Management of perforated peptic ulcer in patients at a teaching hospital

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ABSTRACT

Objectives: To explore and analyze the current status in management of patients with perforated peptic ulcers (PPU).

Methods: A retrospective study carried out at the Surgical Department, Al-Gamhouria Teaching Hospital, Aden, Yemen. Patients admitted with perforated benign peptic ulcers from January 1997 to December 2006 were included in the study.

Results: A total of 156 patients, 138 (88.5%) male and 18 (11.5%) female, with an overall mean age of 39.08 years (range 14-75 years) and a higher frequency of PPU was noted in patients 21-40 years (58.3%). The perforated duodenal ulcer and perforated gastric ulcer ratio was 4.38:1. The mean time of presentation was 16.5 hours, and operative intervention after admission was 5.25 hours. Simple perforation closure was used in 91.7% of the patients. Postoperative complication rate was 41% (statistically significant in cases admitted later than 12 hours), wound sepsis making the majority at 55.2%, 6 deaths (3.9%), the correlation with presentation time was not significant. The overall mean post-operative hospitalization period was 12.76 days; 14.7% of the patients stayed more than 3 weeks.

Conclusions: Younger patients (21-40 years) were frequently affected. Emphasis should be placed on shortening the time to surgery. Simple closure remains the selected treatment in the majority of patients. Overall post-operative mortality was low (3.9%). Improving the surgical skills, wound care, administrative regulations, hospital environment, and equipment are needed to reduce the high rate of complications.


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Despite modern medications for peptic ulcers (PU), leading to a decreased incidence of elective surgery,\(^1,^2\) complications of PU have remained fairly constant or increased,\(^3,^4\) and PU perforation remains a source of mortality.\(^3,^5\) The rate of complications and mortality has not declined during recent decades, the mortality rate for perforated peptic ulcers (PPU) can be as high as 23-30%,\(^1,^6,^7\) particularly if the patient population has a large proportion of elderly,\(^8\) where the morbidity is reported as 25-89%.\(^9,^{10}\) Recently, PPU is a problem seen in the elderly, especially in women,\(^2,^{11}\) possibly due to the increased use of non-steroidal anti-inflammatory drugs (NSAIDs).\(^9,^{11,^{12}}\) Due to the recognition of *Helicobacter pylori* (*H. pylori*) as a causative agent in the duodenal ulcer disease, and the introduction of H. blockers and proton pump inhibitors as an effective medical treatment after surgery, the need for definitive ulcer surgery in the acute management of perforated duodenal ulcers (PDU) is questioned,\(^13\) and simple closure followed by eradication therapy of *H. pylori*\(^14^-16\) has become the preferred option for many surgeons.\(^11\) There are encouraging reports of non-operative treatment for PPU in selected patients with associated medical diseases.\(^17^-19\) Since the early 1990s, the laparoscopic technique has been increasingly used for the treatment of PPU.\(^13,^{20}-23\) The objective of this retrospective study was to provide data related to patients with PPU treated in a teaching hospital in Aden, Yemen.

**Methods.** Al-Gamhuria University Hospital is one of the 2 main teaching hospitals in Aden City of Yemen Republic, treating 26000-28000 patients per year, of which 55% are surgical patients and 29-31% are admitted cases. A retrospective study of 156 hospitalized patients (>14 years old) for PPU in the Surgical Department admitted as surgical emergencies during the 10-year period from January 1997-December 2006 were carried out. After ethical approval was obtained, records of the patients were reviewed and abstracted using a standardized data collection form. Patients with perforated malignant tumors were excluded. The records were analyzed for the following: age, gender, smoking status, use of NSAID, blood group, co-morbidity, socio-economic level, duration of symptoms (including before admission, up to the operation after admission), radiological findings (plain abdominal x-ray for free air under diaphragm), site of perforation (duodenal, gastric I - body and lesser curvature, II - duodenal + pre-pyloric areas, III - pre-pyloric and antral, IV - high in the proximal stomach or cardia), method of operative repair, postoperative complications and case fatality ratio, and duration of hospitalization (pre- and post-operative). The computer program Quickcalcs of Graphpad software (http://graphpad.com/quickcalc) was used for data analysis. Student's t-test, chi-square, and the Fisher's exact test were employed; a 2-tailed p-value of less than 0.05 was considered significant.

