

**Original research article**

# **A study on factors leading to duodenal perforation its management and complications at tertiary care centre**

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**Abstract**

**Aims and Objectives:** To study the outcome and complications of surgery for duodenal perforation based on the:

- a) Duration of perforation.
- b) Patients presenting in a clinical state of shock.
- c) Clinical presentation.
- d) Radiological findings and management.

**Methods:** This prospective study was conducted at the tertiary care center. The study will follow 50 duodenal perforation cases' clinical symptoms and prognosis. All tertiary care center patients who met the inclusion criteria were included in the data collection.

**Results:** In this study, 76% of duodenal ulcer perforations were male and 34% were female, making the male: female ratio 3.16:1. 24% of patients presented after 24 hours and were from low-income families. Most patients were unskilled and semiskilled labourers with low socioeconomic situations. In the study, 76% of patients were smokers and alcoholics, which was the biggest risk factor for perforation, followed by 32% who had taken NSAIDs for various diseases. The diagnosis was based on air under the diaphragm in 94% of cases and absent in 6%. Paracentesis fluid was turbid and bile stained in 88% of patients and absent in 12%, aiding diagnose instances. 24% of patients were in shock at the casualty, and 41.7% died during treatment (12 shock cases, 5 died). Early patients with MPI <21 or between 21 and 29 without shock and no contraindications to anaesthesia can be treated with laparoscopic closure with less morbidity and mortality at a centre with modern anaesthetic equipment, a trained anaesthetist, and a surgeon skilled in laparoscopic techniques.

**Conclusion:** Perforated peptic ulcer patients can tolerate perforation closure and long-term medical care. If the surgeon is well-trained, laparoscopic perforation closure is better than open surgery for early, non-shocked, healthy younger and middle-aged patients.

**Keywords:** Duodenal perforation, anaesthetist, smoker, NSAIDs

**Introduction**

Despite the use of a variety of antiulcer medications and eradication therapy, duodenal ulcer perforation remains one of the frequent consequences of peptic ulcer disease. It is one among the most frequent reasons for casualty admissions worldwide, with a higher prevalence in underdeveloped countries. Infection with H. Pylori is a significant etiological factor in the cause of peptic ulcer disease, followed by chronic NSAIDs use, chronic alcohol use, cigarette use, consumption of smoked foods, intake of spicy foods, irregular diet use, and in type A personalities<sup>[1,2]</sup>.

In order to avoid or prevent the consequences of peptic ulcer disease, it is crucial to identify the etiological factors. The smaller curvature of the stomach and the first section of the duodenum are common locations for peptic ulcers. They can also develop on the stoma following gastric bypass surgery, in the oesophagus, and even in Meckel's diverticulum. Age and the proportion of female patients affected by this deadly complication have steadily increased over time, to the point where perforation now most frequently affects elderly female patients. The most common abdominal emergencies are acute appendicitis and acute intestinal blockage, with duodenal ulcer perforation coming in third. Early detection is crucial because prompt surgical intervention can lower the still-relatively-high death rate.

Treatment is necessary for the ulcer, the perforation, and the ensuing peritonitis <sup>[2]</sup> when an acute or chronic duodenal ulcer perforates into the peritoneal cavity. The ulcer itself does not pose a life-threatening threat, but perforation and peritonitis do. Treatment of peritonitis and ensuring the closure of the perforation are therefore therapeutic goals and can be accomplished through open or laparoscopic surgery.

Recovery also depends on the size of the perforation, degree of contamination, shock at presentation, comorbid conditions, and the general condition of the patients. The majority of patients who arrive at the hospital after a perforation more than 24 hours later had high post-operative complications with high mortality rates. As a result, many different scoring methods, like the APACHE scoring system and the Mannheim's peritonitis index, are used to evaluate pre-operative severity and post-operative outcome. Perforation treatment is still up for debate. There is a school of thinking that advises final surgery in a perforated peptic ulcer since simply closing the perforation may save a patient's life, but the risk of recurrence is significant and the patient may not return for a second curative surgery. Because patients must risk a big operation when their overall health isn't strong, this may, in certain cases, lower their mortality and morbidity. On the other hand, it spares the patient from having to have additional surgery. Laparoscopic closure and H. Pylori eradication therapy complications following surgery and recurrence rates have been significantly reduced with early diagnosis and efficient resuscitation since the introduction of contemporary procedures <sup>[4, 5]</sup>. In order to compare open versus laparoscopic closure of the duodenal ulcer perforation, it has been attempted to analyse the various factors that are affecting morbidity and mortality among individuals with peptic ulcer perforation. This is because despite improved disease understanding, effective resuscitation and prompt surgery under modern anaesthesia techniques, mortality and morbidity are still high <sup>[6-8]</sup>.

