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Original Research Article

Laparoscopic repair of perforated peptic ulcers without omental patch versus conventional open surgery

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ABSTRACT

Background: Perforation of peptic ulcer usually presents as an acute abdomen. Nearly one third of the patients have no history of the disease. Laparoscopic surgery, a minimally invasive technique, has recently begun to be used on perforated peptic ulcers effectively and frequently. This study aimed to evaluate the efficacy, safety and outcome of laparoscopic surgery without omental patch for perforated ulcers in comparison with conventional open surgery.
Methods: All patients diagnosed clinically with perforated peptic ulcers presenting within 24 hours of symptoms and undergoing surgery under a single surgeon during 1 year interval were included in this study and randomly assigned to laparoscopic and open repair group. Patients who had to be converted from laparoscopic surgery to open surgery, were excluded.
Results: A total of 69 patients were included in this study. Number of doses of analgesics required in laparoscopic group was 9.48 ± 1.82, while those required in conventional open group was 18.16±2.24. In laparoscopic duodenal perforation repair group, duration of hospital stay (in days) was 8.42±1.44 as compared to 12.08±4.82 in open repair group. Laparoscopic group had significantly fewer post-operative complications but had longer mean operative time (101.90 minutes compared to 60.32 minutes in open repair group).
Conclusions: Laparoscopic closure of perforated duodenal ulcer is a simple and safe procedure in experienced hands. It maintains the benefits of the minimally invasive approach. It is associated with longer operating time, less postoperative pain, less post-operative complications, a shorter postoperative hospital stay, and earlier returns to normal daily activities.

Keywords: Laparoscopic repair, Open repair, Peptic ulcer perforation, Post-operative analgesia

INTRODUCTION

Perforation of peptic ulcer usually presents as an acute abdomen. Nearly one third of the patients have no history of the disease. Initial symptoms of perforated duodenal or gastric ulcer include a severe and sudden onset abdominal pain that is worse in right upper quadrant and epigastrium and usually accompanied by vomiting and nausea. There is rapid generalization of pain and examination shows peritonitis with lack of bowel sounds.[1] There is, however, disagreement as to the relative merits of non-operative treatment, simple closure, or a definitive acid-reduction procedure for perforated peptic ulcers. Non-operative treatment of perforated peptic ulcers was shown to be effective.[2] However, the uncertainty in diagnosis, the potential delay for treatment in non-responders, and the unreliable response in elderly patients make it difficult to be applied to all clinical situations.[3] Simple closure of the

perforation with an omental patch has become the favored management approach in many institutions. It is technically straightforward and reliable and is also the preferred approach for high-risk patients.[4-10] Laparoscopic surgery, a minimally invasive technique, has recently begun to be used on perforated peptic ulcers effectively and frequently. This study aims to evaluate the efficacy, safety and outcome of laparoscopic surgery without omental patch for perforated ulcers in comparison with conventional open surgery.

METHODS

All patients diagnosed clinically with perforated peptic ulcers presenting within 24 hours of symptoms and undergoing surgery under a single surgeon during the study period i.e. April 2012 to April 2013, were included in this study. Cases were prospectively randomized to undergo either conventional open or laparoscopic without omental patch repair (by random sampling done by lottery method).

Inclusion criteria

- Patients willing to participate in the study (by taking informed consent)
- Patients older than 16 years with a perforated peptic ulcer presenting within 24 hours of symptoms.

Exclusion criteria

- Patients with a surgical diagnosis other than perforated peptic ulcer.
- Patients presenting with perforated peptic ulcer with symptoms persisting beyond 24 hours.
- Patients who absconded or left the study or died during the period of study.
- Patients who had to be converted from laparoscopic surgery to open surgery.

The data collected was analyzed using statistical software, SPSS Version 17.0. Chi-square tests and t-test were used to test the associations between the different variables. While applying chi square test, if the expected count in any box was less than 5, Yates' correction was applied.

RESULTS

A total of 69 patients were included in this study out of which 31 patients (44.9%) belonged to laparoscopic duodenal perforation repair group and 38 (55.1%) to conventional open repair group. The age and sex distribution were comparable in both the groups (Table 1 and 2).

Table 1: Distribution of patients according to age.

Age group	Laparoscopic duodenal perforation repair group		Conventional open repair group	
	n=31	%	n=38	%
<25	6	19.36	5	13.16
25-50	13	41.94	25	65.79
>50	12	38.71	8	21.05

Table 2: Distribution of patients according to gender.

Gender of patient	Laparoscopic duodenal perforation repair group		Conventional open repair group	
	n=31	%	n=38	%
Male	24	77.42	30	78.95
Female	7	22.58	8	21.05

Table 3: Mean duration of operation in laparoscopic duodenal perforation repair group and conventional open repair group.

Groups	Mean duration (minutes)	S.D.	S.E. of mean
Laparoscopic duodenal perforation repair group	101.90	6.426	1.154
Conventional open repair group	60.32	3.786	0.614

t=33.442; df=67; p<0.05.

Table 4: Number of doses of analgesics used post-operatively in both the groups.