**Results.** A total of 156 patients (Table 1) were enrolled in this study with a mean age of 39.08 years (range: 14-75 years [median: 37 years]; SD±13.6; 95% confidence interval [CI]: 36.93-41.23 years). There were 138 (88.5%) males (mean age 38.17 years, range: 14-75 years [median: 36 years]; SD±13.42; 95% CI: 35.91-40.43 years), and 18 (11.5%) females (mean 46.11 years, range: 22-65 years [median: 48 years]; SD±13.15; 95% CI: 39.57-52.65 years) (p=0.0081); the male to female ratio was 7.67:1. Distribution of patients by age groups revealed higher frequency of PPU in patients of age group 21-40 years (91 cases, 58.3%); however, mainly present in younger men (65.9%) of less than 40 years of age, and women (77.8%) of more than 40 years. All of the 156 patients were admitted as emergency cases, 127 (81.4%) with PDU, and 29 (18.6%) with perforated gastric ulcer (PGU), with PDU/PGU ratio of 4.38:1. Fifty-nine (37.8%) had no history of acid peptic disease; 104 (66.7%) had history of tobacco consumption, of which 2 (11.1%) were women and 102 (73.9%) were men; 29 (18.6%) were chronic NSAIDs users, and 46 (29.5%) had a co-morbid condition (ischemic heart disease, arterial hypertension, diabetes mellitus, and chronic obstructive pulmonary disease). Free air under the diaphragm was seen in 139 patients (89.1%). The most frequent blood group encountered was type “O” (62%), type “A” (28%), and 5% each for types “B” and “AB”. A higher percentage of patients (59.6%) belonged to the lower socio-economic level group. The mean time of presentation since the onset of perforation was 16.5 hours, ranging from 1.25-54.5 hours. Only 35 patients (21.2%) attended the hospital within the first 6 hours of perforation incidence, whereas 19 (12.2%) of them came later than 24 hours. In the majority of the cases, (61, 39.1%), the presentation time was between 12 and 18 hours. The mean time of operative intervention after admission was 5.25 hours, ranging from 3.25-18.5. In the majority of the patients (99, 63.5%), the operation was performed between 6 and 12 hours of admission to the surgical department. The overall perforation time (from the onset of perforation up to the time of surgery) ranged between 3.75 and 60.5 hours, with a mean of 25.5 hours (Table 2). Eight patients (27.6%) out of 29 with PGU had type I gastric ulcer, whereas 21 (72.4%) had type III. In most of the patients with PPU (91.7%), simple perforation closure with Graham's patch omentoplasty was carried out. Table 3 illustrates the type of operations performed in PDU; in most of the patients (118, 92.9%), simple closure with omentoplasty was used, while closure of perforation with truncal vagotomy plus gastro-jejunostomy in 5
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**Table 1** - Distribution of patients by age groups, gender, and sites of perforation.

<table>
<thead>
<tr>
<th>Site of perforation</th>
<th>Age groups (years) and gender</th>
<th>Total (n=156)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>≤ 20 (n=4)</td>
<td>21 - 40 (n=91)</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>Perforated DU</td>
<td>4 (3.1)</td>
<td>--</td>
</tr>
<tr>
<td>Perforated GU</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Total</td>
<td>4 (2.6)</td>
<td>--</td>
</tr>
</tbody>
</table>

