

Outcome of Early Surgery in Gastric Ulcer Perforation at Rajshahi Medical College Hospital, Rajshahi

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Abstract

Background: The aim of this study was to look at how surgical treatment of early surgery gastric ulcer perforation has changed, as well as the outcomes. While it has been demonstrated that treating perforated gastric ulcers (GUP) is feasible and effective, its adoption into routine clinical practice has been gradual. Only a few studies have looked at its overall usefulness. **Material and Methods:** A population-based analysis of all patients undergoing surgery for GUP between 2018 and 2020 was conducted in Rajshahi Medical College Hospital as part of a multicentered non-randomized experimental prospective study. The demographics of the patients, as well as their medical assessment, management, and results, were assessed. The following are the outcomes: A total of 482 patients were included in the study, with a median age of 67 years (range, 20–100). **Results:** There were 482 patients in total, with a median age of 67 years (range, 20–100). Women made up 284 (59%) of the total patients, and they were older ($p=0.001$), had more comorbidities ($p=0.002$), and had a higher Boey risk score ($p=0.036$) than men. The position of the perforation was gastric/pyloric in 347 patients (72%), and duodenal in 135 patients (28%). A simple abdominal x-ray revealed pneumoperitoneum Thirty-one out of forty-one patients 361 patients (75%) had abdominal computerized tomography (CT) and 76 of 77 patients (98%) had abdominal computerized tomography (CT) ($p=0.001$). 234 patients (42%) had laparoscopic surgery, which was completed in 361 patients (75 percent of attempted cases). During the study period, the rate of laparotomy care increased from 33-222 patients (7%) to 46 percent ($p=0.02$). Patients handled by laparotomy had a shorter median operation period (70 minutes) than those treated by laparoscopy (82 minutes) or those transferred from laparoscopy to laparotomy (105 minutes; $p=0.017$). In 236 patients, postoperative complications occurred (49 percent). Overall, 77 patients died within 30 days of surgery (16 percent). Both open and surgical repair, there were no statistically significant differences in morbidity and mortality. **Conclusion:** The increased use of clinical evaluation with X-ray (CT) as the primary diagnostic method for PPU and repair in surgical care is demonstrated in this research. Changes in management are not linked to different results.

Keywords: Gastric ulcer, Perforation, Diagnosis, Surgery, Rajshahi Medical College, Bangladesh.

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INTRODUCTION

The multifactorial etiology of peptic ulcer disease (PUD) [1-3], life-threatening complications including acute hemorrhage or perforation occur in a considerable proportion of patients. The mortality rate ranges from 10–40% among patients with perforation [4-6] and immediate surgery is the treatment of choice in most patients with suspected perforated peptic ulcer (PPU) [4], Nathanson [7] and coworkers first recorded surgical management of PPU in 1990, and it has received growing attention in recent decades. The scientific evidence supporting this method has been

strengthened by preliminary early reports [8-10], including randomized controlled trials [11], results from a recent meta-analysis [12], and other publications [13, 14]. Although laparoscopy is considered feasible and effective, the lack of surgeons capable of performing this procedure on a 24-hour basis in all hospitals caring for patients with PPU prevents it from being routine. Just 6% of patients with PPU were treated laparoscopically, according to a recent Danish study [15].

The aim of this audit was to evaluate the surgical management and outcome of early surgery

gastric ulcer perforation consecutive patients diagnosed with PPU during a time period when the surgical treatment of PPU was introduced and available in a surgical department at Rajshahi Medical College Hospital Bangladesh.

MATERIALS AND METHODS

Using pertinent ICD-9 and ICD-10 codes, all patients diagnosed with perforated gastric ulcer (GU) or duodenal ulcer (DU) between January 2018 and December 2020 were reported from the Rajshahi Medical College Hospital Bangladesh administrative electronic database (K25.1, K25.2, K25.5, K25.6, and K26.1, K26.2, K26.5, K26.6). To allow a full identification of all patients, additional searches were conducted using acceptable surgical procedure codes (JDA60 Gastrotomy, JDA61 Laparoscopic gastrotomy, JDH70 Duodenotomy, and JDH71 Laparoscopic duodenotomy). Our hospital serves a population of 320,000 people in the surrounding area.

Patients with perforated GU or DU who underwent surgical treatment were included in the report. Patients who were treated medically or conservatively, as well as those who were diagnosed at autopsy, were exempt. Hospital records, surgical reports, and other sources were used to gather demographic and clinical data as needed.

