



## A Retrospective Clinical Study of Gastroduodenal Perforation Peritonitis

Narendra MC, Ramakrishna B\*, MutheeswaraiahY, Rukmangadha N, Kadivella Aditya Sarma, Aggarapu Mallikarjuna Pavan

Department of General Surgery, Sri Venkateshwara Institute of Medical Sciences, Sri Padmavathi Medical College (Women), Tirupati, India

### ABSTRACT

**Introduction:** Perforated Gastroduodenal ulcer followed by generalized peritonitis is common surgical emergency. Perforation is associated with increased mortality, accounting for greater than 35% of all peptic ulcer-related deaths. There is significant correlation between delayed surgical interventions for more than 24 hours to postoperative complications.

**Materials and Methods:** A Retrospective clinical study of Gastroduodenal perforation peritonitis on patients who underwent exploratory laparotomy in the department of General surgery at SVIMS, SPMC (W), TIRUPATI. All the required data is retrieved from the medical records department of the SVIMS, SPMC (W) hospital. The data like age, sex of patient, other demographic data, detailed history of acute abdomen, past history of gastroduodenal ulcer disease, smoking, alcohol intake, abuse of analgesics and steroids, general examination findings and details of vitals are collected from the medical records and are documented. The details of examination findings are in support of generalized peritonitis, resuscitative measures taken, findings of investigations, details of anesthesia, details of surgical procedure and intraoperative findings like site and size of perforation, quantity and quality of peritoneal fluid, type of repair done to perforation, post-operative management, biopsy details, details of morbidity and mortality, duration of hospital stay and treatment advice on discharge are also documented.

**Results:** In this study, out of 44 patients considered, 33 patients (75%) are Male and 11 patients (25%) are Female with male to female ratio of 3:1. NSAID abuse is documented in 10 patients (22.7%), 10 patients (22.7%) had history of both alcohol abuse and smoking, 4 (9%) had only alcohol and 3 (6.8%) patients had only smoking history, 2 (4.5%) patients had history of chronic stress and one patient (2.27%) had history of steroid abuse. The incidence of site of gastroduodenal perforation is as follows, 21(47.72%) patients had perforation in prepyloric region, 18 (40.9%) patients had perforation in first part of duodenum, 3 (6.8%) patients had perforation in body of stomach and 2 (4.5%) patients had perforation in second part of duodenum. In this study, there is significant correlation between delayed presentations for more than 24 hours to post-operative complications ( $p$ - value 0.003). But there is no correlation of post-operative complications with size of perforation ( $P$  - value 0.065) and site of perforation ( $p$ -value 0.0517).

**Conclusion:** NSAID abuse, smoking and alcoholism are important predisposing factors. Abdominal pain, tenderness, guarding and rigidity are documented in all the patients. There is increasing trend in gastric perforations with highest incidence in prepyloric region. There is significant correlation (0.003) between delayed surgical interventions for more than 24 hours and postoperative complications; but there is no correlation between size of perforation (0.065) and site of perforation (0.0517) to post-operative complications. Mortality is high in duodenal ulcers of size >1.5 cm with delayed presentation. None of them showed malignancy among all the specimens.

**Key words:** Generalized peritonitis, abdominal pain, NSAID

**HOW TO CITE THIS ARTICLE:** Narendra MC, Ramakrishna B, MutheeswaraiahY, Rukmangadha N, Kadivella Aditya Sarma, Aggarapu Mallikarjuna Pavan, A Retrospective Clinical Study of Gastroduodenal Perforation Peritonitis, J Res Med Dent Sci, 2022, 10 (5):23-29.

**Corresponding author:** Ramakrishna B

e-mail✉: raky2k@gmail.com

**Received:** 22-April-2022, Manuscript No. JRMDS-22-63219;

**Editor assigned:** 25-April-2022, PreQC No. JRMDS-22-63219 (PQ);

**Reviewed:** 10-May-2022, QC No. JRMDS-22-63219;

**Revised:** 16-May-2022, Manuscript No. JRMDS-22-63219 (R);

**Published:** 23-May-2022

### INTRODUCTION

Perforated Gastroduodenal ulcer followed by generalized peritonitis is common surgical emergency. The mortality rate ranges from 8% to 25% [1]. Thirty-day mortality rate reaching up to 20% and 90-days mortality rate reaching up to 30% have been reported [2]. Perforation is associated with increased mortality, accounting for greater than 35% of all peptic ulcer-related deaths [3]. Gastroduodenal ulcer perforation is mainly due to an

imbalance between mucosal protective mechanism and the damaging forces. The pattern of Gastroduodenal perforation varies from one geographical area to another, depends on socio-demographic and environmental factors [4]. The important predisposing factors for gastroduodenal ulcer perforation are smoking, use of non-steroidal anti-inflammatory drugs, infection with Helicobacter pylori, stress, and old age [5]. Though incidence of perforated gastroduodenal ulcer is decreasing trend, frequency among old people is increasing [6].

