

## Insight

# Laparoscopic Closure of Perforated Duodenal Ulcer: the Adan Hospital Experience

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## ABSTRACT

**Objectives:** To assess the Adan Hospital experience in laparoscopic closure of duodenal ulcer

**Design:** Retrospective

**Setting:** Al-Adan Hospital, Kuwait

**Subjects and Methods:** Twenty-seven patients aged 18-60 years underwent laparoscopic closure of perforated duodenal ulcer at the Adan hospital from 1999 to 2002. Clinical charts were reviewed retrospectively.

**Results:** Majority of the patients were male (26) and from the Indian subcontinent. Abdominal pain was the presenting symptoms in all patients. However, only 25%

of the patients had classic board like rigidity. Symptoms were present for 12 hours in two third of patients. More than 80% of the patients were treated with omental patch. One patient was converted to open surgery. Two patients developed port site bleeding, one patient developed a fistula as well and another patient developed intestinal obstruction. There was no mortality.

**Conclusion:** Laparoscopic closure of perforated duodenal ulcer is safe and effective, provided a surgeon with laparoscopic suturing skill is available.

KEY WORDS: duodenal ulcer, laparoscopy, perforation

## INTRODUCTION

Peptic Ulcer Disease (PUD) remains a major public health problem<sup>[1]</sup>. Since the introduction of *Helicobacter Pylori* eradication, the role of surgery is limited to the treatment of complications, i.e., perforation, bleeding and obstruction.

Laparoscopy was first used in the treatment of perforated duodenal ulcer (DU) in 1989<sup>[2]</sup>. Perforation is a common complication of PUD that surgeons encounter in their practice. The introduction of laparoscopy in general surgery has changed the approach to the perforated DU. In our study we review the Adan Hospital experience in laparoscopic closure of perforated DU.

## SUBJECTS AND METHODS

A retrospective review of medical records of all patients treated by laparoscopic closure of perforated DU was performed. Twenty-seven consecutive patients were admitted to Adan Hospital over a four-year period (1999-2002) with perforated DU and were treated with laparoscopic simple closure with Graham omental patch or falciform ligament. The diagnosis was made based on clinical presentation and presence of sub-diaphragmatic air on erect chest radiograph. All patients received

preoperative prophylactic intravenous antibiotics and H-2 receptor antagonist given at the time of induction of anesthesia. A nasogastric tube was inserted in all patients.

The operation was performed under general anesthesia with endotracheal intubation. The patients were placed in supine position. After insufflation of peritoneal cavity with CO<sub>2</sub> upto four liters at a pressure of 14 mmHg, a 10-mm trocar was inserted infraumbilically to introduce a 30-degree laparoscope. Peritoneal cavity was inspected, the degree of peritoneal soiling determined and material taken for culture and sensitivity. Under direct vision, another 10-mm and a 5-mm trocar were placed in left and right upper quadrant respectively. The perforation was confirmed on the anterior surface of duodenal bulb in all cases. After separation of fibrinous adhesions, intracorporeal suturing with Vicryl 2/0 was done to close the perforation. Peritoneal cavity was irrigated thoroughly with more than six litres of normal saline and antibiotics. Vacuum drain was left in some cases around the site of perforation. Postoperative management included nasogastric decompression, intravenous antibiotics and H-2 receptors antagonist for 5-7 days.

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On discharge, all patients received amoxicillin and metronidazole for 10-14 days and H-2 receptor antagonist for six weeks with follow-up endoscopy thereafter.

## RESULTS

Twenty-seven patients were included in our study from 1999 till 2002 (26 male and one female). The mean age group was  $35.96 \pm 8.4$  (18-60 years). Majority of the patients (20/27) were from the Indian / Bangladesh subcontinent. All patients presented with upper abdominal pain. The mean time of duration of symptoms was 10 hours (range 4-18 hours). Most patients presented within 12 hours of onset. Six patients had high-grade temperature and tachycardia. A small percentage of patients (3/27) had minimal peritoneal irritation and seven patients had diffuse tenderness and board like rigidity. Leucocytosis (WBC count of more than 16,000) was seen in 11 patients. The mean operative time ranged between 60-90 minutes.

