

Original Research Article

Surgical outcome of management of perforated peptic ulcer: retrospective analysis of 148 cases

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ABSTRACT

Background: Perforated peptic ulcer (PPU) is a common life threatening surgical emergency. Discovery of *H. pylori* (1985) changed the concept of the management of peptic ulcer. Now-a-days reduction in gastric acid production with proton pump inhibitors along with eradication of *H. pylori* is recommended.

Methods: Clinically suspected cases of PPU were confirmed by radiological and laboratory investigation. These patients were subjected to exploratory laparotomy with Graham's omental patch repair after adequate fluid resuscitation with optimal hemodynamic status with or without peritoneal drainage, except in too sick patients. Postoperatively; these patients kept in SICU and closely monitored. Data were collected, tabulated and analyzed.

Results: Out 150 cases enrolled, 2 cases died before exploratory laparotomy and closure of operation. So only 148 took part in the study. Male patients were predominant than female in a ratio of 148:2. Age ranges from 20 to >60 years. Majority of the patients belongs to the age group 30-40 years of age. The morbidity and mortality rates were 20% and 2.7% respectively.

Conclusions: Adequate fluid resuscitation with optimal hemodynamic status and optimal kidney function is the key to decrease morbidity and mortality rates. Simple closure with omental patch followed by *H. pylori* eradication is effective with excellent outcome in most of survivor despite of late presentation. Old concept of prophylactic peritoneal drainage and "no sunset no sun rise" concept of operation should be discouraged as it is not beneficial. Definitive surgery for ulcer recurrence is no more done except in special situation.

Keywords: Perforated peptic ulcer, Peritonitis, Graham's omental patch

INTRODUCTION

Peptic ulcer perforation is a serious and life threatening complication which affects 2-10% of peptic ulcer patients on average.^{1,2} The overall mortality of Perforated peptic ulcer (PPU) is 10% ranging from 1.3-20% in different studies.³⁻⁵ Being a life threatening complication of peptic ulcer, these patients need special attention with prompt fluid resuscitation and appropriate management, if better outcome is desired.^{5,6}

Since the 1st description of surgery for acute PPU, many techniques have been recommended for closure of perforation. Recent advance in antiulcer therapy have shown that simple closure of perforation with omental patch or plug followed by eradication of *Helicobacter pylori* is simple and safe option in many centers. It has changed the old trend of definitive therapy like truncal vagotomy and drainage procedure as it was associated with high morbidity and mortality (13%).⁷ This study was done to analyze the outcome of the patients operated for PPU condition.

METHODS

This is retrospective observational study conducted on patients operated for PPU at tertiary centres (PIMSH, CIMSH and other centers), for 10 years during 2009-2019. Preoperative, operative and postoperative records of these patients were collected. Patient's detailed history and through physical examination and investigation like complete blood count, blood grouping, serum creatinine and serum urea and random blood sugar, viral marker (HIV, HBsAg, HBcAg) and serum amylase were performed. Radiological investigations like x-ray abdomen erect or chest were done in all patients who were suspected of peptic ulcer perforation.

The diagnosis of PPU was made from history, plain x-ray abdomen or chest by presence of free gas under right dome of diaphragm and confirmed at laparotomy. Patients were put on RT suction, intravenous fluid (crystalloid), intravenous antibiotics and antiulcer drugs. Adequate hydration was indicated by an hourly urine output of 30-50 ml. After adequate resuscitation laparotomy was performed through upper midline incision and perforation site identified. Simple closure of perforation with reinforcement of omental patch (Graham's technique) was done. Silk or vicryl suture material was used for the repair. Thorough peritoneal lavage was performed. Placement of intraperitoneal drain was optional. We put prophylactic drain in 98 cases in earlier years of the study while in later years it was not placed in 50 cases. Usually two drains one in pelvis and another in Morrison's pouch were put. Some cases whose general condition was very poor are subjected to peritoneal drainage in local anesthesia. These patients are subjected to surgery after improvement of general condition. All the diagnosed cases of PPU were included except those who died and not fit for surgery even after preoperative peritoneal drainage.