## Materials and Methods

This prospective study was carried out between May 2020 to May 2023 at the tertiary care center in Telangana state. 50 duodenal perforation cases will be included in the study and their clinical manifestations and prognosis will be tracked. Patients who met the inclusion criteria were included in the data collection, which comprised all patients admitted to tertiary care center in Telangana state.

All patients with suspect duodenal ulcer perforation underwent extensive examinations, baseline findings were documented, and the patient underwent repeat examinations during resuscitation and until the diagnosis was established. The symptoms of peritonitis included tachycardia, discomfort in the epigastrium, and abdominal rigidity.

I evaluated each patient with a peptic ulcer perforation in accordance with the proforma, giving each patient a thorough physical examination in order to rule out any underlying diseases.

To save valuable time, regular examinations such as grouping of blood and typing, Hb%, BT, CT, blood urea, serum creatinine and urine routine were ordered.

**Paracentesis:** Peritoneal tap was used as a diagnostic tool. Duodenal perforation was indicated by the fluid extracted being turbid and bile stained; in patients who arrived at the hospital after hours, frank pus and even faecal stained fluids were discovered.

MPI used scoring to evaluate the preoperative state and postoperative results. Following are the scoring guidelines and overall condition ratings:

- 1) **Good:** Patient is conscious and cooperative.
  - pulse rate <90/min.
  - BP 120/80mmHg.
  - Urine output good.
  - No associated medical problems like hypertension, diabetes mellitus, tuberculosis or myocardial infarction.
- 2) **Average:** Patient is conscious.
  - Pulse rate is 90-110/min.
  - BP 120/80mmHg.
  - Oliguria.
  - No or anyone associated medical illness.
- 3) **Poor:** Patient is conscious but poorly oriented.
  - Hippocratic facies.
  - Pulse rate >120/min (tachycardia) or low and of low volume.
  - Anuria.
  - Medical illness may or may not be present.

## Outcome of the patient (recovery)

**Good:** Discharge without intra-or postoperative problems on the seventh to ninth postoperative day.

**Average:** Complications related to the intraoperative anaesthesia, postoperative complications such bronchopneumonia, wound infection, and wound gaping, but recovery before discharge.

**Poor:** With a burst abdomen, an enterocutaneous fistula, and acute starvation, the patient survived.

**Death:** In the time following surgery.

**Inclusion criteria**

- Adult patients in the age group 18-75 years with Duodenal Perforation
- Both Sexes.

**Exclusion criteria**

- Hollow viscus perforation other than Duodenal perforation.
- Patient who died before the confirmation of definitive diagnosis.

**Results**

**Age Distribution**

**Table 1:** Age wise distribution of patients

Age group	Frequency	Percentage
Up to 20 years	03	06
21-30 years	10	20
31-40 years	22	44
41-50 years	11	22
51-60 years	02	04
>60years	02	04
Total	50	100

50 patients in total were included in the study, and a large percentage of them (44%) were between the ages of 31 and 40, while only 4% were above 60. The number of patients didn't significantly change between the third and fifth decades.

**Table 2:** Relation between age and outcome of the patients

Age group	Recovery without complication	Recovery with complication	Deaths	Total
< 20 years	02 (66.7%)	01 (33.3%)	00	03 (100%)
21-30 years	05 (50.0%)	05 (50.0%)	00	10 (100%)
31-40 years	14 (63.6%)	06 (27.3%)	02 (9.1%)	22 (100%)
41-50 years	05 (45.5%)	05 (45.5%)	01 (9.1%)	11 (100%)
51-60 years	01 (50.0%)	00	01 (50.0%)	02 (100%)
> 60 years	00	01 (50.0%)	01 (50.0%)	02 (100%)
Total	27 (54.0%)	18 (36.0%)	05 (10.0%)	50 (100%)

Chi-square-11.57 df-10 p value-0.31.

Complications were more in the third decade and deaths in the fifth & sixth decade.

