# **Original Research Article**

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# A randomized comparative study between omentopexy and omental plugging in treatment of duodenal perforation

# Debashis Mondal, Avijeet Mukherjee\*

Department of General Surgery, College of Medicine and JNM Hospital, Kalyani, West Bengal, India

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# \*Correspondence:

Dr. Avijeet Mukherjee,

E-mail: naveennumerouno@gmail.com

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#### **ABSTRACT**

**Background:** Perforation due to duodenal ulcer is a common cause of peritonitis and is considered as one of the most catastrophic complication of duodenal ulcer perforation. Repair of perforation are considered particularly hazardous because of the extensive duodenal tissue loss, friability of the ulcer margins, surrounding tissue inflammation, poor general condition of the patient and overwhelming sepsis due to bacterial peritonitis. Thus, there is a need to compare closure of duodenal perforations by either Graham's patch (OX) or omental plugging (OP) which are the simpler and more common methods followed these days in duodenal perforation management.

**Methods:** The clinical material consists of all inpatients admitted under General Surgery for management of duodenal ulcer perforation at College of Medicine and JNM Hospital, Nadia. The study was conducted during the period from July 2018 to June 2019. This study consisted of 50 consecutive cases and diagnosis was made on the basis of clinical and histopathological findings.

**Results:** A total of 73 patients were enrolled for the study. All our patients were males. Wound infection (OX -21.1%, OP -14.3%), septicaemia (OX-15.8%, OP-11.4%), and lung complication (OX-13.2%, OP-11.4%) were the commonest complications. Mean postoperative stay for OX was 12.92 with standard deviation 3.00 while in OP was 11.54 with standard deviation 1.54 (statistically significant).

**Conclusions:** OP is associated with less incidence of postoperative complication in compared to omentopexy procedure for example wound infection, reperforation, lung complication, septicemia and intra-abdominal abscess. OP is associated with less number of mortality. OP is associated with higher mean operative time as it is a relatively newer and less utilized technique.

**Keywords:** Duodenal ulcer perforation, Omental plugging, Omentopexy

## INTRODUCTION

Perforation due to duodenal ulcer is a common cause of peritonitis and is considered as one of the most catastrophic complication of duodenal ulcer perforation. <sup>1,2</sup> Following the introduction of H2 receptor blockers and proton pump inhibitors, there has been a sharp decrease in elective peptic ulcer surgery. However, emergency operations for complications such as perforations are on the rise. <sup>3,4</sup> Though it is a common

surgical emergency, literature is silent on exact definition, incidence, management and complication of duodenal ulcer perforation. Repair of perforation are considered particularly hazardous because of the extensive duodenal tissue loss, friability of the ulcer margins, surrounding tissue inflammation, poor general condition of the patient and overwhelming sepsis due to bacterial peritonitis. These factors are said to preclude simple closer using omental patch, often resulting in postoperative leak or gastric outlet obstruction. In spite of

the modern advances in surgical, anesthetic and ancillary facilities it assumes threatening dimensions. Thus, there is a need to compare closure of duodenal perforations by either Graham's patch or omental plugging (OP) which are the simpler and more common methods followed these days in duodenal perforation management.

Also there is a need to study the importance of improvement in patients' health condition based on duration of perforation after which patient presents with it in our health set up and also on how patient responds depending on the size of perforation.

Perforations are technically difficult to repair due to the duodenum's complex anatomy and marginal blood supply shared with the pancreas. High intra luminal pressure, tendency of the mucosa to extrude through the suture line and autodigestive enzymes of the pancreas and bile acid add to the risk of breakdown of the suture line.<sup>5</sup> Conventional wisdom dictates that healthy vascularised tissue should be incorporated in the repair of any defect with tissue loss or with friable edges.<sup>5</sup> Several elaborate surgeries have been devised to manage complicated peptic ulcer. There are also many complex procedures that were tried on duodenal perforations previously but these required a higher level of surgical expertise and also could not be followed in emergency situations and the facilities of these may not be available in all the health centers. In contrast to these elaborate measures, the omental plug is a simple procedure which does not require much of the significant expertise and can even be performed in a very short time by a trainee general surgeon in a seriously ill patient in an emergency situations and in almost every operating health centers. <sup>6,7</sup> Thus in our present study we are considering simple procedures of omental patch and OP and not any other higher complex surgical modalities.

