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The management of large perforations of duodenal ulcers

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ABSTRACT

Perforation is the most common complication of peptic ulcer disease. In spite of modern progress in the management, it is still a life-threatening catastrophe. Due to friable margins and the moribund state of the patient, managing large duodenal perforations(>20 mm in diameter) is a challenging task. The case files of 64 patients who underwent emergency laparotomy for peptic ulcer perforations over a period of three years (2012 – 2015) were retrospectively reviewed and sorted into two groups – one group was defined as 'small 'perforations (<2 cm in diameter), another 'large' (≥2 cm). Of the total of 64 patients, there were 46 males (71.9 %). 54 patients (84.4%) came under the 'small' perforation (group A), but there were 10 patients (15.6%) with large perforation (group B). omental patch was performed in all cases in Group A. in group A, mortality rate was 3.7%. in group B, mortality rate was 60%.In 5 patients in group B, omental patch was done that mortality rate was100%. In remaining 5 patients in group B, omental plug was done that mortality rate was 20%. There are two distinct types of perforations of duodenal ulcers that are encountered in clinical practice. The first, are the 'small' perforations that omental patch closure gives the best results and have low mortality. The second are the 'large' perforations, that are uncommon, and omental plug gives the best results in this subset of patients.

Keywords: peptic ulcer perforation, Omental plug, Omental patch.

INTRODUCTION

Perforation is one of the most catastrophic complications of peptic ulcer [1] Though it is a common surgical emergency, literature is silent on the exact definition, incidence, management and complications of large perforations of peptic ulcers [2]. Large peptic perforations are defined as perforations of size equal to or greater than 2 cm in diameter [1]. These perforations 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 closure using omental patch, often resulting in postoperative leak or gastric outlet obstruction [2–4]. Various methods apart from standard omentopexy (omental patch) have been described for the management of giant perforations and they include partial gasterectomy, jejunal serosal patch, jejunal pedicled graft, omental plug and proximal gastrojejunostomy [2]. Apart from omental plug, all other methods are more elaborate, time consuming, high postoperative leak and technically difficult to perform [1]. Very little data is available in literature regarding the definition, incidence, and the management of large perforations of duodenal ulcers. This paper represents our experience with the management of this subset of duodenal ulcer perforations over a period of three years from January 2012 to December 2015.

MATERIALS AND METHODS

A total of 64 patients underwent emergency surgery for duodenal ulcer perforations at our hospital over a period of three years (January 2012 to December 2015). The case files of all these patients were retrospectively reviewed and sorted into two groups based on the size of the perforations – one group was defined as '*small* 'perforations (less than 2 cm in diameter), another '*large*' (when the perforation was more than 2 cm).The case files of all the patients were retrospectively analyzed for patient particulars, intra-operative findings, surgery performed and mortality. The groups were then compared with each other in terms of age, leak rates, mortality and the surgery performed. Statistical analysis was done using the *chi-square* and the *t- test* by an independent comparison of each group singly against another by a statistician who was blinded to the study. A *p* value of < 0.001 was taken as significant.

RESULTS

Of the total of 64 patients that underwent emergency surgery for duodenal ulcer perforations at our hospital over three years, there were 46 males (71.9 %) and 18 female (28.1 %) patients giving a male to female ratio of 2.5 : 1 . The average age of the patients was 52.34 ± 18.69 years (range 19 – 93 years).Patients were sorted into two groups according to the size of the perforation noted intra-operatively – small perforation (group A:less than2 cm perforation) and large perforation (group B: ≥2 cm)**.** 54 patients (84.4%) came under the 'small' perforation group, but there were 10 patients (15.6 %) with large perforation (Table 1). the commonest surgery performed was the omental patch– in all cases in Group A and 5 patients in Group B.in remaining 5 patients in group B, omental plug was done. 2 patients in group A died due to leak and subsequent sepsis (mortality rate: 3.7%). 6 patients in group B died due to leak and subsequent sepsis (mortality rate:60%). the patients with large perforations (Group B) had significantly increased mortality rate (Table 2). In 5 patients in group B omental patch was done that All five patients died due to leak and subsequent sepsis (mortality rate:100%). In remaining 5 patients in group B, omental plug was done that only one patient died due to leak and subsequent sepsis(mortality rate:20%)and therefore in group B, in patients who omental patch was done, mortality rate was higher than patients who omental plug was done.(Table 3)

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 [5]. The size of perforation in a peptic ulcer varies from 3 mm to over 3 cm in diameter. Which adversely affects the prognosis. If the perforation is less than 5 mm in diameter there is a 6% mortality rate, when it is between 5 and 10 mm, the mortality goes up to 19% and when it is more than 10 mm the mortality rate is around 24% [6]. There is a paucity of data in literature regarding giant peptic ulcer perforation management. The overall incidence of 2 cm or more diameter perforation is about 3% [1]. In our study the incidence was (15.6 %).