**Sex Distribution**

**Table 3:** Sex wise distribution of patients

Age group	Frequency	Percentage
Male	38	76
Female	12	24
Total	50	100

The study patients included both males and females. Majority of patients are males (76%).

**Male:** Female ratio is 3.17: 1

**Table 4:** Relation between sex and outcome of the patients

Sex	Recovery without complication	Recovery with complication	Deaths	Total
Male	20 (52.6%)	13 (34.2%)	05 (13.2%)	38 (100%)
Female	07 (58.3%)	05 (41.7%)	00	12 (100%)
Total	27 (54.0%)	18 (36.0%)	05 (10.0%)	50 (100%)

Chi-square-1.77 df-2 p value-0.41.

Complications were more among females (41.7%) compared to males (34.2%) whereas deaths were found only among males (100%).

**Risk factors for perforation (Smoking, Alcohol & Nsaid's)**

**Table 5:** Distribution of patients based on H/o smoking, alcohol & NSAID

Variables	Frequency	Percentage
H/o smoking		
Yes	36	72
No	14	28
H/o alcohol		
Yes	36	72
No	14	28
H/o NSAID		
Yes	16	32
No	34	68

Out of 50 patients, 72% were smokers, 72% were alcoholics and 32% had h/o NSAID consumption.

**Table 6:** Relation between smoking and outcome of the patients

Smoking	Recovery without complication	Recovery with complication	Deaths	Total
Yes	19 (52.8%)	12 (33.3%)	05 (13.9%)	36 (100%)
No	08 (57.1%)	06 (42.9%)	00	14 (100%)
Total	27 (54.0%)	18 (36.0%)	05 (10.0%)	50 (100%)

Chi-square-2.23      df-2      p value-0.32  
All the died patients had h/o smoking.

**Table 7:** Relation between alcohol and outcome of the patients

Alcohol	Recovery without complication	Recovery with complication	Deaths	Total
Yes	19 (52.8%)	12 (33.3%)	05 (13.9%)	36 (100%)
No	08 (57.1%)	06 (42.9%)	00	14 (100%)
Total	27 (54.0%)	18 (36.0%)	05 (10.0%)	50 (100%)

Chi-square-2.23      df-2      p value-0.32  
All the died patients had h/o alcohol consumption.

**Distribution of signs & symptoms in the present study**

**Table 8:** Distribution of patients based on clinical signs & symptoms

Parameters	Present	Absent	Total
Pain abdomen	50 (100%)	00	50
Vomiting	41 (82.0%)	09 (18.0%)	50
Distension of abdomen	47 (94.0%)	03 (6.0%)	50
Constipation	43 (86.0%)	07 (14.0%)	50
Fever	12 (24.0%)	38 (76.0%)	50
Pallor	15 (30.0%)	15 (30.0%)	50
Abdominal tenderness	50 (100%)	00	50
Abdominal rigidity	50 (100%)	00	50
Obliterated liver dullness	46 (92.0%)	04 (8.0%)	50
Bowel sounds	00	50(100%)	50
Dehydration	19 (38.0%)	31 (62.0%)	50
Good general condition	26 (52.0%)	24 (48.0%)	50
Air under diaphragm	47 (94.0%)	03 (6.0%)	50
Turbid/bile on parenthesis	44 (88.0%)	06 (12.0%)	50
Shock	12 (24.0%)	38 (76.0%)	50

All of the patients (100%) had abdominal pain as their primary symptom, and 82% of them also had vomiting, 94% had abdominal distension, 86% had constipation, and only 24% had fever.

All of the patients reported abdominal discomfort and rigidity, 92% had destroyed liver dullness, 38% had dehydration and 52% had good general health, according to the examination results. None of the patients had any bowel sounds.

94% of patients had air behind their diaphragms upon examination, and 88% had turbid/bile upon paracentesis.

**Distribution of patients according to treatment adopted**

One patient (about 2%) out of 50 received conservative care. The remaining 49 (98%) underwent surgery, with 16 undergoing LAP (32%), 33 undergoing open surgery (66%), and 8 converting from laparoscopic to open surgery.

With a conversion rate of 33.33%, 2 of these cases were converted due to cardio-respiratory instability while undergoing a laparoscopic procedure, 1 due to dense adhesions that could not be separated during a laparoscopic procedure, 3 due to system failure (laparoscopic instruments) and 2 were due to inexperienced surgeons (trainees were given the opportunity to perform a laparoscopic procedure).