Patients present with an acute abdomen associated with shock, generalized peritonitis, tenderness, and absent liver dullness, with sub diaphragmatic gas on plain erect abdominal X-ray and chest X-ray. Ultrasound abdomen and CT scan if required are used in diagnosis. The surgical management of gastroduodenal perforations by exploratory laparotomy/laparoscopy is done. Peritoneal lavage with normal saline followed by primary closure with interrupted sutures. Cellan et al. in 1929 [7] first described the defect closure by using omental patch. It was modified by Graham in 1937 [8]. The time of intervention is one of the important prognostic values, which is known as the Boy score [9,10]. The delay of more than 24 hours in diagnosis and management worsened the predicted outcomes and increased post-operative complications [11]. Other factors associated with increased morbidity and mortality in perforated ulcer patients are concomitant diseases, shock on admission, delayed surgery, revision surgery, and postoperative abdominal and wound infections [12]. Recognizing disease as early as possible, diagnosing promptly and very aggressive proper resuscitation and early surgical intervention will help in reducing the morbidity and mortality low [13].

### AIMS AND OBJECTIVES

To study trends (duodenal/gastric) in site of gastroduodenal perforation.

To study the outcome (morbidity/mortality) in relation to size and site of gastroduodenal perforation.

### MATERIALS AND METHODS

A Retrospective clinical study of Gastroduodenal perforation peritonitis on patients who underwent exploratory laparotomy in the department of General surgery at SVIMS, SPMCW, TIRUPATI from January 2017 to December 2019.

#### Inclusion criteria

All cases of perforation peritonitis due to gastroduodenal perforation.

#### Exclusion criteria:

Age below 18 years.

Traumatic gastroduodenal perforation.

### Methodology

All the required data is retrieved from the medical records department of the SVIMS, SPMC (W) hospital. Data like age, sex of patient, other demographic data, detailed history of acute abdomen, past history of gastroduodenal ulcer disease, smoking, alcohol intake, abuse of analgesics and steroids, general examination findings and details of vitals are collected from the medical records and are documented. The details of examination findings are in support of generalized peritonitis, resuscitative measures taken, findings of investigations, details of anesthesia, details of surgical procedure and intraoperative findings like site and size of perforation, quantity and quality of peritoneal fluid, type of repair done to perforation, post-operative management, biopsy details, details of morbidity and mortality, duration of hospital stay and treatment advice on discharge are also documented.

### Procedure

All patients are operated under general anesthesia. Mid-line laparotomy incision is given. Size and site of gastroduodenal perforation is identified and noted. After aspiration of peritoneal fluids, thorough peritoneal lavage is given with 4 to 5 liters of warm saline in all the quadrants of peritoneal cavity. Edges of perforation refreshed; marginal Biopsy is taken in gastric perforations. The primary single layer closure of gastric ulcers perforation with 2-0 mersilk is done and modified Graham's patch repair done for duodenal ulcers. Abdominal drains are inserted and fixed; and abdomen closed in layers. All the patients are shifted to SICU and kept on Nil by mouth with continuous Ryles tube aspirations. Fourth hourly monitoring of pulse, blood pressure, respiratory rate and body temperature is done. Patient treated using IV fluids and IV antibiotics with close monitoring. Once the patients are stabilized, they are shifted to general surgery wards. Patients are kept on Nil by mouth till bowel sounds are documented. Initially, they are given liquid diet and gradually shifted to solid diet. All the postoperative complications like wound infection, burst abdomen, respiratory track and urinary tract infections are documented. All the patients are kept on Helicobacter Pylori eradication treatment for two weeks before discharge. Patients are reviewed after 2 weeks and kept proton pump inhibitors for one month.

### Ethical considerations

- ✓ The present study is a retrospective study.
- ✓ No experimental animals are involving in the present study
- ✓ No financial burden will be made on the study objects and the institute.

