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RESEARCH ARTICLE

COMPARATIVE STUDY BETWEEN OMENTOPEXY AND OMENTAL PLUGGING FOR GIANT DUODENAL ULCER PERFORATION

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ABSTRACT

Giant duodenal ulcer perforations are common in surgical practice and very less series are reported in literature. The actual size of perforation is known definitely only intraoperatively. Giant duodenal ulcer is defined as perforation of size equal to or greater than 2 cm in diameter. Various techniques such as omentopexy, omental plugging, control tube duodenostomy, partial gastrectomy, jejunal-serosal patch, jejunal-pedical graft, proximal gastrojejunostomy, or even gastric disconnection have been described in literature. Here we are presenting comparative study of 36 cases of giant duodenal ulcer perforation collected prospectively from 2000 to 2014. Al-Ameen Medical college, Bijapur.

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INTRODUCTION

Duodenal Ulcer perforation is a common surgical emergency in our part and requiring prompt surgical intervention. Giant duodenal ulcer perforation is a sever variant of the duodenal ulcer disease and is extremely uncommon and challenging condition to manage. (Jani *et al.*, 2006) Although the size of perforation is an important measure in determining the outcome, a review of literature failed to reveal, any accepted definition of either small or giant perforations of duodenal ulcers. (Sanjay Gupta *et al.*, 2005) Neither could we come across any specific recommendations regarding the management of giant / large perforations which are said to be “difficult” to manage and have anecdotally been associated with high leak rate and mortality. (Sanjay Gupta *et al.*, 2005; Cranford *et al.*, 1988; Nussbaum and Schustermas 1985) Various investigators have used different criteria, some defining GDU perforation as > 0.5 cm (Jani K, Saxena 2000), > 1 cm (Choudhari *et al.*, 1991; Karanjia *et al.*, 1993), > 2 cm (Hermansson Von Holstein and Zilling 1999; Boey *et al.*, 1986), others > 2.5 cm (Pawanindra Lal and Anubhav Vindal 2009) However a more than 2 cm is the criteria used by most of the investigator describing the entity of GDU perforation and also used by us in the present series. (Pawanindra Lal and Anubhav Vindal 2009) Various techniques described in the literature such as omentopexy (Sanjay Gupta *et al.*, 2005), omental plugging (Jani *et al.*, 2006), control tube duodenostomy (Pawanindra Lal and Anubhav Vindal 2009), partial gastrectomy (Sanjay Gupta *et al.*, 2005), jejunal serosal

patch, jejunal pedical graft, proximal gastrojejunostomy (Sanjay Gupta *et al.*, 2005), or even gastric disconnection (Cranford *et al.*, 1988), can be used in its management. During the last two centuries, surgeons rocked their mind in search for way to use greater omentum in different field of surgery. (Gamal *et al.*, 2001) Omentoplasty was first used in 1826, when Jobert and Fanbelle, recommended to insert a strip of greater omentum between the raw edges of intestinal wound. (Gamal *et al.*, 2001) The classic pedicled omental patch that is performed for plugging of these perforations was first described by Cellan Jones in 1929. (Cellan – Jones 1929) Although it is wrongly attributed to Graham, who described the use of a free graft, of omentum to repair the perforates in 1937. (Graham 1937) Omentopexy technique is useful for a small holes, it is associated with leakage, when the perforation is large. These prompted a consideration of an alternative technique like omental plug for patching a large perforated peptic ulcer, which avoids the development of omental ischemia and subsequent leakage. (Karanjia *et al.*, 1993; Gamal *et al.*, 2001) Here we are presenting a comparative study of omentopexy and omental plugging in the management of giant duodenal ulcer perforation.

