

The Jejunal Serosal Patch Procedure: A Successful Technique for Managing Difficult Peptic Ulcer Perforation

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Background: *The selection of the most appropriate technique for the repair of peptic ulcer perforations, especially when the initial attempt of closure has failed have been the concern of many surgeons. Since the experimental report regarding the jejunal serosal patch procedure by Koboldin in 1963, authors have reported its use with encouraging outcome. The main objective of this paper is to describe our experience with the Jejunal Serosal Patch procedure in patients with failed Omental patch procedure following perforated peptic ulcer disease.*

Methods: *This is a retrospective report of cases with failed pedicled omental patch procedure initially performed for perforated peptic ulcer disease and who subsequently underwent Jejunal Patch Procedure at the Minilik II Hospital in Addis Ababa, Ethiopia. Details of their surgical procedure, complications observed and outcome is presented.*

Results: *Five patients, who are all male with mean age of 32.2 years (Range= 31-40 years) were included in the study. The duration of illness of all patients before their first surgery ranged from 48-360 hours (mean= 153.6 hours). All patients had significant collection of gastric and purulent material in the peritoneum during the first surgery and the mean size of the perforation was 1.3 cm (Range 1-2cm). All five patients were re-operated for the first time after a mean of 76.8 hours and all were managed with re-patching of the duodenal perforation. The second re-operation for jejunal patch procedure was within 24 hours in one patient and > 24 hours in four patients (Mean=34.8 hours). The omental patch was found completely detached in 4 patients and partially separated in one. All patients were treated in a similar fashion by using a standardized Jejunal omental patch procedure. Post operatively, a total of 16 complications were seen in the five patients. One patient died, yielding an overall mortality rate of 20%. The mean hospital stay was 25.5 days of (Range 17-51 days) mean 25.4 days.*

Conclusion: *The management of the leaking omental patch is very difficult. Although some leaks transform into fistulas and will eventually close after prolonged period of hyperalimentation and continuous nursing care, this approach requires extended hospitalization and the associated morbidity, mortality and financial/social depletion on the patient is enormous. On the other hand, prompt closure of these defects by serosal patching can result in a rapid return of fluid and electrolytes to normal and permits early oral feedings. Our limited experience with this procedure is encouraging and our post operative complications and mortality are within the acceptable range. We believe this procedure is learnable, and has the potential to be utilised in difficult perforations involving the other parts of the GIT.*

Key words: Jejunal, Serosal, Patch Procedure, perforation, peptic ulcer

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Introduction

The selection of the most appropriate technique for repair of duodenal perforations, especially when perforation are recurrent or when there is duodenal tissue loss have been the concern of many surgeons over the past many years. Various surgical techniques such as omental patch repair, (Cellan-Jones or Roscoe Graham), duodenal resection with end-to-end anastomosis, application of a synthetic mesh, jejunal serosal patching and pedicled jejunal flap have been used to manage such defects¹⁻⁴. The difficult nature of the operation site, the high intra luminal pressure in the duodenum, the tendency of the duodenal mucosa to extrude through closure, its limited vascular supply and the alkaline content of the duodenum (pancreatic and biliary fluids) which interferes with healing and suture integrity has prevented surgeons from following a clear-cut algorithm to approach this problem¹⁻⁴.

Kobold⁵ in 1963 and Wolf⁶ man in 1964 reported a simple serosa-to-serosa closure of experimental duodenal defects in dogs by suturing an intact loop of jejunum over the hole. In their experiments, the

serosal surface of the jejunum was gradually covered by duodenal epithelium, the process being complete in four to seven weeks. No anastomotic leaks occurred, and there was no apparent tendency for peptic digestion of the loop. Since then, many authors have utilised and described jejunal serosal patching in experimental animals and clinically on patients, with reported very good outcome⁵⁻¹⁰.

Perforation of the anterior wall of the duodenum is the commonest cause of duodenal perforation in Ethiopia, and in most african settings¹¹⁻¹⁴. The most acceptable method of ulcer perforation repair has been patching of the perforation with omentum: pedicled or free graft and the success rate of this procedure is said to be a high as 80-90%¹¹⁻¹⁴. However, in some cases, omental patch repairs fail and re-operations are required. The rate of re-leak following omentoplasty reported to be between 2 - 7.6% Such a situation is very difficult to manage and is associated with repeated omental patch failures, morbidity and very high¹⁰⁻¹⁴. Therefore, the main objective of this paper is to describe our experience with the Jejunal Serosal Patch procedure in patients with failed Omental patch procedure following perforated peptic ulcer disease.