### DATA ANALYSIS

Data is entered into the MS Excel sheet and analyzed using SPSS software version 21.

Descriptive statistics like frequencies, percentages for discrete data and means  $\pm$  standard deviation for continuous data are calculated.

Chi-square test and student's t-test or ANOVA test are used to know the significance between discrete and continuous data.

A p value of 0.05 is taken as significance level.

## RESULTS

In this study, out of 44 patients, 33 patients (75%) are Male, and 11 patients (25%) are Female with male to female ratio of 3:1 (Table 1).

The age of all patients is in range of 18 to 72 years with the mean age being 35 years. Out of all patients, 10 are in 41-50 years age group which accounts to 22.7% of total, 9 (20.4%) patients are in 61-70 years age group, 8(18%) patients are in 21 to 30 years, 8(18%) patients are in 31-40 years age group, 6(13.6%) patients are in 51-60 years age group, 2 (4.5%) patients are in 11- 20 years age group and only one patient is in 71-80 years age group (Table 2).

Only 4 patients (9.09%) had history of peptic ulcer disease and none of them had taken pyloric eradication therapy. NSAID abuse is documented in 10 patients (22.7%), 10 patients (22.7%) had history of both alcohol abuse and smoking, 4 (9%) had only alcohol and 3 (6.8%) patients had only smoking history, 2 (4.5%) patients had history of chronic stress and one patient (2.27%) had history of steroid abuse (Table 3).

Abdominal pain is documented in all the patients (100%) and is associated with nausea and vomiting seen in 24

**Table 1: Distribution of patients among both genders.**

Gender of patient	Number of patients
Male	33
Female	11

**Table 2: Distribution of patients among different age groups.**

Age group	Number of patients
<20 years	2
21-30 years	8
31-40 years	8
41-50 years	10
51-60 years	6
61-70 years	9
71-80 years	1

**Table 3: Distribution of various predisposing Factors on patients.**

Predisposing factor	Number of patients
NSAID abuse	10
Smoking	3
Alcoholism	4
Both smoking and Alcohol abuse	10
Steroid abuse	1
Chronic Stress	2
Previous history of Peptic ulcer	4
No predisposing factor Identified	10

patients (54.54%), abdominal distension in 38 patients (89.36%), constipation in 6 patients (13.6%), fever in 4 patients (9.09%), 3 patients (6.8%) presented with decreased urine output and 2(4.5%) patients had got breathlessness (Table 4).

All patients have diffuse tenderness all over abdomen. Rigidity and guarding reported in 40 patients (90.9%), obliteration of liver dullness was documented in 32 patients (72.7%) of cases and absent bowel sounds reported in 41 patients (93.18%) (Table 5).

The time gap between the onset of abdominal pain and admission in hospital is highly inconsistent. 18(40.90%) patients got admitted within 24 hours, 12(27.2%) patients got admitted between 24 hours to 48 hours, 4(9%) patients got admitted between 48 hours to 72 hours, 7(15.9%) patients got admitted between 72 hours to 96 hours and 3(6.8%) patients got admitted between 96 hours to 120 hours (Table 6).

All the patients had erect abdomen and chest X-ray. 32 patients (72.72%) had sub diaphragmatic free gas (air under diaphragm). All patients underwent abdominal ultrasound. 35 (79.5%) patients had free peritoneal fluid suggestive of peritonitis.

All the patients underwent emergency exploratory laparotomy under general anesthesia after optimal resuscitation and none of the patients underwent primary placement of bilateral intra-abdominal drains. The peritoneal exudative fluid was bilious in 31 patients (70.4%), 5(11.36 %) patients showed serosanguinous exudative fluids, 8 patients showed frank pus (Table 7).

The incidence of site of gastroduodenal perforation

**Table 4: Distribution of clinical symptoms among the patients.**

Clinical symptoms	Number of patients
abdominal pain	44
abdominal distension	38
nausea and vomiting	24
Constipation	6
Fever	4
Breathlessness	2
Oliguria	3

**Table 5: Distribution of clinical signs among the patients.**

Clinical signs	Number of patients
Diffuse abdominal tenderness	44
Rigidity and guarding	40
Obliteration of liver dullness	32
absent bowel sounds	41

**Table 6: Distribution of time gap between the onset of abdominal pain and to the admission among patients.**

Time gap between the onset of abdominal pain and to the admission	Number of patients
< 12 hours	3
12-24hours	15
24 -48 hours	12
48-72 hours	4
72 to96 hours	7
96-120 hours	3