MATERIALS AND METHODS

This case series was conducted in the Department of Surgery, Al-Ameen Medical College and Al-Ameen Surgery Unit, District Hospital, Bijapur, taking into account 36 patients with giant duodenal ulcer perforations found during laprotomy from January 2000 to 2014. The case files of all patients were retrospectively analyzed for patient particulars, intraoperative findings, surgery performed post operative stay, morbidity and

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mortality Patients were diagnosed with perforated duodenal ulcer based on history, clinical examination, investigations and intraoperative findings. After preliminary resuscitation and investigations, the patients were taken for emergency surgery In 18 patients omentopexy was done. A total of three sutures of vicryl 2-0 were placed onto the normal healthy duodenum on either side of the perforation. A pedicled strand of omentum was placed directly onto the perforation and the sutures were tied above this. No attempt was made to close the perforation prior to placing the omentum as a plug In 18 patients, omental plugging was done In this procedure, the tip of the inserted nasogastric tube is brought into the peritoneal cavity through the perforation and that tip was sutured with free end of greater. Omentum by using chromic catgut 1-0. The tube was then withdrawn until 5 to 6 cm length of the omentum got occluded in the perforation. The omentum was then fixed to the site of perforation with 5 to 6 interrupted sutures of 2-0 vicryl taken between omentum and serosal of healthy duodenum. On discharge proton pump inhibitors were prescribed for 6 weeks. The gathered data was analyzed on a computer using SPSS version 10.0. Descriptive statistics like frequency, percentage and mean, median, SD (standard deviation) were computed for data presentation. Chi-square test was used to compare frequencies at 95% confidence interval.

RESULT

36 consecutive patients with giant duodenal ulcer perforations in an emergency setting were included in this study during a period of 14 years from 2000 to 2014. Eighteen patients were treated with conventional omentopexy and the remaining 18 with omental plugging, as described above. Both groups were matched with respect to the patients' demography and other features.

AGE

In our study with 36 patients of giant duodenal perforation, 15 patients (41.66%) were in 41-50 years age group, 12 patients (33.33%) were in 51-60 years age group and 9 patients (25%) were above 60 years of age with highest incidence are seen in 5th decade of life. In 18 patients of omentopexy 3 (16.66%) were in the age group of 41-50 years, 6 (33.33%) were in the age group of 51-60 years and 9 (50%) were more than 60 years of age Mean age 59.94 and standard deviation 6.56 While in 18 patients of omental plugging, 12 (66.66%) were in the age group of 41-50 years and 6 (33.33%) were in the age group of 51-60 years Mean age 49.78 and standard deviation 3.69.

Table 1. Age distribution

Age Distribution In Years	Omentopexy	Omental Plugging	Total
41-50 years	3 (16.66%)	12 (66.66%)	15 (41.66%)
51 – 60 years	6 (33.33%)	6 (33.33%)	12 (33.33%)
60 years >	9 (50%)	0	9 (25%)
	18	18	36

SEX

In our study of 36 patients of giant duodenal perforation there were 29 (80.55%) males and 7 (19.45%) females, with M:F 4.14:1 In omentopexy we had 14 (77.77%) male and 4

(22.23%) females with M:F 3.5:1 and in omental plugging 15 (83.34%) males and 3 (16.66%) females with M:F 5:1.

SIZE

In our study 33 (91.66%) patients were had perforation between 2 to 3 cm of size and 3 (8.34%) were more than 3cm size. In omentopexy and omental plugging we had 17 (94.44%) and 16 (88.88%) had size of perforation between 2 to 3 cm respectively and 1 (5.56%) and 2 (11.12%) were size of perforation more than 3cm.

Table 2. Size of Perforation

Size of Perforation	Total	Omentopexy	Omental Plugging
2 to 3 cm	33 (91.66%)	17 (94.44%)	16 (88.88%)
>3 cm	3 (8.34%)	1 (5.56%)	2 (11.12%)
Total	18	18	18

Duration of perforation

In the overall present study 15 (41.66%) patients had the perforation less than 48 hours while 21 (58.44%) patients had more than 48 hours. In omentopexy we had 6 (33.33%) patients had perforation less than 48 hours, 12 (66.66%) had perforation more than 48 hours, with mean 31.00 and standard deviation 5.19 While in omental plugging 9 (50%) patients had perforation less than 48 hours and 9 (50%) had more than 48 hours, with mean 44.78 and standard deviation 18.84.

Table 3. Duration of Perforation

Duration of Perforation	Omentopexy	Omental Plugging	Total
Less than 48 hours	6 (33.33%)	9 (50%)	15 (41.66%)
More than 48 hours	12 (66.66%)	9 (50%)	21 (58.44%)

Peritoneal contamination

Out of 36 patients 25 (70%) had severe contamination with more than 1000 ml of purulent fluid in peritoneal cavity.