Patients and Methods

This is a retrospective report of patients operated for failed omental patch procedure at the Minilik II Memorial Referral Hospital in Addis Ababa Ethiopia. The hospital is the oldest hospital in the country (more than 105 years old) and currently serves as an affiliate teaching hospital for the Addis Ababa University, School of Medicine. It has 120 surgical beds, about 100 of which are dedicated to General Surgery. It is staffed with 7 consultant surgeons and no less than 15 rotating surgical residents at a time. The study period was between June 1, 2013 and June 30, 2016 (a three year period).

During the study period, 87 complete records of patients admitted for surgical treatment of perforated peptic ulcer disease were retrieved. All were treated initially with pedicled omental patch technique (Cellen-Jones Procedure). However, 6 (6.8%) of patients developed failure of the first omental patch procedure and had to be re-operated. All the 6 patch failures underwent peritoneal lavage, pedicled omental re-patching of the perforation site and an additional vagotomy and gastro-jejunostomy. The re-patch failed in four patients and three subsequently underwent jejunal serosal patch. Two patients were also referred from other hospitals with a diagnosis of twice failed omental patch procedure to the Minilik Hospital. Hence these five patients made the basis of the study.

Using a standardised data collection format, the following information was obtained: Socio-demographic data of the patients, operative details and findings during re-laparotomy, mode of management, post operative course of the patients and final outcome. Patients were excluded if the perforation was due to malignant disease or trauma. Data handling and analysis were performed with EP-INFO for Windows and appropriate statistical tests were done.

The diagnosis of failed omental patch was made based on clinical grounds, (Worsening of the post operative patient, occurrence of fever and tachycardia within a few days of surgery, disruption of the abdominal wound and appearance of bilious and gastric content), routine laboratory tests (raised WBC count) and ultra sound finding of an intra abdominal collection in some cases. Invariably, the definitive diagnosis of perforated peptic ulcer and omental patch leakage was obtained at surgery.

Results

During the study period, 87 perforated peptic ulcer cases were operated. Six (6.8%), all with perforated duodenal ulcer, developed generalized peritonitis following omental patch repair. All were re-operated and re-patching of the perforation site with pedicled omentum was done in all. However, the re-patched omentum failed in 4 (66%) of these patients and three were managed by jejunal serosal patch. One underwent re-patching for the second time, but died three days after surgery. Two patients were also referred from other hospitals in Addis Ababa with a diagnosis of twice failed omental patch and were managed in our hospital.

The socio-demographic status of the five patients showed that all five were males with mean age of 32.2 years (Range= 31-40 years). Four came to the hospital from a considerable distance from the hospital.

Three were active alcohol users, two were chat chewers. The duration of illness of all patients before their first surgery ranged from 48-360 hours (mean = 153.6 hours) and three presented in hypotension. All patients had significant collection of gastric and purulent material in the peritoneum during the first surgery and the mean size of the perforation was 1.3 cm (Range 1-2cm) (Table 1).

Table 1: Patterns of patients treated with Jejunal Serosal Patch

No.	Sex	Age	Duration of illness before 1st surgery (Hours)	Shock	Size of perforation	Time between 1st and 2nd surgery	Time between 2nd and 3rd surgery	Outcome	Hosp stay days
1	M	31	96	Yes	2 cm	72 hours	24 hours	Improved	21
2	M	34	360	Yes	1 cm	48 hours	18 hours	Died	17
3	M	27	144	Yes	1.5 cm	72 hours	36 hours	Improved	16
4	M	30	120	No	1 cm	96 hours	24 hours	Improved	22
5	M	39	48	No	1cm	96 hours	72 hours	Improved	51

All five patients were re-operated for the first time after a mean of 76.8 hours. The second re-operation was within 24 h in one patient and > 24 h in four patients, while the mean lapse between second omental patch and jejunal serosal patch was 34.8 hours. A similar intra operative finding was encountered in all patients: The previous skin wound was grossly infected and pouring pus mixed bilious fluid and the peritoneum was filled with a similar fluid. There was gross adhesion in the operation site and distal stomach and first part of the duodenum were oedematous and fragile. The omental patch was completely detached in 4 patients and partially separated in one. All patients were treated in a similar fashion.

