

Esophagoplasty Using Reversed Gastric Tube

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The reverse gastric tube provides the most physiologic substitute for the esophagus whose entire length is bypassed or replaced. This paper presents my experience in this procedure .Six patients underwent this procedure during the last 14 months, there was no mortality and patients had a smooth recovery .The first two patients both developed salivary fistulae, which was managed conservatively. Rest of the four patients had an uneventful recovery.

In 1955 Mr. Henry. J.Heimlich described the reverse gastric tube operation, which provides a gastric pedicle tube graft with an excellent blood supply and adequate length to replace the entire esophagus³⁻⁸.

This is basically a one stage procedure in which the greater curvature of the stomach is used to form a tube the length and diameter of entire esophagus²⁻⁵.

Mr. Beck (1905) and Mr. Jianu (1912) performed the same procedure but on animals only and they utilized this procedure for creating tube gastrostomies in humans but never used it as a form of esophageal replacement^{1,7}.

Materials And Methods

Six patients are included in this study; all of them were males with the age range of 4-32 years. All of them had a history of corrosive intake, four has a suicidal attempt and two of them had an accidental ingestion. The average time period between the corrosive intake and the operation is 72 days. The nature of the corrosive was different. The youngest of them had history of Lye ingestion. Three had history of sulfuric acid (all of them suicidal) and one had history of carbolic acid intake, in one of the patients who came from a village, the nature of the corrosive was not known.

Nature of corrosive intake

Corrosive	n=
Lye	1
Sulfuric acid	3
Carbolic acid	1
Unknown	1

Mode of ingestion	n=
Suicidal	4
Accidental	2

Procedue And How I Do It?

Technique of formation of reverse gastric tube

The patient is placed supine on the table and whole of the abdomen, thorax and neck is draped. The abdomen is opened through a Left Subcostal incision, which in my experience has proved to be the most suitable.

The next step is to free the gastrocolic omentum from its attachment to the colon and the greater omentum is left

attached to the stomach. The entire gastro colic omentum from the pylorus till the splenic flexure is freed.

The next step is to do the splenectomy. The hilus of spleen must not be treated in the usual manner. The technique here requires leaving the splenic vessels intact. Until exposure permits dissection and ligation of their branches within the hilus of spleen. This preserves the origin of left gastroepiploic vessels from the splenic vessels, and thus the blood which formerly went to the spleen is now directed through the left gastroepiploic vessels to the greater curvature of the stomach which makes sure that the entire length of the gastric tube pedicle graft has enriched blood supply.

Formation Of Gastric Tube

The open end of the gastric tube is marked approximately 4cm proximal to the pylorus. The right gastroepiploic vessels at site are doubly ligated and divided. The non-crushing clamps (straight) are placed transverse to the greater curvature of stomach at a previously selected site i.e. 4 cm proximal to the pylorus. A no. 24 nealton catheter is placed through this opening along the greater curvature of stomach and then curved non-crushing clamps are placed one cm proximal to the outer border of the catheter and the stomach is cut in-between. The clamping and division is carried on till the fundus of the stomach so that a tube of at least 40-cm length is constructed. This length is quite adequate to replace even an adult esophagus. The entire cut end of the pedicle to be and the new greater curvature of the stomach is sutured in double layer. The first row is sutured by 2-0 continuous interlocking suture and the second row is sutured by 2-0 continuous vicryl sutures.

Exposure Of Esophagus

The esophagus is exposed through an oblique cervical incision extending from the jugular notch to the angle of mandible. The esophagus is dissected out and a sling is placed around the esophagus. The esophagus is palpated and it is divided proximal to the upper level of the stricture, which is usually just below the level of the cricoid. The lower end is closed with a 2/0 vicryl and pushed down.

Creation Of The Retrosternal Tunnel

I always prefer a retrosternal tunnel as it provides a shorter tunnel for the tube and is less unsightly as it provides a

better cosmetic appearance. I use a sterile obturator to initiate the retrosternal tunnel. A smaller obturator is first used to create a mediastinal tunnel followed by a larger obturator. The obturator is pushed forwards by a side to side movement and finally it is brought onto the manubrial recess. Occasionally we need to have a blunt finger dissection to assist the passage of the obturator.

