CASE SERIES

Duodenal ulcer perforation and its consequences

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Abstract

Duodenal ulcer perforation, a frequent surgical emergency, needs simple closure with indirect Graham's Omentopexy which is effective with excellent results in majority of cases despite patients' late presentation. The objective of the study was to determine the frequency of postoperative complications of perforated duodenal ulcer, conducted in the Surgery Department, Jinnah Postgraduate Medical Centre, Karachi, from March 20, 2018 to September 20, 2018.

The study was a descriptive case series of 108 patients of both genders with perforated duodenal ulcer > 1 week old with ASA score I & II. Patients with trauma and co-morbidities were excluded. The patients underwent laparotomy and peritoneal toilet, and after noting the site of perforation indirect Graham's Omentopexy was performed. Complications like duodenal fistula, peritonitis, and paralytic ileus, and patient's death within 10 days of surgery were noted. Age ranged from 18 to 50 years with mean age of 35.027±5.13 years, mean weight 71.120±12.77 kg, mean height 1.541 ±0.09 metres, mean BMI 29.975±4.99 kg/m2, and the mean duration of complaint was 4.194±1.30 weeks. Male predominance in 75 (69.4%) patients. Duodenal fistula was seen in 10 (9.3%) patients, peritonitis 12 (11.1%), paralytic ileus 14 (13%) and mortality was in 11 (10.2%) patients.

Keywords: Perforated duodenal ulcer, Postoperative complications, Frequency.

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Introduction

Duodenal ulcer perforation is a common surgical emergency in our part of the world. Approximately half a million new cases of duodenal ulcer are diagnosed each year. There is a significant prevalence of duodenal ulcer in young age group as compared to gastric ulcers.[1]

Common sites for peptic ulcers are the first part of the duodenum and the lesser curve of the stomach[2] but they also occur on the stoma following gastric surgery, the oesophagus and even in Meckel's diverticulum, which contains ectopic gastric epithelium. Duodenal perforations are situated in the proximal duodenum within 1-2cm of pylorus, 92% on anterior wall, 2% on posterior wall and 6% at gastro duodenal junction. Perforated peptic ulcer is most prevalent in people between 45 and 55 years of age, and male to female ratio is 2:1.[3]

Mortality due to perforated duodenal ulcer has declined from 40% to the present level of 10%, largely due to early diagnosis and treatment. Prognosis of perforated duodenal ulcer is highly correlated with age, co-morbid condition and time of surgery.[4] Early surgical intervention is important to reduce lethality from ulcer perforatum.[5]

Duodenal ulcer perforations are mostly less than 1cm in greatest diameter, and, as such, are amenable to closure by omentopexy.[6] Despite substantial advances in the management of peptic ulcer disease, the frequency of complications such as bleeding and perforation, have remained fairly constant, largely because of the increasingly widespread use of non-steroidal anti-inflammatory drugs (NSAIDs) and low dose aspirin.[7]

Perforation occurs in about 2-10% patients with duodenal ulcers, and the patient presents with peritonitis; a delay of more than 24 hours before surgery has been shown to result in a threefold increase in morbidity and a seven to eight fold increase in mortality.[8]

In a study, it was observed that frequency of paralytic ileus was less than 1% after surgical intervention of perforated duodenal ulcer.[9]

In a study, Liu J and his associates noted that the prevalence of duodenal fistula was 7.1% after surgical intervention of perforated duodenal ulcer.[10]

In another study, Dr Anil Kumar Bodepudi and his associates observed that the frequency of paralytic ileus was 3.6% and mortality was 16% after surgical intervention of perforated duodenal ulcer.[11]

Little work has been done on postoperative complications of the surgical management of perforated duodenal ulcer disease in the population of Karachi reaching over 16.62 million[12] comprising of people from all four provinces of Pakistan and migrants

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The current study will pave the way to define the burden of morbidity and mortality after surgical management of perforated duodenal ulcer disease in our local population and to help for defining health management policies for such a condition.

