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Original Research Article

Peptic perforations: comparative study of its closure (omentopexy versus figure of 8 closure)

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ABSTRACT

Background: Peptic ulcer perforation is one the most common and catastrophic maladies that affect mankind. The aim of this study was to compare the surgical techniques of peptic ulcer perforation closure namely omentopexy and figure of 8 stitch with reference to recovery time and complications rate.
Methods: Of 80 selected patients, figure of 8 method for closure of peptic perforation was used in 40 patients and 40 by using omentopexy method. Outcomes were compared in view of postoperative recovery time and postoperative complications such as wound complications, respiratory complications, burst abdomen, septicaemia, hospital stay, death.
Results: In our study it was noted that age of presentation was in elderly males with risk factors like alcohol, smoking, tobacco chewing, and NSAIDS use in decreasing order. Late presentation was associated with higher complication including one death. In figure of 8 group it was found that RT Removal was early, early oral resumption loss hospital stay in figure of 8 group than in omentopexy group. Complications such as wound complication, burst abdomen , leak, and septicaemia were more in omentopexy group than figure of 8 group. Only one death occurred in study that was in omentopexy group.
Conclusions: We came to conclusion that peptic perforation is more common in males around 50 years with risk factors of smoking and alcohol. Outcomes of surgery with figure of 8 stitch were better than omentopexy with respect to oral resumptions, early discharge, less complications such as wound complications, burst abdomen leak septicaemia and death.

Keywords: Peritonitis, Omentopexy, Figure of 8

INTRODUCTION

Perforation peritonitis is the most common surgical emergency encountered by surgeons all over the world as well as India.[1-4] Generalized peritonitis is a frequently lethal condition. It continues to be one of the major problems confronting surgeons and their patients throughout the world as in India.[4] Factors such as patients general condition, concomitant diseases, time of presentation, shock on admission, delayed surgery (>24hrs.) and postoperative abdominal and wound infections have been associated with increased morbidity and mortality in perforated ulcer patients.[1-3] When acute or chronic ulcer perforates into intraperitoneal cavity two component require treatment ulcer perforation and resultant peritonitis. Various methods of perforation repair have been established. Aim of this study is to compare between to methods of closure of perforation i.e. omentopexy and figure of 8 method with respect to outcome such as removal of Ryles tube, oral resumption, hospital stay, rate of complications such as wound complication, leak and death also relation of disease to

risk factors such as smoking, alcohol consumption and NSAIDS use.

METHODS

This was a prospective study carried out at GMC Nagpur from July 2015 to December 2018.

Inclusion criteria

All patients with peptic ulcer perforation recurrent peptic ulcer perforations and less than 0.5 cm in size in all age groups and genders

Exclusion criteria

All the cases of perforations due to Malignancy Trauma Iatrogenic injury Meckel's diverticulum with any comorbid condition like Diabetes mellitus, hypertension and previous surgery, not consenting for an operative procedure. All patients not consenting for participation in the study.

Clinically and radiologically proved patients of perforation peritonitis were initially stabilised by fluid resuscitation, I.V antibiotics (broad spectrum), Ryles tube insertion and catheterisation. They were later posted for laparotomy. Selection criteria was applied and selected patients were subjected to randomisation and divided in two groups (40 each), one group was subjected to omentopexy and another to figure of 8 method of perforation closure. Adequate peritoneal lavage and drain placement was done in all patients. All patients were given iv antibiotics and anaerobic coverage in post oprerative period and close monitoring of haematological and biochemical investigations were done as and when required. All patients were followed up daily in ward for vitals, RT aspirate, abdominal examination and drains. Ryles tube was removed with the appearance of bowel sound followed by oral resumption. Check dress was don on postoperative day 3 and SOS. Suture removal was done on 7th day either in hospital or at first follow up. All the data was analyzed by using SPSS 20.0 software. Categorical data presented as frequency and percentages and was analyzed for significance with application of chi-square test. Continuous variables were presented as mean and standard deviation and were analyzed using t tests for significance determination. P value <0.05 was considered significant.

RESULTS

Mean age of the patients did not differ significantly in two groups (p=0.819). Majority of the patients were between 46-60 years of age. There was no difference in distribution of patients according to different age groups in two study groups (p=0.597). Thus one variable that would have affected the outcome was overcomed (Table 1).

Table 1: Age distribution.