The Bangladesh Society of Anesthesiologists (BSA) classification was retrieved from perioperative forms, as judged and reported by the responsible anesthetist at surgery. Based on available information on the three criteria, each patient was retrospectively graded using the Boey score [16]:

(a) Shock at admission (systolic blood pressure <90 mmHg), (b) Severe medical illness (ASA III–V), and (c) Delayed presentation (duration of symptoms >24 h). For this scoring system, the patient is given one point for each positive criterion, with possible scores of 0–3. Severity of complications was retrospectively classified according to the Dindo-Clavien criteria [17],

A unique personal 11-digit identification number of all citizens in our country enabled complete follow-up data with regard to survival. Data without case-sensitive personal identification were recorded in an appropriately designed database.

STATISTICAL ANALYSIS

For statistical analysis, SPSS 18.0 for Mac (SPSS Inc.) was used. A nonparametric distribution was assumed, and descriptive analysis was carried out using the Chi-square or Fisher's exact test for dichotomous data and the Kruskal–Wallis or Mann–Whitney U test for continuous data, as required. Statistical significance was described as a *p* value of less than 0.05.

RESULTS

Our hospital admitted 482 consecutive patients for PPU between 2018 and 2020, with 284 females (59%) and 198 males (41%) receiving surgical care. The annual occurrence of PUP in surgically treated patients was estimated to be 5 per 100,000. Patient characteristics are shown in Table 1. Though females were diagnosed with a slightly higher proportion of additional diseases and comorbidity ($p=0.002$), the ASA classification for both genders was similar (Table 1). Patients with concomitant diseases included 207 (43%), 87 (18%), and 87 (18%) with a current or previous cancer diagnosis, 72 (15%) of the participants had chronic pulmonary disease, and 63 (13%) had an autoimmune condition. In addition, 222 patients (46%) have other unclassified concomitant conditions or a mixture of diagnoses.

Risk Factors

A total of 251 patients (52%) smoked on a daily basis. A substantial proportion of patients received ongoing medical attention, including aspirin in 128 patients (23%), nonsteroidal anti-inflammatory medications in 96 patients (20%), and systemic steroids in 39 patients (8 percent). A Boey score of 2 or 3 was found in 125 (26%) of the patients, suggesting an increased risk of a negative outcome. Females had a slightly lower Boey score profile than males ($p=0.036$). Clinical evidence of peritonitis was found in 318 patients (66%) at the time of admission, with no gender variations.

Non-operative management

A non-operative procedure may be considered in high-risk patients, those who may not tolerate or cannot undergo general anaesthesia, or patients with a sealed retroperitoneal perforation (Table 1). As needed 239–289, this includes PPI and antibiotic treatment, a nasogastric tube, and percutaneous drainage of any collections. The mortality rate for both operative and conservative approaches for the elderly and extremely ill patients with PPU is over 50% [24].

According to one study, patients with PPU who have had symptoms for a short time, have few signs and no generalized peritonitis, and have only small amounts of free air detectable on imaging could be the best candidates for conservative care [482]. The sum of detectable free air, on the other hand, is not always a reliable indicator of disease intensity. Conservative management was effective in 73% of patients, with a mortality rate comparable to surgery, according to a limited RCT of 239 patients, of which 40 were randomized to primary conservative care and 128 to immediate surgery. It was less likely to succeed in patients over 70 years [77]. Conservative care for PPU is rarely published [352], and often in case reports, so its function is unknown and best determined by individual assessment. Especially in the case of gastric ulcer perforations, an upper gastroendoscopy is required to

rule out gastric cancer if the patient has not undergone surgery or if biopsies were not obtained during surgery.

Other outcomes

In published studies, the 30-day mortality rate varies significantly and is linked to patient selection as well as geographic variations (8 percent -83 percent), There is consistent evidence of the negative effects of delayed diagnosis and surgery, as well as higher mortality in the elderly 39-400. (7 percent -8 percent) Wound and other abdominal infections, thromboembolic events, and organ failure are among the most serious postoperative complications 34-39. Omental patch leakage, which necessitates reoperation

in around 4% of patients 482, and recurrent duodenal fistula¹⁹ are rarer complications.