Groups	Mean doses	S.D.	S.E. of mean
Laparoscopic duodenal perforation repair group	9.48	0.926	0.166
Conventional open repair group	18.16	1.128	0.183

t= -34.384; df=67; p<0.05.

In laparoscopic duodenal perforation repair group mean duration of operation (in minutes) was 101.90±12.84, while mean duration of operation (in minutes) for conventional open repair group was 60.32±7.56 (Table 3). Number of doses of analgesics required in laparoscopic group was 9.48±1.82, while those required in conventional open group was 18.16±2.24 (Table 4).

In laparoscopic duodenal perforation repair group, duration of hospital stay (in days) was 8.42±1.44, while

duration of hospital stay (in days) for conventional open repair group was 12.08±4.82 (Table 5).

28 (90.32%) patients in the laparoscopic duodenal perforation repair group and 23 (60.53%) patients in the conventional open repair group had no complications post-operatively. 3 (9.68%) patients in the laparoscopic duodenal perforation repair group and 4 (10.53%) patients in conventional open repair group presented with chest infection. In the conventional open repair group, 6 (15.79%) patients presented with wound dehiscence and 5 (13.15%) patients presented with wound dehiscence and infection (Table 6).

In present study, the differences in the average duration of operation, number of doses of analgesics required in the post-operative period, average duration of hospital stay and post-operative complications were statistically significant (p-value<0.05).

Table 5: Hospital stay in days in laparoscopic duodenal perforation repair group and conventional open repair group.

Groups	Mean duration (days)	S.D.	S.E. of mean
Laparoscopic duodenal perforation repair group	8.42	0.720	0.129
Conventional open repair group	12.08	2.813	0.456

t= -7.049; df=67; p<0.05.

Table 6: Post-operative complications in the laparoscopic duodenal perforation repair group and conventional open repair group.

Post-operative complications	Laparoscopic duodenal perforation repair group		Conventional open repair group	
	n=31	%	n=38	%
No complications	28	90.32	23	60.53
Wound dehiscence and wound infection	0	0	5	13.15
Chest infection	3	9.68	4	10.53
Wound dehiscence and chest infection	0	0	6	15.79

DISCUSSION

The most frequently performed operation for a perforated duodenal ulcer is simple closure with an omental onlay reinforcement or patch. Most surgeons agree that diagnosis of perforated ulcer is readily apparent with the laparoscope in the majority of cases. Laparoscopic surgery was not widely used as expected in perforated ulcer secondary to concerns regarding the technical challenge of two-handed manipulation and intracorporeal suturing of indurated and friable tissue. Recent studies have confirmed the appropriateness of the laparoscopic approach to perforated peptic ulcer in appropriately selected patients.

In our study, mean duration of operation (in minutes) was 101.90±12.84 and 60.32±7.56 in the laparoscopic and open repair group respectively. The difference was statistically significant (p<0.05). This is similar to findings shown by Nicolau AE and Bertleff MJ.[11,12]

In present study, number of doses of analgesics required in laparoscopic group was 9.48±1.82, while those required in conventional open group was 18.16±2.24. The difference was statistically significant (p<0.05). Troidl H, Lunevicius R and Vishwanath Golash also showed that laparoscopic repair of peptic ulcer perforation consumed lesser number of analgesic doses in the post-operative period.[13-15]

In this study, duration of hospital stay (in days) was 8.42±1.44 and 12.08±4.82 in the laparoscopic and open repair group respectively. The difference was statistically significant (p-value<0.05). Similarly Seelig MH compared the results of laparoscopic treatment of 18 patients with perforated gastroduodenal ulcers with 28 patients who were operated by open access and found that the mean postoperative hospital stay was 9.4 compared to 15.3 days (p = 0.15).[16] Similarly Mehendale VG conducted a study among 77 consecutive patients with duodenal ulcer perforation and found that median hospital stay was 4 days (range 4 to 6) for laparoscopy. Corresponding figure for open surgery were 9 days (7 to 13).[17]

In this study, majority of the patients i.e. 28 (90.32%) in the laparoscopic duodenal perforation repair group and 23 (60.53%) in the conventional open repair group had no complications post-operatively. 3 (9.68%) patients in the laparoscopic duodenal perforation repair group and 4 (10.53%) patients in conventional open repair group presented with chest infection. In the conventional open repair group, 6 (15.79) patients presented with wound dehiscence and 5 (13.15%) patients presented with wound dehiscence and infection. Similarly Wing T. Siu conducted

a study to compare the results of open versus laparoscopic repair for perforated peptic ulcers and found that there were fewer chest infections in the laparoscopic group.[3] Vishwanath Golash conducted a study to compare the result of open and laparoscopic repair of perforated peptic ulcers and found that compared to open approach, laparoscopic repair required had fewer complications.[15]

CONCLUSION

Laparoscopic closure of perforated duodenal ulcer is a simple and safe procedure in experienced hands. It maintains the benefits of the minimally invasive approach. Even though laparoscopic repair of peptic ulcer perforation was associated with longer operating time, it had no impact on the outcome. In comparison to open repair, it was associated with less postoperative pain, less post-operative complications, a shorter postoperative hospital stay, and earlier returns to normal daily activities.

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