## **Objectives**

This randomized comparative clinical study is aimed at comparing the efficacy of the two commonly used omental patching (Graham's Patch) and OP techniques in the management of duodenal ulcer perforations. The study also aims to study the patient response based on duration of patient presentation.

## **METHODS**

The clinical material consists of all inpatients admitted under General Surgery for management of duodenal ulcer perforation at College of Medicine and JNM Hospital, Nadia. The study was conducted during the period from July 2018 to June 2019. This study consisted of 50 consecutive cases and diagnosis was made on the basis of clinical and histopathological findings.

All patients diagnosed with perforated duodenal ulcer were included in the study excluding patients with septicaemia, failure of other organ systems, suspected malignant duodenal ulcer multiple perforations or those who have undergone GI surgeries in the past.

#### Sample size

Study was contemplated to include at least 30 patients in each of the study group. There were 80 prediagnosed cases of duodenal perforation during the study period. Among those, 7 patients did not give consent for operation. 73 patients who underwent emergency surgery for duodenal perforation were included in the study. Omentopexy (OX) was done in 38 patients and OP was done in 35 patients.

Randomization was done by simple random sampling.

The parameters used to compare these two techniques depending upon the availability of omentum without adhesions were mean operative time, lung complication, postoperative mortality within 30 days of operation, development of septicaemia, development of intra-abdominal abscess, development of wound infection, commencement of oral feeding and duration of hospital stay.

## Study technique

The patients diagnosed with duodenal perforations underwent emergency laparotomy were divided into 2 groups, thirty-eight in one group and thirty-five in another on the technique of Simple Randomization.

Patients were allotted into Groups A and B as per computer generated random numbers by simple randomization technique thus including 35 in Group A (OP) and in 38 Group B (OX).

# Operative technique

*OP*: The anesthetist / assistant was asked to insert the nasogastric tube further and surgeon guided the tip of the tube so that it came out of the peritoneal cavity through the perforation. The free end of the greater omentum was fixed to the tip of the nasogastric tube using 1-0 absorbable (chromic catgut) suture. Then the anesthetist / assistant were asked to withdraw the tube. As the tip went inside the stomach so did the omentum. The tube was withdrawn until the omentum occluded the perforation. About 5-6 cm length of omental plug generally sufficed. The omentum was then fixed to the perforation site with 5-6 interrupted sutures of 2-0 chromic catgut taken between omentum and serosa of healthy duodenum and/or stomach.

OX / Graham's patch: The perforation was sutured in one layer by three interrupted lembert sutures with 2-0 polyglactin using a patch of pedicled omentum to reinforce the suture line. The suturing technique including the suture material used was essentially the same in all the cases. No attempt was made to close the

perforation prior to placing the omentum as a graft/omentum as a plug. Special precaution was taken not to leave any residual fluid in the abdominal cavity after peritoneal wash. Intraperitoneal

Postoperatively, both the groups were monitored in terms of no. of days of drain requirement, total drain quantity, no. of days of postoperative hospital stay, symptoms, morbidity and mortality. Each patient was followed up until discharge post operatively. Postoperative leakage was identified by the presence of bile in the drain fluid and its quantity. Post operatively all patients were given proton pump inhibitors i.e., Inj. Pantoprazole 40 mg IV twice daily for a minimum of 7 days.

#### Data analysis

The analysis of data was done by using IBM SPSS 22. Descriptive statistics has been used to calculate frequency of different parameters. Student T Test, Fisher's Exact Test, Chi-square Test have been used for comparison. P value <0.05 is considered as statistically significant.

#### Ethical issue

Clearance from ethical committee of College of Medicine and JNM Hospital was obtained. All the operative procedures followed were standard procedures. Written informed consent was taken from the patients before enrolment.

## **RESULTS**

73 cases were studied and following observation were made.

Table 1: Age distribution.

Age group (year)	Frequency (%)
<30	7 (9.59)
31-40	14 (19.18)
41-50	30 (41.10)
>50	22 (30.14)

Majority of the patients were in the age group of 41 to 50 years. Mean age of the studied patients was  $44.42\pm8.65$  years.

