Al Ameen J Med Sci 2023;16(2):178-183 ● US National Library of Medicine enlisted journal ● ISSN 0974-1143

ORIGINAL ARTICLE CODEN: AAJMBG

Perforative peritonitis: our experiences

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Received: 29th January 2023; ***Accepted:*** 22nd March 2023; ***Published:*** 01st April 2023

Abstract: *Aims and Objective:* To study the Perforative peritonitis in relation to its aetiology, clinical presentation, site of perforation, surgical treatment required and post- operative complications and mortality. *Methods:* The prospective study was conducted in the Department of Surgery, Ashwini Rural Medical College Hospital and Research Centre, Kumbhari, Solapur from October 2017 to June 2021. The study population included 100 patients who presented a surgical emergency of perforation peritonitis. *Main Findings:* Commonest age group 41 to 50 years, followed by age group 31 to 40 years, common symptoms in peritoneal perforation were abdominal pain, Fever and signs were Tenderness, Pneumoperitoneum, Abdominal distension, Dehydration, Shock. Most common aetiology of perforation Duodenal ulcer, Ileal, typhoid, Appendicular, Traumatic, Gastric ulcer, Tubercular ulcer, Crohn's disease. Varieties of operative procedures were performed depending on the patient's general condition, peritoneal contamination, site of perforation, gut viability, and surgeon's decision. Commonest complications were wound infection, lung infection, reperforation, burst abdomen, pelvic abscess and DIC. *Conclusion:* Perforation peritonitis is commonest emergency encountered in surgical practice. Most of the patients present with generalized or localized abdominal pain. Most common signs were Tenderness, Pneumoperitoneum, Abdominal distension. Duodenal perforation is most common followed by ileal and typhoid. Common complications were wound infection followed by lung infection.

Keywords: Perforation, Peritonitis, Presentation, Aetiology, Complications.

Introduction

The evidence of acute abdomen is documented in the literature from the time of Hippocrates 400 BC who described Hippocratic facies in the terminal stage of peritonitis [1]. Perforation peritonitis is the most common surgical emergency encountered by surgeons all over the world as well in India [2]. Perforation is defined as an abnormal opening in a hollow organ or viscus. It is derived from the Latin *perforatus*, meaning "to bore through" [3]. Gastrointestinal perforations as a sequelae to various disease processes, trauma, and diagnostic/therapeutic procedures constitute a major percentage of acute abdominal emergencies [4-5].

Peritonitis is peritoneal inflammation due to reaction of peritoneal cavity to the contents of the perforated viscus. Classically, peritonitis is divided into two distinct types. Acute, primary or spontaneous peritonitis is usually caused by an infection with a single organism (e.g., Streptococcus pneumoniae, Escherichia coli) in which no identifiable source or continuing contamination can be demonstrated and Secondary or surgical peritonitis arises from an injury or lesions of the gastrointestinal tract, the biliary system, pancreas, and genitourinary tract [6]. Gastrointestinal perforations lead to diffuse peritonitis, toxemia, septicemia, metabolic and circulatory instability, renal failure, and pulmonary insufficiency, compounded by advanced age and delay in therapeutic procedures; it leads to high mortality and morbidity [7].

In spite of advances in perioperative care, antimicrobial therapy, and intensive care support, perforation peritonitis still has high morbidity and mortality [8-9]. Various studies have shown different etiological spectrums for perforation peritonitis in India compared to

rest of the world [10]. There is a paucity of data from India regarding its etiology, prognostic indicators, morbidity, and mortality patterns [11-13]. Our study was designed to present experiences with the spectrum of perforation peritonitis.

Material and Methods

This prospective study was conducted in the Department of Surgery, Ashwini Rural Medical College Hospital and Research Centre, Kumbhari, Solapur from October 2017 to June 2021. The study population included 100 patients who presented a surgical emergency of perforation peritonitis. The diagnosis of gastrointestinal perforation was made on the basis of detailed history, physical examination, radiological investigations, and operative findings. Associated comorbidity conditions and postoperative courses were noted for each patient. Exploratory laparotomy patients were managed according to the site of perforation.

Data was analyzed on a computer using SPSS version 10.0. Descriptive statistics like frequency, percentage and mean, median, SD (standard deviation) were computed. For data presentation, Chi-square test was used to compare frequencies at 95% confidence interval.

Inclusion Criteria:

- All patients with cases of peritonitis caused by gastrointestinal tract perforations who were undergoing exploratory
- laparotomies were included in the study.

