Management of perforated large/giant peptic ulcers: a comparative prospective study between omental plug, duodenal exclusion, and jejunal serosal patch

Mohamed S. Khalifa, Mohammed A. Hamed, Amr M.M. Elhefny

Department of General Surgery, Faculty of Medicine, Ain Shams University, Cairo, Egypt

Correspondence to Mohamed S. Khalifa, PhD, MD.
e-mail: waledwafy123456789@gmail.com

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Background
Large/giant peptic ulcer (duodenal ulcer and benign gastric ulcer) perforation is a serious life-threatening surgical emergency, with high morbidity and mortality rates. Despite that, no single surgical approach has yet been shown to be superior to others.

Patients and methods
This is a prospective randomized study comparing the efficacy of omental plugging, duodenal exclusion, and jejunal serosal patch as different alternating operative techniques in managing such a problem.

Results
Thirty patients with large/giant peptic perforation more than 2 cm in diameter were included over a period of 24 months. Patients were divided into three groups (A, B, and C) according to surgical approach applied. Males/females were 27/3, average age was 45–73 years old, and mean operative time was 75±28.4 min. Biliary leak rates were 3.3, 10, and 6.6% in group A (omental plug), group B (jejunal serosal patch), and group C (duodenal exclusion and gastrojejunostomy), respectively, with *P* value of 0.199.

Conclusion
The management of large/giant peptic (duodenal ulcer and gastric ulcer) perforations is difficult and presents a great challenge to surgeons. Duodenal stump leaks can carry high incidence of morbidity and mortality. Multiple surgical modalities are available to deal with such surgical problems.

Keywords:
duodenal exclusion and gastrojejunostomy, giant peptic ulceration, jejunal serosal patch, omental plugging

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Introduction

Simple peptic ulcer perforations including both duodenal ulcer (DU) and gastric ulcer (GU) occur as a result of peptic ulcer disease or endoscopic interventions and may be managed with primary repair or via an omental patch. In contrast, many procedures have been described for large peptic ulcer perforations, ranging from drainage and pyloric exclusion to pancreaticoduodenectomy. Furthermore, many of these operations are technically demanding and require long operative time; no one of these operations is considered ideal for patients with sepsis who are often hemodynamically deranged and have shock status mostly while the diagnosis has been made [1].

Therefore, the ideal repair should be simple, easily done, and able to be performed rapidly in a damage control fashion. The consequences of insufficient repair can be devastating, leading to significant leaks, widespread abdominal contamination, sepsis, and death. High rate of wound disruption and patient mortality (15–40%) have been occurred with most of the techniques. Peptic ulcer perforation accounts for 10–20% of the complications of peptic ulcer disease [2].

No adequate data are provided in literature regarding the definition, incidence, and the appropriate treatment of large peptic ulcer perforations. The perforated large/giant peptic ulcers represent ~1–2% of the perforated peptic ulcers and carry significant morbidity (20–70%) and mortality (15–40%). The size of the perforation has a great effect on mortality rate and adversely affects the prognosis, as perforation less than 5 mm has 6% mortality rate, between 5 and 10 mm, the mortality goes up to 19%, and if the perforation is more than 10 mm, the mortality reaches ~24% [3,4].

Although the perforation size is a necessary factor in evaluating the outcome, a review of the literature failed to determine a standard definition related to the size of perforation of peptic ulcers. In contrast, there is a well-accepted definition of large/giant peptic ulcers (>2 cm in diameter), which may be vulnerable to perforate; such ulcers are indicated to be managed by surgical intervention. According to Gupta *et al*. [5], perforated peptic ulcers are classified into three main categories:

(1) Small perforations: smaller than 1 cm in size, and have the best prognosis.
(2) Large perforations: varying from 1 to 3 cm.
(3) Giant perforations: more than 3 cm.

The use of the word 'giant' should be limited to those large defects where omentopexy appears to be inadequate and other modalities are considered important. Several risk factors are associated with high mortality in these patients, such as advanced age, coassociated disease, shock status, perforated ulcer size, late hospital presentation, and surgical intervention. Surgical management of large/giant peptic ulcer perforations remains a matter of controversy. Surgery should be performed early as much as possible in large peptic ulcer perforations in ill patients where pain and abdominal signs are evident. Omental plugging is simple, easy to master, and avoids performing major resection in unstable and already compromised patients. It is also associated with less incidence of leak, morbidity, and mortality as compared with omentopexy, as shown by different series [6]. Literature review has shown that the jejunal serosal patch applied to seal grossly infected peptic ulcer perforations is a reliable procedure. Kobbold and Thal in an experimental setting described the use of a jejunal serosal patch to close the duodenal defect in a canine model. James and Santa in 1965 reported the first clinical application of a serosal patch in repair of a duodenal fistula in a 55-year male, and they reported a perfect closure of the perforation with no evidence of continued leak. Regarding pyloric (duodenal) exclusion, different series have shown no difference in outcome or mortality compared with primary repair [7–9].