Case Series

A descriptive case series was conducted in the Department of Surgery, Jinnah Postgraduate Medical Centre, Karachi, from March 20, 2018 to September 20, 2018. The sample size was calculated using WHO sample size calculator on the following basis: sample size of 108 patients by nonprobability consecutive sampling and taking prevalence of paralytic ileus=11.42%.[11]

At margin of 6% error was calculated at 95% confidence interval. Patients aged between 18 and 50 years, of both genders with ASA score I & II and perforated duodenal ulcer > 1 week were included in the study. Whereas, patients with a history of trauma, cirrhosis (ultrasound revealed surface of the liver nodularity with overall coarse and heterogeneous echotexture), hypertension (blood pressure more than or equal to 140/90 mmHg recorded on two occasions at least three hours apart), and diabetes mellitus (fasting plasma glucose concentration ≥126 mg/dl and a random plasma glucose concentration ≥200 mg/dl on laboratory test) were excluded. Approval of ethical review committee of the institute was taken for the study. The purpose, procedure, risks, and benefits of the study were explained to the participants and informed consent was obtained from the patients/guardian.

All the patients were resuscitated in the emergency room before operation and the baseline investigations were carried out pre-operatively. Patients' proper history including smoking, alcohol use, and duration of complaint were noted.

Exploratory laparotomy was conducted and peritoneal toilet was done, after noting the site of the perforation indirect Graham's Omentopexy was performed. Broad spectrum antibiotic and fluids were given, orals were started on the appearance of bowel sounds. Post-operative complications like duodenal fistula, peritonitis, and paralytic ileus were noted as per operational definition. Wound stitches were removed after 10 days and patients who had no complications were discharged. If a patient developed duodenal fistula re-exploration was done and Foleys catheter was placed in the duodenal fistula and the patient was put on TPN for three weeks and the outcome was observed. If a patient developed multiple recurrent intraperitoneal abscesses re-exploration was done; for prolonged paralytic ileus serum potassium and magnesium levels were checked and deficit replaced along with NG decompression. Patient's death within 10 days after surgical intervention was noted too. All the data were recorded in the proforma. Data was entered and analysed by IBM-SPSS Version 22. Frequency and percentage was computed for qualitative variables like gender, ASA status, age groups, and history of smoking, history of alcohol, duodenal fistula, peritonitis, paralytic ileus and mortality. Mean±SD was used for quantitative variables like age, weight, height, BMI, and duration of complaint. Effect modifiers like age, gender, history of smoking, history of alcohol use, BMI, ASA score, and duration of complaint was controlled by stratification. Post stratification chi square test was applied; p≤0.05 was considered statistically significant.

Table-1: Frequency and percentage of Complications (n=108).

	n (%)
Duodenal Fistula	
Yes	10 (9.3)
No	98 (90.7)
Peritonitis	
Yes	12 (11.1)
No	96 (88.9)
Paralytic Ileus	
Yes	14 (13)
No	94 (87)
Mortality	
Yes	11 (10.2)
No	97 (89.8)

Table-2: Stratification of duodenal fistula with respect to age groups, gender, BMI, history of smoking, history of alcohol use, duration of complaint and ASA score.

	Duodenal Fistula		
	Yes n (%)	**No** n (%)	***p*-value**
Age Groups (years)			
18 – 30	1 (4.8)	20 (95.2)	0.428
31 – 50	9 (10.3)	78 (89.7)	
Gender			
Male	8 (10.7)	67 (89.3)	0.447
Female	2 (6.1)	31 (93.9)	
BMI (Kg/m^2)			
≤25	2 (8)	23 (92)	0.804
>25	8 (9.6)	75 (90.4)	
History of Smoking			
Yes	5 (8.6)	53 (91.4)	0.805
No	5 (10)	45 (90)	
History of Alcohol use			
YES	2 (16.7)	10 (83.3)	0.348
No	8 (8.3)	88 (91.7)	
Duration of complaint (weeks)			
2 - 4	8 (12.5)	56 (87.5)	0.161
>4	2 (4.5)	42 (95.5)	
ASA Score			
I	8 (10)	72 (90)	0.653
II	2 (7.1)	26 (92.9)	

Age range in this study was from 18 to 50 years with mean age of 35.027±5.13 years, mean weight 71.120±12.77 kg, mean height 1.541±0.09 metres, mean BMI 29.975 ±4.99 kg/m^2 and mean duration of complaint was 4.194±1.30 weeks.