The Anastomosis

Anastomosis is performed in the neck between the cervical esophagus and the most proximal end of the reverse gastric tube. I as a routine, excise proximal 1 cm of the gastric tube so as to freshen the margins. Little finger is introduced into the lumen of the esophagus to ensure that there is no residual stricture. I apply the posterior layer mucosa to serosa full thickness 2/0 vicryl suture to reconstruct the posterior wall. Then a nasogastric tube is pushed through the left naris and pushed into the reversed gastric pedicle and then the anterior layer of the anastomosis is reconstructed in the similar manner taking care that the knot of the suture are out side. A corrugated drain is placed and the wound is closed in layers.

Heimlich, H.J. does not advocate the use of the nasogastric tube as in his opinion the tube tends to obstruct the site of anastomosis, so the patient has to expectorate the saliva to prevent aspiration, in the absence of the N/G tube, the saliva is easily swallowed. He advocates making a gastrostomy tube for decompression and for feeding⁹.

The abdomen is closed in layers after placing a drain in the abdominal cavity.

Post Operative Management

The patient is kept NPO for five days. On the fifth day the N/G tube is removed but the patient is not allowed orally till we get a gastrograftin study done on him. In the absence of any evidence of a leakage, liquids are started orally. Initially the patient does suffer from a transient dysphagia which is understandably due to the reverse peristaltic wave in the gastric tube, but the patient is instructed to take liquids and semisolids in the sitting up posture because of which the passage of food is facilitated due to the effect of gravity. This transient dysphagia is completely resolved in a period of three weeks post operatively.

Results

Six patients of stricture of the esophagus were treated by this technique during the last fourteen months i.e. from August 29th to 10th of November 97. The first two patients developed a post operative salivary fistula, which was treated conservatively, and the fistula closed on the average on the 6th day of detection. All the patients has a transient functional dysphagia post operatively except the last patient who tolerated the fluids and semisolids quite well right from the first day when he was allowed orally. The transient dysphagia in my opinion is due to the reversal of the peristaltic wave in the gastric tube, which is really a functional disturbance, and it is gradually

overcome in a period of three weeks. All the patients came for the regular follow up at a two monthly interval and they are back to normal regarding swallowing and digestion. The first two patients did develop fever on the fourth and fifth day and wound infection, which was successfully treated by antibiotic therapy.

COMPLICATION	n=	TREATMENT	RESULT
Anastomotic Leakage in the neck.	2	Treated on conservative management.	Both the patients and their fistulas healed on the 6th day.
Wound infection and fever.	2	Treated by antibiotics for 5 days.	The wound infection was controlled on the 5th day.
Transient Dysphagia	5	On liquid semisolid diet for 3 weeks.	The transient dysphagia got corrected automatically after 3 weeks.

Discussion

I must emphasize that this operation is primarily used for by passing the stricture of the esophagus and is not used as an esophageal replacement and in our rather short study of six cases the results have been very satisfying. The patients have responded well and they have been delighted to get back their function of swallowing as they got rid of constant hunger, spitting of saliva and lack of filling satiety as nothing would go into the stomach.

Technically in the absence of stapling devices this is a marginally difficult and lengthy operation as on the average it take around 3 hours and thirty minutes to perform this procedure however with growing experience and availability of stapling devices I hope to substantially cut down this time period.

The operation provides the most physiologic substitute for the esophagus and it is quite popular in treating benign lesions of the esophagus¹⁰⁻¹¹. The entire stomach has been used as a substitute for the replacement of esophagus most commonly¹² but due to its smaller bulk a slender esophagus tube in the retrosternal space can fit in more easily.

Among the other plus points, the tube has an excellent augmented blood supply; it adequately tolerates its own secretions^{3,4,6}. The problem of development of ulceration, bleeding and stricture at the site of anastomosis between the tube and remaining proximal esophagus has not been encountered in our cases, this is simply due to the reason that the adjoining gastric antrum contains no acid secreting parietal cells and what ever parietal cells are present in the body of the stomach tube are isolated from their vagal nerve supply in the process of division of the stomach wall.

The greatest criticism I have received in this procedure is regarding splenectomy specially the one I performed in the child of four years (which was the 2nd case), yes I acknowledge the risk of O.P.S.I. in these patients (non of the six patients had this problem until now) but removal of spleen is extremely important for augmenting the blood supply of the tube and helps for grater mobilization of

greater curvature of stomach and undoubtedly contributes to the ease with which the gastric tube can be extended retrosternally.

This is an initial experience with this technique, which has borne fruitful results, but after gaining further experience in at least 25 cases I hope I would be more certain about the long term follow up.

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