

Omentoplasty in Perforated Peptic Ulcer Surgery: Is it Still the Gold Standard?

Paul Ochieng' Odula

School of Medicine, University of Nairobi

Correspondence to: Dr. Paul Odula, P.O. Box 19762 – 00202, Nairobi, Kenya. Email: paulodula@yahoo.com

Key words: Omentoplasty, Perforated peptic ulcer

Ann Afr Surg. 2017; 14(2):57-60

DOI:<http://dx.doi.org/10.4314/aas.v14i2.1>

© 2017 Author. This work is licensed under the Creative Commons Attribution 4.0 International License.

Acute peptic ulcer perforation is the commonest cause of emergency hospitalization and accounts for more than 70% of deaths associated with peptic ulcer disease (PUD) (1). This perforation is located either in the stomach or the anterior surface of the duodenum (2). The pattern of perforated PUD varies from one geographical area to another (3). In their article, in this issue, Bekele et al reported that duodenal perforations were more common than gastric perforations in Ethiopia. They further reported that, peptic ulcer perforations (PPU) were more common in the youth (mean age of 33.4 years). In Nigeria, Dongo et al reported that the converse to be true (4). They found that PPU were more commonly seen in gastric ulcers and often affected an older population (mean age of 49.99 years) (4).

The first clinical description of a perforated peptic ulcer was on an autopsy done on the body of King Charles daughter, Henriette Anne, who died suddenly in 1670 (at 26 years of age)(5). John Mikulicz (1850 – 1905), often credited to be the first surgeon who closed a perforated peptic ulcer (PPU) by simple closure, said : “Every doctor , faced with perforated duodenal ulcer of the stomach or intestine, must consider opening the abdomen, sewing up the hole and averting a possible inflammation by careful cleansing of the abdominal cavity”(6).

The narrative on this treatment over a century later has not changed much. It still consists of primary closure of the perforation by sutures and a convenient tag of adjacent omentum on top of this (7, 8). Although this may sound very simplistic, PPU still remains a life

threatening condition with a high mortality of up to 40% which cannot be underestimated (9).

Several recent studies advocate non operative intervention as a stop gap before definitive surgical intervention (8). The disadvantages of this intervention are the high rate of mortality in case of the treatment failure and the lack of the benefit of laparoscopy or laparotomy as a diagnostic tool in case the patient has gastric cancer (10). Moreover, it is well known that, when the patient is in shock or when the time point between perforation and ‘start of treatment’ is 12 hours, simple closure should be the first treatment of choice.

Surgery for PPU is still a subject of debate despite more than an era of publicized expertise. There are many operative methods that could be used to treat PPU. Cellan- Jones published an article in 1929 entitled ‘a rapid treatment in perforated duodenal ulcers’ (11). At that time one had to excise the friable edges, when indicated, and then apply purse string sutures followed with an omental graft on top. Duodenal stenosis led to the popularization of omentoplasty which required omitting the purse string closure. This new technique consisted of placing 4-6 sutures, selecting a long omental strand and passing a fine suture through it. The tip of the strand would then be anchored in the region of perforation before the sutures are finally tied off (11).

It was not until 1937 that Graham published his results with a free omental graft (12). He placed three sutures with a piece of free omentum laid over these sutures, which were then tied. No attempt was made to actually close the perforation (13). The omental graft provided the stimulus for fibrin formation. Very often surgeons mention ‘using a Graham patch’, but what they actually

meant was 'using a pedicled omental patch' as described by Cellan-Jones. Perforated peptic ulcers are not the only ones which routinely benefit from omentoplasty in the abdomen. Marginal ulcer, an ulcer at the margins of the gastro-jejunal anastomosis, perforation which has traditionally been dealt with by converting Billroth II gastro-jejunostomy reconstruction into Roux-en-Y has seen some changes lately. Recent studies have shown that this revision is not mandatory anymore and that omental patch repair has increasingly been shown to be sufficient (14). Furthermore, numerous studies done in the past 4 decades have shown that, general surgeons are not the only ones who utilize the omental patch. The omental pedicle flap has also been widely used by neurosurgeons, thoracic surgeons and in the plastic and reconstructive arena (15-18). In this issue, Wamalwa et al highlights the challenges they went through in managing a difficult pulmonary tuberculosis sequel and how the omental pedicle played a key role in bringing the bronchopleural fistula under control (19).

The key features, as described by Wamalwa et al, that promote the use of the omental pedicle flap include:

1. It being malleable and easily conforming to irregular surfaces.
2. It has a large caliber and reliable vascular pedicle based on either right or left gastroepiploic artery.
3. It can be easily harvested with minimal donor site morbidity.
4. It has a good surface area which can measure up to 25x35 centimeters (15).
5. It stimulates angiogenesis and revascularization (16, 20).
6. With its high absorptive capacity, it is able to relieve lymphedema (17).
7. Its immunoregulatory properties allow it to contain infection well (18).