Age parameter	Figure 8 group (n=40)	Omentopexy group (n=40)	P value
Mean±SD	46.2±12.4	46.8±10.9	0.819
Age groups			
≤30	7 (17.5%)	4 (10.0%)	0.597
31-45	11 (27.5%)	13 (32.5%)	
46-60	18 (45.0%)	21 (52.5%)	
>60	4 (10.0%)	2 (5.0%)	

Distribution of males and females did not differ significantly in two groups (p=0.556). However, males were majority of the case in both groups (95.0% and 97.5%). Thus second variable that would have affected the outcome was over comed (Table 2).

Table 2: Gender distribution.

Gender	Figure 8 group (n=40)	Omentopexy group (n=40)	P value
Male	38 (95.0%)	39 (97.5%)	0.556
Female	2 (5.0%)	1 (2.5%)	

Among different risk factors, alcohol was most frequent, but no significant difference was noted in proportion of patients in two groups (p=0.678). Other risk factors were smoking (35% vs 25%), tobacco chewing (40.0% vs 30.0%) and use of NSAIDs in 10% vs 12.5% cases. The difference in proportion of each risk factor did not differ significantly (Figure 1).

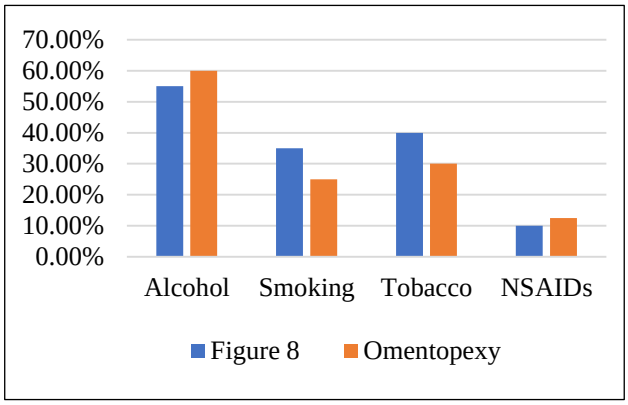

Figure 1: Risk factors for peptic perforation.

Majority of the patients from both groups presented with 24 (45.0% and 40.0%) to <48 hours (42.5% and 42.5%) whereas only 12.5% and 17.5% from two groups presented after 48 hours of onset of symptoms. The difference in distribution of patients was non-significant (p=0.892). Similarly other variable that could have affected the outcome such as clinical signs, previous history, radiological findings (that could have caused

delay in diagnosis and further treatment) were similar in both groups (Table 3).

Table 3: Time of presentation to hospital.

Day of presentation	Figure 8 group (n=40)	Omentopexy group (n=40)	P value
<24 hours	18 (45.0%)	16 (40.0%)	0.892
24-48 hours	17 (42.5%)	17 (42.5%)	
>48 hours	5 (12.5%)	7 (17.5%)	

Duodenal perforation was more common in both groups reaching frequency of 87.5% and 90.0% in figure of 8 and omentopexy groups. Gastric perforation was found in 12.5% and 10.0% cases in two groups. No significant statistical difference was observed for site of perforation (p=0.574) (Table 4).

Table 4: Site of perforation.

Site of perforation	Figure of 8 group (n=40)	Omentopexy group (n=40)	P value
Gastric	5 (12.5%)	4 (10.0%)	0.574
Duodenal	35 (87.5%)	36 (90.0%)	

Greater proportion of patients in omentopexy group had Hb <10 (45%) than figure 8 group (35.0%). However, the difference was statistically insignificant (p=0.497). Thus this factor that could have affected the result was similar in both the groups (Table 5).

Table 5: Hemoglobin.

Hb (gm%)	Figure of 8 group (n=40)	Omentopexy group (n=40)	P value
<10	14 (35.0%)	18 (45.0%)	0.497
>10	26 (65.0%)	22 (55.0%)	

RT removal was early in figure 8 group with mean 3.13±0.33 days post-operatively whereas it was done 4.18±0.38 days in omentopexy group and the difference in means was statistically significant (p<0.0001) (Table 6).

Table 6: RT removal day.

Parameter	Figure 8 group (n=40)	Omentopexy group(n=40)	P value
RT removal day	3.13±0.33	4.18±0.38	<0.0001

Oral feeding was delayed significantly in omentopexy group compared to that in figure 8 group (5.18±0.38 vs 4.13±0.33, p<0.0001) (Table 7).