Postoperatively these patients were kept nil per orally up to 5th postoperative day along with antibiotics, PPI and intravenous fluid. Regular monitoring of blood pressure, pulse, respiration, saturation of oxygen by pulse oximetry and urine output were done. Oral clear water sips allowed after 5th postoperative day, followed by semi solid and solid diet were started gradually. Drains were taken out, once patient is thriving and drainage is clear and <30 ml/day. Dressing was done on third postoperative day and regularly thereafter. After discharge patients were followed-up to 6weeks to 3 years. Data of these patients collected of format, tabulated and analyzed and following observation is obtained.

Table 3: Site and size of perforation (n=148).

Site of perforation	Size of perforation		No. of patients N (%)
	≤5 mm	>5 mm	
Duodenal and pre-pyloric	70	63	133 (89.86)
Gastric	10	05	15 (10.13)

RESULTS

Out of 150 cases enrolled for the study, 6 cases were treated by preoperative peritoneal drainage under local anesthesia. Two cases died. One case belongs to patient whom preoperative peritoneal drain was placed while second case died without any surgical procedure due to irreversible shock. So only 148 took part in the study. Male patients were predominant than female in a ratio of 148:2.

Table 1 shows clinical presentation of the patients in which the common symptoms were pain abdomen, distension, absolute constipation and vomiting whereas common signs were guarding and rigidity, rebound tenderness, masking of liver dullness, distension of abdomen and absent of bowel sound in decreasing order of frequency.

Table 1: Clinical presentation (n=148).

	No. of cases	%
Symptoms		
Abdominal pain	148	100.00
Distension	120	81.08
Absolute constipation	120	81.08
Nausea	15	10.13
Vomiting	100	67.56
Signs		
Guarding and rigidity	148	100.00
Rebound tenderness	148	100.00
Masking of liver dullness	130	87.83
Distension	120	81.08
Absent Bowel sound	119	80.40

Table 2 shows age wise distribution. Age ranges from 20 to >60 years and majority of the patients belongs to the age group 30-40 years.

Table 2: Age wise distribution of cases (n=148).

Age (in years)	No.	%
10-20	Nil	Nil
20-30	15	10.13
30-40	64	43.24
40-50	49	33.10
50-60	12	08.10
>60	08	05.40
Total	148	100

Table 3 shows distribution of cases according to site and size of peptic ulcer perforation. Majority (89.86%) perforations were from duodenal and pre-pyloric group and majority of the perforations were equal or less than 5 mm in size.

Table 4 shows distribution of cases according to the free gas under diaphragm. Majority (92%) of the cases had free gas under right dome of diaphragm while in minority of cases it was absent.

Table 4: Free gas under diaphragm.

Free gas	%
Present	
Right	92
Left	06
Absent	02

Table 5: Duration onset of symptom (n=148).

Duration (in hours)	No. of cases
	N (%)
0-12	08 (5.40)
12-24	13 (8.78)
24-48	31 (20.94)
48-72	32 (21.62)
>72	64 (43.24)
Total	148 (100)

Table 6: Treatment (n=148).

Procedure	No. of patients	%
Graham's repair	147	99.32
Graham's repair with GJ	01	0.67
Prophylactic peritoneal drainage		
Yes	98	66.21
No	50	33.78

Table 7: Post-operative complications (20%).

Types of complications	Frequency	%
Survivors		
Wound infection	23	15.54
Wound dehiscence	15	10.13
Postoperative pyrexia	24	16.21
Diarrhea	06	04.05
Duodenal/gastric fistula	04	02.70
Pelvic abscess	07	04.72
Pneumonia	15	10.13
Suture ulcer	01	0.67
Non-survivors		
Death	04	02.70

Table 7 shows complication. The post-operative complications in decreasing order of frequency were

postoperative pyrexia (16.21%), wound infection (15.54%), pneumonia (10.13%). Four patients (2.7%) died in postoperative period. The morbidity and mortality rates were 20% and 2.7% respectively.