Table-3: Stratification of peritonitis with respect to age groups, gender, BMI, history of smoking, history of alcohol use, duration of complain and ASA score.

	Peritonitis		
	Yes n (%)	**No** n (%)	***p*-value**
Age Groups (years)			
18 - 30	0 (0)	21 (100)	0.071
31 - 50	12 (13.8)	75 (86.2)	
Gender			
Male	9 (12)	66 (88)	0.658
Female	3 (9.1)	30 (90.9)	
BMI (Kg/m^2)			
≤25	4 (16)	21 (84)	0.375
>25	8 (9.6)	75 (90.4)	
History of Smoking			
Yes	6 (10.3)	52 (89.7)	0.785
No	6 (12)	44 (88)	
History of Alcohol use			
YES	1 (8.3)	11 (91.7)	0.745
No	11 (11.5)	85 (88.5)	
Duration of complaint (weeks)			
2 - 4	5 (7.8)	59 (92.2)	0.188
>4	7 (15.9)	37 (84.1)	
ASA Score			
I	9 (11.2)	71 (88.8)	0.938
II	3(10.7)	25(89.3)	

Table-4: Stratification of paralytic ileus with respect to age groups, gender, BMI, history of smoking, history of alcohol use, duration of complaint, and ASA score.

	Paralytic Ileus		
	Yes n (%)	**No** n (%)	***p*-value**
Age Groups (years)			
18 - 30	2 (9.5)	19 (90.5)	0.601
31 - 50	12 (13.8)	75 (86.2)	
,Gender			
Male	9 (12)	66 (88)	0.653
Female	5 (15.2)	28 (84.8)	
BMI (Kg/m^2)			
≤25	4 (16)	21 (84)	0.606
>25	10 (12%)	73 (88)	
History of Smoking			
Yes	6 (10.3)	52 (89.7)	0.383
No	8 (16)	42 (84)	
History of Alcohol use			
YES	1 (8.3)	11 (91.7)	0.613
No	13 (13.5)	83 (86.5)	
Duration of complaint (weeks)			
2 - 4	7 (10.9)	57 (89.1)	0.450
>4	7 (15.9)	37 (84.1)	
ASA Score			
I	9 (11.2)	71 (88.8)	0.370
II	5 (17.9)	23 (82.1)	

Table-5: Stratification of mortality with respect to age groups, gender, BMI, history of smoking, history of alcohol use, duration of complaint, and ASA score.

	Mortality		
	Yes n (%)	**No** n (%)	***p*-value**
Age Groups (years)			
18 - 30	6 (28.6)	15 (71.4)	0.002
31 - 50	5 (5.7)	82 (94.3)	
Gender			
Male	8 (10.7)	67 (89.3)	0.803
Female	3 (9.1)	30 (90.9)	
BMI (Kg/m2)			
≤25	2 (8)	23 (92)	0.680
>25	9 (10.8)	74 (89.2)	
History of Smoking			
Yes	3 (5.2)	55 (94.8)	0.064
No	8 (16)	42 (84)	
History of Alcohol use			
YES	3 (25)	9 (75)	0.072
No	8 (8.3)	88 (91.7)	
Duration of complaint (weeks)			
2 - 4	7 (10.9)	57 (89.1)	0.755
>4	4 (9.1)	40 (90.9)	
ASA Score			
I	6 (7.5)	74 (92.5)	0.119
II	5 (17.9)	23 (82.1)	

Majority i.e. 80.6% of the patients were in the 31-50 years age group. Male predominance was in 75 (69.4%) patients.

History of smoking was present in 58 (53.7%), and alcohol use among 12 (11.1%) patients. ASA score I was seen in 80 (74.1%) and 28 (25.9%) patients were with ASA II.