Patients and methods

This prospective study was conducted in a 2-year duration, during the period from January 2019 to January 2021, and had been done in upper Gastrointestinal Surgery Department, Faculty of Medicine, Ain Shams University. A total of 30 patients presented to the ER Department having clinical manifestations highly suspicious of perforated peptic ulcers, which were confirmed by radiological investigations. After urgent resuscitation and stabilization, they were urgently transfered to the operating theater, where exploratory laparotomy under general anesthesia was done. Patients presented with either perforated large/giant DU or GU more than 2 cm (Figs 1–3). The size of ulcer was evident upon intraoperative exploration, and identification was confirmed after dissection of adhesion and removal of debris and necrotic sloughs to determine the outline and dimensions of the ulcer accurately. Preoperative radiological investigations have no or little role in determining the size of perforated ulcer, where the selected operative procedures were performed after confirming size and dimension of perforated ulcer after intraoperative exploration only. Patients with small perforations less than 2 cm were excluded from our study.

The patients were found to have peptic ulcer (DU or GU). Perforations more than 2 cm intraoperatively were our choice and included in our study. They were divided into three groups, with 10 patients each. All the patients in each group have selected operative procedure designed for each group. As the terms large and giant ulcers are descriptive only to classify perforated ulcer according to size based on Gupta classification, as mentioned before, both types were included in our study. Group A patients had omental plugging, group B had jejunal serosal patch, and group C had duodenal (pyloric) exclusion with gastrojejunostomy.

Although the size of the perforation affects adversely the prognosis, it has not played any role in the choice of operative procedure applied. There were certain inclusion and exclusion criteria for selection of patients.

Inclusion criteria were any adult patients of peptic ulcer perforation more than 2 cm in diameter. Our study was restricted to patients with large and giant perforated ulcers only.

Exclusion criteria were smaller perforations less than 2 cm. Malignant ulcer perforations either suspicious or proven by edge biopsy, traumatic rupture, complex duodenal injuries, blunt trauma and missile bullets, all were excluded.

Detailed patient history was taken with particular attention to smoking and prolonged use of NSAID, as 25 (83.3%) patients were heavy smokers, and 20 (66.6%) patients were chronic NSAID abusers.

Most patients [24 (80%)] presented with manifestations of peritonitis in the form of generalized abdominal pain fever and tachycardia. Moreover, board-like rigidity, generalized abdominal tenderness, and rebound tenderness were noted on examination. Shock necessitated rapid resuscitation with fluid. Wide-pore intravenous cannula for fluid rehydration with close monitoring of fluid balance, nasogastric tube (NGT), and Foley catheter to monitor urine output were done in all cases; after rapid resuscitation and stabilization, antibiotics and cross-matching for blood transfusion were initiated. Complete clinical examination was done for each patient.

Full preoperative laboratory investigations were done such as complete blood count, blood urea nitrogen, serum creatinine, alanine aminotransferase, aspartate aminotransferase, amylase, albumin, serum electrolytes, and coagulation profile. Radiological investigations included plain erect radiograph chest and upper abdomen, which was done for all patients and revealed free air under right hemidiaphragm in 21 (70%) patients; abdominal ultrasound, which revealed significant collections in pelvis and subhepatic space in 12 (40%) patients; and abdominal computed tomography with contrast was done in query cases, which could demonstrate scattered pneumoperitoneum with gas loculus clustered around the gastroduodenal transition, fat straining with signs of pyloric and duodenal wall discontinuity, and to exclude pancreatitis. ECG and echocardiography if needed were done for cardiac consultation (Tables 1 and 2).

After the diagnosis was confirmed, the patient was taken to the operating theater for exploratory laparotomy. Patients were randomized according to closed envelop method. Ethical approval was taken from Ain Shams University ethical committee, and written consent was taken from every patient. Full discussion of the procedure and expected complications with the patient and his/her relatives was done, and written consent for each case was signed.

Surgical techniques

Omental plugging

This process was done for all patients in group A. In this procedure, tip of inserted nasogastric tube was taken out to abdominal cavity via the perforation, and then free edge of greater omentum was tied to tip of nasogastric tube, and anesthetist/assistant was asked to withdraw the nasogastric tube, so that 5–6 cm of omentum went inside stomach or duodenum; this plugged the perforation, and then edges of the perforation were tied to omental plug by 2-0 vicryl sutures. Peritoneal toilet and lavage was done in all cases, and a wide-pore peritoneal drain tube was inserted at the hepato-renal pouch (Fig. 4).

Jejunal serosal patching

It was done for all patients in group B. After suctioning out of intraabdominal collections, perforation site was identified via gentle dissection of adhesion, and then necrotic tissue and debris were debrided. Then, the second part of duodenum is mobilized. A loop of jejunum about 40–60 cm from the ligament of Treitz was selected and brought above the transverse colon and sutured to defect in serosa-to serosa fashion via interrupted 2-0 vicryl sutures about 2–3 cm away from defect site. A diverting jejunojejunostomy was performed 20 cm distal to the patch. This was done after full exploration and assessment of bowel and viscera and after peritoneal lavage with copious amount of warm normal saline. Intraperitoneal wide-pore drain was inserted in the pelvis and right subhepatic space (Figs 5 and 6).

