

Laparoscopic Repair of Perforated Duodenal Ulcer using Suture and Suture Less Technique

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ABSTRACT

Background: Safety and feasibility of laparoscopic processes for the treatment of duodenal ulcer perforation have been fully recognized, repair with laparoscope has turn out to be an extensively frequent procedure of (perforated duodenal ulcer) PDU. The intent to feature an omental patch repair is based on the assumptions that a patch may decrease the possibility of leakage and make the closure more secure. **Objective:** To compare the outcome of laparoscopic repair in patients with perforated duodenal ulcer using suture and suture less techniques. **Study Design:** Randomized controlled trial. **Settings:** Department of Surgery, Lahore General Hospital, Lahore Pakistan. **Duration:** One year from January 2020 to December 2020. **Methods:** Total of 60 patients with perforated duodenal ulcer were included in this study and divided into two equal halves with 30 patients in each group. Group-1 where suture was used. Group-2 without suture. Groups were named suture group and suture less group according to the procedure they had. After discharge patients were followed-up in OPD for the duration of 30 days. Two groups were compared in terms of operating time, duration of hospital stay, having complications i.e. leakage, recurrence and wound infections. **Results:** Operating time and hospital stay were found to be significantly short in Group-2 as compared to Group-1, i.e. operating time [Group-1: 1.56 ± 0.14 hours vs Group-2: 1.01 ± 0.03 hours, p-value= <0.01] & hospital stay [Group-1: 3.07 ± 0.25 days vs. Group-2: 2.03 ± 0.18 days, p-value= <0.01]. The leakage and infection rate was statistically identical in both groups, p-value > 0.05. **Conclusion:** laparoscopic repair in patients with perforated duodenal ulcer Group-2 (using suture less techniques) has less operative time and can reduce the hospital stay.

Keywords: Perforated duodenal ulcer, Open repair, Laparoscopic repair, Suture, Suture less techniques.

INTRODUCTION

Duodenal ulcer disease (DUD) affects every year 4 million people around the globe. About 2-14% of the ulcers will perforate and complications are found in 10-20% of these patients. Although incidence is low but if perforation happens, it is life threatening and the mortality varies from 10-40%.¹ DUD is associated with tobacco use (50%), liquor misuse (34%), steroids (21%) and NSAIDs 53%. Whereas Helicobacter pylori is associated with 26% of patients.² Elimination of Helicobacter pylori following surgical repair of perforated duodenal ulcer PDU diminishes both the short-term and one-year threat of ulcer relapse.³

The advantage of laparoscopic repair for duodenal ulcer perforation (DUP) was suggested in low-risk patients and found be safe. Whether it is harmless to apply in patients with high risk is however inadequately defined. A study conducted to determine better techniques to treat DUP reveals that 50.9% patients were treated by laparoscopy.⁴ The high-risk patients that got laparoscopy-first approach (LFA) were shown to have bigger ulcers with severe contamination that needed conversion. In high-risk patients the mortality was associated with ASA grade ≥3. In relatively hemodynamically stable patients undergoing LFA in PDU, assuming patients having ASA <3, adequate rates of mortality and morbidity is seen with Bony score ≥2.⁴

In suture less technique the fibrin glue sealing with gelatin sponge plug is commonly used method. A recent study has compared the effectiveness of a sutured omental fix with suture less on lay omental fix technique. In suture less omental patch repair group the surgery time and duration of stay in hospital remained less. Study also concluded that the both procedures were safe and viable for the treatment of PDU. Lesser learning curve is required in laparoscopic surgery for the trainees to perform laparoscopic suture less repair easily.⁵

A meta-analysis have documented that perforated duodenal ulcer with laparoscopic repair (LR) was linked with a lower rate of overall postoperative complications and reoperation rate was equal in both the procedures. Lower quality evidence was found to show that LR had similar operative time and hospital mortality. Moreover, LR was observed having the advantages of earlier resumption of oral intake, no prolonged hospital stay and minimum use of analgesic but its evidence was not strong. All the evidences leads that LR is superior for PDU, however high-quality RCTs are yet required for further support.⁶

The rationale of the study is to determine and compare the laparoscopic repair for perforated duodenal ulcer with and without suture.

The objective of the study was to compare the outcome of laparoscopic repair in patients with perforated duodenal ulcer using suture and suture less techniques.