In our study the highest incidence of perforation was seen in the 6th decade but in other studies in literature the highest incidence was seen in the 5th decade. [1, 7, 8]. In our study majority of patients were 46 males (71.9 %) giving a male to female ratio of 2.5 : 1 which is similar to other studies where the male to female ratio is between 9:1 to 7.5:7 [1,7,9,10].

The overall reported mortality rate varies between 1.3 to nearly 20 % [11,13] in different series, and recent studies have shown it to be around 10 % [13]. In our study, the overall reported mortality rate was 12.5%.Omental patch has become the "gold standard" for the treatment of small perforations [14]. In our study the commonest surgery performed was the omental patch – in all cases in Group A and 5 patients in Group B.in group A, mortality rate was 3.7%. However, large perforations of the duodenum may be encountered in which there exists the threat of post-operative leakage following closure by this omental patch [3,4]. in our study in patients with size of perforation≥2cm who omental patch was done mortality rate was 100%.

Giant 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 [15]. Conventional wisdom dictates that healthy vascularized tissue should be incorporated in the repair of any defect with tissue loss or with friable edges [15]. Several elaborate surgeries have been devised to manage complicated giant peptic ulcers [1]. These include resection of the perforation bearing duodenum and gastric antrum in the form of a partial gasterectomy, conversion of the perforation into a pyloroplasty or the closure of the perforation using a serosal patch or pedicled graft of the jejunum [2]. However, each of these procedures not only prolong the operating time, but also require a level of surgical expertise that may not be available in the emergency [2, 16].

In contrast to these elaborate measures, the omental plug is a simple procedure which does not require 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 situation [1, 16]. In our study, In 5 patients in group B omental plug was done that only one patient died due to leak and subsequent sepsis (mortality rate:20%) and therefore in group B, in patients who omental patch was done mortality rate was higher than patients who omental plug was done.

Table 1-characteristics of patients with Peptic Perforation

Characteristic	
Age (years)	52.34 ± 18.69
Sex, n (%)	
Male	46 (71.9)
Female	18 (28.1)
Diabetes, n (%)	
Yes	13 (20.3)
No	51 (79.7)
Smoking,n (%)	
Yes	40 (62.5)
No	24 (37.5)
NSAID n (%)	
Yes	26 (40.6)
No	38 (59.4)
Alcohol, n (%)	
Yes	23 (35.9)
No	41 (64.1)
H.P, n (%)	
Yes	17 (26.6)
No	47 (73.4)
size of perforation n (%)	
<2 cm	54 (84.4)
≥ 2 cm	10 (15.6)

NSAID *-Non-steroidal anti-inflammatory drugs/* ***H.P****- Helicobacter Pylori infection*

Table 2- characteristic of total patients based on perforation size

Characteristic	size of perforation		total	P
	<2 cm (n=54)	≥ 2 cm (n=10)		
Age (years)	50.81± 18.73	60.60 ± 17	52.34 ± 18.69	0.129
Sex, n (%)				0.421
male	38 (70.4)	8 (80)	46 (71.9)	
female	16 (29.6)	2 (20)	18 (28.1)	
Diabetes n (%)				0.673
Yes	11 (20.4)	2 (20)	13 (20.3)	
no	43 (79.6)	8 (80)	51 (79.7)	
Smokingn (%)				0.438
Yes	33 (61.1)	7 (70)	40 (62.5)	
no	21 (38.9)	3 (30)	24 (37.5)	
NSAID n (%)				0.375
Yes	21 (38.9)	5 (50)	27 (42.2)	
no	33 (61.1)	5 (50)	37 (57.8)	
Alcohol n (%)				0.483
Yes	20 (37)	3 (30)	23 (35.9)	
no	34 (63)	7 (70)	41 (64.1)	
H.P n (%)				0.248
Yes	13 (24.1)	4 (40)	17 (26.6)	
no	41 (75.9)	6 (60)	47 (73.4)	
Mortality n (%)				< 0.001
Yes	2 (3.7)	6 (60)	8 (12.5)	
no	52 (96.3)	4 (40)	56 (87.5)	

Table 3- characteristic of patients with perforations≥2cm based on type of operation

Characteristic	Type of operation		Total
	Omental patch	Omental plugging	
Age (years)	66.20 ± 12.28	55 ± 20.52	60.60 ± 17
Sex, n			
Male	4	4	8
Female	1	1	2
Diabetes, n			
Yes	0	2	2
No	5	3	8
Smoking,n			
Yes	4	3	7
No	1	2	3
NSAID, n			
Yes	2	3	5
No	3	2	5
Alcohol, n			
Yes	0	3	3
No	5	2	7
H.P, n			
Yes	1	3	4
No	4	2	6
Mortality, n			
Yes	5	1	6
no	0	4	4

CONCLUSION

There are two distinct types of perforations of duodenal ulcers that are encountered in clinical practice. The first, are the 'small' perforations that omental patch closure gives the best results and have low mortality. The second are the 'large' perforations, that are uncommon, and omental plug gives the best results in this subset of patients.

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