Diagnosis and Preoperative Imaging

During the study era, abdominal computerized tomography (CT) more or less replaced plain abdominal imaging as the imaging modality of choice, as shown in Fig. 1. A simple abdominal x-ray was performed on 174 patients (36%), with pneumoperitoneum being diagnosed in 361 (75%) of them. Six patients with a negative simple abdominal x-ray had their diagnosis and surgery postponed. In 328 patients (68 percent), an abdominal CT was performed, with pneumoperitoneum being diagnosed in 477 of them (99 percent). There were 385 patients in total.

Table-1: Patient characteristics

Variable	Males 198 (41%)	Females 284 (59%)	Total 482 (100%)	p value
Age, years (median, range)	187 (20–90)	156 (29–100)	139 (20–100)	<0.001
Age >60 years	265 (55%)	376 (78%)	328 (68%)	0.012
Comorbidity ^a	328 (68%)	439 (91%)	395 (82%)	0.002
Smoking	376 (78%)	270 (56%)	251 (52%)	0.8
ASA				
1	–	–	–	0.6
2	–	14 (3%)	10 (2%)	
3	318 (66%)	289 (60%)	299 (62%)	
4	154 (32%)	159 (33%)	159 (33%)	
5	10 (2%)	24 (5%)	14 (3%)	
Boey score				
0	174 (36%)	63 (13%)	111 (23%)	0.036
1	207 (43%)	275 (57%)	246 (51%)	
2	92 (19%)	116 (24%)	106 (22%)	
3	10 (2%)	29 (6%)	19 (4%)	
Surgery completed laparoscopically	164 (34%)	178 (37%)	154 (32%)	0.2
Complications ^b	216 (45%)	246 (51%)	231 (48%)	0.5
Mortality ^c	53 (11%)	92 (19%)	77 (16%)	0.2
LOS, days (median, IQR)	7 (6–19)	8.5 (5–16)	8 (6–17)	0.7

LOS length of stay, BSA Bangladesh Society of Anesthesiology score, IQR interquartile range

a) Existing concomitant diseases reported at hospital admission;

b) Dindo–Clavien criteria [17];

c) Death within 30 days

Visceral perforation was already suspected based on history and clinical review in 80 percent of patients with pneumoperitoneum diagnosed

radiographically. On the other side, pneumoperitoneum was diagnosed in 96 patients (20%) without clinical suspicion of visceral perforation.

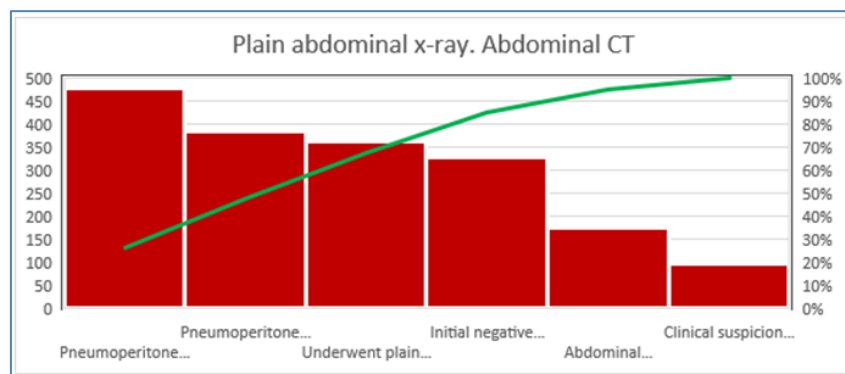


Fig-1

Changes in preoperative abdominal imaging during the study period are depicted in Figure 1.

Perforations

Perforations were found in the prepyloric area in 192 patients (40%), the duodenum in 135 (28%), the pylorus in 63 (13%), and the antrum in 24 patients (5 percent). Perforation was either in the corpus of the stomach or not otherwise known in the remaining 67 patients (14%). There were no gender gaps found. A combination of ulcer bleeding and perforation was observed in 67 patients (14%).

Surgery

In 448 patients (93 percent), a gastro- or duodenography was performed, with segmentation in 395 of them (82 percent). Antibiotics were provided to 415 (86%) and 429 (89%) patients, respectively, prior to surgery and after surgery. Laparotomy was started in 202 patients (42%), and the surgical procedure (i.e., raphy) was completed laparoscopically in 361 patients (75%); therefore, laparotomy was used in 32 percent of the total 482 patients. A Billroth I or Billroth II resection was performed in three patients, one of whom was later surgically treated for a second PPU. The use of laparoscopy increased dramatically ($p=0.002$; Fig. 2) as the study period progressed.