METHODS

This was a randomized controlled trial conducted at general Surgery Department, Lahore General Hospital, Lahore Pakistan. The duration of the study was twelve months from January 2020 to December 2020.

Total included patients in the study were 60. Patients were divided into two equal halves with 30 patients in each group and 90% power of test. Expected percentage of leakage was taken in suture less group as 0.00%⁷ and in suture group 5.90%.⁵ Non probability, purposive sampling technique was used.

After taking consent the repair technique was randomly assigned to the patients by using balloting method.

Patients with perforated duodenal ulcer, age group 16-60 years and both genders were included in the study.

Patient with co-morbid medical illness at present and patient with more than 1x1cm perforated duodenal ulcer were excluded from the study.

Perforated duodenal ulcer is a duodenal ulcer disease associated with intake of NSAIDS (Non-steroidal Anti-

inflammatory drugs), H.pylori infection, tobacco and alcohol abuse.

Outcomes include leakage, infection, duration of hospital stay and operating time.

After taking permission from hospital ethical committee, there were 60 patients enrolled in the study by fulfilling inclusion and exclusion criteria and they were divided into two groups. Group-1 (Suture) & Group-2 (Suture less) by using balloting method. For monitoring randomized controlled trial CONSORT guidelines were followed. The procedure was explained to the patients and informed consent was taken from all the patients. Demographic information including name, age, sex, gender was noted, proper history and examination was carried out.

Operative Criteria: To predict the outcome for PDU patients the Boey score and the ASA score are most commonly utilized techniques. Other scoring frameworks are hindered by an absence of verification that forestalls routine clinical use. Peptic Ulcer Perforation (PULP) score appears good, but it needs support and further evidence before broad use.¹

Laparoscopic Suture Repair (Group 1): Needle holder was used to introduce the needle through duodenum alongside perforation and through a mobilized part of omentum. An extracorporeal Roeder tie was applied in the suture and slipped below to fix the patch above the aperture. As a mandatory step extra sutures were applied followed by peritoneal wash with normal saline.

Laparoscopic Suture less Repair (Group 2): The method of laparoscopic fix with gelatin wipe and fibrin stick has been represented. A bit of gelatin wipe 20x15x10 mm hefty sheet was moved in the cone. This attachment was gotten a handle on with a forceps and back stacked into a 10mm reducing sheath for inclusion into the peritoneal cavity. The fitting was set into the aperture with the goal that the base of the cone jutted into the serosal area. A pre warmed 2-ml quantity of two segment fibrin glue was infused gradually by means of a double lumen catheter. Peritoneal lavage was done prior to finishing of the surgery.

SPSS 21 was applied for data entry and analysis. The continuous variables like age and hospital stay were shown in the state of mean \pm SD and categorical variables like sex, recurrence, leakage and infection etc. were represented in the form of recurrence and rates. The numeric information, fulfilling the parametric supposition was investigated with student t-test. Chi Square test was applied to compare the proportion of outcome with suture and suture less technique. P-value of \leq to 0.05 was examined as statistically important.

RESULTS

The mean age of patients in Group-1 & Group-2 were 37.67 ± 7.55 and 37.77 ± 7.20 years, respectively. In Group-1, there were 23(76.7%) male patients and 7(23.3%) female patients, whereas in Group-2, there were 21(70%) male patients and 9(30%) female patients. (Table 1)

Table 1: Demographics of patients

	Study Groups	
	Group-1	Group-2
N	30	30
Age (years)	37.67 ± 7.55	37.77 ± 7.20
Male	23(76.7%)	21(70%)
Female	7(23.3%)	9(30%)

The mean operative operation time was 1.56 ± 0.14 hours and in Group-2, was 1.01 ± 0.03 hours, the mean operative time was statistically less in Group-2 as compared to Group-1, p-value < 0.01. (Table-2)

The mean length of hospital stay in Group-1 was 3.07 ± 0.25 days and in Group-2 was as 2.03 ± 0.18 days, the mean length of hospital stay was statistically less in Group-2 patients as compared to Group-1 p-value < 0.01. (Table 2)

Table 2: Comparison of operating time and hospital stay in both groups

Outcome	Study Groups		p-value
	Group-1	Group-2	
Operating Time (hours)	1.56 ± 0.14	1.01 ± 0.03	< 0.01
Hospital Stay(days)	3.07 ± 0.25	2.03 ± 0.18	< 0.01

