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Original Research Article

Laparoscopic and open repair of perforated peptic ulcer

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ABSTRACT

Background: The study included patients diagnosed as perforated peptic ulcer. Outcomes are assessed by mortality and morbidity rate, operation time and hospital length of stay.
Methods: On the period from January 2013 to December 2014 a total of 71 patients were operated in both facilities: 37 patients in Dubai hospital and 34 in Mafraq Hospital. Open repair with omental patch done in 34 patients (47.9%) and laparoscopically in 37 patients (52.1%). No cases of laparoscopy converted to laparotomy.
Results: The data demonstrates homogeneous results for the outcome variables of morbidity and complications, while operation time and hospital length of stay differ significantly. Statistical significance could not be reached for any of these variables, although odd ratios were consistently in favour of the laparoscopic repair. Similarly, the laparoscopic approach resulted in a lower rate of minor complications (10% vs. 23%). Total lengths of stay post open repair made of 4.2±1.2 days, after laparoscopic repair 3.6±0.9 days. At the same time there were observed longer operating times for laparoscopic repair of PPU which constituted 62±10.6 minutes whereas open repair took only 45±12.9 minutes. Peritoneal lavage has been a factor of prolonged duration of laparoscopic surgery.
Conclusions: Laparoscopic repair of a perforated peptic ulcer is an amenable and feasible technique within the hands of experienced laparoscopic surgeon. Current evidence does not clearly demonstrate the advantages of laparoscopic versus open repair. Growing interest in the laparoscopic approach may encourage the design of additional randomized trials to analyze its efficacy compared with the open approach.

Keywords: Laparoscopic and open repair of perforated peptic ulcer, Ulcer

INTRODUCTION

Despite the significant decrease in surgical management of peptic ulcer disease as a result of introduction of medical treatment and eradication of *H. pylori*, the complication of peptic ulcer disease remained steady.[1] The most common complication of peptic ulcer disease includes bleeding, perforation and obstruction with perforation being second most common complication as well as second most common cause of bowel perforation after acute appendicitis. Perforation of duodenal ulcer will lead to contamination of peritoneal cavity with bile as well as free air.[2] First description of laparoscopic repair for perforated duodenal ulcer was on 1990 by Mouret et al.[3] Comparing laparoscopic repair of perforated duodenal ulcer with conventional open repair, laparoscopic repair has the advantage of minimal postoperative pain and decrease hospital stay.[4] However laparoscopic repair is not best option for all patients as significantly high reoperation rate has been reported. According to the literature review on 2010 the conversion rate from laparoscopic to open repair was 12.4 (0.0%-28.5%) with the most common causes of that conversion were the size and site of the ulcer.

METHODS

This case control study was carried out on the period of two years from January 2013 till December 2014. A majority of patients in Dubai Hospital were operated by open technique which includes midline laparotomy, suture of the ulcer with an omentum patch. Laparoscopic treatment is mainly employed in Mafraq Hospital. The procedure is undertaken through 3 trocars. Suture of the ulcer with omentum patch is performed.

Figure 1: Air under diaphragm.

Over the period of time, total of 71 patients were operated in both facilities: 37 patients in Dubai Hospital and 34 in Mafraq Hospital. Average age was about 25-28 years in both groups with male predominance. Diagnostic modalities including CBC, CRP, plain X-ray chest with under diaphragm as shown in Figure 1, as well as CT abdomen with contrast in some selected patients. Diffuse peritonitis was found in 44.1% in laparoscopic repair group, whereas the number in open repair group constitutes 59.5%. Circulatory failure developed in 2.9 and 10.8% of the cases respectively. Surgery was undertaken via laparotomy (47.9%) and under laparoscopy (52.1%). No cases of laparoscopy converted to laparotomy were observed.

RESULTS

The data demonstrates homogeneous results for the outcome variables of morbidity and complications, while operation time and hospital length of stay differ significantly. Statistical significance could not be reached for any of these variables, although odd ratios were consistently in favor of the laparoscopic repair. Similarly, the laparoscopic approach resulted in a lower rate of minor complications (11.7% vs. 21.6%).

Total lengths of stay post open repair made of 4.2±1.2 days, after laparoscopic repair 3.6±0.9 days. At the same time there were observed longer operating times for laparoscopic repair of PPU which constituted 62±10.6 minutes, whereas open repair took only 45±12.9 minutes. Peritoneal lavage has been a factor of prolonged duration of laparoscopic surgery (Table 2).

Table 1: Demographic data for laparoscopic and open repair groups.

Variables	Laparoscopic repair	Open repair	P-value
Number of patients	34	37	0.028
Age	28.1±5.6	25.9±7.9	0.076
Gender			
Male	34 (100%)	35 (94.5%)	0.098
Female	0	2 (5.5%)	
Duration of perforation >24 h	5 (14.7%)	8 (21.6%)	0.032
Shock upon admission	1 (2.9%)	4 (10.8%)	0.119
Peritonitis diffuse	15 (44.1%)	22 (59.5%)	0.769
Ulcer history	8 (23.5%)	12 (32.4%)	0.239
Ulcer size (mm)	4.2±0.5	6.7±1.2	0.028
Previous abdominal surgeries	0	5 (13.5%)	0.068

DISCUSSION

Surgery is the treatment of choice for perforated peptic ulcer according to world journal of emergency surgery guidelines on 2013. Surgical procedures include simple closure with or without omental patch.[4]

Many studies despite describing laparoscopic repair as efficient and feasible they found the procedure has equal outcome with open repair. In present study and due to small number of patient we also found there no significant statistical difference between both procedures. There were no clear guidelines for which patient will be selected for neither laparoscopic nor open repair but in general there is an agreement if patient upon admission has one or most of the following criteria it is better to go for open repair.[5-7]

- Shock on admission with systolic blood pressure less than 90mmHg
- Old patients with age above 70 years.
- Presentation beyond 24 hours.

- American Society of Anesthesiologists grade III to IV.

Table 2: Outcomes of laparoscopic and open repair of peptic ulcer.

Outcome measure	Laparoscopic repair	Open repair	P-value
Operative time (min)	62±10.6	45±12.9	0.034
Hospital stay (d)	3.6±0.9	4.2±1.2	0.056
Postoperative morbidity (%)	4 (11.7%)	8 (21.6%)	0.087
Suture leakage	0	1 (2.7%)	0.175
Intraabdominal abscess	1 (2.9%)	2 (5.4%)	0.178
Ileus	1 (2.9%)	1 (2.7%)	0.296
Fistula	0	1 (2.7%)	0.459
Pneumonia	1 (2.9%)	2 (5.4%)	1.000
Reoperation	1 (2.9%)	1 (2.7%)	0.035
Mortality	0	0	

In present study, the age group of the patients was between 28-28 years with 13 patients out of 71 patients presented after 24 hours from the onset of perforation, the majority of them 8 patients managed with open repair. 5 patients presented with shock upon admission after resuscitation 4 of them were managed by open repair. Regarding conversion rate from laparoscopic to open repair which was 12.4% on reviewing literature study in 2010, our conversion rate was 0%.[7]

CONCLUSION

In conclusion, laparoscopic repair of a perforated peptic ulcer is an amenable and feasible technique within the hands of experienced laparoscopic surgeon when the cases are early and properly diagnosed. Current evidence does not clearly demonstrate the advantages of laparoscopic versus open repair of PPU for any of the examined outcome measures. Growing interest in the laparoscopic approach may encourage the design of additional randomized trials to analyze its efficacy compared with the open approach.

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