

Comparative Study Between Omental Plugging With Controlled Tube Duodenostomy for Management of Giant Duodenal Ulcer Perforation

Nishikant Gujar¹, Sachin D. M.²

^{1,2}Department Of General Surgery, Al-Ameen Medical College, Bijapur – 586108, Karnataka, India

Abstract: *Perforated peptic ulcer is common surgical emergency, the immediate definitive treatment operation for perforated peptic ulcer is neither safe. Giant duodenal ulcer is defined as perforation of size equal to or greater than 2 cm in diameter. Giant perforation is common in Indian surgical practice but literature is silent regarding its result. 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. To choose right surgery either omentopexy, omental plugging or control tube duodenostomy definitive surgery is very difficult. Similar to the omentopexy, omental plugging and control tube duodenostomy they are not immune for the complication i.e. post surgical leakage. Here we are studying the efficacy of omental plugging and control tube duodenostomy.*

Keywords: Giant duodenal ulcer perforation, omental plugging, control tube duodenostomy, Reperforation and complications.

1. Introduction

Ulcer perforation was a rare disease in the nineteenth century, However its incidence increased greatly at the turn of the twentieth century. Since then, the world has seen in an epidemic of duodenal perforation among young men which now seems to be waning.^{1,3}

Following the introduction of H₂ –Receptor blocker and proton – pump inhibitors, there has been sharp decrease in elective peptic ulcer surgery. However, emergency operations for complication such as perforations are in the rise.^{5,6}

Giant duodenal ulcer perforation is a severe variant of the duodenal ulcer disease and is not uncommon in Indian Surgical Practice and this condition is challenging to manage.

Two related but different terms used in literature must not be used interchangeably “giant Duodenal Ulcer” and “Giant Duodenal Ulcer perforation”.

Various investigators have used different criteria, some defining UDU Giant Duodenal Ulcer perforation as > 0.5⁷. Some defining > 1 cm², Some > 2 cm^{9,10}, P others > 2.5 cms in size.

Principally, any duodenal ulcer perforation that cannot be managed by the conventional method of repair because of the size of perforation and the extent of native tissue loss is to be considered as a special entity and should be managed in a different manner.

Various technique described in literature such as Omental plugging³, Controlled tube duodenostomy², control tube duodenostomy¹, partial gastrectomy, jejunal serosal patch, jejunal pedical gastrectomy, proximal gastrectomy³, or even gastric disconnection⁴ can be used in its management.

Duodenal ulcer perforation > 2 cm have been defined as giant duodenal ulcer (GDU) perforation and is used by most of the investigators, describing the entity of Giant Duodenal Ulcer perforation and also used in the present series.

Although there have been some reports of Giant Duodenal Ulcer in small series, there is no consensus yet on the appropriate type of surgical intervention for this rare and dangerous condition.

Here we are presenting comparative study of omental plugging with controlled tube duodenostomy in the management of Giant Duodenal Ulcer perforation.

2. Materials & Methods

This prospective case of series was conducted in the department of surgery Al-ameen medical college Bijapur, taking in to account 36 patients with giant duodenal ulcer perforation found during laprotomy from January 2000 to 2015. The case files of all patients were retrospectively analyzed for patient particulars, intraoperative findings, surgery performed post operative stay, morbidity and 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, 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.

In 18 patients, modification of the controlled tube duodenostomy, which has been described for duodenal trauma, triple tube duodenostomy was done. Following a peritoneal lavage by laprotomy, Kocherisation of the duodenum is done in an attempt to decrease tension at the site of repair. After freshening of the edges of the perforation, a primary repair is done with 2-0 vicryl single layer in interrupted fashion, kipping the knots out side. In retrograde duodenostomy, 15cms of jejunum distal to the duodenal-jejunal flexure is identified and a tube is passed through an ante mesenteric enterotomy in a retrograde fashion in to the junction of the second and the third part of duodenum. Another Malcot's catheter of size 16 F is passed through and enterotomy, 5cms distal to first one in an ante grade manner in to jejunum as feeding jejunostomy. An optional open tube gastrotomy is done. 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.

3. Result

36 consecutive patients with giant duodenal ulcer perforations in an emergency setting were included in this study during a period of 15 years from 2000 to 2015. Eighteen patients were treated with conventional Omental plugging and the remaining 18 with Triple tube duodenostomy, as described above. Both groups were matched with respect to the patients' demography and other features

3.1 Age

In our study with 36 patients of giant duodenal perforation, 26 patients (72.22%) were in 41-50 years age group, 10 patients (27.78%) were in 51-60 years age group with highest incidence are seen in 5th decade of life.