**Outcome of patient’s with respect to complications**

**Table 10:** Distribution of patients based on the outcome

Outcome	Frequency	Percentage
Normal recovery	27	54
Recovery with complications & death	23	46
Total	50	100

Only 54% of people treated had a simple recovery and the remaining 46% had problems, 10% of which were fatal.

**Table 11:** Distribution of patients based on the pattern of outcome

Pattern of outcome	Frequency	Percentage
Normal recovery	27	54
Bronchopneumonia	08	16
Burst abdomen	02	04
Wound infection	08	16
Death	05	10
Total	50	100

Out of 50 patients who received treatment, 54% did so without any complications, while 16% developed bronchopneumonia, 16% had an abdominal aortic dissection, 8% had wound infections, and 5% passed away.

**MPI Score and Post-Operative Outcome**

**Table 12:** Relation between MPI score and outcome of the patients

MPI score	Recovery without complication	Recovery with complication	Deaths	Total
< 21	13 (65.0%)	07 (35.0%)	00	20 (100%)
21-29	14 (51.8%)	11 (40.7%)	02 (7.5%)	27 (100%)
> 29	00	00	03 (100%)	03 (100%)
Total	27 (54.0%)	18 (36.0%)	05 (10.0%)	50 (100%)

Chi-square -29.82 df-4 p value-0.00

Out of 50 patients, 20 had MPI scores of under 21 and only 35% of them experienced problems or died. While all of the patients with MPI scores more than 29 died, 27 patients with MPI scores between 21 and 29 had complications, accounting for 40.7% of their difficulties and 7.5% of their deaths. We find that this relationship is statistically significant.

**Outcome of patients depending upon technique adopted**

**Table 13:** Relation between management technique and outcome of the patients

Management technique	Recovery without complication	Recovery with complication	Deaths	Total
Conservative	00	00	01 (100%)	01 (100%)
Open surgery	13 (39.4%)	16 (48.5%)	04 (12.1%)	33 (100%)
LAP	14 (87.5%)	02 (12.5%)	00	16 (100%)
Total	27 (54.0%)	18 (36.0%)	05 (10.0%)	50 (100%)

Chi-square-19.26 df-4 p value-0.00

One patient only received conservative care before passing away. When 16 patients received LAP, none of them died, but only 12.5% of them experienced difficulties. In contrast, when patients underwent open surgery, four of them (12.1%) passed away and 16 (48.5%) experienced complications. Statistics show that this gap is significant.

**Outcome of cases presented with shock**

**Table 14:** Relation between shock and outcome of the patients

Shock	Recovery without complication	Recovery with complication	Deaths	Total
Yes	04 (33.3%)	03 (25.0%)	05 (41.7%)	12 (100%)
No	23 (60.5%)	15 (39.5%)	00	38 (100%)
Total	27 (54.0%)	18 (36.0%)	05 (10.0%)	50 (100%)

Chi-square-17.61 df-2 p value-0.00

In contrast to patients without shock, who experienced problems but no deaths, patients with shock had a mortality rate of 41.7% and a development rate of 25%. It is determined that this difference is statistically significant.

**Outcome Depending on Duration of Perforation**

**Table 15:** Relation between duration of perforation and outcome of the patients

Duration	Recovery without complication	Recovery with complication	Deaths	Total
< 6 hours	02 (40.0%)	03 (60.0%)	00	05 (100%)
6-12 hours	05 (55.6%)	04 (44.4%)	00	09 (100%)
13-24 hours	15 (75.0%)	05 (25.0%)	00	20 (100%)
> 24 hours	05 (31.3%)	06 (37.4%)	05 (31.3%)	16 (100%)
Total	27 (54.0%)	18 (36.0%)	05 (10.0%)	50 (100%)

Chi-square-15.63 df-6 p value-0.16

Among patients who had h/o perforation for more than 24 hours, all of them died.