Duodenal (pyloric exclusion) and gastrojejunostomy

It was done for all patients in group C. Pyloric exclusion with primary repair of DU perforation

Table 2 Patients with previous peptic ulcer disease

H/o PUD	Group A	Group B	Group C	%
Present	6	8	6	66.6
Absent	4	2	4	33.3

PUD, peptic ulcer disease.

Table 1 Preoperative clinical data and associated comorbid diseases

	Group A	Group B	Group C
Abdominal pain, vomiting, and fever	10	9	10
Abdominal tenderness and rigidity and peritonitis signs	7	9	8
Septicemia and shock	4	5	3
Comorbid diseases			
DM	3	4	2
HTN and IHD	4	3	5
Chronic obstructive airway disease	3	5	4

DM, diabetes mellitus; HTN, hypertension; IHD, ischemic heart disease.

together with performing side-to-side gastrojejunal anastomosis as a loop of jejunum ~12–15 cm from the ligament of Treitz was selected and brought through an opening in the transverse mesocolon usually to the left of the middle colic vessels using 2-0 vicryl. A posterior layer of seromuscular Lambert sutures was placed, the stomach and the adjacent jejunum are opened. A full-thickness inner layer was started posteriorly and completed anteriorly using inverting Connell sutures, and then the anastomosis was completed by placing anterior seromuscular layer of interrupted 2-0 vicryl using Lambert sutures.

For a stapled anastomosis, the jejunum is first aligned to the dependent portion of the stomach with 2-0 vicryl sutures at each end. A stab incision was made in stomach and jejunum, and the anastomosis was performed using a GIA stapling device. The staple line is inspected for hemostasis. The combined stab incision is closed in two layers with 3-0 absorbable sutures. The defect in transverse mesocolon is carefully closed to avoid herniation (Figs 7–9).

Partial gastrectomy (antrectomy)

Dissection was commenced along the distal half of the greater curvature, and greater omentum is separated from the transverse mesocolon. The branches of gastroepiploic arcade were divided and ligated with 2-0 vicryl sutures from the mid-portion of stomach to duodenum. The posterior wall of first part of duodenum was freed from the pancreas and divided using GIA 60 linear device. The right gastric artery was identified and ligated. With electrocautery, the gastrohepatic ligament was divided proximally along the lesser curvature. The left gastric vessels lying along lesser curve were carefully isolated and secured. After the nasogastric tube was withdrawn proximally, the stomach is divided with a GIA 60 linear stapler.

The Roux-en-Y gastrojejunostomy was done with partial (distal) gastrectomy for conversion after failed jejunal serosal patching to control leak in such case. An afferent loop of jejunum was selected at 10–15 cm of ligament of Treitz and divided. The efferent limb passed through defect made in transverse mesocolon and anastomosed to gastric pouch either manually or via linear GIA stapled technique as previously described and efferent loop anastomosed in end-to side technique or stapled side-to-side anastomosis.

Feeding jejunostomy was placed in all cases, as a loop of jejunum about 12–15 cm from ligament of Treitz was brought, and two layers of purse-string sutures were placed, then a small opening by electrocautery and tip of artery forceps to pierce mucosa and a Foleys catheter was placed for a length of 8–10 cm. The purse-string was tied around, and it was anchored to abdominal wall. Approximating sutures were placed between peritoneal surface and jejunal serosa after bringing the Foleys catheter out through stab incision, and then suturing the feeding tube to skin of abdominal wall was done (Figs 10 and 11).

Statistical analysis

Data were collected, revised, coded, and entered to the statistical package for social science (IBM SPSS), version 23 (Chicago, USA). Data were presented as percentages. The differences in surgical outcomes among the three groups were compared using analysis of variance test for difference between more than two study group means. The Pearson χ^2 and Fisher's exact tests were performed. *P* values were reported, where the results were considered to be significant with *P* value less than 0.05, highly significant with *P* value less than 0.01, and nonsignificant with *P* value more than 0.05.

Results

Of the 30 patients operated for large and giant DU perforations at our department over 2 years, there were 27 (90%) males and three (10%) females, giving a male to female ratio of 9 : 1. The mean age was 46±16.5 in group A, 48.5±12.3 in group B, and 51.4±18.7 in group C, with the total average age of the three groups being 45–73 years old. The mean operative time was 62 ±8.4 min in group A, 80±10.5 min in group B, and 110.5±12.6 min in group C, with total mean operative time of 75±28 min (Table 3). The patients were arranged into three groups according to the surgical modality performed (Table 2).

Table 3 Preoperative demographic characteristics

	Group A	Group B	Group C	*P* value
Number of patients	10	10	10	
Male/female ratio	10/0	9/1	8/2	
Mean age (years)	46±15.5	48.5±12.3	51.4±18.7	
Average operative time (min)	62±8.4	80±10.5	110.5±12.6	<0.001
Average hospital stay (days)	10.8±2.61	12.8±2.73	11.8±4.28	0.271

In group A patients (10 cases) who had omental plugging procedure and feeding jejunostomy, one (3.3%) patient developed postoperative leak on third postoperative day which was managed conservatively via total parenteral nutrition (TPN), intravenous antibiotics and the patient was discharged after 2 weeks completely improved. One (3.3%) case developed chest infection, and two (6.6%) patients developed wound infection who were managed conservatively. Other patients of group A were discharged on the 8th–12th postoperative day. One (3.3%) case developed postoperative burst abdomen, which necessitated closure with secondary tension sutures and was discharged after 14 days.

