

Case Report

Iso-peristaltic colonic loop interposition for the treatment of benign oesophageal stricture: a case report with review of literature

Pradeep Balineni*, Venkata Pavan Kumar C., Debaraju Reddy E.

Department of Surgery, S. L. G. Hospitals, Hyderabad, Telangana, India

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*Correspondence:

Dr. Pradeep Balineni,

E-mail: pradeep052191@gmail.com

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ABSTRACT

Corrosive oesophageal strictures are a common and debilitating condition in India. Patients generally have dysphagia, cachexia, drooling of saliva, aspiration pneumonitis, and lung abscess. Though endoscopic dilatations are done in cases of short segment strictures, surgical oesophageal bypass is the permanent solution for this condition. A 24 years female presented with complaints of dysphagia and cachexia, due to corrosive stricture. Patient had a history of poison ingestion 2 years back. Intra-operatively stricturous mucosa is excised and an iso peristaltic colonic loop by pass was carried out. Post operatively patient had a complication of anastomotic leak which was treated conservatively, excepting which patient is symptom free and gaining weight on a follow up period of 1 year. Ever since first described by Kelling and Vuillet in 1911 colonic interposition is mostly used around the globe for oesophageal bypass in both benign and malignant conditions. Stomach and jejunum are the other conduits that can be used. Iso peristaltic loop is mostly used to reduce the incidence of reflux. Right colon or transverse colon graft based on the mid colic artery or the left colic artery owing to the reliable blood supply and less diameter. This procedure has a high complication rate of around 27% most of which are due to the vascular compromise of the graft.

Keywords: Corrosive strictures, Oesophageal bypass, Colonic interposition, Iso-peristaltic loop, Dysphagia

INTRODUCTION

Dysphagia due to oesophageal strictures is the most debilitating symptom for a patient post corrosive ingestion. In the Indian sub-continent corrosive poison ingestion is mainly accidental (mainly in paediatric population), suicidal or sometimes may be homicidal, while the mainstay of treatment for corrosive ingestion would be early resuscitation and nutritional support.^{1,2} In spite of best efforts many patients would not survive, those patients who survive may have disabling sequel of stricture formation in the pharynx, oesophagus and even in the stomach. Short segment oesophageal strictures may be treated with repeated endoscopic dilatations, whereas long segment or multiple oesophageal strictures are

treated surgically by by-pass surgeries.^{1,2} Stomach is the most favoured organ for oesophageal bypass, followed by colon and jejunum in many centres that perform such procedures. Here we present a case of iso peristaltic extended transverse colonic interposition based on mid colic artery in a patient of corrosive oesophageal stricture.

CASE REPORT

A 24 years old lady presented to the outpatient department with complaints of difficulty in swallowing for the past 2 years. She had complaints of decreased appetite, non-projectile vomiting, loss of weight, no history of fever and dyspnoea, bowel habits were normal.

She had history of consumption of acid 2 years back. On examination patient was hydrated, malnourished and underweight, abdomen was soft, non-tender, no distension and there was no palpable organomegaly

Contrast enhanced computer tomography (CECT) chest and abdomen showed multiple strictures in the oesophagus with thickened gastric wall and narrowed gastric lumen. Upper gastro-intestinal scopy showed a stricture in the upper oesophagus at 22 cms length and scope was not able to negotiate past the stricture (Figure 1).

An oesophageal dilatation could not be done; patient was planned for by-pass surgery with a colonic graft. At surgery patient was found to be having a stricture in the oesophagus below the cricoid cartilage, lesser curvature of the stomach was scarred and fibrosed. Oesophagus was resected below the cricoid cartilage the stricturous mucosa was excised. An iso-peristaltic extended transverse colonic loop which was based on middle colic artery is mobilized retrosternal and a cervical anastomosis is done and the lower end is anastomosed to jejunal loop, a feeding jejunostomy is done and colo-colic anastomosis is done between ascending and descending colon.

The post-operative period patient was started on feeding jejunostomy tube feeds on post-operative day 3, ryles tube feeds were started on post-operative day 7. On the 7th post-operative day patient had tachypnoea and decreased breath sound in the left lower lobe, imaging showed a left pneumothorax an inter-coastal drain tube was placed for the same, which was removed on post-operative day 11 Figure 2 (a and b). Ryles tube was removed on post-operative day 11. Oral liquid diet and soft diet were started on post-operative days 11 and 15 respectively. Patient was discharged on post-operative day 17 after tolerating soft diet and removing drain tubes. Patient had no complications on 1 year follow up.