Exclusion Criteria

- Cases of primary peritonitis, iatrogenic perforations, and anastomosis leak were excluded from the study. Perforation
- Peritonitis cases due to corrosive ingestion were also excluded.

Results

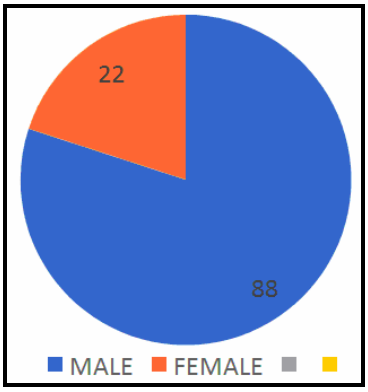
In our study maximum number of patients (28%) belongs to age group 41 to 50 years, followed by 24% of patients belong to age group 31 to 40 years and 51 to 60 years each. 17% of patients belongs to age group 21 to 30 years followed by 3% of patients belongs to age group 11 to 20 years and 61 to 70 years each, only 1% of patients belong to age group of 71 to 80 years (Table no.1)

Table -1: Age Distribution of Patients

Age	No. of Cases	Percentage
11-20	3	3%
21-30	17	17%
31-40	24	24%
41-50	28	28%
51-60	24	24%
61-70	3	3%
71-80	1	1%

This study was conducted on 100 patients with perforated peritonitis. Out of this, 88(88%) were males and 22(22%) were females; with the male: female ratio being 4:1. (Fig no.1)

Fig-1: Male to Female Ratio



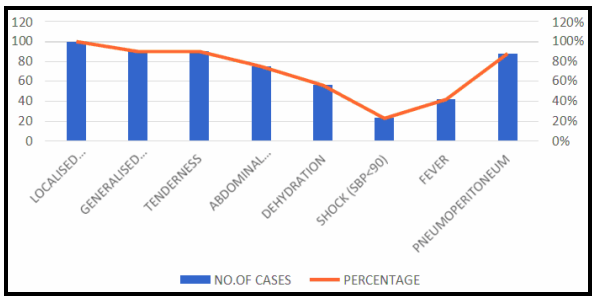
In the present study, following Co-morbidities were hypertension (9%), Respiratory Illness (8%), Chronic Obstructive Pulmonary Disease (8%), Diabetes Mellitus (7%), Arthritis (5%), Chronic Renal Disease (2%), Malignancy (1%) (Table no.2).

Table-2: Associated Co Morbid Conditions

Co-Morbid Conditions	No. of Cases	Percentage
Hypertension	9	9%
Diabetes Mellitus	7	7%
Chronic Renal Disease	2	2%
Malignancy	1	1%
Respiratory Illness	8	8%
Chronic Obstructive Pulmonary Disease	8	8%
Arthritis	5	5%

In our study, common symptoms in peritoneal perforation were Localized abdominal pain (100%), Generalised abdominal pain (90%), Fever (42%), and signs were Tenderness (90%), Pneumoperitoneum (88%), Abdominal distension (75%), Dehydration (56%), Shock (23%) (Fig no.2).

Fig-2: Symptoms and Signs



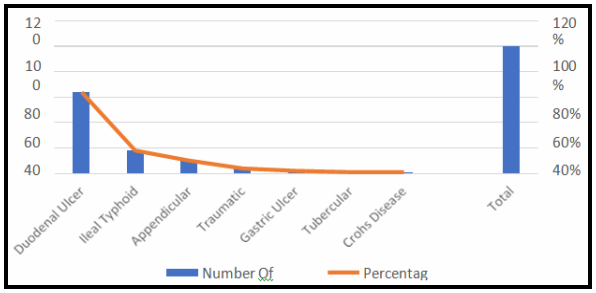
The common presenting symptoms in Peptic perforation were Dyspepsia (70.76%), Intractable pain (3.07%), while (26.15%) had no symptoms (Table no.3).

Table-3: Presenting Symptoms of Peptic Perforation

Symptoms	No. of Cases	Percentage
Dyspepsia	46	70.76%
Intractable Pain	2	3.07%
No Symptoms	17	26.15%
Total	100	100%

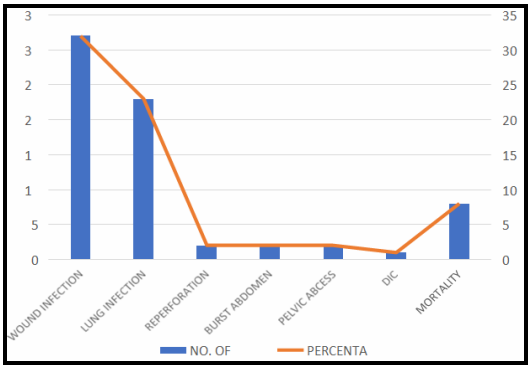
In our study of Aetiology of perforation Duodenal ulcer comprised (64%), Ileal typhoid (18%), Appendicular (10%), Traumatic (4%), Gastric ulcer (2%), Tubercular ulcer (1%), Crohn's disease (1%) (Fig no.3).