**Outcome of patients depending on duration of surgery**

**Table 16:** Relation between duration of surgery and outcome of the patients (LAP)

Duration of surgery	Recovery without complication	Recovery with complication	Total
1.00 hour	03 (100%)	00	03 (100%)
1.10 hour	09 (90.0%)	01 (10.0%)	10 (100%)
1.30 hour	01 (100%)	00	01 (100%)
1.50 hour	00	01 (100%)	01 (100%)
1.80 hour	01 (100%)	00	01 (100%)
Total	14 (87.5%)	02 (12.5%)	16 (100%)

Chi-square-16.00 df-5 p value-0.00

**Table 17:** Relation between duration of surgery and outcome of the patients (open)

Duration of surgery	Recovery without complication	Recovery with complication	Death	Total
Up to 1.0 hour	01 (50.0%)	01 (50.0%)	00	02 (100%)
1.0 – 1.5 hour	03 (60.0%)	01 (20.0%)	01 (20.0%)	05 (100%)
1.6 – 2.0 hour	09 (39.1%)	12 (52.1%)	02 (8.8%)	23 (100%)
> 2.0 hour	00	02 (66.7%)	01 (33.3%)	03 (100%)
Total	13 (39.4%)	16 (48.5%)	04 (12.1%)	33 (100%)

Chi-square-16.49 df-6 p value-0.41

With open surgery, difficulties occur more frequently as the procedure's length grows and a high percentage of fatalities (33,3%) were discovered when the procedure lasted more than two hours.

**Outcome of patients depending upon surgical technique adopted**

**Table 18:** Relation between surgical technique and duration of hospital stay\*

Surgery	Mean hospital stay (days)	Standard deviation
LAP	4.56	0.89
Open	8.94	1.62

Student 't' test p-value-0.00

The mean duration of hospital stay was high among patients undergone open surgery (8.9 days) compared to LAP (4.5 days) and it is found statistically significant.

**Table 19:** Duration of surgery depending on technique adopted

Variable	Duration of surgery (mean)	Standard deviation (SD)
Lap	67.2minutes	0.20
Open	106.8minutes	0.32

\*Student ‘t’ test p-value-0.00

When an unskilled surgeon does the process, the average length of time for a laparoscopic procedure is 1.12 hours, which is high. In contrast, the average length of time for an open procedure is 1.78 hours, which is noticeably high.

**Table 20:** Relation between surgical technique and return to normal activity\*

Surgery	Mean (days) of return to normal activity	Standard deviation
Lap	6.44	1.03
Open	11.48	1.79

\*Student‘t’ test p-value-0.00

The mean duration of returning to normal activity was high among patients undergone open surgery (11.4 days) compared to LAP (6.4 days) and it is found statistically significant.

**Table 21:** Relation between surgical technique and period of analgesia\*

Surgery	Mean (days) period of analgesia	Standard deviation
Lap	3.00	0.81
Open	6.78	1.13

\*student‘t’ test p-value-0.00

The mean duration of analgesia was high among patients undergone open surgery (6.7 days) compared to LAP (3.0 days) and it is found statistically significant.

**Radiological investigation:** Plain x-ray abdomen in erect posture was done in all the patients in study group and was under the diaphragm (Pneumo-peritoneum) was found in Erect x-ray showing Pneumo-peritoneum.

**Table 22:** Erect x-ray abdomen (plain)

Erect x-ray abdomen (plain)	No. of patients
Air under diaphragm present	47
Air under diaphragm not present	3

**Abdominal paracentesis:** In all patients four quadrant paracentesis was done. In 44 patients it revealed bile stained turbid fluid and in remaining 5 patients it was dry tap. But in all cases laparotomy revealed perforation, while a positive tap adds to the diagnosis of perforated duodenal ulcer with peritonitis.

**Table 23:** Paracentesis-Turbid bile stained fluid

Paracentesis-Turbid bile stained fluid	No. of cases
Present	44
Absent	6



**Fig 1:** Erect abdomen showing pneumoperitoneum

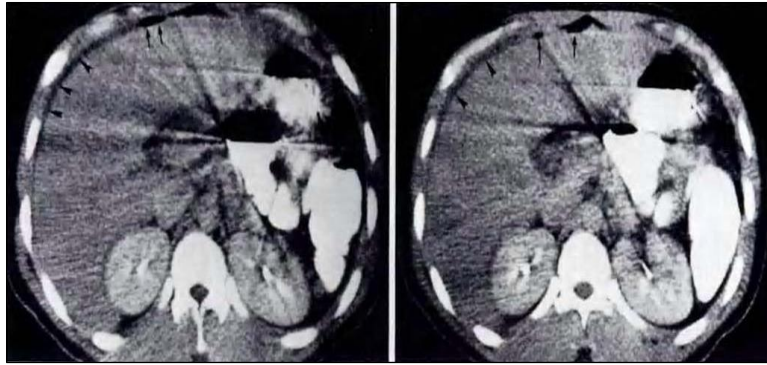


Fig 2: CT-Scan abdomen showing pneumoperitoneum. (black arrows)