**Table 7: Distribution of peritoneal exudates among patients.**

Character of peritoneal exudates	Number of patients
Bilious	31
Serosanguinous	5
Fank pus	8

**Table 8: Distribution of site of perforation among patients.**

Site of perforation	Number of patients
body of stomach	3
Prepyloric	21
first part of duodenum	18
second part of duodenum	2

**Table 9: Distribution of size of perforation in patients.**

Size of perforation	Number of patients
<0.5 cm	32
0.5 to 1 cm	2
1.1 -1.5 cm	5
1.6 to 2 cm	5

is as follows, 21 (47.72%) patients had perforation in prepyloric region, 18 (40.9%) patients had perforation in first part of duodenum, 3(6.8%) patients had perforation in body of stomach and 2 (4.5%) patients had perforation in second part of duodenum (Table 8).

The size of gastroduodenal perforation ranges between 0.4 cm to 2.5 cm, 32 (72.72 %) patients had size of perforation in the range of 0.5 to 1 cm, 5 ((11.36%) patients had perforation in the range of 1.1 -1.5 cm, 5 patients (11.36%) had size of perforation between 1.6 to 2 cm and 2 patients (4.54%) had perforation size less than 0.5 cm (Table 9).

Edge biopsy is taken for all the patients who had gastric perforation and none of them had HPE suggestive of malignancy.

33 patients underwent modified Graham's omental patch repair and 11 patients underwent only primary closure of perforation and only 2 patients had feeding jejunostomy along with primary repair.

The most common complication is pulmonary infection that is observed in 18 patients (40.90 %), renal failure is seen in 2 patients (4.5%), surgical site infection seen in 10 (22.7%)urinary tract infection seen in7 patients (15.9 %), wound gaping seen in 5 patients (11.36%), liver failure seen in5 patients (11.36 %), abnormal coagulation profile seen in 4 patients (9.09%), bile leak seen for 2 patients (4.5%) and one patient with intestinal obstruction due to adhesions. 2 patients underwent relaparatomy; one patient for burst abdomen and another for intestinal acute intestinal obstruction.2 patients had mortality with MODS following bile leak.

In this study, there is significant correlation between delayed presentation for more than 24 hours to post-operative complications ( $p$ - value 0.003). But there is no correlation of post-operative complications with size of perforation ( $P$  – value 0.065) and site of perforation ( $p$ -value 0.0517) (Tables 10-13).

**Table 10: Distribution of post-operative complications among patients.**

Post-operative complication	Number of patients
Pulmonary infections	18
Renal failure	2
Surgical site infection	10
Urinary tract infection	7
Abnormal coagulation profile	4
Bile leak	2
Adhesive intestinal obstruction	1
Wound gaping	5
Liver failure	5

**Table 11: Distribution of patients with and without complications for different time gaps between onset of symptoms and intervention.**

Gap between onset of symptoms and intervention	With complications	Without complications
<24 hours	5	13
>24 hours	19	7

$p$  - value 0.003

**Table 12: Distribution of patients with and without complications for different perforation sizes.**

Size of perforation	With complications	Without complications
< 1cm	16	18
>1cm	8	2

$P$  – value 0.065

**Table 13: Distribution of patients with and without complications for different sites of perforation.**

Site of perforation	With complications	Without complications
Gastric	16	6
Duodenal	18	4

$P$ -value 0.0517

All the discharged patients are put on *H. pylori* eradication therapy. All the gastric perforation patients advised to have upper GI endoscopy to rule out carcinoma stomach but only 6 patients underwent upper GI endoscopy; none of them diagnosed to have malignancy.

The mean duration of hospitalization is 9 days (range 6 to 20 days). Two patients had the post-operative mortality with developed MODS following bile leakage. Both the deceased patients had perforation size more than 1.5 cm in first part of duodenum, and both underwent surgery after 48 hours of onset of symptoms.

## DISCUSSION

In this study, maximal incidence of gastroduodenal perforation is found in 41 to 50 years age (22.7%) and least number of cases between 20 years (4.5%). Girish S et al. also documented the highest incidence found in 40-49 years of age (25%) and lowest incidence in less than 19 years of age (3.4%) [14]. Sangita et al. also documented the highest number of cases in 41 to 50 years age group (32.78%) and least number of cases in less than 20 years group (3.44%) [15].