Table 1: Age distribution

Age Distribution In Years	Omental plugging	Controlled tube duodenostomy	Total
41-50 years	12 (66.66%)	14 (77.77%)	26 (72.77%)
51 – 60 years	6 (33.33%)	4 (22.23%)	10 (27.78%)
Total	18	18	36

In 18 patients of Omental plugging 14 (66.66%) were in the age group of 41-50 years, 4 (33.33%) were in the age group of 51-60 years and 9 (50%) were more than 60 years of age Mean age 59.9 and standard deviation 6.6. While in 18 patients of Controlled tube duodenostomy, 14 (77.77%) were in the age group of 41-50 years and 4 (22.23%) were in the age group of 51-60 years Mean age 47.20 and standard deviation 4.77.

3.2 Sex

In our study of 36 patients of giant duodenal perforation there were 30 (83.33%) males and 6 (16.66%) females, with M:F 5:1. In Omental plugging we had 14 (77.77%) male and 4 (22.23%) females with M:F 3.5:1 and in Controlled tube

duodenostomy 16 (88.88%) males and 2 (11.11%) females with M:F 5:1.

3.3 Size

Table 2: Size of Perforation

Size of Perforation	Omental plugging	Controlled tube duodenostomy	Total
2 to 3 cm	17 (94.44%)	15 (83.34%)	32 (88.88%)
>3 cm	1 (5.56%)	3 (16.66%)	4 (11.11%)
	18	18	36

In our study 32 (88.88%) patients were had perforation between 2 to 3 cm of size and 4 (11.11%) were more than 3 cm size.

In Omental plugging and Controlled tube duodenostomy we had 17 (94.44%) and 15 (83.34%) had size of perforation between 2 to 3 cm respectively and 1 (5.56%) and 3 (16.66%) were size of perforation more than 3cm.

3.4 Duration of Perforation

Table 3: Duration of Perforation

Duration of Perforation	Omental plugging	Controlled tube duodenostomy	Total
Less than 48 hours	6 (33.33%)	10 (55.56%)	16 (41.66%)
More than 48 hours	12 (66.66%)	8 (44.44%)	20 (58.44%)

In the overall present study 16 (44.44%) patients had the perforation less than 48 hours while 20 (55.55%) patients had more than 48 hours. In Omental plugging we had 6 (33.33%) patients had perforation less than 48 hours, 12 (66.66%) had perforation more than 48 hours, with mean 48.6 and standard deviation 18.2 While in Controlled tube duodenostomy 10 (55.56%) patients had perforation less than 48 hours and 8 (44.44%) had more than 48 hours, with mean 36.61 and standard deviation 13.89.

3.5 Peritoneal Contamination

Out of 36 patients 27 (75%) had severe contamination with more than 1000 ml of purulent fluid in peritoneal cavity.

3.6 Associated Diseases

Out of 36 patients, 12 (33.33%) had associated diseases, hypertension in 5 (13.88%), 5 (13.88%) were diabetes mellitus and 2 (5.55%) was arthritis. In Omental plugging 4 patients (22.22%) were associated with hypertension, 2 (11.11%) were associated with diabetes mellitus while in Controlled tube duodenostomy 3 (16.66%) were associated with hypertension, 1 (5.55%) was associated with diabetes mellitus and 2 (11.11%) was associated with arthritis.

3.7 Mean Operative Time

The operative time for Omental plugging ranged from 40 – 80 mins, with mean of 63.4 mins and SD of 5.4 Operative time for Controlled tube duodenostomy was 90-120 mins with a mean of 112.38 mins and SD of 878. According to our study Omental plugging has the least operative time compared to Controlled tube duodenostomy procedures Operative time for Controlled tube duodenostomy was

significantly more ($P < 0.001$) than operative time for omentoplexy.

3.8 Complication

Table 4: Complications

Complications	Omental plugging	Controlled tube duodenostomy
Wound Infections	4 (22.22%)	4 (22.22%)
Lung Infection	3 (16.66%)	2 (11.12%)
Re-perforation	3 (16.66%)	1 (5.55%)
Pelvic Abscess	1 (5.55%)	1 (5.55%)
Total	11 (61.11%)	8 (44.44%)

In Omental plugging 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 Controlled tube duodenostomy 8 (44.44%) complication among these 4 (22.22%) wound infection, 2 (11.12%) lung infection, 1 (5.55%) reperforation and 1 (5.55%) pelvic abscess.