Wound complications were most frequent seen in 25% and 35% patients from two groups (p=0.396). Presence of respiratory complications was seen in significantly greater proportion of cases from omentopexy group than figure 8 group (30.0% vs 12.5%, p=0.029) (Figure 2).

Table 7: Oral feeding day.

Parameter	Figure 8 group (n=40)	Omentopexy group (n=40)	P value
Oral feeding started	4.13±0.33	5.18±0.38	<0.0001

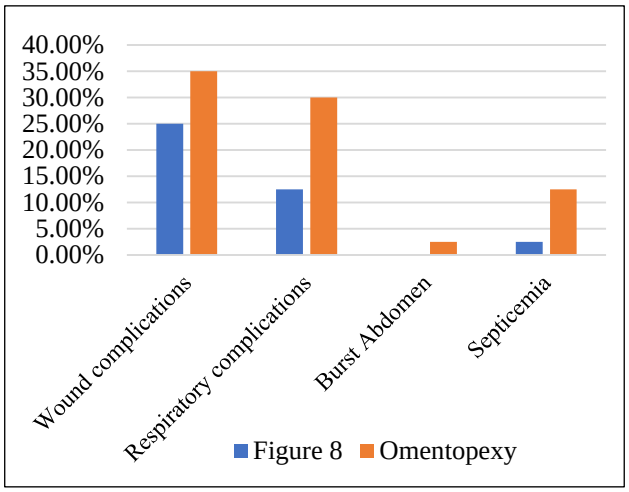

Figure 2: Individual postoperative complications.

Mean duration of hospital stay was significantly lower in figure 8 group than omentopexy group (8.13±0.46 vs 9.75±1.61, p=<0.0001). Majority of cases from figure 8 had duration <10 days compared to omentopexy group (97.5% vs 65.0%, p<0.0001) (Table 9).

Table 9: Duration of hospital stay.

Duration of hospital stay	Figure 8 group (n=40)	Omentopexy group (n=40)	P value
Mean±SD	8.13±0.46	9.75±1.61	<0.0001
<10 days	39 (97.5%)	26 (65.0%)	<0.0001
≥10 days	1 (2.5%)	14 (35.0%)	

Final-outcome of patients

There was only one death in omentopexy group whereas no death occurred in figure 8 group and all patients were discharged from hospital.

DISCUSSION

The present study was conducted at our tertiary care centre with predetermined criteria during the period of September 2015 to November 2017.A total of 80 patients were included in this study. Forty patients in each figure of 8 group and omentopexy group. Duodenal ulcer was

most common cause of peptic ulcer perforations followed by gastric ulcer perforations.

Peptic ulcer disease (PUD) is one of the common gastrointestinal ailments. Perforation of peptic ulcer is one of dreadful complication which requires immediate treatment. In our study we compared figure of 8 technique to omentopexy for the closure of peptic ulcer perforation.

Age

In our study, the mean age of patients was 46.2±12.4 and 46.8±10.9 in figure of 8 and omentopexy groups respectively. Maximum number of patients were in age group of 46-60 (45% and 52.5% respectively). Greater proportion of patients in 5th and 6th decade of life suggest PUD is more common in middle-age adults. We observed that 27.5% and 32.5% patients in age group of 31-45 whereas 17.5% and 10.0% patients from two groups respectively were below 30 years of age. This suggest there is increasing trend for PUD with perforation in younger age groups. Interestingly, there has been a shift in the age of patients with peptic perforation towards elderly in other part of world.[5]This might be due to H Pylori Infection More predominant in India as compared to developed nations. In a study from New Delhi, Bhandari et al reported mean age of 40.6 years in figure of 8 surgery and 44.46 years in omentopexy group which is similar to our finding. [6]In a study assessing figure of 8 technique in perforated peptic ulcers, Kishor and Gupta reported that majority of the patients were between 41 – 50 years.[7] A study from Ahmed et al observed that most of the patients with perforated duodenal ulcer were in 4th decade of life.[8]

Gender

Proportion of males outnumbered females in both groups. Overall male: female ratio was 25.6:1. Bhandari et al reported M:F ratio of 19:1.[6] Jani et al, reported M:F ratio of 9:1 in a study involving omental plugging operation.[9] Taj et al reported M:F ratio of 7.5:1 is their study assessing outcome of omentopexy as primary repair technique.[10] Ahmed et al, observed M:F ratio of 7.8:1 in cases of perforated duodenal ulcer.[8] Kishor and Gupta reported M:F ratio of 24:1 which nearly corresponds to our observation.[7] This high M:F ratio in our study compared to other studies may be due to the difference in the lifestyle of females indifferent parts of India.