Post operatively, a total of 16 complications were seen in the five patients. One patient died, yielding an overall mortality rate of 20%. The mean hospital stay was 25.5 days of (Range 17-51 days) mean 25.4 days (Table 2).

Table 2: Post operative complications seen in patients who underwent jejunal patch procedure

Post operative complications seen	Frequency (N=16)
Surgical Site Infections	5
Wound Dehiscence/Burst Abdomen	2
Intractable Septic shock	1
Pneumonia/Respiratory failure	4
Severe hypoproteinemia	3
Duodeno-cutaneous fistula	1

Discussion

The management of the leaking omental patch is very difficult. Although some leaks transform into fistulas and will eventually close after prolonged period of hyperalimentation and continuous nursing care, this approach requires extended hospitalization and the associated morbidity, mortality and financial/social depletion on the patient is enormous. On the other hand, prompt closure of these defects by serosal patching can result in a rapid return of fluid and electrolytes to normal and permits early oral feedings.

Literature review has shown that the jejunal serosal patch used to seal grossly infected duodenal perforations are reliable procedures ⁴⁻⁹. Kobbold and Thal ⁹, in an experimental setting described the use of a jejunal serosal patch to close the duodenal defect in a canine model where the serosa-to-serosa anastomosis between the edges of duodenal defect and jejunum was performed. They have observed that the jejunal serosa exposed to the lumen was completely covered with duodenal mucosa within 8 weeks.

James and Santa ⁷ in 1965 reported the first clinical application of a Serosal Patch in repair of a Duodenal Fistula in a 55 years male and they reported a perfect closure of the perforation with no evidence of continued leak. In an experimental setting, Jones, created a duodenal defect analogous to a perforated duodenal stump, allowing the leak to continue for 20 hours. Then at a second operation the duodenal defect was closed by the "serosal patch" technique. Again, all the experimental dogs survived and no anastomotic leaks occurred ⁸. Another experiment has documented that in the presence of a grossly contaminated peritoneum, jejunal serosal patches were still in place and there was ingrowth of neomucosa beginning along the margins on the serosal surface of the jejunal patch. The complete coverage of duodenal neomucosa on jejunal surfaces was observed at 6 weeks ¹⁷.

The procedure is described as follows

After opening the previous surgical wound, the intra abdominal collection was sucked out and the operation site approached. The duodenal perforation site was identified after gently dissecting through the adhesions. Once identified, all the debris and obvious necrotic tissues were debrided. If the adhesions allow, the second part of the duodenum was mobilized, then a loop of jejunum, 40-60cm way from the ligament of Treitz was brought over the colon and sutured over the duodenal defect serosa-to-serosa with interrupted sutures of 2-0 silk about 2-3 cms away from the perforation site. A diverting jejunojejunostomy was also done 20 cm distal to the patch in all cases. After generous intra abdominal lavage, a large drainage tube (sometime 2 tubes) were left behind. The abdominal cavity was washed with copious amount of warm normal saline, jejunal serosal patch was applied to the perforation site and a drainage tube was inserted to the right sub hepatic space. Catheters were removed when there was no drainage from the abdominal cavity.

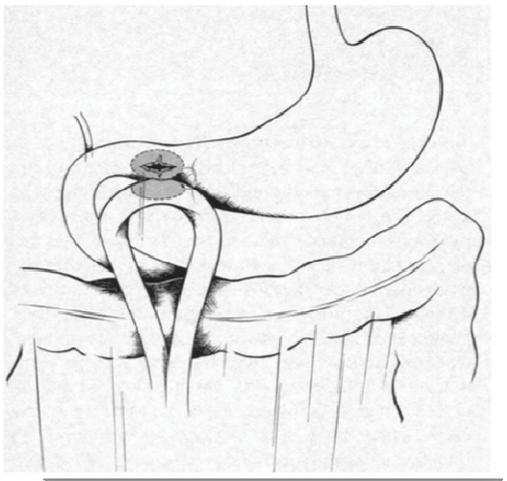


Figure 1.

Adopted from: James MC Kittrick, Santa Barbara. Use of a Serosal Patch in Repair of a Duodenal Fistula: Clinical Application of an Experimental Method 1965, California medicine, 433-435.