The number of elective procedures performed for PUD has declined by more than 70% since the 1980's (21, 22). Reasons for the decline in definitive ulcer surgery include:

1. Lower recurrence rate of PUD and PPU because of good results of *H.Pylori* eradication
2. Elimination of NSAID use.

Chung et al noted that less than 10% of PPU patients required gastric resection. In a study of 601 patients and including 62 patients treated with gastric resection, they noted that outcomes of patients treated with gastric resection were found to be more inferior when compared to omental patch repair with mortality risk of 24.2% (8). Some of the reasons for this outcome may include:

1. In the past two decades, patients operated for PPU are much older with higher surgical risks. Hence definitive ulcer surgery would give a worse outcome than omental patch repair.
2. Many surgeons practicing today have limited experience with definitive ulcer operations (21).

Patients in whom definitive ulcer surgery should be considered are those with PPU who are found to be *H. Pylori* negative or those with recurrent ulcers despite triple therapy (21). In these patients, a parietal cell vagotomy is recommended if necessary combined with anterior linear gastrectomy (21). This procedure can be safely and relatively easily performed laparoscopically in many centres now (21, 22).

Self-expandable metals stents and drainage is one of the new treatment options for PPU which can be used primarily or secondarily to deal with post operative leakage after initial surgical closure. A study involving 10 patients with PPU who were treated with primary stenting showed good clinical results (23). This study indicated stent treatment as a minimal invasive alternative with fewer complications compared to surgical treatment. More data however, is required to prove the effectiveness of this method.

Laparoscopy was first performed for a perforated duodenal ulcer in 1990 (24). A recent systematic review of 3 randomized controlled trials, having a total of 315 PPU patients, compared laparoscopy with open surgery (25). This study failed to demonstrate differences in abdominal septic complications, pulmonary complications, mortality and re-operation. A systematic

review of 56 studies, comparing laparoscopic versus open approach for PPU, concluded that 'there was no consensus on the perfect operating techniques' (26). The overall conversion rate for laparoscopic surgery was 12.4% and this was mainly due to the size of perforation. Ulcer size more than 9mm was considered a significant risk factor for conversion to open surgery for PPU (26).

Laparoscopic repair techniques and in particular, sutureless technique, mirror techniques of open surgery. Sutureless techniques involve use of gelatin sponge plug with fibrin glue sealing or use of endoscopic clipping techniques (27). A recent study has compared the effectiveness of a sutureless onlay omental patch with sutured omental patch method (28). Forty three patients underwent laparoscopic repair of PPU with sutureless onlay omental patch and another 64 patients underwent laparoscopic repair of PPU with sutured omental patch. There were no leaks in either group. The operating time and length of stay were significantly shorter in sutureless onlay omental patch group. This study indicated that both techniques were safe and effective for repair of PPU. Trainees could easily perform laparoscopic sutureless repair with limited experience in laparoscopic surgery (29). Endoscopic clipping of PPU, on the other hand, is not widely practiced because there are very few centers with technical expertise and experience. Reports so far are limited, while the complication rates and mortality are quite high (30, 31).

Recent studies done in Africa continue to reveal that, omentopexy or simple repair still produces good results in patients with PPU (3, 4). The study on 104 patients in Nigeria by Dongo et al 2017 and 87 patients in Ethiopia by Bekele et al 2017 showed an overall mortality of 17.3% and 10.3% respectively, where only 4 patients and 6 patients respectively developed a leak(3, 4). Dongo et al reported success using omental patch even for ulcers that were relatively large. Fourteen of their patients (13.5%) had ulcers larger than 2cm in diameter (4).

In conclusion, surgical treatment for perforated peptic ulcer has undergone some transformation during the last 3 decades. Duodenoraphy or gastroraphy with

omentoplasty have more or less replaced gastric resection as emergency operations (9, 32). Exploratory laparotomy and omental patch repair remains the gold standard while laparoscopic surgery should only be considered when expertise is available. Gastrectomy is recommended in patients with large or malignant ulcer to enhance outcomes. New techniques which may in near future upset this standard include gelatin sponge plugs, fibrin glue sealants, self-expandable stents and endoscopic clipping techniques. For the time being, they deserve to be tested in a controlled trial setting before being released for widespread use.

References

1. Svanes C. Trends in Perforated Peptic Ulcer: Incidence, Etiology, Treatment and Prognosis. *World J Surg* 2000; /24/277083.
2. Williams N, Bullstrode C, O'Connell P. Stomach and Duodenum in Bailey and love's short Practice of surgery, CRC, London, UK. 26th edition, 2013.
3. Bekele A, Zemenfes D, Kassa S, et al. Patterns and Seasonal Variations of perforated Peptic Ulcer Disease: Experience from Ethiopia. *Ann Afr Surg*. 2017;14(2): 86-91
4. Dongo AE, Uhunmwagho O, Kesieme EB, et al. A five –year review of perforated peptic ulcer disease in Irrura, Nigeria. *Int. Sch Res Notices* 2017;8375398.
5. Bertleff MJOE, Lange JF Perforated peptic ulcer disease: a review history and treatment. *Dig Surg* 2010; 27:161-169.
6. Rayner HH. Treatment of perforated Peptic ulcer. *Lancet* 1930; ii: 107-108.
7. Sangster AH. Perforated Peptic ulcer: an analysis of 100 consecutive cases. *Lancet* 1939; 23:1 311- 7
8. Chung KT, Shelat VG. Perforated Peptic ulcer - An update. *Word J Gastrointest Surg* 2017;9(1):1-12
9. Thorsen K, Glomsaker TB, Von Meer A, et al. Trends in diagnosis and surgical management of patients with Perforated Peptic ulcer. *J Gastrointest Surg*. 2011; 15:1329-1335.
10. Crofts TJ, Park KG, Steel RJ, et al. Randomized trial of non operative for perforated peptic ulcer. *N Eng J Med* 1989;3 20:970 -973.