Fig-3: Aetiology of Perforation



Out of 100 patients, 48 patients (48%) had 62 complications, among these the commonest complications was wound infection(32%), lung infection (23%), reperforation (2%), burst abdomen (2%), pelvic abscess (2%), DIC (1%) and Mortality(8%). (Fig-no.4)

Fig-4: Complications Of Perforating Peritonitis



Total number of cases of perforation were 65 cases, out of which Duodenal were 63 cases and Gastric were 2 cases. (Table-no.4)

Table-4: Number of Cases of Perforation

Duodenal	63
Gastric	2
Total	65

Table-5: Surgical treatment given

Surgery	Diagnosis	Number of Cases
Primary Repair With Omentopexy	Duodenal Ulcer	64
Primary Repair with Omentopexy, With Biopsy	Gastric Ulcer	2
Appendicectomy	Appendicular	10
Diversion Stoma	Traumatic Colonic Perforation	2
Primary Closure	Traumatic Ileal Perforation	2
	Ileal	14
	Tubercular Ileal Perforation	1
Resection And anastomosis with Diversion Stoma	Ileal	4
Limited Resection	Crohns Disease	1
	Total	100

All the cases underwent laparotomy and following procedures were done (Table no 5)

1. Primary Repair with Omental Patch-64 cases
2. Primary Repair with Omental Patch with Biopsy-2 cases
3. Appendectomy-10 cases
4. Diversion Stoma-2 cases
5. Resection and Anastomosis-17 cases
6. Resection and Anastomosis with Diversion Stoma-4 cases
7. Limited Resection-1 case.

Discussion

This study was conducted on 100 patients with perforated peritonitis. Out of this, 88(88%) were males and 22(22%) were females; with the male: female ratio being 4:1. Sachin sharma et. al showed 83.57% male and 16.43% female [3]. In our study maximum number of patients (28%) belongs to age group 41 to 50 years, followed by 24% of patients belong to age group 31 to 40 years and 51 to 60 years each. 17% of patients belongs to age group 21 to 30 years followed by 3% of patients belongs to age group 11 to 20 years and 61 to 70 years each. Only 1% of patients belong to age group of 71 to 80 years.

T. Srinivasan et al showed that highest incidence seen in 40 to 60 years, Average age of incidence in 45 years [6]. Sachin Sharma Et.al showed maximum number patients belonged to 21 to 30 years of age group [3]. In the present study, following Co-morbidities were Hypertension (9%), Respiratory Illness (8%), Chronic Obstructive Pulmonary Disease (8%), Diabetes Mellitus (7%), Arthritis (5%), Chronic Renal Disease (2%), Malignancy (1%). Gujar. N et.al showed, cardiovascular, diabetes mellitus, chronic pulmonary obstructive disease were the most frequent concomitant diseases. One or more associated diseases were significant factors associated with increased mortality in patients undergoing surgeries.[14]

In our study, common symptoms in peritoneal perforation were Localized abdominal pain (100%), Generalized abdominal pain (90%), Fever (42%), and signs were Tenderness (90%), Pneumoperitoneum (88%), Abdominal distension (75%), Dehydration (56%), Shock(23%). Sujit M et.al showed abdominal tenderness was the commonest clinical findings and was present in all patients. Abdominal guarding was present in (97.14%) patients followed by diminished or absent bowel sounds (57.14%), shock (54.29%), tachycardia (54.28%), dehydration and obliteration of liver dullness (48.57%) [15]. Hameed et.al showed the common presenting symptoms in gastrointestinal perforations were pain, distension, and constipation followed by vomiting, fever, diarrhea and melena. Signs of dehydration, shock and anemia were present in 42.2%, 28%, 59.4% of patients respectively [10].

In our study of Aetiology of perforation Duodenal ulcer comprised (64%), Ileal typhoid (18%), Appendicular (10%), Traumatic (4%), Gastric ulcer (2%), Tubercular ulcer (1%), Crohn's disease (1%). Sujit M et.al the perforations of proximal gastrointestinal tract were approximately 7 times as common as distal tract which is in sharp contrast to developed countries where distal tract perforations are more common [15]. The relative incidence of various types of perforation is variable [16-17].