Fig 3: Instrument Table Kept Ready for Both Open & Lap Procedures



Fig 4: Patient's Position After Drapping (Prepared Both for Open & Lap Technique)

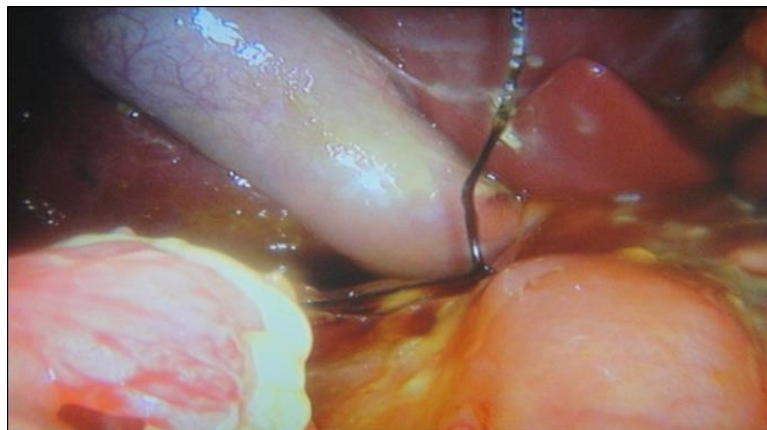
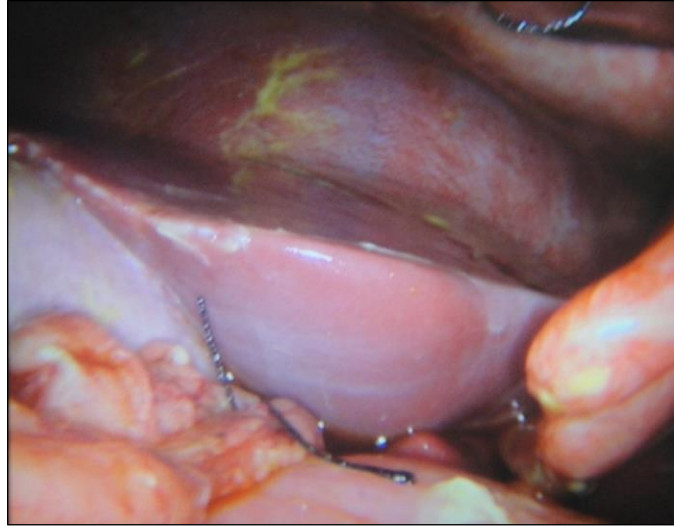


Fig 5: Laparoscopic View of Perforated Duodenal Ulcer





**Fig 6:** Laparoscopic View of Closed Duodenal Perforation



**Fig 7:** Duodenal Perforation Open Technique View

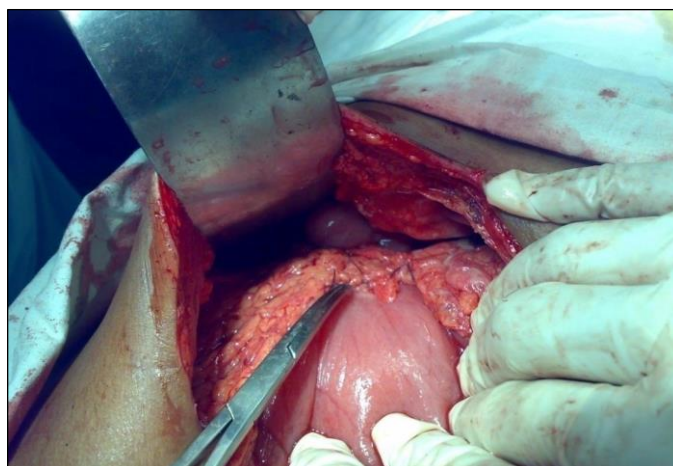


Fig 8: Picture Showing Closed Duodenal Perforation

**Discussion**

With the introduction of more recent proton pump inhibitors and H2 receptor antagonists, the prevalence of surgery for peptic ulcer disorders has substantially decreased; however, surgery for complications such perforation has not changed.