Associated diseases

Out of 36 patients, 11 (30.55%) had associated diseases, hypertension in 7 (19.44%), 3 (8.33%) were diabetes mellitus and 1 (2.77%) was arthritis. In omentopexy 4 patients (22.22%) were associated with hypertension, 2 (11.11%) were associated with diabetes mellitus while in omental plugging 3 (16.66%) were associated with hypertension, 1 (5.55%) was associated with diabetes mellitus and 1 (5.55%) was associated with arthritis.

Mean operative time

The operative time for omentopexy ranged from 40 – 80 mins ,with mean of 63.44 mins and SD of 5.36 Operative time for omental plugging was 90-110mins with a mean of 104.33 mins and SD of 5.32. According to our study omentopexy has the least operative time compared to omental plugging procedures Operative time for omental plugging was significantly more (P<0.001) than operative time for omentopexy.

Complication

In omentopexy we had 11 (61.11%) complications, 4 (22.22%) wound infection, 3 (16.66%) lung infection, 3

(16.66%) reperforation and 1 (5.55%) pelvic abscess While in omental plugging 8 (44.44%) complication among these 3 (16.66%) wound infection, 3 (16.66%) lung infection, 1 (5.55%) reperforation and 1 (5.55%) pelvic abscess. In our study incidence of complication were greater in omentopexy than omental plugging Patients with reperforation were managed conservatively with TPN and laprostomy wound dressing and 1 patient underwent re exploration proceed partial gastrectomy.

Table 4. Complications

Complications	Omentopexy	Omental Plugging
Wound Infections	4 (22.22%)	3 (16.66%)
Lung Infection	3 (16.66%)	3 (16.66%)
Re-perforation	3 (16.66%)	1 (5.55%)
Pelvic Abscess	1 (1.55%)	1 (1.55%)
Total	11 (61.11%)	8 (44.44%)

Table 5. End Points of Study

End Points	Omentopexy	Omental Plugging
Re-Perforation	3 (16.66%)	1 (5.55%)
Mortality	2 (11.1%)	1 (5.55%)
Mean Post-Op stay	17.94	16.22

Post op stay

Mean post operative stay for omentopexy was 17.94 with standard deviation 4.52 While in omental plugging was 16.22 with standard deviation 4.40. In our study the difference in the post operative stay between omentopexy and omental plugging was statistically not significant.

Mortality

In present study mortality noticed in 11.1% (2) patients of omentopexy and 5.55% (1) patients of omental plugging.

DISCUSSION

Taking into account the various data from literature and comparing it with present series, a few interesting facts came in the limelight

AGE

Highest cases in our study are seen in 5th decade which is comparable with other studies. (Jani *et al.*, 2006; Khalil *et al.*, 2010; Gupta *et al.*, 2003) Study of P Lal *et al.* (2009) showed the majority of the patients 75% ranged in the age from 30 to 50 years. Whereas only 4 and 6 patients were less than 30 years and greater than 50 years respectively. (Pawanindra Lal and Anubhav Vindal 2009)

SEX

In our study of 36 giant duodenal ulcer perforation the reported male female ratio is 4.14:1 In omentopexy M:F 3 5:1 and in omental plugging M:F 5:1. In other studies the reported male:female ratio varies between 9:1 and 7 5:7. (Jani *et al.*, 2006; Khalil *et al.*, 2010)

Size of Perforation

In our study 33 (91.66%) patients had perforation between 2 to 3 cm of size and 3 (8.34%) were more than 3 cm size.¹⁰ In

omentopexy and omental plugging we had 17 (94.44%) and 16 (88.88%) had size of perforation between 2 to 3 cm respectively and 1 (5.56%) and 2 (11.12%) were size of perforation more than 3 cm respectively. Study of P Lal *et al* showed 67.5% patient had perforation greater than 2 cm and 32.5% had perforation greater than 3 cm.