44 patients with perforation peritonitis are considered with male to female ratio of 3:1 ratio. Charan Satapathy et

al. documented Male to Female ratio of 11.2:1 [16]. Girish et al. documented higher incidence in male compared to female with male to female ratio as 19:1.14. Sangita et al. got similar male predominance with male to female ratio as 10.6:1 [15]. Similar results are documented in a study by Rao Mohan Vijaya S and et al [17]. Kenneth Thorsen al. documented equal incidence in both male and female [18].

10 (22.72%) patients have history of both alcohol abuse and smoking, 4 patients have only alcohol, and 3 patients have only smoking history. Laishram Oken Singh et al. also documented 34.5% of duodenal ulcer perforation in patients having both alcohol and smokers abuse [19] Kumar PV et al., had similar association with both alcohol and smokers abuse (66%) [20]. Unar et al. documented smoking history in 23.1% [21].

NSAID abuse is documented in 10 patients (22.2%), two patients have history of chronic stress and only one patient has history of chronic steroid abuse. Fathalah et al. also documented that Smoking, NSAIDs uses, and stress are risk factors for PPU and also can affect outcome [22]. Dushyant Kumar Rohit, et al. documented 26.6% patients having history of NSAIDs intake [23].

Abdominal pain is most common symptom that is seen in all the patients, followed by abdominal distension in 38 (86.36%) patients, nausea and vomiting in 24 (54.54%) patients, constipation in 6(13.6%) patients and fever in 4 (9%) patients. Sachin Sharmaet al. also documented that the incidence of symptoms are as follows: pain in abdomen (100%), abdomen distension (95%), constipation (88.57%) and vomiting (22.85%) cases [24]. Dushyant Kumar Rohit, et al. documented that the incidence of symptoms are as follows: pain in abdomen (100%), abdomen distension (80%) [23]. Laishram Oken Singh et al. also documented 100% incidence with abdominal pain, 18.2 % incidence of nausea and 13.6% incidence of vomiting [19]. In the study by Sangita M Gavit et al, 100 % of patients had abdominal pain, Nausea and vomiting in 84. 48%, distension of abdomen 74. 13%, fever in 60.34%, loose motion in 18. 96% [15].

3 patients (6.81%) got admitted in hospital within 12 hours of onset of abdominal pain, 15(34.09%) patients admitted between 12-24 hours, 12(27.2%) between 24 hours to 48 hours, 4(9%) patients between 48 hours to 72 hours, 7(15.9%) patients between 72 hours to 96 hours and 3(6.8%) patients between 96 hours to 120 hours. There is a significant correlation between one or more post-operative complications and delayed admission beyond 24 hours (P- value 0.003). It is documented that mortality is high in patients who presented after 24 hours to hospital. Boey et al. also documented poor postoperative complications and outcome if presentation is more than 24 hours [10]. Lau JY et al. reported that mortality increased if duration of symptoms for more than 24hours [25]. Bin-Taleb AK et al. reported that the shorter mean period between onset of perforation symptoms and surgical intervention was associated with reduced mortality rates [26]. No correlation was identified between duration of

symptoms and postoperative outcome in a study by Mutlu Unver et al [27].

The following clinical signs like diffuse tenderness all over abdomen reported in 44 patients (100%), rigidity and guarding all over the abdomen reported in 40 patients (90.9%), obliteration of liver dullness in 32 patients (72.7%) and absent bowel sound reported in 41 patients (93.18%). JB Baid and Jain TC reported that guarding and rigidity in 85% and abdominal distension in 56% of patients [28]. Chaudhary et al. also identified abdominal tenderness in all patients, rigidity and rigidity in 95.6%, obliteration of liver dullness in 81.3% and absence of bowel sounds in 36.5% patients [29].

Air under diaphragm in erected abdomen X-ray is noticed in 32(72.72%) patients and 35 (79.54%) patients documented to have free peritoneal fluid; which suggest peritonitis in their abdominal ultrasonography. William N and Everson NW also documented gas under diaphragm in 60-70% [30]. Sharad Seth and Keshav Kumar Agrawal also reported like this study; pneumoperitoneum in 86.27% and ultrasonography suggestive of perforation in 78.43% [31]. Laishram Oken Singh et al. documented gas under diaphragm in 97.3% patients [19].

