred to our institution.

A repeat endoscopic examination for a second cervical TEF was performed; the result was negative. In turn, a recurrent TEF was observed at the same location previously described. We then decided to reoperate by using an omental flap as a natural tissue sutured between the trachea and the esophagus.

A 5-mm trocar introduced through the umbilicus was used for a 5-mm and 30-degree camera. The pneumoperitoneum was established at 8 mm Hg. Three additional 5-mm trocars were inserted. The omentum was taken down from the right part of the great gastric curve using the cautery, going up along the curve and paying attention not to burn the gastropiploic vessels. The omentum was dissected to the top of the great curve, creating a pediculated omental flap (Kircuta technique).⁵ An additional Nissen procedure was performed. The hiatus was opened to place the omental flap into the chest at the end of the wrap confection. An open thoracic approach was used to fix the TEF, and the omental flap was sutured between the esophagus and the sutured trachea. The postoperative course was uneventful. The patient is doing well at 24 months of follow-up.

PATIENT 2: A female infant was born at 41 weeks of gestation with a prenatal diagnosis of EA. She underwent operation at 1 day of age with EA repair and TEF closure. Soon after the drain removal, a right pneumothorax presented that required a chest tube placement (removed 3 days later). After feeding was started, the patient presented with respiratory distress and desaturation. An endoscopic examination for a recurrent TEF showed a tracheomalacia and an anastomotic stenosis that required 2 pneumatic dilations. Despite the dilatation, the baby presented continuous feeding difficulties with desaturation. Therefore, another endoscopic examination was performed that showed a recurrent TEF. Treatment with glue was performed without any success. She underwent operation. An omental flap was harvested using a laparoscopic approach and the same technique as previously described without Nissen fundoplication. The postoperative course was simple, and she is doing well at 17 months of follow-up.

Discussion

To our knowledge, this is the first report of using an omental flap for a recurrent TEF repair in a baby. Furthermore, this is the first report to describe a laparoscopic approach for this indication.

Recurrence of the TEF occurs in approximately 10% of cases, most often within 2 months after initial repair.¹ It remains challenging to treat. This should be differentiated from a second congenital fistula, which is best done by an endoscopic examination before the surgery. Anastomotic tension, leak, or stenosis, which are well-known factors of recurrent TEF,¹ should be avoided.

When a surgeon decides to use a flap as an interposition tissue between the sutured trachea and the esophagus, it is traditionally

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TABLE 1. Patient characteristics

	Sex	Gestational age (wk)	Birth weight (g)	Age at surgery	Postoperative event	Time to first feeding (POD)	Length of ICU stay (d)	Length of hospital stay (d)
1	F	36	2360	2 d	Hemodynamic shock	Unknown	Unknown	Unknown
2	F	41	2180	1 d	Pneumothorax	2	13	81

POD, Postoperative day; ICU, intensive care unit.

TABLE 2. Tracheoesophageal fistula data

	Clinical findings	Diagnosis	Additional features	Previous surgery and/or procedure		Surgery		Length of mechanical ventilation (d)	Time to first feeding (POD)	Length of ICU stay (d)	Length of hospital stay (d)
				Y/N	Procedure	Age (d)	Additional procedure				
1	Choking with feeding	Endoscopy and contrast study	Tracheomalacia	Y	TEF repair and pleural flap	110	Nissen	4	6	5	51*
2	Respiratory distress	Endoscopy and methylene blue test	Esophagus stenosis and tracheomalacia	Y	Glue	52	None	4	22	6	81

POD, Postoperative day; ICU, intensive care unit. *In our institution.

done using a surrender tissue such as a pericardial flap, an intercostal pedicle flap, or a costal cartilage grafting.^{2,3}

The use of the great omentum as a natural tissue to fill a space or cover a defect has been described in adult surgery, especially in cancer surgery or wall defect reconstruction.⁴ This flap offers several practical advantages: adaptable size of the mucosal patch, great plasticity (including the omentum), and large length and size of the pedicle. The disadvantage may be the need for abdominal operation. The laparoscopic approach limits the abdominal trauma and offers a good cosmetic result. Moreover, in case of EA and TEF, the need for an antireflux procedure or a gastrostomy justifies the abdominal surgery.

The surgical technique is more similar to harvesting an epiploic candlewick, as initially described by Kiricuta,⁵ than to using a real pedicled omental flap. The flap can be placed in the chest without any risk of devascularization.

Conclusions

We described the use of an omental flap harvested laparoscopically to use in case of recurrent TEF. The laparoscopic ap-

proach offers a better cosmetic result and less abdominal trauma. This technique should be an alternative for a recurrent TEF surgical treatment, especially if an antireflux procedure or a gastrostomy is required.

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