Risk factors

In this study, 55% from figure 8 group and 60% patients from omentopexy group were alcoholic, whereas 35% and 25% respectively were active smokers. 40% and 30% patients from these groups respectively had tobacco consumption. Some of them had history of NSAID consumption. A study from Svanes C showed most of ulcer perforation in subject <75 years of age can be attributed to smoking.[11] Bhandari et al, observed smoking and tobacco chewing in 63.3% 51.6% cases. Among two groups, 70% and 56.6% were smokers whereas 50% and 53.3% were tobacco chewers. They reported alcoholism in 53.3% and 60% of patients respectively from two groups.[6] Ahmed et al, observed smoking in 38% cases whereas 8.7% were tobacco chewers.[8] Rosenstock et al, reported *Helicobacter pylori* and tobacco smoking as major risk factors for PUD. Odds ratio for these two factors were 4.3 and 3.8 respectively. They found that intake of alcohol increased risk of PUD significantly in patients positive for *H. pylori*.[9] These findings point that smoking, alcohol and H. pylori infection responsible for most of the PUD. We did not assess *H. pylori* status in our patients as patients were already had complication of perforation as well as because of cost constraints.

Day of presentation

Most of the patients (87.5% and 82.5% from two groups) in our study presented within 48 hours of onset of symptoms, of which 45% and 40.0% from figure of 8 and omentopexy groups presented within 24 hours. Only small number of patients of patients presented after 48 hours. These patients presented probably due to ignorance and poor economical status and treatment by quacks. Bhandari et al, reported that 35% patients presented within 24 hours whereas 35% presented after 24 hours but within 48 hours. Remaining presented late after onset of symptoms. Mean duration for presentation to hospital was 2.53 days.[6] Choudhary et al, in their study assessing figure of 8 technique reported that the average time of presentation was between 3-4 days, earliest up to 2-3 hours and delayed up to 7-8 days.[12] Delay in PUD perforation before surgical treatment is a strong determinant for increased complication rates and hospital costs.[13]

Site of perforation

Duodenal perforations were more common (87.5% and 90.0%) than gastric perforation (12.5% and 10.0%) in both figure of 8 and omentopexy groups respectively.The size of perforation was 0.5cm with minimal induration and minimal collections. Edges were friable. It is known that frequency of duodenal ulcer more common in western countries whereas gastric site is common in oriental countries. A 16 years trend analysis of PUD in India from Cherian et al reported that over the years, there was a steady increase in the proportion of women affected with PUD. However, there was a significant decrease in the endoscopic diagnosis of duodenal and gastric ulcers.[14] Choudhary et al, reported that in 120 patients assessed, there was duodenal perforation in 78% and gastric perforation in 22% patients.[12]

RT removal/oral feeding

We observed that figure of 8 surgical technique was associated with early RT removal than omentopexy

technique due to return of early bowel activity and early bowel sounds. The mean duration was 3.13±0.33 versus 4.18±0.38 in figure of 8 and omentopexygroup, and there was a statically difference(p<0.0001). This was further associated with early oral feeding and the mean duration was 4.13±0.33 versus 5.18±0.38 in figure of 8 and omentopexygroups and there was statically difference (p<0.0001). This finding suggests that the figure-8 technique is a good alternative to omentopexy with early recovery. Bhandari et al, observed that mean post-operative day of commencement of oral feed in figure of 8 group was 3.5±0.7 days and 4.133±1.6 days in the omentopexy group.[6] Study from MukhopadhyM et al showed that mean day of commencement oral feed in patients treated by omental plugging was 4.8 days and mean day of commencement of oral feed in patients treated by omentopexy was 3.46 days.[15]

Haemoglobin

In our study, 35% and 45% patients from figure of 8 and omentopexy group had Hb below 10 gm %. But the difference was non-significant (p=0.497). In a study from Bhandari et al, 28.33% patients had Hb<10 gm%.[6] Anemia is more prevalent in Indian setting compared to western countries. A correction of severe Hb deficiency may be necessary before surgical procedures.