Prepyloric region perforation seen in 21(47.72%) patients, followed by first part of duodenum in 18 (40.9%) patients, body of stomach in 3(6.8%) patients and least common site is second part of duodenum in 2 (4.5%) patients. An equal proportion of gastric and duodenal ulcers with ratio of 1:1 is documented, although highest number of cases are found at prepyloric region of stomach, which is in contrast to Bali et al. who reported a ratio of 1:5 among gastric to duodenal perforation [32]. The following studies by Etonyeaku et al. with 1:10 and Seow et al. with 1:13 ratio highly shows variability of among gastric and duodenal perforation across the world [33,34]. A.I. Ugochukwu et al. and Nuhu A et al. reported all their cases are due to perforated duodenal ulcer [35,36]. Fedail S et al. documented high duodenal to gastric perforation ratio of 25:1 [37].

32 (72.72%) patients have size of perforation in the range of 0.5 to 1 cm, 5 (11.36%) patients in the range of 1.1 -1.5 cm, 5 (11.36%) patients have size of perforation between 1.6 to 2 cm and 2 (4.5%) patients had perforation size less than 0.5 cm. Laishram et al. also reported the size of the perforations ranging 0.5cm to 2cm in diameter. 60.9% of perforations have size range from 0.5cm to 1cm, 25.5% of perforations have size less than 0.5cm and 13.6% of perforations have size range from 1cm to 2cm in diameter [19]. Dushyant Kumar Rohit et al. reported 75.5% patients have perforation of size  $\geq 10\text{mm}$  [23]. Sangita M Gavit and Bhagyashri M Ahirrao, documented the size of perforation from 0.5-3 cm, 43.10% of patients had the size of perforation < 0.5 cm, 39.65% of perforations of size 0.6-1.5 cm, 12.06% of perforations of size 1.6-2.5 cm and only 5.17% of perforations of size > 2.5 cm [15].

The most common bilious peritoneal exudative fluid reported in 31 patients (70.4%), followed by 5(11.36

%) patients showing Serosanguineous and 8 (18.18%) patients showed frank pus. A.I. Ugochukwu et al. reported 14.5% of patients who had delay between onset of symptoms and surgical procedure developed frank pus in the peritoneal cavity [35]. Owaid M. Almalki also reported pus mixed with bile in 19% cases and pus in 7.3% as peritoneal contamination [38].

33 patients underwent modified Graham's omental patch repair, and 11 patients underwent only primary closure of perforation, 2 patients had feeding jejunostomy along with the primary repair. None of the patients underwent definitive antiulcer surgery like vagotomy with drainage as majority of the patients had moderate to severe peritoneal exudative fluids [39]. A.I. Ugochukwu et al. also documented that none of their patients underwent definitive antiulcer procedures [36]. Biopsy is taken from 22 patients having gastric perforation and none of them showed malignancy. Sangita et al. also reported that all the histopathological report was negative for malignancy among the 19 cases (32.75%) [15].

The most common complication is pulmonary infections in 40.90 %, renal failure seen in 4.5%, surgical site infection is seen in 22.7%, urinary tract infection seen in 15.9 %, wound gaping seen in 11.36%, liver failure seen in 11.36 %, abnormal coagulation profile seen in 9.09%, bile leak seen in 4.5% and one patient had intestinal obstruction due to adhesions. Sangita et al. documented that most common complication was respiratory infection (29.31%), followed by Wound infection (22.41%) [15]. Chaiya et al. reported that surgical site infections are most common complication [40]. Vinod et al. also reported that wound infection was most common complication (41.8%) followed by respiratory system infections. (31.8%) [41]. Dushyant Kumar Rohit et al. also documented that surgical site infection was most common complication followed by pulmonary infection, intra-abdominal abscess, septicaemia and burst abdomen [23].

There is no correlation between size of perforation >1 cm and post-operative complications (p- 0.06594). Laishram Oken et al. also documented similar results (P -0.100)19. But Gupta BS et al. reported larger perforations had increased hospital admission duration, post-operative leak and morbidity [42].

Mortality is seen in 2 patients (4.5%) with both patients having perforation of size greater than 1.5 cm and purulent peritoneal exudative collections and had multi organ dysfunction syndrome following septic shock. Shamil V Timerbulatov et al. also documented Postoperative mortality of 4.5% [43]. All Owaid documented postoperative mortality of 7% which is comparable to this study [38]. Jobta et al. reported mortality of 10% in their study [44].