Regarding group B, 10 patients were subjected to jejunal serosal patching with feeding jejunostomy. Overall, three (10%) patients developed postoperative bile leak on the 4th day; two (6.6%) cases of them were improved on conservative treatment till complete resolution of leak which was detected radiologically and clinically, and one (3.3%) patient had deteriorated condition and was subjected to partial gastrectomy (antrectomy) with Roux-en-Y gastrojejunostomy and entero-enterostomy reconstructive operation. This patient presented with perforated large prepyloric GU with failed repair with jejunal serosal patch. He was discharged after 2 weeks, after removal of sutures and feeding tube. Moreover, two (6.6%) cases developed severe chest infection needed ICU admission and intensive therapy. Overall, two (6.6%) cases died on 4th postoperative day, most probably owing to severe septicemia and chest infection, with poor response to antibiotics. ICU admission was needed. In addition, three (6.6%) cases developed wound infection and were treated conservatively. One patient developed burst abdomen and was treated by secondary tension sutures and discharged after 17 days. Two cases developed severe chest condition and needed intensive chest therapy.

Regarding group C, 10 patients were subjected to duodenal exclusion and gastrojejunostomy. Overall, three (10%) patients developed wound infection with seropurulent discharge; one of them improved on conservative treatment with antibiotic according to culture and sensitivity and daily dressing, and two (6.6%) cases developed mild postoperative leak and were managed conservatively with nothing per os (NPO) and TPN, and it was successful. Moreover, two (6.6%) cases died most probably owing to severe sepsis, hypoalbuminemia, and prolonged intraoperative exposure to anesthesia with bad chest condition. In addition, two (6.6%) cases developed burst abdomen were treated by secondary tension sutures and were discharged after 18 days. Additionally, two cases developed chest infection and gradually improved on medical treatment according to culture/sensitivity (CS) (Tables 4 and 5).

The average hospital stay in the three groups was 10.8 ±2.61, 12.8±2.73, and 11.8±4.28 days, respectively. Feeding jejunostomy tube was placed in all patients of the three groups.

The morbidity recorded in group A was five (16.7%), nine (30%) in group B, and nine (30%) in group C, with overall morbidity of 73.3%, with *P* value less than 0.05 (significant). Such relatively high morbidity was attributed to severe sepsis and shock state, prolonged operative time, heavy anesthesia exposure, severe chest infection, and nutritional problems. Mortality rate were four (13.3%) patients, with *P* value more than 0.05, being insignificant (Figs 1–11).

Table 5 Mortality

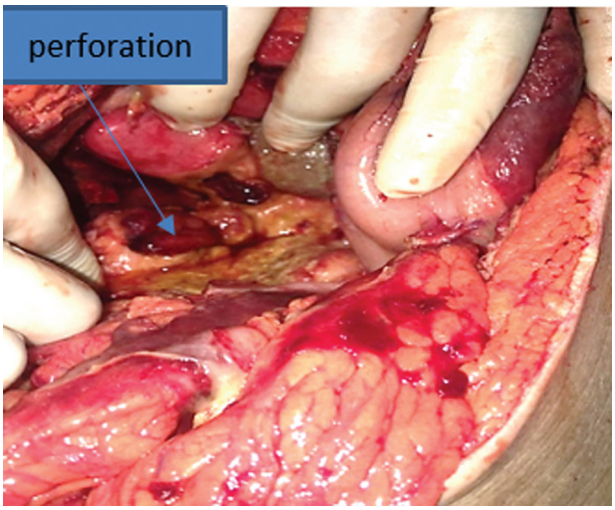
	Group A	Group B	Group C	*P* value
Deaths	0	2 (6.6)	2 (6.6)	0.166

Table 4 Operative data and postoperative complications

	Group A	Group B	Group C	Total	*P* value
Type of procedure	Omental plug and feeding jejunostomy	Jejunal serosal patch and feeding jejunostomy	Duodenal exclusion, and gastrojejunostomy	–	–
Type of ulcer; DU, GU	8 DU	7 DU	9 DU	–	–
	2 GU	3 GU	1 GU		
Conversion		1 distal gastrectomy, Rou-en-Y gastrojejunostomy)		–	–
Chest infection	1	2	2	5	0.299
Wound infection	2	3	3	8	0.178
Bile leak	1	3	2	6	0.199
Burst abdomen	1	1	2	4	0.499

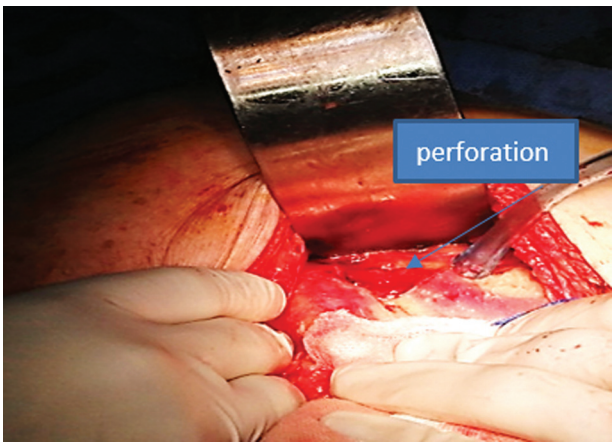
DU, duodenal ulcer; GU, gastric ulcer.

