

Pharyngo-Oesophageal Reconstruction with Colon Bypass Plus Pectoralis Major Myocutaneous Flap For Corrosive Injury of Upper Gastrointestinal Tract

Dr. Chandan Kumar Saha¹, Dr. Sayar Kumar Munshi²

Department of Cardiothoracic and Vascular Surgery, Niratan Sircar Medical College & Hospital [NRSMCH], Kolkata, Westbengal, India

Abstract: *Corrosive acid stricture of long segment oesophagus along with pharynx and hypopharynx is a therapeutic challenge for thoracic surgeons. Corrosive stricture of pharyngo oesophageal area can very well be reconstructed with myocutaneous flaps like pectoralis major myocutaneous flap. On the other hand long segment oesophageal stricture may be well bypassed by pulling up of suitable abdominal viscera like colon. Post operative swallowing is satisfactory when reconstruction is done in such a combined procedure.*

Keywords: oesophagus, hypopharynx, pectoralis major, myocutaneous flap, corrosive stricture

1. Introduction

Stricture of hypopharynx and oesophagus may occur after suicidal or accidental corrosive acid ingestion. Corrosive stricture usually produces dense stricture, which is may be restricted to a small segment at the pharyngo-oesophageal junction. This is due to corrosive induced spasm at the cricopharyngeal musculature resulting from prolonged contact of the toxic agent with the mucosa at that area. This cricopharyngeal stricture usually involves a small segment and can be reconstructed by local or distant or free flap [1,2]. In some cases corrosive acid trickle down to lower esophagus and stomach producing a long segment stricture of oesophagus and pylorus as well. In such cases of long segment oesophageal replacement may be done by visceral pull up like colon. The primary goal of such procedure is to reestablish the continuity of the alimentary tract[3]. If the stricture at hypopharynx is very severe and circumferential whole of the strictured segment is resected and reconstruction is done by a flap fashioned as a tube. If the stricture is not very severe and not circumferential then the strictured segment is slit open and a flap is placed longitudinally as an onlay flap over a nasogastric tube [1,2].

2. Case report

A 25 years old male patient was admitted in the general surgical emergency after suicidal corrosive acid ingestion. Initially the patient presented with absolute dysphagia with burning of pharynx and hypopharynx and managed conservatively with IV fluids, nil per mouth, maintenance of airway and after stabilization a feeding jejunostomy was created for maintenance of nutrition. The barium swallow x-ray performed after one and half months of acid ingestion demonstrated long segment oesophageal stricture from hypopharynx upto lower oesophagus with pyloric stenosis as well. The patient was advised to continue feeding through jejunostomy tube. After six months the patient is readmitted in cardiothoracic surgery for definitive treatment of restoration of gastrointestinal continuity.

In the initial step the patient was prepared for colonic conduit harvest. The abdomen is entered through midline and stomach is examined for thickened pylorus to confirm pyloric stenosis. For colonic harvest we constructed a long colon segment graft supplied exclusively by the inferior mesenteric artery. Initially we mobilized the ascending colon, the right flexure and the transverse colon. Using transillumination the right colic artery, the middle colic artery and the connection between ileocolic artery and the right colic artery are clamped temporarily using vascular clamps. In this situation only the inferior mesenteric artery feeds the ascending and transverse colon through the left colic artery and the arcade of marginal artery of Drummond. As the blood supply remained adequate after prolonged trial clamping, we started constructing the long colonic interposition graft based on left colic artery. The right and middle colic arteries were divided and ligated as centrally as possible. Then we transected the remaining mesentery of the right colon upto the level of the transverse colon. The colon is transected proximally above caecum and distally in the middle of the descending colon and a fairly long and mobile colon graft is obtained with a pedicle based on left colic artery that could be passed easily up into the thorax and to the cervical region. The colonic continuity is maintained by colocolostomy among the divided ends and the colonic graft is pulled up retrosternally through the anterior mediastinum in isoperistaltic fashion into neck. The distal end of the colon is anastomosed with the anterior wall of the stomach near fundus and also a posterior gastrojejunostomy was performed to bypass pyloric stenosis. The proximal end of the colonic conduit is exteriorised through the left lateral wall of the neck temporarily as a colostomy.