Kumar¹⁵ in his publication has outlined some very important predictors of leak: ie. age > 60 years, Pulse rate >110/minute, Blood pressure <90mmHg, Haemoglobin < 10g/dl, Serum albumin <2.5 g/dl, Total lymphocyte count < 1800 cells/mm and size of perforation > 5mm. Other publications Maghsoudi ¹⁶, have

identified pre-disposing factors for leak include delay in surgery, shock on admission, post-op abdominal complications and age.

Conclusion

Our limited experience with this procedure is encouraging and our post operative complications and mortality are within the acceptable range. We believe this procedure is easily learnable, and has the potential to be utilised in difficult perforations involving the other parts of the GIT.

References

1. Astarcioglu H, Kocdor MA, Sokmen S, Karademir S, Ozer E, Bora S. Comparison of different surgical repairs in the treatment of experimental duodenal injuries. *Am J Surg* 2001; 181: 309-12.
2. Lal P, Vindal A, Hadke NS. Controlled tube duodenostomy in the management of giant duodenal ulcer perforation: a new technique for a surgically challenging condition. *Am J Surg* 2009; 198: 319-23.
3. Jani K, Saxena AK, Vaghasia R. Omental plugging for large-sized duodenal peptic perforations: A prospective randomized study of 100 patients. *South Med J* 2006; 99: 467-71.
4. Chen GQ, Yang H. Management of duodenal trauma. *Chin J Traumatol* 2011; 14: 61-4.
5. Kobold TH, Thal AP. A simple method for the management of experimental wounds of the duodenum. *Surg Gynecol Obstet* 1963; 116:340 -3.
6. Wolfman, E. F., Jr., Trevino, G., Heaps, D. K., and Zuidema, G. D.: An operative technic for the management of acute and chronic lateral duodenal fistulas, *Ann. Surg.*,159:563,1964.
7. James Mc Citric and SantaBarbara. Use of a Serial Patch in Repair of a Duodenal Fistula: Clinical Application of an Experimental Method 1965, *California medicine*, 433-435.
8. Jones, S. A., Gregory, G., Smith, L. L., Saito, S., and Joergenson, E. J.: Surgical management of the difficult and perforated duodenal Stump, *Am. J.Surg.*,108:257, 1964.
9. S. Austin Jones, Alan B. Gazzaniga, Thomas B. Keller. The serial patch: A Surgical Parachute. *The American journal of surgery*. Vol 126, August 1973, p 186-196.
10. Sanjay Gupta, Robin Kaushik*, Rajeev Sharma and Ashok Attri. The management of large perforations of duodenal ulcers *BMC Surgery* 2005, 5:15 doi:10.1186/1471-2482-5-15
11. Jennifer Rickard. Surgery for Peptic Ulcer Disease in sub-Saharan Africa: Systematic Review of Published Data. *J Gastrointest Surg* (2016) 20:840–850 DOI 10.1007/s11605-015-3025-7
12. Ersumo T1, Ali A, Kotiso B. Complicated peptic ulcer disease in Tikur Anbessa Hospital, Addis Ababa. *Ethiop Med J*. 2004 Apr;42(2):87-95.
13. Asefa Z, G/eyesus A. Perforated peptic ulcer disease in Zewditu Hospital. *Ethiop Med J*. 2012 Apr;50(2):145-51.
14. Abebe Bekele, Seyoum Kassa, Daniel Zemenfes, Andualem Deneke and Mulat Taye. Patterns and seasonal variation in the incidence of Perforated Peptic Ulcer Disease: A Three- Years Experience from Addis Ababa, Ethiopia. Sent for publication
15. Kumar K, Pai D, Srinivasan K, Jagdish S, Ananthakrishnan N. Factors contributing to re-leak after surgical closure of perforated duodenal ulcer by Graham's Patch. *Trop Gastroenterol*.2002;23(4):190-2
16. Maghsoudi H, Ghaffari A. Generalized peritonitis requiring re-operation after leakage of omental patch repair of perforated peptic ulcer. *Saudi Gastroenterol* 2011;17(2):124-8
17. Hu¨seyin Astarciog˘lu, M.D., Mehmet Ali Koc,dor, M.D., Selman Skmen, M.D., Sedat Karademir, M.D., Erdener O¨zer, M.D., Seymen Bora, M.D. Comparison of different surgical repairs in the treatment of experimental duodenal injuries. *The American Journal of Surgery* 181 (2001) 309–312