Figure 1: Upper gastroscopy showing upper end of stricture.

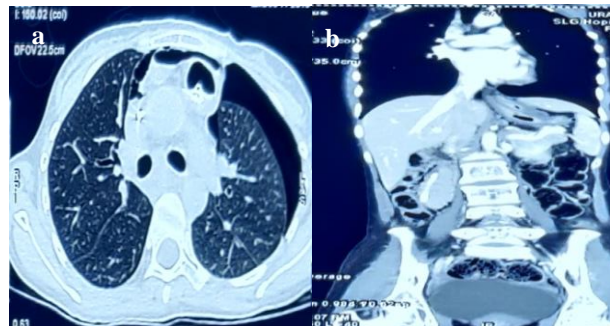


Figure 2 (a and b): post-operative CT showing left side pneumothorax with retrosternal colon and thickened stomach wall.

DISCUSSION

The procedure of colonic interposition was first described by Kelling and Vuillet in 1911 and was first successfully done by Hacker.¹⁻³ Oesophageal bypass is done for treatment of benign (oesophageal stricture and atresia) and malignant (oesophageal and cardiac tumours) causes.⁴ Main cause of benign oesophageal stricture is corrosive ingestion, treatment of which is mainly early resuscitation, nutritional supplementation and followed by corrective procedure for strictures.⁵ Strictures can be treated either by endoscopic dilatation or by surgery, as suggested by Ogunleye et al, endoscopic dilatations needs repeated admissions, anaesthetic evaluations even then have a higher recurrent rate.^{1,5} The incidence of oesophageal perforation has been decreased due to the advancement in investigations and early treatment protocols, but Erdogan and Lew warn a significant increase in mortality if perforation occurs.² Oesophageal by pass is the surgical procedure done while leaving behind the oesophagus as the dense peri esophagitis post corrosive ingestion would make it difficult for resection and also there are very less documented cases of having mucocele or malignancy in the left over oesophagus which would also suggest against resection.^{1,2} 6 months post injury is the ideal timing for surgery as suggested by many authors whereas Bongland et al., proposed 2-3 month would be enough for surgery.^{1,2}

There is no recorded evidence suggesting that pre-operative angiography had better results, any anatomical variations would be dealt intra operatively. Pre-operative angiography may be considered in patients who had undergone previous abdominal surgeries with potential involvement of the colonic vessels, previous surgeries of abdominal aorta, and in cases of lower limb claudication.^{1,9} Colonoscopy should be done in cases where colonic interposition is planned to look for any primary lesions in the colon.⁴

Stomach, colon and jejunum are the different conduit used for bypass.⁵ Jejunum is useful to replace a small segment, whereas stomach and colon are required to replace long segment. Though the technique of

oesophageal bypass was first described by Roux using jejunum, except for the MD Anderson group jejunum is not frequently used these days due to vascular insufficiency that can easily occur even with slight tension over vascular pedicle, and also jejunal mucosa is not tolerant to the gastric acid.^{2,6} Stomach can be used as a reversed or non-reversed tube from the greater curvature, which has reflux, ulcerations, anastomotic narrowing and propulsive dysfunction as major complications.²

The advantages of having right colon conduit over the left is that it has more reliable blood supply (marginal arteries of Drummond), provides adequate length for reconstruction, is smaller in diameter and less prone to dilation.⁶ The arterial anastomosis (marginal) between collaterals of the right colic and left colic arteries would supply the graft, a procedure first described Lees et al in 2 patients where middle colic and right colic arteries are ligated without disturbing the left flexure is used to provide length of the graft.³ When left colon is mobilized on the left colic artery then the vasculature is outstretched and remains a tort sheet in the posterior mediastinum causing tortuous convoluted shape of the graft, also injury to the left colic artery during mobilization of the left flexure will lead to graft necrosis.⁷ Iso peristaltic loop is mostly used, as anti-peristaltic loop might be having significant spasm causing reflux.⁷⁻⁹