**Duration of symptoms before presentation to hospital:** According to Walgenbach *et al.*'s [9] 1992 study, patients who report themselves within 24 hours after the onset of their symptoms have a lower mortality rate (12%), while patients who wait longer than 24 hours have a higher mortality rate (24%). They came to the conclusion that patients who underwent surgery more than 24 hours after the onset of acute symptoms had begun had a fourfold higher mortality risk than those who underwent surgery within 24 hours.

Therefore, the period between the perforation and the surgery has a significant impact on the type of surgery to be planned as well as the course of the disease [9].

In our study, 31.3% of patients presented more than 24 hours after the onset of symptoms (and 40% within 12 to 24 hours) and 5 of these patients died, resulting in a mortality rate of 20% in that group, which is comparable to that in the study mentioned above.

The comparison between the various studies is shown in the table below. In the study conducted by Bharathi C Ramesh, 10% of patients presenting after 24 hours had died, while 64% of patients presented within 24 hours of the onset of symptoms.

Table 24: No. of Patients with Respect to Duration of Symptoms

Variable	Present study	De Bakey series (1940) [10]	Bharati C Ramesh <i>et al.</i> [11]
< 6hrs	10%	50.83%	12%
6-12hrs	18%	13.02%	12%
12-24hrs	40%	4.73%	24%
>24hrs	32%	13.60%	64%

**Shock on presentation**

Preoperative shock, a delay in surgery of more than 24 hours, and concomitant illnesses are three risk factors that, according to Tsugawa K *et al.* [12], increase fatality rates as the number of risk variables grows.

In 1992, Boey John *et al.*'s study [13] found that patients with perforated duodenal ulcers had a higher mortality rate when they had concurrent medical disease, preoperative shock, and delayed surgery (>48 hours). When there is gross contamination, late investigation (>48 hours), or perforation that lasts longer than 12 hours, death and morbidity rise, with the mortality rate being close to 50%. In the study conducted by Donaldson in 1970, the significance of peritoneal soilage and duration of perforation were identified as a risk factor in the outcome of duodenal ulcer perforation.

In our study, 12 patients presented in shock and 5 of them passed away, resulting in a mortality rate of 41.7%, similar to the study mentioned above.

Manheim's Peritonitis Index (MPI): The MPI scoring system was created expressly to assess peritonitis prognostic variables. According to Billing *et al.*'s study, it is simple and reliable. The findings of the current study are consistent with those of a study by A.Y. Notash and colleagues published in the Indian Journal of Gastroenterology in 2005, which found that the MPI's most accurate cutoff points are 21 and 29, with a mortality rate of 60% and as high as 100% when the score is over 29.

**Table 25:** Showing mortality depending on MPI score

Score	Present study	Study of A Y Notash & co. <sup>[14]</sup>
<21	0%	2%
21-29	7.5%	60%
>29	100%	100%

In a different study by Dr. Chandrashekar Agrawal, which was published in the journal of the Nepal Medical College in 2009, MPI scores were divided into two groups, and the outcomes are contrasted with those of the current study in the accompanying table.

**Table 26:** MPI score

MPI score	Dr. Chandrashekar & co's study <sup>[15]</sup>		Present study	
	No. of cases	Mortality rate	No. of cases	Mortality rate
<26	119	4.2%	40	0%
>26	5	60.0%	10	50%

In the study, open and laparoscopic procedures were compared in terms of operation time, the need for post-op pain medication, hospital stay, the amount of time needed to resume normal activity and complications.

In our study, patients who present within 24 hours of the onset of symptoms, who have mild to moderate abdominal distension, and who do not present in shock are given preference for laparoscopic technique. The postoperative analgesic requirement, hospital stay and complications like wound infection, gaping and burst abdomen and bronchopneumonia are then compared to the patients who underwent open surgery.

In our study, out of 50 patients, 22 underwent laparoscopic procedure closure, 8 were converted to open technique, and out of the remaining 16, 2 suffered bronchopneumonia. No patient encountered wound infection, a gaping or burst abdomen, or any of these complications, which required 3 to 4 days of analgesics and a 5 to 6-day hospital stay. Six patients whose underwent open surgery developed bronchopneumonia, eight had wound infections, two had ruptured organs, required six to seven days of pain medication, spent 13 to 14 days in the hospital, and five of them passed away. This is in contrast to the laparoscopic technique, which had no fatalities, possibly because the patients spent less time under anaesthesia.

