Can Distal Abdominal Esophagostomy Replace Gastrostomy in Esophageal Atresia?

Wael Ghanem
Pediatric Surgery Unit, Ain Shams University

ABSTRACT

Background: *Conventional gastrostomy is essential in long gap esophageal atresia with or without tracheoesophageal fistula and in postoperative major anastomotic dehiscence, but it has a lot of complications.* ***Objective:*** *The aim of this study is to assess the effectiveness of distal abdominal esophagostomy in replacing conventional gastrostomy.* ***Patients and Methods:*** *The distal esophagus was exteriorized on to the left upper abdominal wall (abdominal esophagostomy) in 12 babies who had esophageal atresia with or without tracheoesophageal fistula. The indications for this procedure were long gap esophageal atresia with or without tracheoesophageal fistula in which primary anastomosis was not possible and a major anastomotic dehiscence requiring cervical esophagostomy and gastrostomy. In all these patients a decision to replace the esophagus had been made, and a cervical esophagostomy was constructed. The distal esophagus was mobilized either from the thorax if thoracotomy had been done or by a transhiatal abdominal route.* ***Results:*** *All babies survived the procedure, 3 unrelated deaths occurred. Narrow distal esophageal stump recorded in one patient. No skin excoriation, no wound infection, no stomal retraction, nor vascular compromise of the distal esophageal stump had been recorded. No reflux of gastric contents through the distal esophagostomy. Intermittent catheterization for feeding found a great acceptability with the parents.* ***Conclusions:*** *Advantages of the abdominal esophagostomy include absence of gastroesophageal reflux, no indwelling catheter, early institution of enteral feeds, intermittent catheterization for feeding, easy nursing care, and no stomal complications. In addition, this procedure allows the entire stomach to be available for esophageal replacement and retains the natural gastroesophageal junction and the lower esophagus for anastomosis to any bowel segment being used for the esophageal replacement.*

Key Words: *Distal abdominal esophagostomy, gastrostomy, esophageal atresia, long gap atresia, tracheoesophageal fistula, anti-reflux mechanism, gastroesophageal reflux, post-operative fistula formation.*

INTRODUCTION

A long-term gastrostomy is necessary in the management of esophageal atresia with or without tracheoesophageal fistula as a primary procedure if esophageal anastomosis is not possible and esophageal replacement is contemplated, or as a secondary procedure if there has been a major anastomotic dehiscence[1]. As anastomotic leaks after repair of esophageal atresia range from subclinical "detected only through barium/gastrograffin swallow" to significant disruptions with accumulations of fluid (saliva, gastric juices, ingested fluids) or air (pneumothorax), which may lead to decompression despite thoracostomy drainage. It's recognized that small leaks may be treated by continued chest drainage, especially if the approach has been retropleural and the pleura remains intact [2].

A conventional gastrostomy has many disadvantages including lower stump blow out, delayed institution of feeds, and a significant decrease in lower esophageal high pressure zone (LEHPZ) and lower esophageal sphincter length after Stamm gastrostomy as postulated that anchoring the stomach to the anterior abdominal wall results in tension on the gastro-esophageal junction, this alters the length and change the angle of His, which predisposes to the development or worsening of gastro-esophageal reflux[3,4,5].

To avoid these problems, the lower pouch of the esophagus is exteriorized on the abdominal wall to function as a gastrostomy port.

PATIENTS AND METHODS

Indications for this procedure included long gap atresia "3 cm or more" with or without tracheoesophageal fistula in which primary anastomosis is not possible and a major anastomotic dehiscence requiring cervical esophagostomy and gastrostomy.

Operative procedure

If thoracotomy has been performed as in esophageal atresia with tracheoesophageal fistula, the lower stump of the esophagus is mobilized up to the diaphragm. Otherwise, laparotomy is performed by an upper abdominal midline incision. The left lobe of the liver is mobilized and retracted medially. The abdominal esophagus is mobilized by sharp dissection taking care to avoid injury of the vagus nerves (figure 1). If thoracotomy has not been performed the thoracic portion of the lower esophageal pouch is mobilized by trans hiatal blunt dissection.