## OX

Wound infection was noted in 8 patients among 38 patients who underwent OX procedure. Reperforation was noted in 4 patients, intra-abdominal abscess was noted in 4 patients, 5 patients developed lung complications and septicaemia occurred in 6 patients. Oral feeding in OX group was started as soon as peristalsis occurred which usually varied between 3 to 4 days. Out of 38 patients in the study group B, 3 patients died.

#### OP

Five patients of OP group developed wound infection, reperforation occurred in 2 patients among 35 patients, 3 patients developed intra-abdominal abscess, patients among developed lung complication and septicaemia developed in 4 patients of OP group.

In OP group, starting of oral feeding of majority of patients varied between 4 to 5 days. Out of 35 patients 1 patient died.

**Table 2: Wound infection.** 

Parameter	OX (n=38)	OP (n=35)	P value
Wound infection	8 (21.1%)	5 (14.3%)	>0.05

Among 38 patients underwent OX procedure wound infection was noted in 8 (21.1%) patients and among 35 patients underwent OP procedure 5 (14.3%) patients developed wound infection which is statistically not significant.

**Table 3: Reperforation.** 

Parameter	OX (n=38)	OP (n=35)	P value
Reperforation	4 (10.5%)	2 (5.7%)	>0.05

4 (10.5%) patients of OX group among 38 patients developed reperforation. In OP procedure 2 (5.7%) patients developed reperforation. This is statistically not significant.

Table 4: Intra-abdominal abscess.

Parameter	OX (n=38)	OP (n=35)	P value
Intra-	4 (10 50/)	2 (9 (0/)	. 0.05
abdominal abscess	4 (10.5%)	3 (8.6%)	>0.05

In OX group 4 (10.5%) patients developed intraabdominal abscess while 3 (8.6%) patients of OP group developed intra-abdominal abscess which is statistically not significant.

Table 5: Septaecemia.

Parameter	OX (n=38)	OP (n=35)	P value
Septicaemia	6 (15.8%)	4 (11.4%)	>0.05

Septicaemia occurred in 6 (15.8%) patients of OX group and 4 (11.4%) patients of OP group which is statistically not significant.

**Table 6: Lung complication.** 

Parameter	OX (n=38)	OP (n=35)	P value
Lung complication	5 (13.2%)	4 (11.4%)	>0.05

Lung complication was noted in 5 (13.2%) patients of OX group and 4 (11.4%) patients of OP group which is statistically insignificant.

**Table 7: Mean operative time (in minute).** 

Parameter	OX (n=38)	OP (n=35)	P value
Mean operative time (in minute)	62±5.56	99±9.12	<0.01

It was noted that mean operative time of OP procedure  $(62\pm5.56)$  was higher than that of OX procedure  $(99\pm9.12)$  which is statistically significant.

Table 8: Oral feeding (days).

	Parameter	OX (n=38)	OP (n=35)	P value
< 0.01	Oral feeding	2.84±1.00	4.05±0.93	< 0.01
	davs	2.84±1.00	4.05±0.93	

Oral feeding in OX group  $(2.84\pm1.00)$  was started early than OP group  $(4.05\pm0.93)$ . This is statistically significant.

Table 9: Mean hospital stay (in days).

Parameter	OX(n=38)	OP (n=35)	P value
Mean hospital stay	12.92±3.0	11.54+1.9	< 0.05
(in days)	12.92±3.0	11.54±1.9	<0.03

The mean hospital stay was 11.54 days for the OP group compared to 12.92 days for the OX group and p value is <0.05 which is statistically significant.

3 (7.89%) patients of OX group died in the postoperative period while total number of death in OP group was 1 (2.85%). It is statistically insignificant.

