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## Laparoscopic versus Open Surgery for the Management of Duodenal Ulcer Perforation- A Comparative Study

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### ABSTRACT

In the current era approximately, 10 to 20% of patients with peptic ulcer suffer from perforation of stomach or duodenum initially develops from gastric and duodenal secretion but in a few hours bacterial contamination superimpose the disease. This study aims at evaluating efficacy, safety and outcome of laparoscopic surgery for patients with perforated duodenal ulcer. Patients admitted with perforated duodenal ulcer perforation, were evaluated. A total 51 cases were diagnosed as peritonitis secondary to duodenal perforation were involved in study. 30 underwent laparoscopic closure and 21 underwent open surgeries. The results of study revealed lesser antibiotic open: lap (5:4.03 days;  $p = 0.001$ ), analgesic requirement (7:4.87 days;  $p = 0.001$ ) and lesser hospital stay (8:6.17 days;  $p = 0.001$ ) and reduced postoperative complications open-three (8%): lap-one (2%) patients. The duration of surgery was more with laparoscopic surgery (open-55: lap-60.15 minutes;  $p = 0.003$ ) since we are at initial stages at laparoscopic management for DU perforation, also depend on skill of surgeon but it had no effect on the overall outcome. Three (8.6%) patients in lap group were needed conversion to open surgery.

**Keywords:** Laparoscopy, Peritonitis, Duodenal ulcer perforation



### INTRODUCTION

Laparoscopic repair of perforated peptic ulcers is now technically feasible<sup>1-3</sup> and, in the small series reported to date, carries many of the minimal access advantages apparent in other upper gastrointestinal (GI) and biliary procedures.<sup>2</sup> With the establishment of the role of *Helicobacter pylori*<sup>13</sup> eradication making simple over sewing of perforated ulcers an effective long-term solution, there is a tremendous increase in the laparoscopic procedure among the surgical trainees and, as the role of routine laparoscopy in the diagnosis and management of peritonitis that has been accepted,<sup>4</sup> it is in danger of being seen as the procedure of choice without prior evaluation or evidence of benefit. Unlike many of the procedures that have established the role of laparoscopy in elective upper GI surgery, however, it is performed in patients with generalized peritonitis<sup>5</sup> and the often severe physiological disturbances which may accompany this. The pathophysiological insult of a 'tension CO<sub>2</sub> pneumo-peritoneum' during laparoscopy may be exaggerated in such patients, while the effect on the immune system and its mediators is unpredictable. The balance of

exchanging the obvious postoperative benefits of rapid recovery,<sup>6-8</sup> reduced the wound complications and improve respiratory function and also improves cosmetic appearance for an increase in intraoperative physiological compromise may be in favor of laparoscopic surgery in relatively fit elective patients, but may be considerably more marginal in ill patients at risk of multiple organ dysfunction syndrome (MODS).<sup>9</sup> To examine the risks and benefits of laparoscopic surgery for perforated peptic ulcers, this nonrandomized comparison with a consecutive series of laparoscopic repairs of perforated peptic ulcers (lap group)<sup>10-12</sup> with a concurrent series of consecutive open repairs (open group).

### MATERIALS AND METHODS

All patients diagnosed clinically with perforated peptic ulcers were prospectively nonrandomized to undergo either conventional open or laparoscopic suture omental patch repair<sup>13-16</sup> (consent and cafeteria approach) who are admitted to GEMS Hospital, Ragolu. Informed consent for randomization to laparoscopic or open omental patch repair was obtained from all patients by

explaining in their local language . A total of 51 patients were included in the study with 30 in lap group and 21 in open group.<sup>17-20</sup> Patients with a surgical diagnosis other than perforated peptic ulcer and previous abdominal surgery were excluded from the current study. Following parameters were noticed: operative duration, analgesics and antibiotics requirement (pre- and postoperative), postoperative hospital stay,<sup>21</sup> local and systemic complications. All the cases underwent preoperative assessment, the decision to operate laparoscopic or open surgery depending on the patient presentation.<sup>22</sup> Their preoperative and intraoperative, postoperative findings and complications were meticulously recorded as per protocol.<sup>23</sup>

**SURGICAL PROCEDURE**

A pneumoperitoneum was created using Hasson open technique, insufflation pressure was maintained at 11 mm Hg. Four ports were inserted,<sup>24</sup> the upper port in subxiphoid area used for irrigation and suction, retraction of liver. An umbilical port was used for camera and two remaining ports were placed on each side of camera port in triangular position. Surgeon stands on left of patient, with assistant on each side.<sup>25</sup> The gallbladder was retracted upward and held by assistant. Inflammatory adhesions were released and suctioned. The perforation area isolated and tip of the suction tube is used as to measure the size of perforation. The next step was irrigation and thorough suction of intra-abdominal fluid using normal saline. All the quadrants were cleaned in clockwise fashion. The perforation was closed using the classical omental patch with 2 to 3 stitches of absorbable sutures before tying the knot intracorporeally. Pelvic and subhepatic drains were placed at the end of procedure. The open surgery was conducted by midline incision and followed the same technical guidelines. All the data 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,  $p < 0.05$  taken as statistically significant.