11. Cellan-Jones CJ: A rapid method of treatment of perforated duodenal ulcers. *Surg Gynecol Obstet* 1937;2:35-238.
12. Graham RR. The treatment of perforated duodenal ulcers. *Surg Gynecol Obstet* 1937;2:35-238.
13. Graham RR. The surgeon's problem in duodenal ulcers. *Am J Surg* 1938;40:102-107
14. Natarajan SK, Chua D, Anbalakan K, et al. Marginal ulcer perforation: A single center experience. *Eur J Trauma Emerg Surg* 2016 Sept 12 ; Epub ahead of print [PMID ;27619359
15. Das SK. The size of the human omentum and methods of lengthening it for transplantation. *Br J Plast Surg* 1976;29(2):170-44
16. Bruzoni M, Steinberg GK, Dutta S. Laparoscopic Harvesting of Omental Pedicle Flap for Cerebral Revascularization in children with Moyamoya Disease. *J Pediatr Surg* 2016;51(4):592-7.
17. Nguyen AT, Suami H, Hanasono MM, et al. Long-term outcomes of the minimally invasive free vascularized omental lymphatic flap for the treatment of lymphedema. *J Surg Oncol* 2017;115(1):84-89. DOI:10.1002/jso.24379. PMID:27439587
18. Miyamoto Y, Akiyama T, Sakamoto Y, et al. Omental flap pelvic exenteration for pelvic cancer. *Surg Today* 2016; 46(12):1471-1475.
19. Wamalwa AO, Nangole FW. Omental pedicled flap for pulmonary tuberculosis sequelae. *The Ann Afr Surg.* 2017;14(2): 108-12
20. Litbarg NO, Gudehithlu KP, Sethupathi P. Activated omentum becomes rich in factors that promote healing and tissue regeneration. *Cell Tissues Res* 2007;328(3):487-497. doi:10.1007/s00441-006-0356-4
21. Zittel TT, Jehle EC, Becker HD. Surgical management of peptic ulcer disease today- Indication, technique and outcome. *Langenbecks Arch Surg* 2000;385:84-96.
22. Harbison SP, Dempsey DT: Peptic ulcer disease. *Curr Probl Surg* 2005; 42:3 46-454.
23. Bergstrom M, Arroyo Vasquez JA, Nsouli G, et al. (Good results of stent treatment in perforated duodenal ulcer). *Lakartidningen* 2015;112 {PMID:26418934}
24. Mouret P, François Y, Vignal J, et al. Laparoscopic treatment of perforated peptic ulcer. *Br J Surg.* 1990; 77:1006.
25. Sanabaria A, Villegas MI, Morales-Urbe CH. Laparoscopic repair for perforated peptic ulcer disease. *Cochrane Database Syst Rev* 2013; 2:CD004778 {PM, ID23450555
26. Bertleff MJ, Halm JA , Bemelman WA, et al. Randomized clinical trial of laparoscopic versus open repair of the perforated peptic ulcer: the LAMA Trial. *World J Surg* 2009;33:1368-1373 {PMID:19430829
27. Lagoo S, McMahon RL, Kakihara M, et al. The sixth decision regarding perforated duodenal ulcer. *JLS* 2002;6:359-368 {PMID:12500837}
28. Wang YC, Hsieh CH, Lo HC, SU LT. Sutureless onlay omental patch for the laparoscopic repair of perforated peptic ulcers. *World J Surg* 2014;38:1917-1921
29. Lau WY, Leung KL, Kwong KH, et al. A randomized study comparing laparoscopic versus open repair of perforated peptic ulcer using suture or sutureless technique. *Ann Surg* 1996;224:134-138
30. Hashiba K, Carvalho AM, Diniz G, et al. Experimental endoscopic repair of gastric perforations with an omental patch and clips. *Gastrointest Endosc* 2001; 54:500-4
31. Ishiguro T, Nagawa H. Inadvertent endoscopic application of hemoclip to the splenic artery through a perforated gastric ulcer. *Gastrointest Endosc* 2001;53:378-379 {pmid:11231409 DOI:10.1016/S0016-5107(01)70424-5}
32. Pamiela H, Tuompo PK, Perakyl T, et al. Peptic ulcer surgery during the H2-receptor Antagonist Era: A population-based Epidemiological study of ulcer Surgery in Helsinki from 1972 to 1987. *J Surg* 1991; 78:28 31.