If the lower esophageal stump has been mobilized during a thoracotomy, then it can be easily delivered in the abdomen via the esophageal hiatus. The esophageal hiatus may or may not be closed. The lower esophageal stump is then exteriorized, to function as an abdominal esophagostomy, through a tiny stab incision made with the diathermy needle in the left upper quadrant of the abdominal wall. It is anchored to the peritoneum with 4-0 vicryl and stitched to the skin with no more than three or four interrupted 6-0 vicryl stitches. A size 8 or 10 Foley's balloon catheter is left indwelling in the stomach, and the laparotomy wound is closed. The lie of the distal stump is across the body of the stomach with an acute angle at the gastro-esophageal junction. Gastrostomy feeding is started as soon as effective peristalsis is evident. The indwelling catheter is removed after 2 weeks. Subsequently, intermittent catheterization is performed for feeding.

This procedure was performed for 12 neonates. Four patients had esophageal atresia with tracheoesophageal fistula after major anastomotic dehiscence in whom salvage of the anastomosis was deemed not possible underwent cervical and abdominal esophagostomies. Encourged by the effectiveness of this procedure, it has been performed in 4 babies who had esophageal atresia without tracheoesophageal fistula and in 4 babies who had long gap esophageal atresia with tracheoesophageal fistula in which primary anastomosis was not possible.

RESULTS

All babies survived the procedure. Three babies had late deaths because of acute gastroenteritis. In one baby who had atresia without fistula, the distal esophageal stump had a very narrow caliber and a size 8-balloon catheter had a very tight fit. However, this improved within 1 week. There was no instance of skin excoriation, wound infection, stomal retraction, or vascular compromise of the distal esophageal stump (Figure2).

Reflux of gastric contents through the abdominal esophagostomy has not been occurred in any of the babies. Intermittent catheterization for feeding has found greater acceptability with the parents as compared with indwelling gastrostomy catheter. The nursing of babies without an indwelling catheter was easier.

Esophageal replacement has been successfully performed in 5 children. In the first case a reverse gastric tube was fashioned from the greater curvature for the esophageal replacement. Because no gastrostomy was present in the anterior wall of the stomach, the construction of the gastric tube was achieved with considerable ease and without fear of vascular compromise.

The distal esophageal stump was retained for gastric decompression and access for feeding. In four cases, esophageal replacement was successfully achieved by colon interposition between the cervical and abdominal esophagus, thus retaining the natural gastro-esophageal junction and strengthening the anti-reflux mechanism by a partial fundic wrap.

Four children are awaiting esophageal replacement.

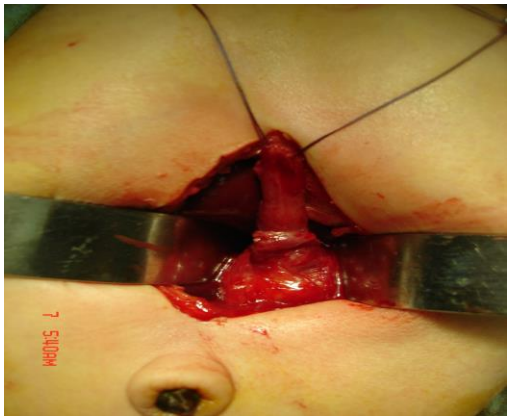

Fig. 1: Operative photograph of the distal esophagus after full mobilization through the hiatus.

Fig. 2: Clinical photograph of a child with the distal esophagostomy. No skin excoriation, no stomal retraction, nor indwelling catheter is required.

DISCUSSION

A conventional gastrostomy has a definite place in the management of esophageal atresia, particularly in those patients in whom atresia is an isolated defect or in patients who have an associated tracheoesophageal fistula with either a long gap or anastomotic dehiscence [(1)]. The native esophagus is the best esophagus, and although delayed primary anastomosis is being increasingly used and techniques have been described for elongation of the upper and lower esophageal pouches to effect a tension free anastomosis, many children still need cervical esophagostomy and gastrostomy and subsequent esophageal replacement [(6,7)].

The conventional gastrostomy may be associated with many complications, e.g. gastric mucosal prolapse, stomal problems (perigastrostomy leak, skin excoriation, exuberant granulation tissue with chronic blood loss, and anemia), recurrent dislodgement of the gastrostomy catheter, progression of the tube towards the pylorus and duodenum producing gastric outlet obstruction, lower stump blow out after ligation, and division of the tracheoesophageal fistula, and institution of enteral feeds may be delayed [(8,9,10)]. Other complications seen over a long-term period include a persistent gastrocutaneous fistula after tube removal, gastrocolic fistula formation, volvulus around a malpositioned tube, erosion of the gastrostomy tube through adjacent organs, and abscess formation [(11,12)]. Gastrostomy buttons are not always available and may not necessarily be free from stomal complications [(13)].

The procedure being described here is addressed only to this small category of patients in whom a decision for esophageal replacement has been taken and those in whom gastrostomy has to be maintained for a long period.