Figure 1



Perforated giant prepyloric GU. GU, gastric ulcer.

Figure 2



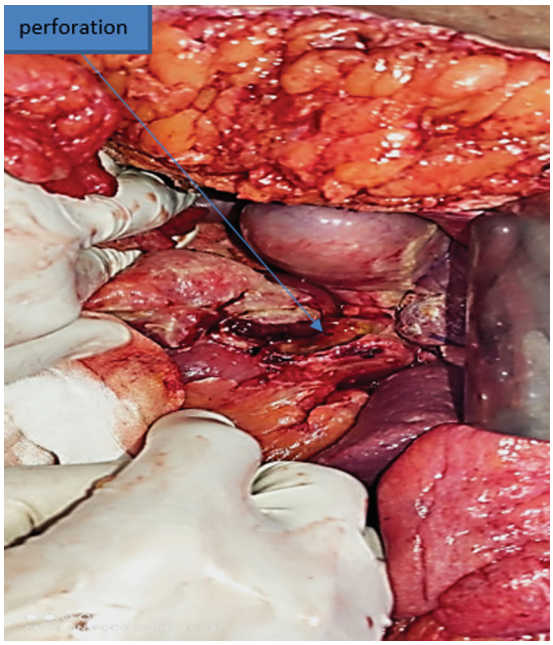
Perforated large DU 2–3cm. DU, duodenal ulcer.

Discussion

Perforated peptic ulcer is a challenging surgical condition. The use of proton pump inhibitors (PPI) has resulted in decrease in the rates of elective peptic ulcer surgery. Ulcer perforation represents 10–20% of the recognized complications of peptic ulcer disease, and the perforated large/giant ulcers comprise ~1–2% of the perforated peptic ulcers and account for both high morbidity (20–70%) and mortality (15–40%). The reported mortality rate varies from 1.32% to nearly 20% in different series [5,10,11].

In a study among 245 patients admitted and had been operated for perforated peptic ulcer disease (PUD), 30 patients presented intraoperatively after exploration with large/giant perforations, and the overall morbidity in series was 73.3%, and overall mortality was 13.3%, which corresponds to that published in the literature. The size of the perforation in peptic ulcers varies from 3 mm to over 3 cm in diameter which has adverse effects on the prognosis [12]. A review of the literature has not shown any considerable agreement to determine ulcer perforation size that carries high incidence of leak and fatality. Such difference in size between large and giant ulcers has no role in decision of operations in our study.

Figure 3

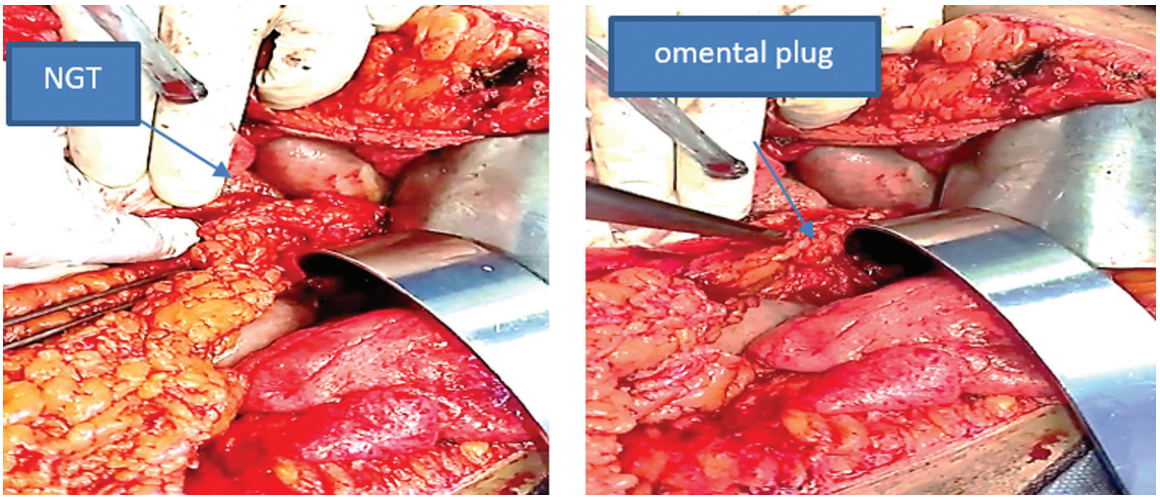


Perforated giant prepyloric GU. GU, gastric ulcer.