Duodenal fistula was seen in 10 (9.3%) patients, peritonitis 12 (11.1%), paralytic ileus in 14 (13%) and mortality recorded in 11 (10.2%) as shown in Table 1.

Stratification of postoperative complications with respect to age, gender, BMI, history of smoking, history of alcohol, duration of complaint and ASA score are shown in Table-2, 3, 4 and 5.

Discussion

In the present study, perforated duodenal ulcer disease was noted to be most common in the fourth decade of life and tended to affect more females than males, which is comparable with other studies in developing countries.[13,14] Our demographic profile is in sharp contrast to what is reported in developed countries where the majority of the patients are above 60 years of age and the prevalence is higher in elderly females taking ulcerogenic medications.[15] Male predominance in this age group is attributed to

excessive alcohol consumption and smoking among young males, which is common in our environment. Alcohol consumption and smoking have been reported to be associated with increased risk for perforated duodenal ulcer. Alcohol, as a noxious agent, causes gastric mucosal damage, stimulates acid secretion, and increases serum gastrin levels,[16] while smoking inhibits pancreatic bicarbonate secretion, which results in increased acidity. It also inhibits the healing of duodenal ulcers.[13,17]

Determination of Helicobacter pylori was not performed in our study due to lack of reagents. Use of NSAID is an important cause of perforated duodenal ulcer in the West. In agreement with other studies,[15] more than 60 percent of patients had no past history suggestive of duodenal ulcer disease and those with a known history were not on regular treatment. This is in sharp contrast to the study by Nuhu et al in Nigeria which reported that 71% of cases had previous history of duodenal ulcer disease.[13] It has been reported that in many developing countries, in many instances, the diagnosis is first made after perforation.[18] The present study confirms this observation because more than 60 percent of the patients with perforation had not been diagnosed previously as cases of perforated duodenal ulcer and, therefore, were not on treatment. Patients with no previous diagnosis of duodenal ulcer have a higher risk of perforated duodenal ulcer than patients with a known history of ulcer disease. This may be because preventative measures are more likely to have been taken in patients with a known history of ulcer. Furthermore, these patients are perhaps more likely to seek treatment earlier. In this study, most of patients had either primary or no formal education and more than three quarter of them were unemployed. Similar occupational pattern has been reported by other studies.[13] This observation has an implication on accessibility to health care facilities and awareness of the disease. It has been reported that the interval between perforation and initiation of treatment is a better predictor of outcome. In the present study most of patients presented late, i.e. more than 24 hours from the beginning of symptoms. This is in agreement with other studies in most developing countries.[13,14,18]

In the current study, duodenal fistula was seen in 9.3% patients, peritonitis 11.1%, paralytic ileus 13%, and mortality in 10.2%. In a study it was noted that frequency of paralytic ileus was less than 1% after surgical intervention of perforated duodenal ulcer.[9]

In a study, Chalya PL and his associates observed that the frequency of peritonitis was 12% and duodenal fistula was 12% after surgical intervention of perforated duodenal ulcer.[10]

In another study, Patel D. and her associates observed that the frequency of paralytic ileus was 11.42% and mortality was 12% after surgical intervention of perforated duodenal ulcer.[11]

Late presentation in the current study may be attributed to a lack of accessibility to health care facilities and lack of awareness of the disease. Hospital treatment is expensive and the patients may seek care only when the pain is unbearable. Patients may take medications in the pre-hospital period with the hope that the symptoms will abate. It is also possible that some clinicians managing the patients initially may not have considered perforation as a possible diagnosis. More than 90% of our patients had classical presentation with sudden onset of sharp epigastric pain, as most of the studied patients were young in contrast to elderly patients in whom silent perforations usually occur.[19]

Conclusion

The current study concluded that perforation of duodenal ulcer remains a frequent clinical problem in our environment predominantly affecting males. Simple closure with indirect Graham's Omentopexy was effective with excellent results in majority of the cases despite patients' late presentation in our centre.

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Conflict of Interest: None.

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