Duration of Perforation

In the overall presence study 15 (41.66%) patients had the perforation less than 48 hours while 21 (58.44%) patients had more than 48hours In omentopexy we had 6 (33.33%) patients with perforation less than 48 hours, 12 (66.66%) had perforation more than 48hours While in omental plugging 9 (50%) patients had perforation less than 48 hours and 9 (50%) had more than 48 hours. Study of P Lal *et al.* (2009) showed thirty one Patients (77.5%) presented after 48 hours of the onset of peritonitis. (Pawanindra Lal and Anubhav Vindal 2009)

Peritoneal Contamination

In our study 70% patients had sever contamination more than 1000 ml purulent fluid in peritoneal cavity The findings is also comparable with most of the series. (Taj Mh *et al.*, 2007) Duration of perforation along with the size of the perforation in most cases determine the amount of peritoneal contamination. (Mukhopadhyay *et al.*, 2011)

Associated Diseases

Out off 36 patients, 11 (30.55%) had associated diseases, hypertension in 7 (19.44%), 3 (8.33%) were diabetes mellitus and 1 (2.77%) was arthritis. One or more associated disease was one of the significant factor associated with mortality in patients undergoing surgery (Sanjay Gupta *et al.*, 2005)

Operative Time

The operative time for omentopexy ranged from 40 – 80 mins and with a mean of 63.44 mins and SD of 5.36 operative time for omental plugging was 90-110 mins with a mean of 104.33 mins and SD of 5.32 Omentopexy has the least operative time compared to omental plugging procedures. According to our study operative time for omental plugging was significantly more (P<0.001) than operative time for omentopexy similar observation made by Mukhopadhyay *et al.* (2011)

Complications

In our study 11 (61.11%) patient of omentopexy had complication among these 4 (22.22%) patients had wound infection, 3 (16.66%) had lung infection, 3 (16.66%) had reperforation and 1 (5.55%) had pelvic abscess While in patients treated with omental plugging 8 (44.44%) patients had complication among these 3 (16.66%) had wound infection, 3 (16.66%) had lung infection, , 1 (5.55%) had reperforation and 1 (5.55%) had pelvic abscess. All patients had major or minor post surgical complication raging from wound infection to intra abdominal sepsis but the incidence of severe complication was greater in the omentopexy. Similar observation made by Mukhopadhyay *et al.* (2011) Leakage after duodenal repair is not uncommon (2 to 10%) and is associated with high mortality 10 to 35% which increases with

delay in reperforation. (Pawanindra Lal and Anubhav Vindal 2009) In our study of patient treated with omentopexy 3 (16.66%) had reperforation while patient treated with omento plugging had 1 (5.55%) had reperforation. None of the available procedure in the literature is immune to the risk of post surgical leakage. (Pawanindra Lal and Anubhav Vindal 2009)

Post Operative Stay

Mean post operative stay for omentopexy was 17.94 with standard deviation 4.52, while in omental plugging was 16.22 with standard deviation 4.40. In our study the difference in the post operative stay between the omentopexy and omentoplugging was statistically not significant. Similar study observed by Mukhopadhyay *et al.* (2011) Higher hospital stay is seen in omentopexy because patients in their group developed reperforation with increase in hospital stay

Mortality

Reported mortality in patients of omentopexy 11.1% while 5.55% in patients of omental plugging. The overall reported mortality rate varies between 1.32 to nearly 20% in different series (Hermansson Von Holstein and Zilling 1999; Rajesh *et al.*, 2003) and recent studies have shown it to be around 10%. (Rajesh *et al.*, 2003) The size of perforation in peptic ulcer varies from 3 mm to 3 cm in diameter which adversely affect the prognosis if perforation is less than 5 mm in diameter there is 6% mortality rate reported when it is between 5 to 10 mm the mortality goes upto 19% when it is more than 10 mm mortality rate is about 24%. Hannessy (1969)

Conclusion

Giant duodenal ulcer perforation is a severe life threatening variant of duodenal ulcer perforation. Comparative to omentopexy, omental plugging is associated with less number of complication for example re perforation and low mortality. But our sample size is less, that is 36 cases (18 cases each), it requires further study with a larger sample size.

Author Contribution

Study conception and design : Nishikant Gujar.
Supervision : Sajid Ahmed Mudhol
Drafting of Manuscript and critical revision : Adil Ahmed Karnul & Sachin D.M.
Acquisition of data : Sushila P. Garag

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