Research Article

Role of laparoscopic surgery for management of duodenal ulcer perforation

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Abstract

Background: The chief support of remedy of patients with peptic duodenal perforation is surgery. With the invention of minimal access procedures, laparoscopy is being used for the treatment of this condition.

Objective: To establish the role of laparoscopy in duodenal ulcer perforation.

Materials and Methods: This is a nonrandomized, controlled clinical trial. Patients diagnosed with perforated peptic ulcers, admitted to VS Hospital during the period of January 2013–June 2014, underwent either open or laparoscopic suture omental patch repair. A total of 20 patients were included in the study; 10 in laparoscopic group and 10 in open group.

Result: This observational study revealed 80% male preponderance, and 57% of them were in the fourth, fifth, and sixth decades, with mean age of 50 years. The duration of surgery was 56 min in open group when compared with 76 min in laparoscopic group. The duration of antibiotic usage in open group was 5 days when compared with 3 days in laparoscopic group. The usage of analgesics in open group was 7 days when compared with 5 days in laparoscopic group. The hospital stay for open surgery was 8 days when compared with 6 days in laparoscopic group. There were wound infections in three patients in open group when compared with one in laparoscopic group. No leakage was reported in either group. Two patients in laparoscopic group needed conversion.

Conclusion: Results of laparoscopic management of perforated peptic ulcer are encouraging, with no conversion to open surgery, low morbidity, and no mortality.

KEY WORDS: Laparoscopy, peritonitis, duodenal ulcer perforation

Introduction

The disease, duodenal ulcer perforation can be life-threatening. Early diagnosis and treatment is extremely important. The mortality will get surged if perforation continues for over 24–48 h. Generally, the only surgical procedure that is essential is simple closure with omental patch.

Laparoscopic repair of perforated peptic ulcers is technically now feasible[1,2] and, in small series reported till date, carries many of minimal access advantages apparent in other upper gastrointestinal (GI) and biliary procedures. With the establishment of the role of *Helicobacter pylori* eradication making simple oversewing of perforated ulcers an effective long-term solution, the laparoscopic approach is progressively within the area of surgical trainees and, as the role of routine laparoscopy in the identification and management of peritonitis becomes accepted, it is at risk of being viewed as the technique of choice without prior interpretation or evidence of advantage. Unlike several procedures that have established the role of laparoscopy in elective upper GI surgery, however, it is performed in patients with generalized peritonitis and the often extreme physiological disturbances that may go along with this. The pathophysiological insult of a tension CO_2 pneumoperitoneum during laparoscopy may be excessive in such patients, while the effect on the immune system and its mediators is incalculable. The balance of exchanging the clear postoperative advantages of quick recuperation, diminished wound

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difficulties, better respiratory function, and better cosmetic appearance for an elevation in intraoperative physio-logical compromise may be in favor of laparoscopic surgery in relatively fit elective patients, but may be greatly more negligible in ill patients of risk of multiple organ dysfunction syndrome.

To examine the risks and benefits of laparoscopic surgery for perforated peptic ulcers, this nonrandomized cohort comparison compared a consecutive series of laparoscopic repairs of perforated peptic ulcers (laparoscopic group) with a concurrent series of consecutive open repairs (open group).

Materials and Methods

All patients diagnosed clinically with perforated peptic ulcers, admitted to VS Hospital during the period of January 2013–June 2014, were prospectively nonrandomized to undergo either conventional open or laparoscopic suture omental patch repair (consent and cafeteria approach). Informed consent for randomization to laparoscopic vs open omental patch repair was obtained from all patients. A total of 20 patients were included in the study; 10 in laparoscopic group and 10 in open group. Patients with surgical diagnosis other than perforated peptic ulcer and previous abdominal surgeries were excluded at surgery. The following parameters were noticed: operative duration, analgesics and antibiotic requirement (pre- and postoperative), postprocedure hospital stay, and local and systemic complications. All the cases underwent preoperative assessment, the decision to operate laparoscopic or open surgery depending on the patient presentation. Their preoperative, intraoperative, and postoperative findings and complications were meticulously recorded as per protocol.

Surgical Procedure

A pneumoperitoneum was created using Hasson open technique. Insufflation pressure was kept at 11 mm Hg. Four ports were inserted,[3] the upper port in subxiphoid area used for irrigation and suction and retraction of liver. An umbilical port was used for camera, and two remaining ports were placed on each side of left of patient with assistant on each side. The gall bladder was retracted upward and held by an assistant. Inflammatory adhesions were released and suctioned. The perforation area was isolated, and the tip of suction tube was used to measure the size of perforation. The next step was irrigation[4,5] and thorough suction of intraabdominal fluid using normal saline. All the quadrants were cleaned in clockwise fashion [Figures 1 and 2].

The perforation was shut using the classical omental patch with two to three stitches of absorbable sutures before tying the knot intracorporealy. Pelvic and subhepatic drains were placed at the end of procedure. The open surgery was conducted by midline incision, and the same technical guide lines were followed. All the data were expressed as median and in quartile range unless stated. Comparison between two groups was made using nonparametrical methods. Comparison was done using independent samples *t*-test. A value of $p < 0.05$ was taken as statistically significant.