Table 5: End Points of Study

End Points	Omental	Controlled tube duodenostomy
Re-Perforation	3 (16.66%)	1 (5.55%)
Mortality	2 (11.1%)	1 (5.55%)
Mean Post-Op stay	17.9	14.1

In our study incidence of complication were greater in Omental plugging than Controlled tube duodenostomy. Patients with reperforation were managed conservatively with TPN and laprostomy wound dressing and 1 patient underwent re exploration proceed partial gastrectomy.

3.9 Post op Stay

Mean post operative stay for Omental plugging was 17.9 with standard deviation 4.5. While in Controlled tube duodenostomy was 14.1 with standard deviation 4.24. In our study the difference in the post operative stay between omentoplugging and Controlled tube duodenostomy was not significant. ????

3.10 Mortality

In present study mortality noticed in 11.1% (2) patients of Omental plugging and 5.55% (1) patients of Controlled tube duodenostomy.

4. 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. (^{1,14,15}). Study of P Lal et al 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. ¹⁰

Sex: In our study of 36 giant duodenal ulcer perforation the reported male female ratio is 5:1. In Omental plugging M:F 3.5:1 and in Controlled tube duodenostomy M:F 8:1.

In other studies the reported male : female ratio varies between 9:1 and 7.5:7. ^{1,14}

Size of Perforation: In our study 32 (88.88%) patients had perforation between 2 to 3 cm of size and 4 (11.11%) were more than 3 cm size. ¹⁰ In Omental plugging and Controlled tube duodenostomy we had 17 (94.44%) and 15 (83.34%) had size of perforation between 2 to 3 cm respectively and 1 (5.56%) and 3 (16.66%) 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 16 (44.44%) patients had the perforation less than 48 hours while 20 (55.55%) patients had more than 48 hours. In Omental plugging we had 6 (33.33%) patients with perforation less than 48 hours, 12 (66.66%) had perforation more than 48 hours. While in Controlled tube duodenostomy 10 (55.55%) patients had perforation less than 48 hours and 8 (44.44%) had more than 48 hours.

Study of P Lal et al showed thirty three Patients (77.5%) presented after 48 hours of the onset of peritonitis. ¹⁰

Peritoneal Contamination: In our study 75% patients had sever contamination more than 1000 ml purulent fluid in peritoneal cavity. The findings is also comparable with most of the series. ¹⁶

Duration of perforation along with the size of the perforation in most cases determine the amount of peritoneal contamination. ¹⁷

Associated Diseases: Out off 36 patients, 12 (33.33%) had associated diseases, hypertension in 5 (13.88%), 5 (13.88%) were diabetes mellitus and 2 (5.55%) was arthritis.

One or more associated disease was one of the significant factor associated with mortality in patients undergoing surgery. ²

Operative Time: The operative time for Omental plugging ranged from 40 – 80 mins and with a mean of 63.4 mins and SD of 5.4 operative time for Controlled tube duodenostomy was 90-120 mins with a mean of 112.38 mins and SD of 8.78

Omental plugging has the least operative time compared to Controlled tube duodenostomy procedures. According to our study operative time for Controlled tube duodenostomy was significantly more ($P < 0.001$) than operative time for Omental plugging similar observation made by Mukhopadhyay M et al. ¹⁷

Complications: In our study 11 (61.11%) patient of Omental plugging 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 Controlled tube duodenostomy 8 (44.44%) patients had complication among these 4 (22.22%) had wound infection, 2 (11.12%) had lung infection, 1 (5.55%) had reperforation and 1 (5.55%) had pelvic abscess.

All patients had major or minor post surgical complication ranging from wound infection to intra abdominal sepsis but

the incidence of severe complication was greater in the Omental plugging. Similar observation made by Mukhopadhyay M et al.¹⁷

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.¹⁰ In our study of patient treated with Omental plugging 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.¹⁰

Post Operative Stay

Mean post operative stay for Omental plugging was 17.9 with standard deviation 4.5, while in Controlled tube duodenostomy was 14.1 with standard deviation 4.24. In our study the difference in the post operative stay between the Omental plugging and omentoplugging was not statistically not significant. Higher hospital stay is seen in Omental plugging because patients in their group developed reperforation with increase in hospital stay

5. Mortality

Reported mortality in patients of Omental plugging 11.1% while 5.55% in patients of Controlled tube duodenostomy. The overall reported mortality rate varies between 1.32 to nearly 20% in different series^{8,18} and recent studies have shown it to be around 10%.¹⁸ 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%.¹⁹

6. Conclusion

Even management of Giant duodenal ulcer perforation by omental plugging and controlled tube duodenostomy both procedure having risk of re perforation. No of these procedure is immune for complication. But our sample size is less that is 36 cases (18 case each), it requires further study with a large sample size .