DISCUSSION

PPU reported in necropsies during 1600-1800.^{8,9} The credit for first closure of perforated peptic ulcer goes to Redekci (1850-1905).¹⁰ Surprisingly, the basic principle of treatment has not changed and remained the same i.e., suturing of perforation and supporting further a tag of omentum on the top of it.^{11,12} Although this procedure appears to be simple but it is associated with high mortality and morbidity.¹³

Clinical symptoms and signs are so typical. It is hardly difficult to diagnose.¹³ These patients have typical history of sudden onset of acute sharp pain usually located in the epigastrium and sometimes felt in right shoulder indicating free air irritation under the diaphragm.¹⁴ Typical patient with PPU is a male with average age of 48 years. He may have history of peptic ulcer disease (PUD), or nonsteroidal anti-inflammatory drug (NSAID) usage (20%). Nausea (29%) and vomiting (5%). Similar clinical presentation was also observed in the present study (Table 1).

Physical examination findings are rapid pulse rate, shock (5-10%).¹⁵ Hypotension and fever are the late features. Masking of liver dullness was noted in only 37%. So, this diagnostic tool it has limitation.¹³ In contrast to above finding masking of dullness was present in 87.83% of cases in the present study.. This could be because larger size of perforation and delayed presentation (Table 1).

Blood analysis may show moderate leukocytosis and acute pancreatitis is excluded by level of serum amylase.¹⁰ An x-ray abdomen or thorax in standing position will reveal gas under diaphragm in about 80-85% of cases.^{13,14} Some centres also prefer ultrasonography and CT scan with oral contrast.¹⁶ With current radiological technique 80-90% of cases are correctly diagnosed.¹⁵ We diagnosed all the cases with the help of clinical symptoms and physical examination and plain x-ray abdomen or chest in erect position. In this series 98% cases had free gas under diaphragm (Table 4). None of the patient required CT scan in this series.

Treatment begins with diagnosis of acute abdomen. It consists of fluid resuscitation, nasogastric suction, H2 blocker or proton pump inhibitor and broad spectrum antibiotics. Once PPU has been confirmed then different therapeutic option are explored.¹⁵ Decision regarding operative and conservative therapy is to be taken according to the condition of patient and by experienced member of the team. If surgery is to be planned, then decision of the type of procedure should be done. Whether a simple closure with or without omentoplasty will be sufficient or there is need for definitive surgery. If

so which definitive surgery is indicated.¹⁶ The role of definitive surgery was based on “no acid, no ulcer” and most of the ulcers were thought to be consequence of excessive acid secretion caused by smoking, alcohol use, stress or other environmental factors and further supported by the study which revealed ulcer recurrence following simple closure ranges from 30-70%.^{17,18} Definitive surgery along with closure of perforation in the same sitting prolongs the duration of surgery and increase mortality (1 vs 3.3-13.4%).¹⁸⁻²⁰ Therefore; there is progressive decline in the role of definitive surgery due to decrease recurrence rate of ulcer due to life style modification and availability of potent acid reducing agents like H2 blockers and PPIs. There is further decline of definitive ulcer surgery after discovery of *H. pylori* as the causative agent which can be treated by drugs. Presently the role of definitive surgery is limited only for patients with ulcer perforation with negative *H. pylori*, recurrent ulcer despite triple therapy or perforation during triple therapy course.^{15,21-23} In the present series we managed the cases with Graham’s omentopexy followed by definitive surgery (TV+GJ) in few cases before discovery of *H. pylori* as the causative agent of ulcer and its recurrence (Table 6). After discovery of *H. pylori*, we have not done a single case of definitive surgery for PPU. Similar to the recommendation of previous workers, we subject patient to endoscopy if symptom persists and does not improve after acid reducing drugs. These cases were managed as per endoscopic finding.¹⁷