## CONCLUSION

In this study, higher incidence of gastroduodenal perforation in male of age 41 to 50 years age group is documented. The incidence among female population is

in increasing trend compared to previous studies. NSAID abuse, smoking and alcohol consumption are important predisposing factors. Abdominal pain and tenderness are documented in all the patients. There is an increasing trend in gastric perforations with highest incidence in prepyloric region. There is significant correlation between delayed surgical interventions for more than 24 hours to postoperative complications (0.003) but there is no correlation between size of perforation (0.065) and site of perforation (0.0517) to post-operative complications. Mortality is high among duodenal ulcers of size >1.5 cm with delayed presentation.

## REFERENCES

1. Machado NO. Management of duodenal perforation post-endoscopic retrograde cholangiopancreatography. When and whom to operate and what factors determine the outcome? A review article. JOP 2012; 13:18-25.
2. Buck DL, Møller MH. Influence of body mass index on mortality after surgery for perforated peptic ulcer. J Br Surg 2014; 101:993-9.
3. Wang YR, Richter JE, Dempsey DT. Trends and outcomes of hospitalizations for peptic ulcer disease in the United States, 1993 to 2006. Ann Surg 2010; 251:51-8.
4. Kudva MV, Htut T. Profile of peptic ulcer disease in Malaysia. Singapore Med J 1988; 29(6).
5. Milosavljevic T, Kostić-Milosavljević M, Jovanović I, et al. Complications of peptic ulcer disease. Dig Dis 2011; 29(5):491-3.
6. Dunn BE, Cohen H, Blaser MJ. Helicobacter pylori. Clin Microbiol Rev 1997; 10:720-41.
7. Graham RR. The treatment of perforated duodenal ulcers. Surg Gyneco Obst 1937; 64:235-8.
8. Mouret P, Francois Y, Vignal J, et al. Laparoscopic treatment of perforated peptic ulcer. J Br Surg. 1990; 77:1006.
9. Lau WY, Leung KL, Kwong KH, et al. A randomized study comparing laparoscopic versus open repair of perforated peptic ulcer using suture or sutureless technique. Ann Surg 1996; 224:131-8.
10. Boey J, Choi SK, Poon A, et al. Risk stratification in perforated duodenal ulcers. A prospective validation of predictive factors. Ann Surg 1987; 205:22-6.
11. Bas G, Eryilmaz R, Okan I, et al. Risk factors of morbidity and mortality in patients with perforated peptic ulcer. Acta Chir Belg. 2008; 108:424-7.
12. Møller MH, Adamsen S, Thomsen RW, et al. Multicentre trial of a perioperative protocol to reduce mortality in patients with peptic ulcer perforation. J Br Surg 2011; 98:802-10.
13. Hermansson M, von Holstein CS, Zilling T. Surgical approach and prognostic factors after peptic ulcer perforation. Eur J Surg 1999; 165:566-72.
14. Noola GS, Shivakumar CR. A clinical study of duodenal ulcer perforation. Int Surg J 2016; 3:711-3.