7. Author Contribution

Study conception and design: Nishikant Gujar
Supervision: Nishikant Gujar
Drafting of Manuscript and critical revision : Sachin D.M.
Acquisition of data: Sachin D.M.

8. Acknowledgement

The authors deeply acknowledge Dr. B. S. Patil, Dean, Al-Ameen Medical college, Bijapur for granting permission to publish the study. We are very much thankful to Dr. Saleem Dhundasi, Vice Principal, Al-Ameen Medical College, Bijapur for the valuable support in conduction of study.

References

- [1] Jani K, Saxena AK, Vaghasia R (2006) omental plugging for large sized duodenal peptic perforation : a prospective randomized study of 100 patients. *Souther. Med. J.* 99 (5) : 467-471.
- [2] Sanjay Gupta, Robin Kaushik, Rajeev Sharma, Ashok Attri. The management of large perforations of duodenal ulcers. *BMC, Surgery* 2005, 5 : 15 doi ; 10 : 1186 / 1471-2482 - : 15.
- [3] Cranford CA, Alson RO, Brudky EL III . Gastric disconnection in management of perforated giant duodenal ulcer *Am. J. Surg.* 1988 ; 155 : 439-42.
- [4] Nussbaum MS, Schustermas MA. Management of giant duodenal ulcer, *Am J. Surg.* 1985 ; 1491 : 357-61.
- [5] Jani K, Saxena. Management of large sized duodenal peptic perforations by omental plugging – A new technique : A prospective randomized study of 100 patients. *Ind. J. Surgery* 2000, 62 : 134-88.
- [6] Choudhari A, Bose SM, Gupta NM, Wig-JD, Khanna SK. Giant perforations of duodenal ulcer. *Ind J. Gastroenterol.* 1991, 10 : 14-5.
- [7] Karanjia ND, Shanahan DJ, Knight MG. Omental patching of a large perforated duodenal ulcer. A new method *Br. J. Surg.* 1993, 80 : 65.
- [8] Hermansson Von Holstein CS, Zilling T : Surgical approach and prognostic factors after peptic ulcer perforation. *Eur. J. Surg.* 1999, 165 : 566-72.
- [9] Boey J, Choi KY, Alagaratnam TT, Poon A : Risk stratification in perforated duodenal ulcers. A prospective validation of predictive factors. *Ann Surg.* 1986, 205 : 22-6.
- [10] Pawanindra Lal, Anubhav Vindal : Controlled tube duodenostomy in the management of giant duodenal ulcer perforation – a new technique for surgically challenging condition. *American Journal of surgery* (2009) 198 , 319-323.
- [11] Gamal I, Moussa, M. D. : Abd El Wahab H. Gad, M D ; Osama H. EL Khadrawy, M. D. Mahmoud M, Abdulrazeck, M.D. ; and fersan A, Sallam, M. D. Omental plug technique in the treatment of a large perforated peptic ulcer. *Egyptian Journal of Surgery* Vol. (20), No. (3), July, 2001.
- [12] Cellan – Jones CJ : A rapid method of treatment in perforated duodenal ulcer. *BMJ* 1929, 36 : 1076-7.
- [13] Grahm RR : The treatment of perforated duodenal ulcers. *Surg. Gynecol Obstel* 1937, 64 : 235-8.
- [14] Khalil AR, Yunas M, Jan QA. Nisar W, Imran M (2010) Grahm's omentoplexy in closure of perforated duodenal ulcer *J Med Sci* 18 (2) : 87-90.
- [15] Gupta BS. Talukdar RN, Neupane HC (2003). Cases of perforated duodenal ulcer treated in college of medical sciences, Bharatpur over a period of 1 year. *Kathmandu Univ Med J* 1 : 166-169.
- [16] Taj Mh, Muhammad D, Qureshi SA (2007). Outcome of omentoplexy as primary repair in perforated duodenal ulcer. *JCPSP* 17 (12) : 731-735.
- [17] Mukhopadhyay M, Banerjee C, Sarkar S, Roy D, Rahman QM (2011). Comparative study between omentoplexy and omental plugging in treatment of giant peptic perforation. *Ind J. Surg.* 73 (5) : 341-345.

- [18] Rajesh V, Sarathchandra S, Smile SR. Risk factors predicting operative mortality in perforated peptic ulcer disease. Trop Gastroenterol 2003 ; 24 : 148-50.
- [19] Hannessy E (1969) Perforated peptic ulcer mortality and morbidity in 603 cases Aust NZ J Surg. 38 : 243.