Although there is a high acceptance to consider that the giant DUs more than 2 cm in size are vulnerable to perforate, according to Gupta and colleagues, perforated DUs can be classified as large perforations between 1 and 3 cm and giant perforations which exceed 3 cm in diameter. Otherwise, our study had not focused on ulcer size (lager or giant) and its influence on postoperative leak, prognosis, and patient outcome, but our scope is to evaluate the efficacy and feasibility of the selected three techniques, which we have chosen in such a study [5].

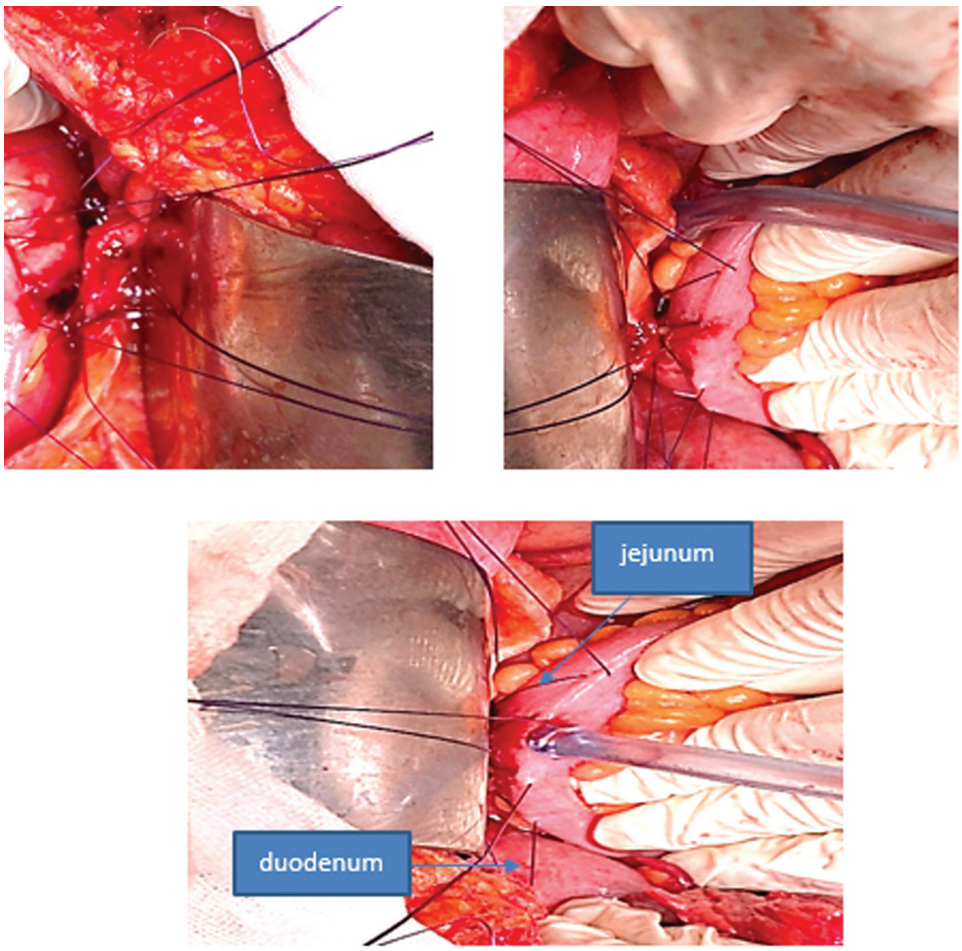
All patients in our study were diagnosed to have large perforated peptic ulcer more than 2 cm (either DU or GU) during intraoperative exploration. Diagnosis was based largely on clinical suspicion, as most of cases [24 (80%) patients] presented with peritonitis, and with careful clinical examination, diagnosis was confirmed with radiological investigations, such as plain radiograph of lower chest upper abdomen to check air collection under right hemidiaphragm with sensitivity 70%, and pneumoperitoneum with

Figure 4



Omental plug insertion.

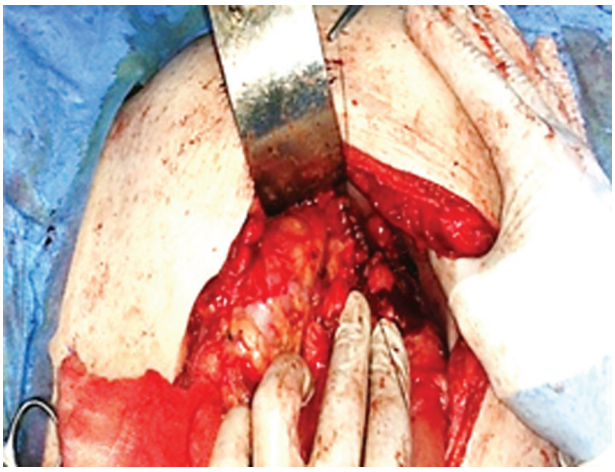
Figure 5



Jejunal serosal patching technique and seromuscular jejunal sutured to edges of the ulcer.