Out of 8, 2 were converted to open procedures due to cardiovascular instability throughout the procedure, 1 was due to dense adhesions, 3 were due to instrument failure, and the remaining 2 were due to an attempt by a trainee student surgeon who lacked experience.

In comparison to earlier research, the conversion rate for the current study is comparable at 33.3%.

Therefore, laparoscopic technique is greater to traditional open closure in situations where experienced surgeons are available, the instruments are good, the patient doesn't have comorbid conditions that limit the creation of pneumoperitoneum and the patient presents early (because there is a lower risk of dense adhesions & contamination).

Laparoscopic closure of duodenal perforation is superior to conventional open technique, according to a study by Dr. Nita Zaji <sup>[16]</sup> in Laparoscopic Hospital, New Delhi, India, published in July 2007 and available online, if the patient presents at an early stage, if he has no co-morbid conditions that limit anaesthesia, if the catering hospital is well-equipped with the necessary instruments, and if the surgeon is skilled in laparoscopic procedures.

The findings of our investigation are comparable with those of the Sui WT *et al.* <sup>[17]</sup> and Swiss studies on lap vs. open duodenal perforation closure, as indicated in the table.

**Table 27:** Showing comparison of present study with other studies

Variables	Present study		Swiss study (lap v/s open)		Siu WT <i>et al.</i> 2004	
	Lap	Open	Lap	open	Lap	Open
Operative time (in minutes, mean)	67.20	106.80	65±40	80±50	60±50	75±10
Post-operative analgesic requirement (in days)	3.00	6.78	1±0.5	6±0.3	1±0.3	6±0.8
Wound infection/gaping	Nil	08	1%	7%	Nil	5%
Burst abdomen	Nil	02	Nil	1%	Nil	3%
Bronchopneumonia	02	06	.....	.....	.....	.....
Post-op hospital stay (in days)	4.56	8.94	3±1	6±0.6	3±0.9	7±0.5
Return to daily activity (in days)	6.44	11.48	3±0.8	6±0.8	3±0.5	6±1

In another study done by M.M, Porecha and co published in internet journal of surgery 2008 <sup>[18]</sup>, the variables are compared with the present study which closely resembles.

**Table 28:** Comparing outcome of present study with older study

Variables	Present study		M.M. Porecha &co	
	Lap	Open	Lap	Open
Operative time (in minutes)	67.2	106.80	68±5.2	90±5.5
Post-operative analgesic Requirement (in days)	3	6.78	1±0.45	6.78±0.6
Wound infection/gaping	Nil	8	Nil	10%
Burst abdomen	Nil	2	Nil	5%
Post op hospital stay (in days)	4.56	8.94	3±0.4	8±1.6
Return to normal activity (in days)	6.44	11.48	5±1	7±2

Our study's findings are comparable to those of other studies, as shown in the tables. However, because most patients present more than 24 hours after the onset of their symptoms, there are other factors that prevent our hospital's treating physicians from using the laparoscopic technique, including the absence of modern anaesthetic equipment and the presence of comorbid conditions. In patients who appear within 24 hours of the onset of symptoms, are comparatively younger patients, do not have any concomitant diseases, and if the surgeon is skilled in laparoscopic procedures, laparoscopic closure of duodenal perforation closure is encouraging.

### Conclusion

The following findings were found in a 6-month to 1-year investigation of 50 duodenal ulcer perforation cases: Perforation was prevalent in 30-50-year-olds. Males had more perforations. Smoking, drinking, and chronic NSAID use increased peptic ulcer perforation risk. Peptic ulcer perforation was greater in unskilled labour and low-income people. Shock-presenting patients have higher fatality rates. After 24-hour symptom start, death and morbidity are high. MPI scores >29 and 21-29 have increased mortality and morbidity. Conservative therapy with high mortality and morbidity can be tried in sepsis patients with major contraindications for anaesthesia. Perforated peptic ulcer patients can tolerate perforation closure and long-term medical care. If the surgeon is well-trained, laparoscopic perforation closure is better than open surgery for early, non-shocked, healthy younger and middle-aged patients. Good anaesthetic equipment, qualified anaesthetists and laparoscopic devices are available. H. Pylori eradication therapy (for 7-14 days) with proton pump inhibitors for 4-6 months is indicated to avoid recurrence as final surgery is not done anymore.

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