Non-operative management is based on Taylor observation which consists of nasogastric suction, antibiotics, intravenous fluid and now days *H. pylori* triple therapy.^{22,24} It was based on Crisp observation during laparotomy. He noticed that abdominal cavity was filled with adhesions to the surrounding viscera which prevented the leakage from the stomach in peritoneum. It is general consensus that conservative treatment can be considered in cases with associated morbidity to surgery, anesthesia, old age >70 years, time gap between perforation and start of treatment is <12 hours and documented contrast study that perforation has sealed. There is conflicting reports about advantages and disadvantages in conservative treatment. Some are in favour and others are not in favour. Those who are in favour argue that operation, anesthesia in associated morbidity, reduction in postoperative intra-abdominal adhesion induced by surgery which makes future elective definitive surgery for PUD or other indications difficult but hospital stay is shorter where as those who are not in favour, argue that there is prolonged hospital stay, higher mortality rate if conservative fails, lack of benefit of laparoscopy as diagnostic tool in cases of patient with misdiagnosis and missing of gastric cancer.^{22,25,26} So in cases in whom conservative treatment is chosen UGI endoscopy should be performed to rule out gastric cancer. In the present series we have not managed a single case conservatively. We have also found one case of malignancy positive gastric perforation which healed on usual treatment.

Operative management consists of upper midline incision followed by identification of perforation and closure as advice by Graham using three stiches enforcing with omentum. If ulcer is gastric, biopsy should be done to exclude gastric cancer. Proper sealing can be confirmed by putting air via RT in stomach or dye can put via NGT. This follows peritoneal toilet and putting peritoneal which is controversial.^{27,28} Some surgeons infiltrate abdominal wound Bupivacaine 0.25% at the end of procedure. Various methods have been advocated for repair of perforation. These are Cellan-Jones method and Graham’s omental patch technique.^{29,30} Today’s Graham’s technique is misnomer, in original technique Graham has used free graft of omentum, putting 3 sutures with a piece of free omentum laid over these sutures and then tied. No attempt was usually made primary close the hole. The omental graft produces stimulus for fibrous formation. This approach is gold standard since its publication. Very often surgeon mention they used Graham’s omental patch, but they actually used pedicle omental graft. Schein have advocated the plugging of perforation with omentum.¹⁰ We used omental pedicled graft along with three stiches to close the perforation. Biopsy was taken in every case of gastric ulcer perforation. We have found one case in which malignancy was diagnosed. Ulcer healed with usual treatment.

Postoperative irrigation is controversial. Some surgeons doubt the usefulness of irrigation. Nothing has been found in the literature supporting this theory. Irrigation with warm saline up to 6-10-30 liter is recommended.³³ There is no evidence to support this theory.³⁴ We have not used this technique in this study.

There no agreement on prophylactic drainage of peritoneal cavity after closure perforation.^{10,31} It has been reported that drain does not reduces the incidence of intra-abdominal fluid collection or abscess formation.³¹ On the other hand, drain site can become infected (10%) and can cause intestinal obstruction.^{31,33} It is argued in favour that drain signal early leak. But clinically it has been seen that drains are blocked early by fibrinous exudates and plugged by omentum and whenever leak happens fluid does not come out from drain but it comes out from the incision site. In one of the study it has been observed that drains are not beneficial.²⁸ It has been reported that well equipped centre radiological investigation like USG or CT scan and good clinical observation by experienced surgeon can provide all information probably better than a nonproductive drain (Table 6).