Morbidity and Mortality

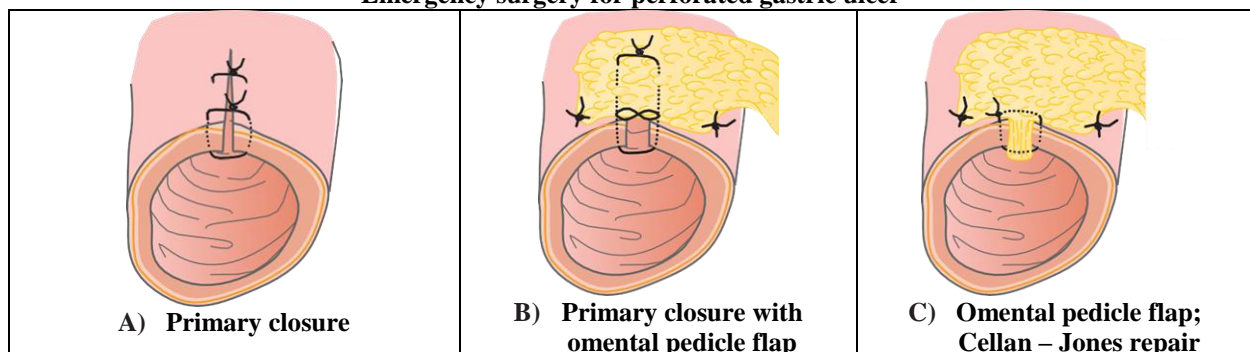
The 30-day postoperative mortality rate was 16% (77 patients), and it was linked to high comorbidity (ASA score of 3) and older age. According to the Dindo–Clavien criterion, a patient's death is graded as grade V. 17 The cause of death was not always determined by autopsy, but sepsis, mostly in conjunction with multiorgan failure, was the most common cause of death (at least seven deaths, or 50 percent). Myocardial infarction, renal, and respiratory failures were among the other causes. There was no evidence of a connection between postoperative mortality and surgical approach (Table 2).

Patients with a duodenal perforation were more likely to experience shock and/or syncope at admission (106 (22%) vs. those with other ulcer

localization (77 (16%)), although this difference was not statistically important. In 236 patients, postoperative complications were reported (49 percent). The majority of these patients experienced multiple complications, including respiratory failure in 120 (25%) patients, postoperative intra-abdominal infection in 77 (16%) patients, cardio-vascular events in 72 (15%) patients, renal failure in 58 (12%) patients, postoperative suture leakage in 43 (9%) patients, and wound infection in There are 24 patients in total. (5%) of patients, postoperative bleeding in 10% (2%) of patients, and numerous other complications in 43 (9%) of patients. In addition, 67 patients (14% of the total) were treated for clinical sepsis. While the grade I–II Dindo–Clavien complications may be treated without surgery, endoscopy, or radiology, the grade III complications require surgery, endoscopy, or radiology. Grade IV complications, such as single or multiorgan dysfunction, are life-threatening 34. (7 percent) Of the 482 patients who had complications, 67 (14%) had grade II, 87 (18%) had grade III, 174 (36%) had grade IV, and the 154 patients (32%) who died were listed as g. Re-admission to the hospital within three weeks of discharge was seen. Pneumonia ($n=3$), subphrenic abscess ($n=1$), wound infection ($n=2$), and worsening of concomitant diseases ($n=7$), including lung cancer, brain cancer, non-Hodgkin lymphoma, and cardiovascular disease, were among the reasons for readmission.

We compared the characteristics and outcomes of patients based on the surgical method (Table 2). The age and gender distributions, as well as the ASA and Boey ratings, were all identical (Table 2). In terms of preoperative delay and ulcer localization, no major variations were found. The median time of the procedure was shorter in the laparotomy community relative to the laparoscopic or transformed operations groups ($p=0.017$). There was a nonsignificant disparity in postoperative complications, with the laparotomy community having more complications ($p =0.057$). Nonetheless, within each category, the proportions of complications classified using the Dindo–Clavien criteria¹⁷ had a similar distribution.

