American Journal of Emergency Medicine xxx (2016) xxx–xxx

Contents lists available at ScienceDirect

American Journal of Emergency Medicine

journal homepage: www.elsevier.com/locate/ajem

Original Contribution

Outcome of nonsurgical intervention in patients with perforated peptic ulcers☆

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ARTICLE INFO

Article history:
Received 20 April 2016
Received in revised form 15 May 2016
Accepted 17 May 2016
Available online xxxx

ABSTRACT

Background: Although surgical intervention is the favorable treatment modality for perforated peptic ulcer, nonsurgical treatment is another option. The aim of this study is to analyze the results of conservative treatment for perforated peptic ulcer.
Methods: Between 2003 and 2014, 403 patients were admitted to our hospital for perforated peptic ulcer, and 383 patients underwent surgery, whereas 20 were allocated to conservative treatment. The results of nonsurgical intervention in these patients were analyzed retrospectively.
Results: The overall mortality rate of conservative treatment was 40%. Eleven patients remained hospitalized less than 2 weeks; among them, patients with a high (≥IV) American Society of Anesthesiologists class at admission had higher mortality than those with a low (<IV) American Society of Anesthesiologists class (83.3% vs 0%, $P = .015$). However, when patients remained hospitalized longer than 2 weeks, the mortality rates did not differ between patients with the low and high American Society of Anesthesiologists classes. Eight patients presented with a high American Society of Anesthesiologists class, of which 3 received early enteral feeding, and all of them survived. In contrast, the survival of patients without early enteral feeding was 0%, suggesting that early enteral feeding improved survival of patients with the high American Society of Anesthesiologists class ($P = .018$).
Conclusions: A higher American Society of Anesthesiologists class correlated with mortality in patients undergoing conservative treatment during the first 2 weeks of hospitalization. Early enteral feeding might improve the outcome of conservative treatment in patients with high American Society of Anesthesiologists class.

1. Introduction

In the past century, peptic ulcer disease was a common health problem. Since histamine-2 receptor (H-2) blockers and proton pump inhibitors (PPIs) were introduced in the 1970s [1,2], these antisecretory drugs have played an important role in the treatment of peptic ulcer disease, according to the principle of "no acid, no ulcer" [3]. In addition, Marshall and Warren [4] and discovered *Helicobacter pylori* (*H. pylori*) in 1982 and proved the crucial involvement of this pathogen in the development of peptic ulcers. Furthermore, the eradication of *H. pylori* reduces the recurrence of peptic ulcer [5]. Because of the aforementioned findings and advancements, the incidence of uncomplicated peptic ulcer has declined [6,7]. However, the incidence of perforated peptic ulcer (PPU) has remained unchanged in the past decades [7–9]. It may be that the increased use of nonsteroidal anti-inflammatory drugs or aspirin in elderly patients increased the risk of PPU [10,11].

Perforated peptic ulcer is an emergent condition, and surgical intervention is the preferred therapeutic treatment modality [12,13]. At first, broad-spectrum antibiotics should be administered intravenously, and then simple closure, omental patch repair, or laparoscopic treatment is performed in most patients, followed by antisecretory treatment and *H. pylori* eradication, if indicated [13–15]. The mortality rate ranges between 4% and 30% [7]. When patients are unsuitable for surgical repair, nonsurgical treatment involving fasting, nasogastric tube suction, intravenous broad-spectrum antibiotics, and antisecretory therapy is another option for PPU [16–20]. In 1946, Taylor [20] first reported the results of conservative treatment for PPU, which yielded promising results, with 11% mortality rate after conservative treatment for perforated duodenal ulcers. In addition, in 1989, Crofts et al [21] reported a randomized trial in which similar outcomes were reported for nonsurgical treatment and emergency surgery, and the mortality rate was 5% in both groups. Gul et al [17] reported an overall mortality rate of 3% in

☆ This study was supported by the Research Fund of Tri-Service General Hospital (TSGH-C103-067).
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http://dx.doi.org/10.1016/j.ajem.2016.05.045
0735-6757/

patients with perforated duodenal ulcer managed conservatively. However, these results are not widely accepted. In 1971, Cohen et al [22] reported their experience in the management of 852 patients with PPU, in which 87 patients received conservative treatment only, and their mortality rate was 100%, which was significantly higher than the 9% in the operative treatment group in the same study. The reason for this huge difference in mortality rates between conservative and operative treatments in previous studies may be selection bias, and in such studies, only patients with a low risk were recruited. Further, in those studies, patients managed conservatively would be switched to surgical treatment immediately if the former treatment was unsuccessful.

In 1987, Boey et al [13,23] reported that the major medical illness, preoperative shock, and prolonged perforation (over 24 hours) are risk factors for patients with perforated duodenal ulcer and can predict the outcome of surgical treatment accurately. Kocer et al also showed that old age, delayed surgery, presence of shock, high American Society of Anesthesiologists (ASA) class, and definitive surgery are poor prognostic factors for patients undergoing emergency surgery for PPU [7]. Larkin et al [24] performed a retrospective study of patients undergoing conservative treatment and reported that the mortality rates of patients with perforated duodenal ulcers were lower in the group with ASA classes I-III than in the group with ASA classes IV-V (0% vs 52.9%). The above reports suggest that prognostic factors are crucial for the outcome of both surgical and nonsurgical treatment of patients with PPU.

In this study, we aimed to retrospectively analyze the results of conservative treatment in patients undergoing nonsurgical treatment for PPU in a teaching hospital. The clinical characteristics of our patients were first examined, and subsequently, we analyzed the putative prognostic factors and determined whether these factors were important for the entire course of conservative treatment.