**RESULTS**

There was male preponderance with 80% of patients, and 57% of the cases in 4, 5 and 6th decade of life the mean age is 50 years. The mean duration of surgery in open group is 56 minutes compared with 62 minutes in lap group which was statistically significant ( $p = 0.003$ ). The mean number of antibiotic used in open group was 5 days compared with 4 days in lap group ( $p = 0.001$ ). The mean usage of analgesics in open group was 7 days

as compared with 5 days<sup>5,17,22</sup> ( $p = 0.001$ ). The mean duration of hospital stay for open surgery was 8 days as compared with 6 days in lap group ( $p < 0.001$ ). There was wound infection in three (9%)<sup>25-27</sup> patients in open group as compared with one (3%) in lap group, one patient had wound dehiscence<sup>16</sup> in open group (3%). Three (9.6%)<sup>23</sup> of lap group were needed to be converted to open surgery due to large perforation and extensive adhesions (Figs 1 to 4 and Tables 1 to 3).

**Table 1: Sex distribution**

Sex	Number of cases	%
Male	49	80
Female	12	20
Total	61	100

**Table 2: Age distribution**

Age	Number of cases	%
21-40	23	37
41-60	35	57
61-80	3	4
Total	61	100

Post op. complications	Open	Laparoscopic group
Wound infection	3 (9%)	1 (3%)
Wound dehiscence	1 (3%)	0

**DISCUSSION**

There was no difference in age, weight, duration of symptoms and the time to surgery in both groups. Often it is mentioned that the age of presenting with peptic ulcer is more so in older age group due to excessive use of NSAIDs and aspirin usage. The results in Table 1 show that 57% of the population was among the 40 to 60 age groups, with mean age of 52 years which correlates with literature.<sup>20,22,23</sup>

The mean operating time of the laparoscopic patch repair was significantly longer than the open procedure (52.4:62.1 minutes;  $p = 0.001$ ) which correspond to other studies. A disadvantage of the laparoscopic approach is longer operating time, but this had no impact on the outcome. Three (9.6%) patients were needed conversion to open surgery due large perforation (>1 cm) and other 2 patients had dense adhesions. In analyzing our results with other studies, we observed that clinical parameters

that are excluded for safe laparoscopic procedure are symptom duration >24 hours. Patients who presented with shock and delayed presentation have higher conversion rate and worse post-operative course.

The best parameters to compare the two different surgical techniques are morbidity and mortality. Peptic ulcer perforation has high morbidity with problems of wound infection, sepsis, leakage at repair and pulmonary infections. In our study, high morbidity three (9%) and mortality two (6%) was noticed in open group which is consistent with other studies.<sup>25,26</sup> The analgesic requirement was significantly less in lap group ( $p = 0.002$ ); the time to return to normal diet is shorter in lap group (3 days,  $p = 0.001$ ). This was significantly reflected on the duration of hospital stay which was shorter with lap group (3 days,  $p = 0.003$ ). A follow-up of upper GI endoscopy was performed on 5 in lap group and 7 in open group after 6 months, rest of patients did not turn up for follow-up. No recurrence of ulcer was noticed in both groups.

Laparoscopic surgery minimizes postoperative wound pain, encourages early mobilization and return to normal. Daily activities. The benefit of early discharge and early return to work may outweigh the consumable cost incurred. In the execution of the 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 had no impact on outcome. It had less postoperative pain, reduced chest complications and reduced analgesic usage, shorter postoperative hospital stay, and earlier return to normal daily activities than the conventional open repair. It has lesser morbidity and mortality as compared to open group. Data from the present study indicate that laparoscopic surgical treatment of patients with peptic ulcer perforation can be implemented and completed safely in a large proportion of patients with this life-threatening condition, given that the responsible surgical team has the appropriate technical expertise. We need to do study with more number of cases as to claim advantage of laparoscopic surgery.

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