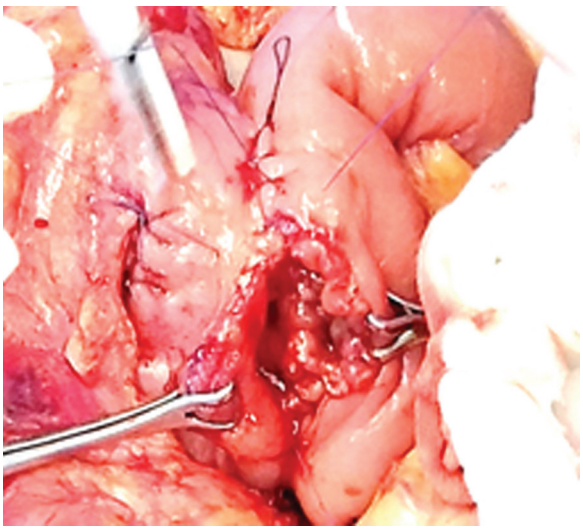
sensitivity 22%, and also abdominal ultrasound was performed and detected significant collection in 12 (40%) patients, with sensitivity of 32%. In the absence of any specific definition and guidelines regarding the management of such large/giant perforation in the literature, different authors have recommended variable surgical options from time to time, based on their experience and research. These

Figure 6



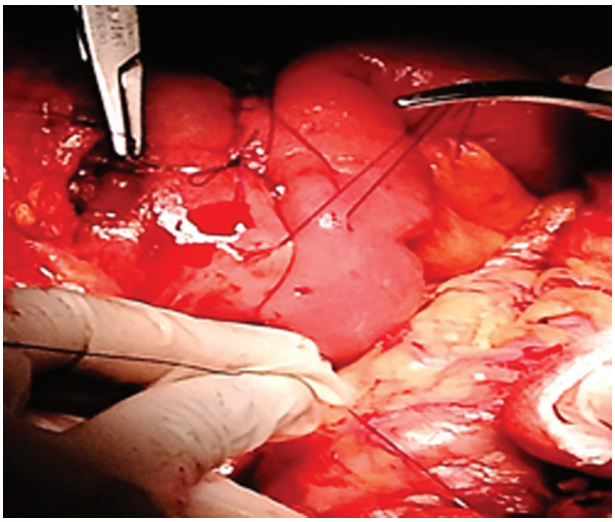
Primary repair with duodenal exclusion.

Figure 7



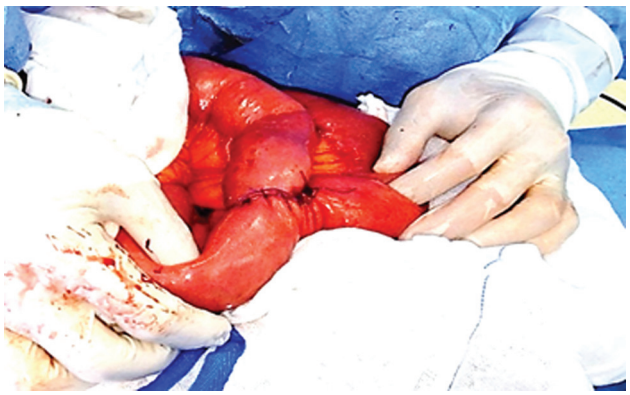
Anterior layer of gastrojejunostomy.

Figure 8



Duodenal exclusion with gastrojejunostomy.

Figure 9



Roux-en-Y gastrojejunostomy.

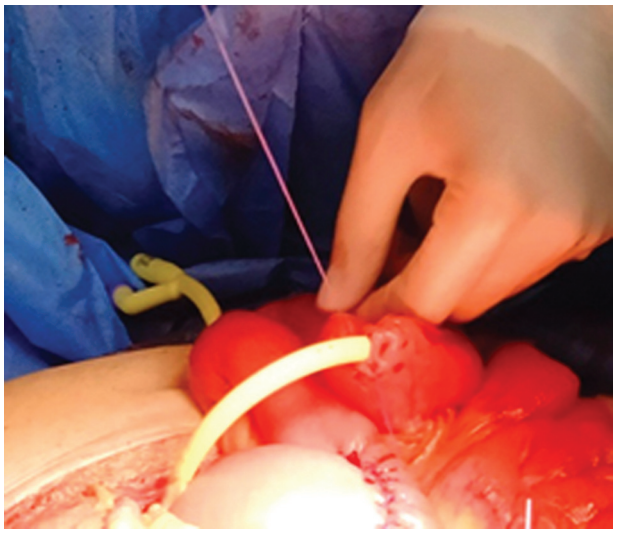
procedures include partial gastrectomy with Billroth I or II operation, vagotomy and antrectomy, gastrostomy, and lateral duodenostomy with feeding jejunostomy. Others recommended conversion of perforation into pyloroplasty, closure of defect with serosal patch or pedicled graft of jejunum, or the use of free omental plug, and even suturing of omentum to NGT. Proximal gastrojejunostomy may be added to provide diversion [13,14]. In our study, we chose three techniques to assess efficacy, safety, and outcome in managing such problem.

In our study, 30 patients were divided into three groups (A, B, and C) according to surgical procedure applied for each group; they were surgically managed, as the three groups of patients had presented with either perforated large DU or large GU. Group A patients were subjected to omental plugging with feeding jejunostomy. Group B had jejunal serosal patch procedure and feeding jejunostomy. Group C patients were managed via duodenal exclusion procedure with gastrojejunostomy and feeding jejunostomy.