2. Materials and methods

2.1. Patients

In this retrospective study, medical records of patients who presented to Tri-Service General Hospital with PPU, during a 10-year period between January 2003 and February 2014, were reviewed. The diagnosis of PPU was based on radiological (chest radiography or computed tomography scans), endoscopic, or operative findings. This study focused on patients who did not undergo surgical intervention for PPU. Patient age, sex, ASA class, Acute Physiology and Chronic Health Evaluation II (APACHE II) score, clinical presentation, management mode, mortality, and duration of hospital stay of these patients were analyzed. Nonsurgical treatment of these patients with PPU consisted of fasting, nasogastric tube suction, intravenous fluids, intravenous broad-spectrum antibiotics, and antisecretory therapy with PPIs. Some patients underwent endoscopic placement of enteral feeding tubes, which bypassed the perforated site [25–27] and received early enteral feeding before the PPU healed (Fig. 1). Patients undergoing conservative treatment were categorized into 2 groups according to the duration of hospital stay (≥ or <15 days). The mortality rate of these patients in the 2 groups was calculated. The study was approved by the institutional review board of Tri-Service General Hospital.

2.2. Statistical analysis

All data were presented as median and range for continuous variables or number and percentage for categorical variables. Statistical analysis was performed using SPSS statistics software, version 18 (IBM Co, Somers, New York). Continuous variables were compared using Mann-Whitney *U* tests, and categorical variables were compared using Fisher exact test. All reported *P* were 2-tailed, and $P < .05$ was considered significant.

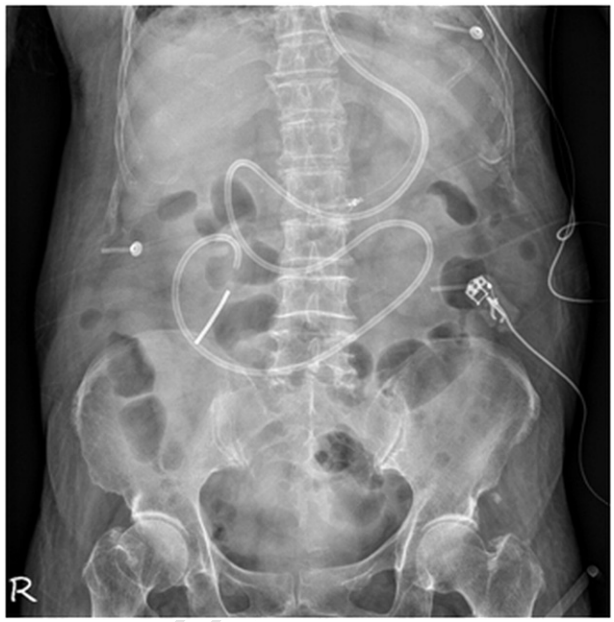

Fig. 1. Plain abdominal radiograph showing the enteral feeding.

3. Results

3.1. The clinical features of PPU in patients who did not undergo surgical intervention

During 2003-2014, 403 patients were admitted to the Tri-Service General Hospital for PPU. Three hundred eighty-three patients underwent surgery, whereas 20 patients (median age, 74 years; range, 31-99) received conservative treatment because they were unsuitable or unwilling to undergo surgery. Five patients were men, and 15 were women. Fourteen patients had shock index (heart rate/systolic blood pressure) <1 at admission. Median ASA class was III (range, I-V). Median APACHE II score was 10.5 (range, 5-46). Median duration of hospital stay was 14 days (range, 1-78). Of 20 patients, 8 died of sepsis with multiple-organ dysfunction, and the overall mortality rate of conservative treatment was 40%. Patients were divided into 2 groups according to the duration of hospital stay (≥ or <15 days), and 9 patients remained hospitalized longer than 2 weeks (Table 1). There was no difference in age, ASA class, and APACHE II score between these 2 groups. There was no significant difference in the percentage of patients with clinical improvement after conservative treatment for 12 hours between these 2 groups. Female sex predominated in both groups. The proportion of shock index 1 or higher at admission was higher in patients with lengths of hospital stays shorter than 2 weeks than in patients with lengths of hospital stay longer than 2 weeks (45.5% vs 11.1%); however, the difference in these values was not significant ($P = .16$). Similarly, mortality rates were higher in patients with shorter hospital

Table 1
Clinical characteristics of patients with PPU according to the duration of hospital stay

	Hospital stay <15 d	Hospital stay ≥15 d	*P*
No.	11	9	
Median age (range)	74 (48-99)	74 (31-97)	.94
Gender (male/female)	2/9	3/6	.62
Shock index ≥1 at admission, no. (%)	5 (45.5)	1 (11.1)	.16
Median ASA class (range)	III (II-V)	III (I-IV)	.19
Median APACHE II score (range)	14 (5-46)	10 (7-23)	.37
With clinical improvement in 12 h, no. (%)	5 (45.5)	3 (33.3)	.67
Mortality, no. (%)	6 (54.5)	2 (22.2)	.19
Median hospital stay (range)	8 (1-14)	34 (15-78)	<.001

Abbreviations: Shock index, heart rate (min)/systolic blood pressure (mm Hg).

Please cite this article as: Lay P-L, et al, Outcome of nonsurgical intervention in patients with perforated peptic ulcers, Am J Emerg Med (2016), http://dx.doi.org/10.1016/j.ajem.2016.05.045