Figure 1: Places for different ports to be inserted for laparoscopic surgery.

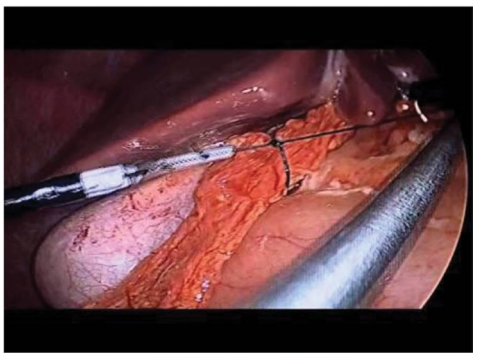

Figure 2: View from laparoscopic camera.

Result

There was male preponderance with 80% of patients, and 57% of them were in the fourth, fifth, and sixth decades of their life, with the mean age of 50 years [Table 1].

The mean duration of surgery was 56 min in open group when compared with 76 min in laparoscopic group, which was statistically significant. The mean duration of antibiotic usage in open group was 5 days when compared with 3 days in laparoscopic group. The mean usage of analgesics[6] in open group was 7 days when compared with 5 days in laparoscopic group. The mean duration of hospital stay for open surgery was 8 days when compared with 6 days in laparoscopic group. The wound infection was reported in three patients in open group when compared with one in laparoscopic group. One patient in open group showed wound dehiscence. No leakage was reported in either group. Two patients in laparoscopic group needed conversion[7] to open surgery owing to large perforation and dense adhesions.

Discussion

There was no difference in age, weight, duration of symptoms, and time to surgery in both the groups. Often, it is mentioned that the age of presenting with peptic ulcer is more so in older age group owing to extensive use of nonsteroidal anti-inflammatory drugs and aspirin usage.

About 57% of the population were among the 40–60 age group, with mean age of 52, which correlates with literature [Table 2].

Table 1: Distribution of the patients according to gender

Sex	Number of cases	%
Male	16	80
Female	4	20
Total	20	100

Table 2: Distribution of the patients according to different age groups

Age (years)	Number of cases	%
21–40	7	35
41–60	12	60
61–80	1	5
Total	20	100

Table 3: Post-operative complications in both type of surgeries

Postop complications	Open, *n* (%)	Laparoscopy, *n* (%)
Wound infection	3 (15)	1 (5)
Wound dehiscence	1 (5)	0 (0)
Morbidity	2 (10)	0 (0)

The mean operating time of laparoscopic patch repair was significantly longer than the open procedure, which corresponds to open studies. A disadvantage of laparoscopic approach is longer operating period, but this showed no impact on outcome. Two patients in lap group needed conversion to open surgery owing to (one) large perforation (size more than 1 cm) and (one) dense adhesion. In analyzing our results with other studies, we observed that clinical parameters that are excluded for safe laparoscopic procedure are shock and symptom duration >24 h. Patients who presented with shock and delayed presentation reveal higher conversion rate and worse postoperative course.

The best parameters to compare the two different surgical techniques are morbidity and complications. Peptic ulcer perforation exhibits high morbidity with problems of wound infection, sepsis, and high morbidity noted in open group, which is consistent with previous studies. The analgesic requirement was significantly less in laparoscopic group, and the time to return to normal diet was shorter as well. This was significantly reflected on duration of hospital stay, which was shorter in laparoscopic group. A follow-up of upper GI endoscopy was performed on five patients in laparoscopic group and seven in open group; rest of the patients did not come for follow-up. No recurrence of ulcer was noticed in both the groups.

Laparoscopic surgery minimizes postoperative wound pain and encourages early mobilization and return to normal daily activities. The benefit of early discharge and early return to work outweigh the consumable cost incurred [Table 3].

In execution of laparoscopic procedures, the role of laparoscopic surgery in emergencies is well-documented. The change of disease pattern in perforated peptic ulcer favors a simple repair procedure. With the demonstrated benefit in our trial, laparoscopic repair of perforated peptic ulcers should be the procedure of choice. Laparoscopy should be incorporated into the general surgeon's armamentarium for the management of patients with peritonitis.

Conclusion

Laparoscopic repair of perforated peptic ulcer is a safe and reliable procedure and is proven to be efficient. Even though it was associated with longer operating time, it showed no impact on outcome. Compared with conventional open repair, the laparoscopic repair is associated with less postoperative pain, reduced chest complications, reduced analgesic requirement, shorter postoperative hospital stay, and earlier return to normal daily routine.[8,9]

It reveals lesser morbidity and complication rate when compared with open group. Data from this study indicate that laparoscopic surgical treatment of patients with peptic ulcer perforation can be implemented and completed safely in large proportion of patients with this life-threatening condition, given that the responsible surgical team has appropriate technical expertise. A large, randomized, controlled clinical trial is required to further establish the advantages of laparoscopic surgery.

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