The highest incidence of large/giant ulcer perforation was seen in fifth decade of life, as most cases were noted over 50 years old. In our study, the average age group was 45–73 years old. These results are comparable to those published in other studies. Male-to-female ratio was found to be 9 : 1, as 27 (90%) males, and three (10%) females were present in our study, whereas in other similar studies, it ranged from 8 : 1 to 7.5 : 7.

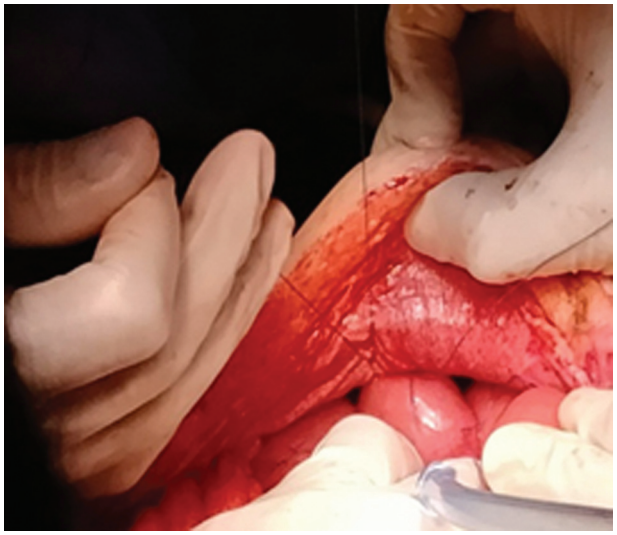
Factors such as old age, coassociated disease, preexisting shock, perforated ulcer size, late hospital presentation, and operative intervention have

Figure 10



Purse-string tie around Foleys.

Figure 11



Anchoring sutures to peritoneum.

considered to increase the incidence of mortality in this condition. In our study, four (13.3%) patients died, most probably owing to severe sepsis, prolonged operative procedure, long duration of anesthesia exposure, bad chest condition with nutritional deficiency, and poor response to antibiotic therapy.

The presence of severe duodenal tissue defect, surrounding edema, and inflammatory changes are devastating factors, which are associated with high incidence of leakage and septicemia.

In addition, other contributing factors are said to increase leakage in such conditions, including a significant high intraluminal pressure, eversion of duodenal mucosa, and pancreatic enzyme lytic reaction. Different surgical repair techniques are described to manage such perforated large/giant perforations [15].

Such procedures have the disadvantages of long operative time, need high level of surgical experience, and carry considerable risk of leak. Regarding our procedures, group A patients have omental plugging procedure, which seemed safer and associated with less postoperative leak than omentopexy. Such superiority was demonstrated by Jani and colleagues in a prospective randomized study of 100 patient with large sized more than 20 mm duodenal peptic perforation comparing omental plugging with omentopexy. There was no perforation site leak in the omental plugging group as compared with six patients in omentopexy group, which could be explained by the fact that a part of omentum is taken inside the stomach, and even with rise of intragastric pressure, the omentum is always kept in contact with gastric mucosa. In omentopexy technique, the repair is done from outside, and so with rise of intragastric pressure, the patch could be easily detached [6]. In our study, one (3.3%) patient had suffered leak which was detected from all 10 patients who had omental plug procedure.

Regarding group B patients who had jejunal serosal patching, three (10%) cases presented with leak, two (6.6%) cases had successful conservative management, and one (3.3%) case had converted to partial gastrectomy with Roux-en-Y gastrojejunostomy.

Several series have failed to show difference in morbidity and mortality compared with primary repair. However, there are case reports of successful repair of giant DU perforation with a jejunal serosal patch [16].

Pyloric (duodenal exclusion) with primary repair has been widely practiced in the management of duodenal defects, and recent studies have noted no difference in mortality compared with primary repair. However, it has also shown to increase hospital stay with considerable rate of abdominal septic complications [17].

In our study, 10 patients in group C had duodenal exclusion and gastrojejunostomy procedures for large/giant perforated ulcers, where two (6.6) cases had postoperative leak managed conservatively, two (6.6%) cases died owing to severe septicemia and shock status, and two (6.6%) cases had burst abdomen and subjected to secondary tension suture, with average hospital stay of 11.8±4.28 days.

Conclusion

Large/giant perforations are rare but carry a significant high level of morbidity and mortality in relation to small perforations. Omental plugging technique is a suitable alternative with less incidence of leakage, shorter procedural time, and easy to perform especially in already compromised patients. Jejunal serosal patch when combined with feeding jejunostomy is an effective and feasible procedure but carries considerable risk of leak. Duodenal exclusion procedure is safe and has no significant difference in mortality compared with omental plugging technique. However, it carries the disadvantages of long operative time, needs surgical expertise, and is difficult to perform with friable, edematous tissues. However, they are considered as the last choice to safe patients' life after failed omental plugging.

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Conflicts of interest

There are no conflicts of interest.

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