The second operation is undertaken to reconstruct hypopharynx as there is extensive stricture in the pharyngo-oesophageal junction. A hypopharynx is created with pectoralis major myocutaneous flap based on pectoral branch of thoracoacromial artery. The flap is rotated over a nasogastric tube passed through oral cavity into pharynx and the hypopharynx thus created is interposed between the pharynx and proximal end of the previous colonic conduit. Initially the reconstructed upper gastrointestinal tract is maintained over nasogastric tube for healing of anastomosis

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and nutrition is maintained through feeding jejunostomy tube. The postoperative recovery is uneventful and the patient is gradually shifted to oral feeding. The patient is discharged in good health after three weeks of final operation with minimal difficulty in swallowing.



Reconstruction of hypopharynx over ryles tube



Scar over chest wall after final operation

3. Discussion

Since 1866, the first successful cervical oesophageal reconstruction by Mikulicz et al by local cervical skin flap, the search is going on for a suitable method for pharyngo-oesophageal reconstruction. Each method has its advantages and disadvantages and the therapeutic challenge continues.

Pectoralis major myocutaneous flap allowed the head and neck surgeon, for the first time, to perform a one-stage reconstruction of a circumferential defect of the hypopharynx. The advantages of the pectoralis flap are its ease of harvest, reliability, low donor site morbidity, and the ability to perform this reconstruction without the need for microvascular techniques. Disadvantages include the potential for excess bulk, potential for fistula and stricture formation. Difficulty and controversy arise when this flap is used for reconstruction of a circumferential defect. Folding this flap into a tube is analogous to rolling up a thick book. The early attempts using the pectoralis flap as a tube were uniformly unsuccessful with stenosis developing at the distal anastomosis, especially in patients who received postoperative radiation [2,4,6,7,12,16,17].

Various segments of abdominal viscera like stomach, colon can be transposed to replace portions of oesophagus advantages include longer segments of oesophagus can be replaced by mucosa lined tissue in a single stage however the magnitude of surgical trauma is generally greater with higher rate of morbidity and mortality as it require entering into both abdominal and thoracic cavity [1,3,15].

The jejunal free flap would seem to be an ideal choice for pharyngeal reconstruction since it is another mucosa-lined conduit from the alimentary tract, which closely approximates the caliber of the pharynx. In this instance, a hollow muscular tube, the pharynx, is replaced by another hollow muscular tube [14].

The radial forearm free flap for pharyngoesophageal reconstruction was first described in 1985, by Harii et al in Japan. The radial forearm flap can be harvested quickly under tourniquet control with minimal blood loss. This flap is extremely reliable due to the large caliber of the radial artery and the presence of multiple veins that can be used to drain the flap. Donor site morbidity is also low. There is no laparotomy and its associated complications [8,9].

Deltpectoral flap alone is very useful for correction of small segment corrosive stricture at the pharyngoesophageal junction. The flap is very thin and pliable so tube formation is very easy where the defect was circumferential, for noncircumferential stricture the flap was used as an onlay patch [10,11,13,16]. For long segment oesophageal replacement by viscera with stomach or colon, in cases of long segment corrosive strictures or carcinoma of oesophagus when the viscera is pulled very high in the neck there is tension in the suture line and distal vascular jeopardization resulting in anastomotic stricture. Deltpectoral flaps can also correct these secondary anastomotic strictures very well.

N. Ananthakrishnan et al suggested preliminary pectoralis major myocutaneous flap as a tube prior to oesophagocolic anastomosis to avoid pulling the viscera very high in the neck [12]. Deltpectoral flap is a very thin flap with good pliability so the tube formation is easy, it is very easy to harvest, it is a very reliable flap with good vascularity, donor site morbidity is almost nil. Technically also the procedure is very easy and it does not need any microvascular expertise. With care full dissection the blood loss also very minimum.

Cosmetically also it is very well accepted by the patients [1,5].

In our case we use a colonic conduit based on left colic artery for oesophageal replacement and pectoralis major myocutaneous flap based on pectoral branch of thoracoacromial artery for hypopharyngeal reconstruction. The patient is discharged successfully in good health with minimum swallowing difficulty.

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