During 1980’s and before definitive surgery was strongly advocated to prevent recurrence which was reported up to 70%.^{17,18} Some surgeon performs definitive surgery during closure of perforation. But it was reported that adding definitive surgery prologs the surgical time and this adds the mortality and morbidity to already sick patient.^{17,20} So others argue that it should be done on

elective basis after the recovery of first surgery. Slowly and slowly both trend has declined because surgeons were not willing to do definitive surgery along with closure of perforation as patient is too sick and secondly these patients usually lost during follow up and those who return for follow up and are asymptomatic. If patient on follow up is symptomatic, a UGI endoscopy is usually advised. If endoscopy shows a good healed ulcer, regular follow up with acid reducing drug is advised. If endoscopy shows recurrence of ulcer or symptom persists even after treatment, acid reducing surgery is advised. Presently definitive ulcer surgery is advised in PPU with negative *H. pylori*, recurrent ulcer despite of triple drug therapy or those cases who develop PPU despite of on ripple drug therapy.^{13,21-23} In these patients parietal cell vagotomy is recommended if needed combined with anterior linear gastrectomy.³⁴ This procedure can now be performed safely laparoscopically.^{21,35} In the present study 2 cases were diagnosed as recurrent ulcer while one case was diagnosed of suture ulcer. These cases were subjected to elective truncal vagotomy and gastro-jejunoscopy. Suture ulcer cases was managed by endoscopic removal of suture. This suture was non-absorbable silk. Due to availability of vicryl suture material, now a day's silk suture should not be used.

Postoperatively these cases were managed with nasogastric aspiration, intravenous fluid and antibiotics, painkiller and vital monitoring. Duration of nasogastric aspiration is controversial. Some expert advice for 48 hours only while other use for 3 days.^{33,36} We used nasogastric aspiration for average 5 days. Another differing opinion exists regarding starting of oral feed. Some advocate early start of oral feed while others use it after 5 days postoperatively when gastric aspirate reduced and abdominal distension settled and patient is passing flatus and faeces. General trend of empiric use of post-operative antibiotics consisting three drug protocol covering gram positive and negative and anti-anaerobe was usual. Most antibiotic protocols have aminoglycosides.³⁷ But recent study has shown that there is no role of aminoglycoside along with 3rd generation cephalosporin antibiotics.³⁸ We have also found in this series that non aminoglycoside based 2 antibiotic drug consisting of 3rd generation cephalosporin and metronidazole or tinidazole is equally effective.

Postoperative complication includes pneumonia, wound infection, UTI, suture leak, abscess formation, heart problem, ileus, fistula, wound dehiscence, sepsis, reoperation and death. Over all complication rate ranges from 15-38% in previous published reports.^{21,31,39} Incidence of the complications (20%) in the present study is comparable to the previous reports. The most commonly observed postoperative complication was pneumonia followed by wound infection (Table 7).

The overall mortality rates in the present study was 2.7% (Table 7) which is less than the previous published reports (6-10%).^{39,40} This mortality reaches to 30-35% of

patients with PPU who have sepsis on arrival at the operation theatre and sepsis is believed to be the cause of fatalities in 30-40% of cases. Increase in mortality rate is reported to be associated with age >60 years, delay in treatment for >24 hours, shock at admission (systolic blood pressure <100 mmHg and concomitant disease.²¹ Gastric ulcer perforation is associated with 3-5-fold increase in mortality.^{21,35} It has been observed during the study that those cases operated without optimizing hemodynamic balance, show increase morbidity and mortality. So the old concept of "no sun set and sun rise" the patient should be operated should be discouraged. In the present series mortality rates are less and this may be because of majority of our patients are young and operations were done after achieving good hemodynamic status.

CONCLUSION

Adequate fluid resuscitation to achieve optimal hemodynamic status and optimal kidney function is the key to decrease morbidity and mortality rates. Simple closure with omental patch followed by *Helicobacter pylori* eradication is effective with excellent outcome in most of survivor despite of late presentation. Old concept of prophylactic peritoneal drainage should also be discouraged as it not beneficial. The old concepts of "no sunset no sun rise" the peritonitis cases should be operated despite of poor hemodynamic status should be discouraged. Definitive surgery for ulcer recurrence is no more done except in special situation.

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