- M - male, F - female, DU - duodenal ulcer, GU - gastric ulcer

**Table 2** - Distribution of patients according to presentation time since perforation, and the outcome.

<table>
<thead>
<tr>
<th>Presentation time</th>
<th>Patients</th>
<th>Morbidity</th>
<th>Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>≤ 6 Hours</td>
<td>33 (21.2)</td>
<td>2 (6.1)</td>
<td>--</td>
</tr>
<tr>
<td>7-12</td>
<td>14 (9.0)</td>
<td>3 (21.4)</td>
<td>--</td>
</tr>
<tr>
<td>13-18</td>
<td>61 (39.1)</td>
<td>23 (37.7)</td>
<td>2 (3.3)</td>
</tr>
<tr>
<td>19-24</td>
<td>29 (18.6)</td>
<td>17 (58.6)</td>
<td>1 (3.5)</td>
</tr>
<tr>
<td>&gt;24 hours</td>
<td>19 (12.2)</td>
<td>19 (100)</td>
<td>3 (15.8)</td>
</tr>
<tr>
<td>Total</td>
<td>156 (100)</td>
<td>64 (41.03)</td>
<td>6 (3.9)</td>
</tr>
</tbody>
</table>

**Table 3** - Distribution of patients by age groups, gender, and sites of perforation.

<table>
<thead>
<tr>
<th>Site of perforated ulcer</th>
<th>Simple closure plus omentoplasty with gastric or without duodenal excision</th>
<th>Closure + gastrojejunostomy + truncal vagotomy</th>
<th>Simple closure + pyloroplasty + truncal vagotomy</th>
<th>Antrectomy + truncal vagotomy</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>Duodenal</td>
<td>118* (92.9)</td>
<td>5* (3.9)</td>
<td>4* (3.2)</td>
<td>0</td>
<td>127</td>
</tr>
<tr>
<td>gastric</td>
<td>25* (86.2)</td>
<td>0</td>
<td>0</td>
<td>4 (13.8)</td>
<td>29 (18.6)</td>
</tr>
<tr>
<td>Total</td>
<td>143 (91.7)</td>
<td>5</td>
<td>4</td>
<td>4† (2.6)</td>
<td>156 (100)</td>
</tr>
</tbody>
</table>

*with one death, †with 2 deaths
(3.9%), and truncal vagotomy plus pyloroplasty in 4 cases (3.2%) were used. In most patients with PGU, 25 (86.2%) excision of the ulcer with omentoplasty was performed, whereas the rest of the patients (4, 13.8%) underwent antrectomy plus truncal vagotomy. Post-operative complications developed in 64 (41%) patients, wound sepsis making the majority (58, 55.2%) (Table 4). In 37 patients (57.8%) there was only one complication; 13 (20.3%) with 2 complications, and 14 (21.9%) with 3 complications. The statistical analyses for correlation between pre-admission time interval after perforation and the rate of complications by Fisher’s exact-test show that the 2-tailed p-values were of statistically significant difference for those admitted later than 12 hours (p=0.0001).

As shown in Table 2, 6 patients (3.9%) died postoperatively (3 with PGU and 3 with PDU), 2 after antrectomy plus truncal vagotomy, one after gastric perforation closure plus omental patch, one after closure of duodenal perforation with gastro-jejunosomy plus truncal vagotomy, one after closure of perforation plus pyloroplasty with truncal vagotomy, and one after duodenal perforation closure plus omental patch. All of the death cases included elderly patients with co-morbidity, admitted later than 12 hours after perforation of their ulcers. The causes of death were septicemia in 2 patients, 2 myocardial infarction, one pneumonia with respiratory failure, and one renal failure. Mortality in the study was 12.76 days; 14.7% (23) of the patients stayed more than 3 weeks, reaching up to 34 days.

**Table 4 - Post-operative complications.**

<table>
<thead>
<tr>
<th>Type of complication</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wound sepsis</td>
<td>58 (55.2)</td>
</tr>
<tr>
<td>Paralytic ileus</td>
<td>23 (21.9)</td>
</tr>
<tr>
<td>Atelectasis + pneumonia</td>
<td>14 (13.3)</td>
</tr>
<tr>
<td>Wound dehiscence (burst abdomen)</td>
<td>3 (2.9)</td>
</tr>
<tr>
<td>Deep vein thrombosis</td>
<td>5 (4.8)</td>
</tr>
<tr>
<td>External biliary fistula</td>
<td>2 (2.0)</td>
</tr>
<tr>
<td>Total</td>
<td>105 (100)</td>
</tr>
</tbody>
</table>