At day 7, in Group-1, 1(3.3%) case had leakage while in Group-2, none of the case had leakage. The leakage rate was statistically same even at day 7th, p-value > 0.05. (Table 3)

Table 3: Comparison of leakage in both study groups

Leakage	Study Groups		Total	p-value
	Group-1	Group-2		
Day 1	0(0%)	0(0%)	0(0%)	--
Day 3	0(0%)	0(0%)	0(0%)	--
Day 7	1(3.3%)	0(0%)	1(1.7%)	0.313
Day 15	1(3.3%)	0(0%)	0(0%)	--
Day 30	1(3.3%)	0(0%)	0(0%)	--

Infection was seen in 1(3.3%) of the cases treated in Group-1 only, while in Group-2, none of the cases had infection. The infection rate was statistically same, p-value > 0.05. (Table 4)

Table 4: Comparison of infection in both study groups

Infection	Study Groups		Total	p-value
	Group-1	Group-2		
Day 1	0(0%)	0(0%)	0(0%)	--
Day 3	0(0%)	0(0%)	0(0%)	--
Day 7	1(3.3%)	0(0%)	1(1.7%)	0.313
Day 15	1(0%)	0(0%)	0(0%)	--
Day 30	1(3.3%)	0(0%)	0(0%)	--

DISCUSSION

Peptic ulcer disease has been shown to affect males more than females and a study showed 74% of their study population having peptic ulcer disease as being male.⁷ Same was reflected in our study with male patients being 76% and 70 % in Group-1 (suture repair group) and Group-2 (suture less repair group) respectively.

In above mentioned study⁷ mean age in Group-1 was 56 years (range 19–92 years) and in Group-2 it was 52 years (range 21–88 years). In our study the mean age of cases in Group-1 was 37.67 ± 7.55 years and in Group-2 was 37.77 ± 7.20 years. There is no statistically significant difference between the ages of both groups (p-value > 0.05).

Wang *et al*,⁷ conducted a study to compare sutured repair (omental fix) with suture less repair (onlay omental patch) technique. The mean surgery duration was less in suture less patients (67 ± 19 min) than in sutured patients (93 ± 30 min) (p < 0.0001). In our study the mean operation time in suture group was 1.56 ± 0.14 hours and in suture less group was 1.01 ± 0.03 hours, the mean operation time was statistically less in suture less group as compared to suture group (p-value < 0.01). These findings are almost similar to above mentioned study.⁷

Stepanyan *et al*⁸ in 2019 published their single center experience in dealing with perforated duodenal ulcer via both laparoscopic and open techniques. They published that in the laparoscopy group the mean hospital stay was 5 days (range: 3-14 days), in the open group it was 11.7 days (range: 6-63 days), and in the conversion group it was 9.3 days (8-10 days) (p < 0.001). Another systemic review⁹ revealed duration of stay in laparoscopic duodenal perforation repair as 6.6 days vs. 8.2 days for open repair, p = 0.01. Wang *et al*⁷ reported duration of hospital stay in their study as 6 ± 2 days in sutured group and 5 ± 1 days was in suture less group, p-value = 0.007. In comparison our study showed mean hospital stay in laparoscopic suture repair group as 3.07 ± 0.25 days and in suture less group it was 2.03 ± 0.18 days, p-value < 0.01.

Manco G *et al*¹⁰ reported in their retrospective study about complications that happened following laparoscopic duodenal perforation repair. Among them duodenal

leakages occurred in 7.1% and 4.7% had deep space infections (pelvic and sub diaphragmatic abscesses) in the first week after surgery. There was significant mortality in their study as well. Murad *et al*¹¹ reported 3% patients with perforated duodenal ulcer treated laparoscopically presenting with any late wound complication compared to laparotomy i.e. 23%. They also reported 6% patients in the laparoscopic group presenting with postoperative respiratory complications in comparison to 31% in the laparotomy group. But in our study no mortality was noted and only minor complications were observed in sutured group those were managed accordingly.

CONCLUSION

Our study shows statistically significant data to prove that laparoscopic repair in patients with perforated duodenal ulcer using suture less techniques has less operation time and can reduce the hospital stay. The complications of sutured repair are minor and manageable though suture less technique had no complications. So, it is recommendable to use suture less technique to manage perforated duodenal ulcer.

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