By pass can be done in sub cutaneous, retro sternal and posterior mediastinal route after resecting the oesophagus. Retrosternal approach is technique more demanding as it involves removing of sternal end of the first rib and sternal head of left clavicle to increase size of thoracic inlet, this might injure apical pleura causing pneumothorax and also post-operative respiratory complications.² According to various studies there is a high incidence of anastomotic leakage in retrosternal placement which can be attributed to the long vascular pedicle. The subcutaneous route of reconstruction is easier and quicker and doesn't require any thoracotomy, but cosmetically is not well appreciated. Necrosis of the graft, anastomotic leakage in neck and delayed stricture and redundancy issue of graft, alimentary dysfunction is common to all three approaches.² According to Huguier et al mortality rate was 20.5% for ante sternal, 25% for retrosternal, and 50% for oesophageal bed placement, the higher mortality may be due intra thoracic placement of anastomosis causing leak and mediastinitis.² According to reports of Rourke et al, Fujita et al, and Shirakawa et al there was decreased rate of anastomotic leakage when the graft was super charged with micro vascular anastomosis, done between proximal mesenteric vessels and internal thoracic vessels or transverse cervical artery.⁶ As described by Kesler et al intra-operative use of indocyanine green and Doppler flow can help in assessing the conduit blood flow and the need for augmentation of the blood supply.⁶ Attention should be paid to the following steps during cervical anastomosis to avoid compression over the anastomosis retrosternal

space should be kept to avoid compression the colon, to make sure that there is no intestinal volvulus, sternohyoid muscle should be partially resected to avoid possible compression of the oesophagus or colon, and the oesophageal colic anastomosis should be placed higher to avoid large cervical to retrosternal angle.⁸ There is no recorded evidence in literature showing much difference in the outcome between hand sewn and stapler anastomosis.^{8,9}

In the three conduits that are stomach, colon and jejunum, Moreno-ossett et al concluded that the steady, homogenous colonic responses contributed active role in transport of food.⁷ In addition to the 3 normal movements in colon five other subtypes are also identified based on the amplitude which helps in propelling the food bolus. Benages et al had reported that segmental contractions that are present would help in propelling the food.⁷ Isolauri et al reported that rarity of reflux of acid in to colon is due to vagotomy during the procedure, and also colonic transit is slower as compared to the normal oesophagus.⁷ Cologastric anastomosis is preferred to be performed on the posterior wall of the stomach, as that acts as anti-reflux mechanism for a great extent.⁷ In the post-operative period supportive measures such as control of sepsis, limitation of the inflammation surrounding the bed of conduit and optimal nutritional resuscitation are to be taken for the overall, general and fast recovery of the patient.¹

Standard colon interposition had a complication of 30-65% and mortality rate of 0-23%.⁹ Furst et al showed a 27% rate of major complication and 7% of anastomotic leakage.³ Early complications are graft necrosis, anastomotic leak 2-22%.^{9,10} Fistulae, anastomotic strictures, unusual early complications are para colic hiatal herniation, hiccup and eructation in anti-peristaltic colon interposition most of these complications are due to hypo perfusion of graft are can be because of any venous occlusion.^{4,6,10} Late complications of the procedure are fibro stenosis of the graft, peptic colitis with ulceration, gastro colic reflux, colo pericardial (or) colo bronchial fistulae, diverticular disease in colon interposition also has been reported by Nelson and Grayer.⁹ An unusual late complication is adenocarcinoma of the interposed colon.^{4,7} Being thin walled hollow viscous, responds to the negative pressure in the thorax and passively dilates above any potential obstructing anatomical land marks causing redundancy and herniation which might require a second surgery to correct.^{7,9} Huguier reported that leakage of cervical anastomosis is the most frequent non-fatal complication to occur in as many as 25%, and are mostly seen around the first week of surgery.^{2,10} Anastomotic leak can be detected by ultrasound of cervical region or contrast studies, barium esophagography would provide a functional evaluation of the graft and integrity of the conduit anastomosis in case of doubt.^{4,8} In a series of 2067 patients by Postlethwait the most prominent cause of death was due to necrosis of colon.^{2,11} Rate of colon necrosis or ischemia is 4.6% with

use of the left colon and 10.8% with use of right colon. Osborne et al revealed a graft related complication of 35% when ascending colon was a part of the graft supplied by left colic artery.³

Outcome in form of symptom free survival is also comparable; more than 90% patients have symptom free life after follow up of 1 month to 7 years.¹ Ahmed and Spitz reported in studying outcome of colonic replacement of the oesophagus had operative mortality of 15, oesophago-colic leak of 48.2%.⁷ Occurrences of neoplastic changes in the colon and cologastric junction are predictable. The latent period of development of carcinoma on an average is 40 years after the injury.² Thomas et al concluded that the single important predictor of a good functional result was the placement of colon in the posterior mediastinum.⁷

CONCLUSION

Surgery remains the mainstay of treatment for long segment benign oesophageal strictures. Out of the various conduit available gastric conduit is proven to be the best followed by colon (left more than right) and jejunum respectively, and the oesophageal bed route though it is technique more demanding proves to be better in long term.

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