The abdominal esophagostomy serves as a very effective gastrostomy port, yet it does not need an indwelling catheter, hence, the nursing care is much simpler. Because a constant dressing is not needed, there is no maceration of skin, and application of skin protecting agents is not required. The parents manage intermittent catheterization for feeding very well.

There is no reflux of gastric contents, this is achieved by the preservation of gastroesophageal junction, and the natural antireflux mechanism is strengthened by the acute angulation at the gastroesophageal junction and the lie of the distal esophagus as it traverses across the anterior wall of the stomach to be exteriorized in the left upper quadrant of the abdomen. The left lobe of the liver overhangs the distal esophagus, and a full stomach would produce a pinch cock action against the liver to further strengthen the antireflux mechanism. No stomal problems or skin excoriation have been encountered [(14)].

The preservation of the distal esophagus and the natural gastroesophageal junction also allows it to be used during esophageal replacement, particularly if the colon is being used. The colonic segment can be anastomosed to the distal esophagus, and the fundus of the stomach can be used for a partial or complete wrap.

Even if the colon is not being used for esophageal replacement, the entire stomach is available for construction of a gastric tube without fear of vascular compromise, and the distal esophageal stump can be used as a temporary gastrostomy port in the postoperative period [(15)].

CONCLUSION

Distal abdominal esophagostomy can replace gastrostomy as it prevents occurrence of gastro-esophageal reflux, no indwelling catheter, easy nursing care, and no stomal complications. It provides the distal esophagus for anastomosis with esophageal reeplacement and it allows the entire stomach to be available for esophageal replacement.

REFERENCES

1. Spitz L, Hitchcock RJ (1994): Esophageal atresia and tracheoesophageal fistula, in Freeman V, Burge DM, Griffiths DM, etal (eds): Surgery of the newborn. London, England, Chirchill livingstone: 353-373.
2. Kenneth C, Greg F, John C, et al (1996): Save the child's esophagus: Management of major disruption after repair of esophageal atresia. J Pediat Surg; 31(1): 48-52.
3. John G P, Dennis WV, Craig C, et al (1987): The effect of various types of gastrostomy on the lower esophageal sphincter. J. Pediat Surg; 22(12) : 1198-1202.
4. Canal DF, Vane DW, Goto S, et al (1987): Reduction of lower esophageal sphicter pressure with Stamm gastrotomy. J Pediat Surg 22: 54-57.
5. Samuel M and Holmes K (2002): Quantitative and qualitative analysis og gastroesophageal reflux after percutaneous endoscopic gastrostomy. J pediat Surg; 37(2): 256-261.
6. Agarwal S, Bhatinger V, Bajpai M, et al (1996): Factors contributing to poor results of treatment of esophageal atresia in developing countries. Pediat surg International;11:312-315.
7. Randolph JG (1986): Esophageal atresia and congenital stenosis, in Welch KJ, Randolph JG, Ravitch MM, etal,(eds): Pediatric surgery. Chicago, IL, Year Book Medical: 682-692.
8. Haws EB, Sieber WK, Kieswetter WB (1996): Complications of tube gastrostomy in infants and children: 15 years review of 240 cases. Ann. Surgery;164: 284-290.
9. Holder TM, Leape LL, Aschcraft KW (1972): Gastrostomy: its use and dangers in pediatric patients. N Eng J Med;286:1345-1347.
10. Campbell JR and Sasaki TM (1974): Gastrostomy in infants and children : An analysis of complications and techniques. Ann. Surgery;40:505-508.
11. Gallagher MW, Tyson KRT, Ashcraft KW (1973): Gastrostomy in pediatric patients: An analysis of complications and techniques. Surgery; 74: 536-539.
12. Joshua MG and Jacob CL 1999: Gastrocutaneous fistula in children after removal of gastrostomy tube: Incidence and predictive factors. J Pediat Surg 34 (9): 1345-1346.
13. Michael JG, Neil J, Michael F, et al (1996): Alternative techniques of feeding gastrostomy in children: A critical analysis. J. American College of Surgeons; 182:233-240.
14. Kozarek RA, Payne M, Barkin J, et al (1995): Prospective multi-center evaluation of an initially placed button gastrostomy. Gastrointestinal Endoscopy;41:105-108.
15. Carmelo R, Nunzio B, Sergio B, et al (2000): Gastric motility disorders in patients operated on for esophageal atresia and tracheoesophageal fistula: long-term evaluation. J Pediat Surg 35 (5): 740-744.