15. Gavit SM, Ahirrao BM. A Study of Risk Factors, Early Evaluation and Management of Duodenal Ulcer Perforation Peritonitis. Galore Int J Health Sci Res 2020; 5:66-76.
16. Satapathy MC, Dash D, Panda C. Modified Grahams' omentopexy in acute perforation of first part of duodenum; A tertiary level experience in South India. Saudi Surg J 2013; 1:33-36.
17. Rao Mohan VS, Siddharth O. A Clinical Study of Duodenal Ulcer Perforation. Indian J Appl Res 2014; 4:230-6.
18. Thorsen K, Søreide JA, Kvaløy JT, et al. Epidemiology of perforated peptic ulcer: age-and gender-adjusted analysis of incidence and mortality. World J Gastroenterol 2013; 19:347-54.
19. Singh LO, Maibam C, Singh TS, et al. A Clinical Study of Duodenal Ulcer Perforation. IOSR J Dent Med Sci 2020; 19:7-29.
20. Kumar PV, Naveen N, Mahajan V. A Clinico-Pathological study of duodenal ulcer perforation and its management in rural area in Karnataka. Int J Med and App Sci 2013; 2:4-7.
21. Unar SK, Danish AA, Bhurt AA, Laghari AA. Outcome of duodenal ulcer perforation after graham omental patch repair. Ann Punjab Med Coll 2019; 13:14-7.
22. Hawrane TA, Fathalah ZS, Mahmood MA. Risk factor for perforated duodenal ulcer in sulaemania city. Zanco J Med Sci 2010; 14:61-6.
23. Rohit DK, Verma RS, Pandey G. Clinical study and management of peritonitis secondary to perforated peptic ulcer. Int Surg J 2017; 4:2721-6.
24. Sharma S, Kaneria R, Sharma A, et al. Perforation peritonitis: a clinical study regarding etiology, clinical presentation and management strategies. Int Surg J 2019; 6:4455-9.
25. Lau JY, Sung J, Hill C, et al. Systematic review of the epidemiology of complicated peptic ulcer disease: Incidence, recurrence, risk factors and mortality. Digestion 2011; 84:102-13.
26. Bin-Taleb AK, Razzaq RA, Al-Kathiri ZO. Management of perforated peptic ulcer in patients at a teaching hospital. Saudi Med J 2008; 29:245-50.
27. Unver M, Firat Ö, Ünalp ÖV, et al. Prognostic factors in peptic ulcer perforations: a retrospective 14-year study. Int Surg 2015; 100:942-8.
28. Baid JC, Jain TC. Intestinal perforation. Indian J Surg 1988; 50:353-7.
29. Chaudhary V, Mathur R. Clinical presentations, factors related with complications and mortality in peptic ulcer perforation in young adults: A tertiary level hospital study. Int J Med Sci Edu 2014; 1:174.
30. Williams N, Everson NW. Radiological confirmation of intraperitoneal free gas. Ann R Coll Surg Engl 1997; 79:8-12.
31. Seth S, Agrawal KK. A Review of 51 cases of Duodenal perforation in Rohilkhand region. Int J Contemp Med Res 2016; 3:1806-8.
32. Bali RS, Verma S, Agarwal PN, et al. Perforation peritonitis and the developing world. ISRN Surg. 2014;2014.
33. Etonyeaku AC, Agbakwuru EA, Akinkuolie AA, et al. A review of the management of perforated duodenal ulcers at a tertiary hospital in south western Nigeria. Afr Health Sci 2013; 13:907-13.
34. Seow JG, Lim YR, Shelat VG. Low serum albumin may predict the need for gastric resection in patients with perforated peptic ulcer. Eur J Trauma Emerg Surg 2017; 43:293-8.
35. Ugochukwu AI, Amu OC, Nzegwu MA, et al. Acute perforated peptic ulcer: On clinical experience in an urban tertiary hospital in south east Nigeria. Int J Surg 2013; 11:223-7.
36. Nuhu A, Madziga AG, Gali BM. Acute perforated duodenal ulcer in Maiduguri: experience with simple closure and Helicobacter pylori eradication. West Afr J Med 2009;28(6) 384-7.
37. Fedail S, Homeida M, Araba BO, et al. Upper gastrointestinal fibreoptic endoscopy experience in the Sudan: Analysis of 2500 endoscopies. Lancet 1983; 322:897-9.
38. Almaliki OM. Short-term outcome of perforated peptic ulcer; Relation with estimated time from the onset of the abdominal pain to surgical intervention. Egypt J Hosp Med 2020; 78:332-6.
39. Yunas M, Jan QA, Nisar W, et al. Graham's omentopexy in closure of perforated duodenal ulcer. J Med Sci. 2010; 18:87-90.
40. Chalya PL, Mabula JB, Koy M, et al. Clinical profile and outcome of surgical treatment of perforated peptic ulcers in Northwestern Tanzania: A tertiary hospital experience. World J Emerg Surg 2011; 6:1-10.
41. Yedalwar V, Kaneria R, Singh AK, et al. Intraoperative Findings in Patients of Peptic Ulcer Perforation: A Prospective Study in Correlation with Patient Outcome. JMSCR 6; 924-9.
42. Gupta BS, Talukdar RN, Neupane HC. Cases of perforated duodenal ulcer treated in College of Medical Sciences, Bharatpur over a period of one year. Kathmandu Univ Med J 2003; 1:166-9.
43. Timerbulatov SV, Timerbulatov VM, Khisamutdinova RI. Perforated gastric and duodenal ulcers: treatment options. Int Phys Med Rehabil J 2018; 3:95-8.
44. Jhobta RS, Attri AK, Kaushik R, et al. Spectrum of perforation peritonitis in India-review of 504 consecutive cases. World J Emerg Surg 2006; 1:1-4.