Postoperative complications

We observed that number of complication in each surgical technique did not differ significantly (25% vs 35%, p=0.396). Major complications were wound infection (25% vs 35%) followed by respiratory complications (12.5% vs 30.0%). Burst abdomen was observed in one patient whereas septicemia was seen in 2.5% and 12.5% in both figure of eight and omentopexy groups respectively. Wound complications like stitch abscess and suture leak were most common. Respiratory complications like chest infections were most common. Post-operative complications were major factor in increasing hospital stay of patients. In Kocer et al, study, post-operative complications were seen in 24.2% patients. Pneumonia and wound infection were the commonest complications seen in 37.04% and 18.52% cases respectively; followed by sepsis in 8.34%, leakage in 5.55%, intra-abdominal abscess in 2 (1.86%) cases and bleeding in 1 (0.92%) patient.[13] A study from Taj et al, assessing the omentopexy treatment observed that 50% of the patients developed one or more complications postoperatively. Wound infection was seen in 10 (33.3%) patients and pneumonia in 7 (23.3%) patients. Two (6.7%) patients developed burst abdomen and residual pelvic collection that required re-exploration.[10] Bhandari et al, reported that wound infection (28.33%) was most common followed by burst abdomen (18.33%) and lung complications (18.33%).[6] Only one patient from omentopexy group developed post-operative bile leak. They also reported that 11.66% patients had post-operative septicaemia, of which 10% were from figure 8 surgical group and 13.33% patients from omentopexy group. Intra-abdominal abscess like pelvic abscess and sub diaphragmatic abscess was seen in 5% patients. Post-operative wound infection (26.66% vs 30%), burst abdomen (13.33% vs 23.33%) post-operative lung complications (16.66% vs 20%) were present in two groups.[6] Kishor and Gupta reported that overall most common complication was respiratory distress in postoperative period (16%). Second most common complication was fever (10%) followed by mild wound infection (6%), wound abscess in one case and leakage in one case.[7] Choudhary et al, reported that in the postoperative period, 3/153 (1.96%) patients had leakage from repair site.[12]

Duration of hospital stay

Mean duration of hospital stay was significantly lower in figure 8 technique than omentopexy (8.13±0.46 vs 9.75±1.61, p<0.0001). Bhandari et al reported mean hospital stay of 6.67±2.36 days and 6.6±2.21 days in two groups respectively. It should be noted that the hospital stay varies upon the duration of perforation, initial condition of the patients, associated illness and development of post-operative complications.[6] Taj et al reported median duration of hospital stay of 9 days in omentopexy treatment.[10]

Outcome

There was one death in omentopexy group. Delay in presentation was associated with higher mortality which are due to development of septicaemia and respiratory complications. Bhandari et al, reported that both intra-operative mortality and post-operative mortality within 30 days in both group was zero.[6] Taj et al, observed mortality in 1 (3.3%) case in patients who underwent omentopexy technique.[10] Kishor and Gupta reported that overall mortality was 4%; one each in Simple closure with omental patch (7.69%) and closure with omental plug (8.33%) but no mortality occurred in figure of 8 suture with omental patch.[7] Therefore, from this discussion it is clear that figure of 8 surgical technique is at par to omentopexy and may have benefits of early recovery, lower hospital stay and possibly lower complication rates.

CONCLUSION

Perforation peritonitis is more common in males , in fifth decade, with most common type is duodenal ulcer perforation (87.5% to 90%)followed by gastric ulcer perforation (12.5%to10%)**.** Majority of the patients belong to low socioeconomic status, with risk factors of alcohol consumption, and smoking being the leading risk factor. Major Post-operative complications were wound infection followed by respiratory complications, depending on time of presentation and general condition of the patients, amount of intraabdominal contamination. There was 1 death in omentopexy group. No death seen

in figure of 8 group. Other factors influencing the mortality rate in our study were the delay in presentation, low systolic blood pressure (less than 90 mm of hg) and impaired renal function, respiratory complications at the time of presentation. Patients with figure of eight were discharged earlier than omentopexy patients. Post operatively biliary leak was not seen in any patient of among figure of 8 stitch and one among omentopexy group's patients. In this study it can be concluded that figure of 8 stitch technique was a better alternative than omentopexy as with figure of 8 suturing technique, lesser tension is exerted on four points instead of two, there is faster post-operative recovery and lesser rate of complications. It can be used as safe alternative to omentopexy.

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