**Table 10: Mortality.** 

Parameter	OX (n=38)	OP (n=35)	P value
Mortality	3 (7.89%)	1 (2.85%)	>0.05

## **DISCUSSION**

Peptic perforation is a common disease in the general population. There is a sharp decrease in elective peptic ulcer surgery but the emergencies such as perforation are on rise in some studies.<sup>4</sup>

A total of 73 patients were enrolled for the study after confirming to the inclusion criteria and written consent for being included in the same. In our study the highest incidence was seen in the 5<sup>th</sup> decade which is similar to other studies. <sup>1,8,9</sup> All our patients were males which is in

sharp contrast to other studies where the male to female ratio is between 9:1 to 7.5:7. 1,3,8,10

In this study post-operative complications encountered were wound infection, intra-abdominal abscess, lung complication, septicemia, reperforation. Wound infection (OX -21.1%, OP -14.3%), septicemia (OX-15.8%, OP-11.4%), and lung complication (OX-13.2%, OP-11.4%) were the commonest complications. These figures correspond to the available literature. Hastings et al reported commonest complication was wound infection. <sup>11</sup>

Perforations are technically difficult to repair due to the duodenum's complex anatomy and marginal blood supply shared with the pancreas. High intra luminal pressure, tendency of the mucosa to extrude through the suture line and autodigestive enzymes of the pancreas and bile acid add to the risk of breakdown of the suture line.<sup>5</sup> Conventional wisdom dictates that healthy vascularised tissue should be incorporated in the repair of any defect with tissue loss or with friable edges.<sup>5</sup> Several elaborate surgeries have been devised to manage complicated peptic ulcer.<sup>1</sup> There are also many complex procedures that were tried on duodenal perforations previously, each of these procedures not only prolong the operating time, but also required a higher level of surgical expertise and may not be available in emergency situations.<sup>7,12</sup>

Oral feeding in OX group was started as soon as peristalsis occurred, which is usually varied between 3 to 4 days. In OP, as it is a new procedure and as omentum was sutured with the nasogastric tube, initially we delayed the starting of oral feeding. <sup>13</sup>

In our study 8 patients (21.1%) of OX group had wound infection, 4 patients (10.5%) had intra-abdominal abscess, 5 patients (13.2%) had lung complication, 6 patients (15.2%) had septicemia, 4 patients (10.5%) had reperforation. While in patients treated with OP 5 patients (14.3%) had wound infection, 3 patients (8.6%) had intraabdominal abscess, 4 patients (11.4%) had lung complication, 4 patients (11.4%) had septicemia, 2 patients (5.7%) had reperforation. All of the above data was statistically insignificant and no conclusive evidence can be drawn from this study that any of the two procedures is better in preventing wound complication, intra-abdominal abscess, lung complication, septicemia or reperforation but the incidence of complication was greater in OX. Similar observation was made by Mukhopadhyay et al. 13

Leakage after duodenal repair is not uncommon (2 to 10%) and is associated with higher mortality 10 to 35% which increases with delay in perforation.<sup>2</sup> None of the available procedure in the literature is immune to the risk of post-surgical leakage.<sup>2</sup>

Mean postoperative stay for OX was 12.92 with standard deviation 3.00 while in OP was 11.54 with standard deviation 1.54. In our study the difference in the postoperative stay between the OX and OP was

statistically significant. Higher hospital stay is seen OX group because patients in this group developed reperforation and there was a greater incidence of postoperative complications resulting in increased hospital stay.

Mean operative time for OX group was 62 min with standard deviation 5.56. Mean operative time for OP was 99 min with standard deviation 9.12. According to our study OX has least operative time compared to OP procedures. Operating time for OP was significantly more (p<0.01) than operative time for OX. OP is a new procedure and it is not often practiced, so it took significantly more time than OX. Similar observation made by Mukhopadhyay et al.<sup>13</sup>

In our study mortality rate of OX was 7.89% while 2.85% in OP group and it is not statistically significant. The Overall reported mortality rate varies between 1.32 to nearly 20% in different series and recent studies have shown it to be around 10%. 4.14

### **CONCLUSION**

Perforation due to duodenal ulcer is a common cause of peritonitis and is considered as one of the most catastrophic complication of duodenal ulcer perforation. This study was done to compare the efficacy of two different procedure performed for duodenal perforation operation with a sample size of 73 patients. On the basis of study we can conclude that majority of cases of duodenal perforation is seen in 5<sup>th</sup> decade of life. OP is associated with less incidence of postoperative complication in compared to OX procedure for example wound infection, reperforation, lung complication, septicemia and intra-abdominal abscess. OP is associated with less number of mortality. OP is associated with higher mean operative time as it is a relatively newer and less utilized technique.

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