**Discussion.** In our study, the overall mean age of the patients with PPU was 39.08 years (range 14-75 years) and higher frequency of PPU (58.3%) was more frequent in the younger age group (21-40 years), in comparison with other reports. This could be related to the earlier age of *H. pylori* infection as reported by Gunaid et al, and the demographic characteristics of the Yemen population. Male preponderance is declining in western countries due to changing pattern of smoking and the increased stress in working women. An absolute increase has been reported in elderly women in different studies. The reported percentage of PDU ranges between 78.9% and 94.2%. In our study, the higher percentage of PDU is probably related to *H. pylori* infection. Approximately 10-32% of patients usually have no history of PU disease prior to perforations. A higher rate in our patients is probably due to unawareness regarding the significance of upper abdominal discomfort. The incidence of NSAIDs use in our patients is lower than the reported studies. Smoking more than 15 cigarettes a day increases the risk of ulceration and perforation by 3-folds. Smoking among young people in Yemen is common, which may explain our higher incidence of perforation in young males. Higher frequency of free air under the diaphragm in our patients (89.1%) might be related to the less number of patients attending to the hospital with sealed perforations.

Increased availability of *H. pylori* receptors in the gastro-duodenal mucosa of subjects with blood group “O”, as compared with other blood groups, results in greater risk to develop PU and perforation among such populations. The higher percentage of our patients with blood group “O” is in agreement in the Arab and worldwide observations. Risk of post-operative morbidity and mortality is closely related to the duration of perforation. Although studies from Europe reported a time interval of 10 hours, many surgeons from different countries reported a longer interval. The prolonged interval in our study could be explained by lack of sufficient number of staff in the anesthesia department and operating theater, causing frequent delays of operative interventions in many emergency surgical conditions, relaxed behavior of some surgeons with protracted preoperative preparation, and poverty.

Treatment of the PPU continues to be a controversial subject. Emergency surgery is generally considered the treatment of choice. There are encouraging results of non-operative therapy in selected patients unfortunately, up to 43% of these patients ultimately required surgery for complications, and re-perforation developed in 7.1%. Definitive surgical intervention for PPU is less recommended and only in selected cases. Choice of surgical procedure in our patients depended on their age, time of presentation, associated medical

**Reference**


2. Saudi Med J 2008; Vol. 29 (2)

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diseases, size of perforated ulcer, severe scarring of the ulcer causing stenosis, and experience of the surgeon; mostly simple closure was preferred. The post-operative complication rate varied between 7.5% and 30% in different studies. Our morbidity rate compares unfavorably with other reports due to inappropriate environment in the operating rooms.

There were some limitations in this study that may affect the accuracy of the results, which included, first, the subjects in the study underwent open repair. On the contrary, current surgical approach in treating PPU is leaning towards laparoscopic repair. The type and incidence of post-operative complications observed in the present study may not fully represent those after laparoscopic repair. Second, we did not study the association of H. pylori, as an important potential factor, with post-operative outcomes due to lack of necessary facilities at the hospital, and absence of information in the medical records. Third, since our duration of post-operative follow up was relatively short, we could not estimate the incidence of re-leak after simple closure. However, the purpose of the present investigation was to focus on the current status in the management of patients with PPU admitted to such a teaching hospital.

Post-operative mortality ranges widely at 4.41-30%. Our results compared favorably with many other reports. Mortality rate after simple closure in our study was significantly lower than after other types of operation, and is in agreement with results reported by Plummer et al (1% for simple closure), and compared well with other reports (4.2% for simple closure). There are reports with much higher (37.5%) mortality rate after closure of PGU than after gastric resections (2.9%). The low mortality rate in our study could be related to younger age of our patients, and the use of effective antibiotics with low resistance of bacteria. The mean post-operative hospital stay period did not differ from other reports (12.76 days).

In conclusion, we found that younger age groups (21-40 years) are frequently affected due to the prevailing young age structure of Yemeni population and earlier H. pylori infection. Emphasis should be placed on shortening the time to surgery. Simple closure remains the selected treatment in the majority of patients. The overall post-operative mortality in our patients was low (3.9%). We suggest improving the surgical skills (diagnosis and management) and hospital environment to reduce the duration of perforation time, and the high rate of postoperative complications.

References