Emergency surgery for perforated gastric ulcer



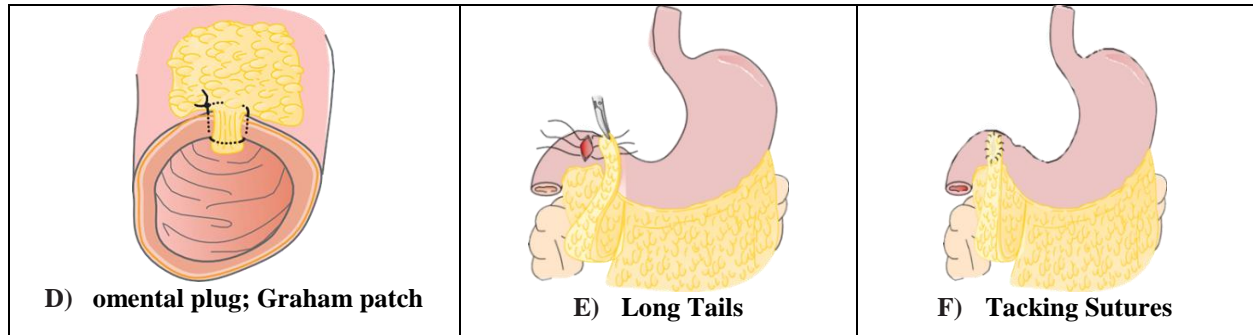


Fig-2: A primary suture; b primary suture with pedicled omental flap; c pedicled omental flap sutured into the perforation (Cellan– Jones repair); d free omental plug sutured into the perforation (Graham patch); e use of three long-tailed sutures to close the perforation and buttress with a pedicled omental flap; f use of tacking sutures around the thigh; g use (for example when friable edges or a large perforation may not allow approximation of wound edges)

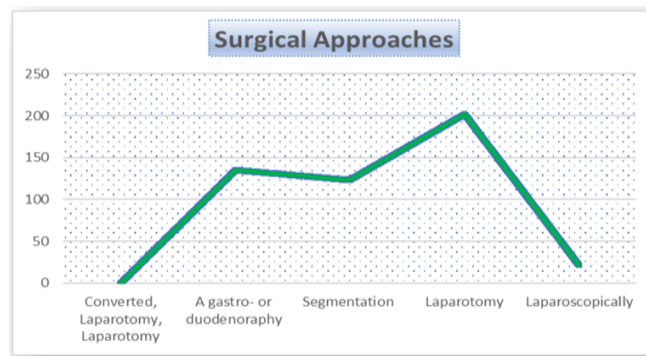


Fig-3: Shows the distribution of surgical methods over the course of the research

Table-2: Characteristics and outcomes (n=482) based on surgical approach

Variable	Laparotomy 280 (58%)	Laparoscopy 154 (32%)	Converted 53 (11%)	p value
Females	37 (56%)	25 (69%)	5 (42%)	0.18 ^a
Median age [years] (range)	187 (20–100)	139 (29–95)	156 (40–87)	0.16 ^b
ASA score				
I	0	0	0	0.69 ^a
II	4.82 (1%)	14 (3%)	0	
III	280 (58%)	347 (72%)	280 (58%)	
IV	183 (38%)	106 (22%)	159 (33%)	
V	14 (3%)	14 (3%)	43 (9%)	
Boey score				
0	87 (18%)	135 (28%)	159 (33%)	0.33 ^a
1	241 (50%)	280 (58%)	159 (33%)	
2	125 (26%)	53 (11%)	159 (33%)	
3	29 (6%)	14 (3%)	0	
Preoperative delay [h] (median, range)	6.6 (1.4–116)	5.8 (1.8–113)	6.0 (3.3–50)	0.5 ^b
Localization of perforation				
Gastric	251 (52%)	227 (47%)	280 (58%)	0.72 ^a
Pyloric	43 (9%)	92 (19%)	82 (17%)	
Duodenal	140 (29%)	149 (31%)	82 (17%)	
Not specified	53 (11%)	14 (3%)	39 (8%)	
Median operative duration[min] (range)	70 (39–291)	82 (37–160)	105 (60–155)	0.017 ^b
Postoperative complications	318 (66%)	174 (36%)	58 (12%)	0.057 ^a
Complications according to Dindo–Clavien score				
Grade I	0	0	0	0.30 ^a
Grade II	53 (11%)	114 (3%)	0	
Grade III	39 (8%)	53 (11%)	39 (8%)	
Grade IV	96 (20%)	82 (17%)	120 (25%)	
Grade V	101 (21%)	39 (8%)	39 (8%)	
Postoperative mortality (≤30 day)	101 (21%)	39 (8%)	39 (8%)	0.18 ^a
^a Chi-square test				
^b Kruskal–Wallis test				