Twenty-two patients were treated by simple closure with omental patch, four had simple closure with the falciform ligament and there were no complications. Only in one patient, the laparoscopic procedure was converted to open surgery and vagotomy with pyloroplasty was performed. Three ports were used in majority of the patients. Subhepatic drain in the area of perforation was used in 20 patients. The results of cultures were negative. The median duration of nasogastric decompression was three days. Oral feeding was resumed on the fourth postoperative day in eight patients and after one week in two patients.

Twenty-three patients had no postoperative complication. Two patients developed bleeding from the port site, one had fistula formation and another patient developed intestinal obstruction. Port site bleeding was managed with port site revision and hemostasis, fistula treated with gastro-jejunostomy and the patient with intestinal obstruction underwent laparotomy and adhesiolysis. Eight patients stayed in the hospital for 7-10 days, six patients for less than seven days and seven patients were kept in the hospital for more than 10 days. There was no death reported among patients in our study.

## DISCUSSION

The introduction of Helicobacter therapy (HET) has shown reduction in DU recurrence in many studies<sup>[3]</sup>. In other studies the reduction of recurrence extended upto seven years at follow-up<sup>[4]</sup>. The presence of successful medical treatment for DU<sup>[5]</sup> has limited the surgeon's role to the management of DU complications (perforation,

bleeding and obstruction). A non-operative management of perforated DU has been introduced by Taylor in 1945<sup>[6]</sup>, but this modality of treatment is appropriate for a smaller subset of patients<sup>[7]</sup> which makes the surgical intervention a predominant option. Surgical treatment in form of simple closure with omental patch has been shown to be safe and effective<sup>[8]</sup>. The closure can be achieved by laparotomy or laparoscopic intervention. The laparoscopic option, introduced by Nathanson *et al*<sup>[2]</sup>, is almost replacing the traditional open repair for many reasons. First, it is technically feasible and associated with lower consumption of analgesics<sup>[9]</sup>. Secondly, it is a safe and effective treatment<sup>[10]</sup>. However, there was no statistical difference in terms of hospital stay when compared with open surgery.

In our study, we found that the majority of the complications occurred during the first few cases when laparoscopic closure was just introduced into practice. This indicates a definitive learning curve, which was reflected in the long operative time during the initial cases. We can conclude that a surgeon who is planning to treat perforated DU laparoscopically should have sufficient experience in intracorporeal suturing techniques, which will result in short operative time and lower complication rates.

Many controversies regarding the role of definitive treatment of PUD exist<sup>[11]</sup>. Simple closure alone, even for patients with chronic dyspepsia, has been supported in the literature<sup>[7]</sup>. Other modalities besides suturing have been used in the treatment of perforated DU. The use of fibrin glue for omental patching has been described by Tate<sup>[12]</sup>. Others recommend not to disturb the naturally occurring omental plug<sup>[13]</sup>.

In our study, the presence of the classic board like rigidity was seen only in 25% patients, but the vast majority (95%) had leucocytosis on admission. The perforation was 1.5 cm in diameter and the surgeon was able to close it laparoscopically in all cases except one.

The majority of our patients presented early (within 12 hours of their symptoms). All cases were treated by simple closure using either an omental patch or falciform ligament. There were no complications except in one patient, who received definitive treatment in the form of pyloroplasty and vagotomy, because the perforation was 1.5 cm and the surgeon was unable to close it laparoscopically. We left a drain in most of our patients during the initial period; later, we only selectively drained them according to the degree of contamination. Significant risk factors that lead to death are the presence of shock at admission, the co-existence of significant illnesses and resection surgery in terms

of antrectomy<sup>[14]</sup>. However, we did not have any mortality in our patient population.

We had four complications that required interventions and all of them occurred during the first ten cases in our study. No complication had occurred in the last 17 cases and this shows that the complication rates reflect a surgeon's experience. Seven patients had stayed for more than 10 days during our early experience.

## CONCLUSION

Laparoscopic closure of perforated DU is a safe and effective treatment and should be the procedure of choice provided a surgeon with laparoscopic skills is available.

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