DISCUSSION

Surgical treatment for perforated ulcers has evolved over the last three decades, with duodenoraphy or gastroraphy with omentoplasty increasingly replacing gastric resection as an emergency procedure [18, 19]. Additionally, a reduction in surgical trauma with the use of laparotomy for these often-fragile patients is thought to be important. Others, on the other hand, believe that a laparoscopic procedure is particularly useful for low-risk patients [13].

Though early studies were hindered by flaws such as patient selection bias, poor study design, and low statistical capacity, a recent Cochrane report concluded that laparoscopic surgery findings are clinically equivalent to open surgery. 14 Nonetheless, the laparoscopic approach to the care of patients with PPU has progressed slowly, and several surgical departments still do not provide it around the clock. 15 Local hospitals are widely used to treat this surgical emergency. Given the relatively low number of cases, as shown by our annual incidence of 5 per 100,000, all surgeons would find it difficult to obtain the requisite professional expertise.

Perforation is still a significant complication of peptic ulcer disease, according to this population-based survey of consecutive patients. However, the recorded 16 percent 30-day postoperative mortality is lower than the recent 25 percent mortality reported from Denmark¹⁵, and the 48 percent complication rate is comparable to other estimates. Nonetheless, these findings should be viewed in light of the patient's advanced age and general comorbidity, as well as the fact that this population is seeking surgical care for a potentially life-threatening condition. The 8% postoperative mortality rate observed in laparoscopically treated patients is consistent with recent studies [15, 20, 23]. The high proportion of patients treated laparoscopically during the last four years of the study period, between 45 and 50 percent, is noteworthy. This is in contrast to recent data from another Scandinavian community, which revealed that only 6% of patients were treated laparoscopically, and only half of acute abdominal surgery departments provided laparoscopic repair of perforated peptic ulcers. 15 Despite the fact that the second half of the study period saw a substantially higher proportion of laparoscopic procedures performed, our average conver

Several risk factors are important for interpreting our findings, as mirrored by the Boey score¹⁶. It's worth noting that these risk factors are assessed in the majority of patients during the pre-hospital phase between symptom onset and hospital admission. However, a thorough medical examination that could lead to immediate surgical treatment is critical. As a result, suboptimal imaging does not hinder

effective clinical decision-making. This research also found that plain abdominal imaging has a high risk of producing false negative results. As a result, in this clinical case, low-dose CT should be favored when imaging is used [26, 27].

There is a large proportion of elderly patients with high comorbidity, as previously stated. 6,20,28,29; 6,20,28,29; 6,20,28, Others also stressed the importance of a prompt diagnosis and adequate surgical care in this vulnerable community of patients. 30.28 The majority of our patients' preoperative in-hospital waiting times are comparable to those reported by other writers [6].

While we used a laparoscopic procedure for surgical treatment of patients with PPU in a few single patients with PPU before 2004, we planned to use this technique for surgical treatment of patients with PPU when it became available among the responsible surgeons in 2005. 13,14,23,31 are all numbers that can be used to make a number of As a result, during the last part of the study era, we saw a slightly higher proportion of patients treated laparoscopically. Other research has found that laparoscopy results in less postoperative pain, a shorter hospital stay, less septic cases, and less wound infection [32].

Females had a higher median age and substantially more comorbidities than males, as reported by Miller *et al.* [30]. This may be explained in part by the fact that we have a higher proportion of elderly females in our population, and high comorbidity is closely linked to older age. As previously stated by Svanes and colleagues, gastric ulcer perforations, which are often associated with smoking in patients under 75 years of age, were the most common [6].

CONCLUSIONS

If the responsible surgical team has the requisite medical skills, surgical treatment of patients with peptic ulcer perforation can be implemented and completed safely in a significant proportion of patients with this life-threatening condition. The findings of this study do not allow for firm conclusions on which patients should undergo open versus laparoscopic surgery. The care these patients can benefit from laparoscopic care, which is similar to mini-invasive procedures for other conditions. It remains to be seen if the positive results seen in controlled trials can be replicated in routine surgical practice.

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