There is definitely a regional basis in the frequency and incidence of intestinal perforations with extensive perforations being encountered more frequently in the developing countries of south east asia and colonic perforations in the far east in India [16-18]. In India peptic ulcer perforations is the commonest followed by enteric, appendicular, traumatic and malignant perforations.

Enteric and upper intestinal pathology is common in developing nations such as Asia due to poor socio-economic conditions and stressful lifestyle. In western countries due to lifestyle and dietary habbits along with genetic predisposition, large bowel pathology is common. Duodenal ulcer perforations was the most common (54.29%) and same results were by other studies [12, 19].

Sharma S et.al showed gastric and prepyloric perforations comprised (16.43%) cases, while duodenal perforation was the most common type (35%), which were mainly due to acid peptic disease (48.92%) caused by either inadvertent drug (NSAIDS) intake or *H.*

pylori infection followed by trauma and malignancy. Jejunal and ileal perforations (34.95%) were due to typhoid (13.21%), tuberculosis and trauma. Appendicular perforations (10.36%) were the result of acute appendicitis and large bowel (3.21%) perforations can be due to malignancy or trauma.[3] Similar observations were noted by Jhobta et al in their study on 504 patients [12].

Peritonitis due to proximal gastrointestinal perforations were more common in the developing world than distal gastrointestinal perforations which are more common in the western world [9]. Hameed et al showed Gastroduodenal perforations cases, a total of 52%, were found to be the most common cause of perforation peritonitis and it was almost the same as found in many other recent studies in India and Pakistan but was different to the western world where more than 48% of cases were due to penetrating trauma and 21% of cases were due to appendicular perforation [10].

Traumatic perforation was the third most common cause of perforation peritonitis in this series ahead of appendicular and tubercular stricture perforation. This change in spectrum is most likely because of the development of good highways associated with more road traffic accidents in rural areas. Another interesting trend noticed in our study is declining share of tubercular perforations (3.1%) as compared to two other studies in the recent past, it is because of early diagnosis of tuberculosis and better treatment facilities available at a primary healthcare level along with increased awareness [10].

In a retrospective observational study conducted by Ross et al. the proportion of colonic and appendicular perforations was far higher than gastroduodenal perforations. Infectious pathology namely typhoid, tuberculosis, and amoebic perforations remain an important etiological factor of perforation peritonitis in the eastern part of the world and accounted for almost a quarter (24%) of all cases in our study, it is in sharp contrast to the western world where only 2.7% of the cases were due to infectious pathology [20].

In our study mortality rate was 8%, mortality was more in age group of 61 to 80 years which in similar to Chalya et al and Goud et al as patients in this age group have poor nutritional status and associated co morbities [21-22].

Out of 100 patients, 48 patients (48%) had 62 complications, among these the commonest complications was wound infection (32%), lung infection (23%), reperforation (2%), burst abdomen (2%), pelvic abscess (2%), DIC (1%). Sharma et al showed wound infection was the most common complication (29.64%), followed by pulmonary complications (22.14%), wound dehiscence in 22 cases (7.86%). Electrolyte imbalances were seen in 11% cases. Postoperative leak was seen in 9 cases [3]. Chalya study has shown the commonest postoperative complications were surgical site infections (48%) and pneumonia (28%). Pulmonary complications are due to delayed mobilization, whereas gross intraperitoneal contamination, poor nutrition and anaemia are responsible for wound infection, wound dehiscence [21].

All the cases underwent laparotomy and following procedures were done;

1. Primary repair with omental patch
2. Primary repair with omental patch with biopsy
3. Appendicectomy
4. Diversion stoma
5. Resection & anastomosis
6. Resection and anastomosis with diversion stoma
7. Limited resection

In our study, a variety of operative procedures were performed depending on the patient's general condition, peritoneal contamination, site of perforation, gut viability, and surgeon's decision.

All duodenal perforations were managed with primary repair closure with omentopexy (64 cases), Gastric perforations were managed by primary repair closure with omentopexy with biopsy(2 cases). In appendicular perforations, appendectomy (10 cases) was done. In traumatic colonic perforation, Diversion stoma (2 cases) was done. Primary closure were done in 17 patients traumatic ileal perforation (2 cases), Ileal perforation (14 cases), tubercular perforation (1 cases).

Resection and anastomosis with diversion stoma in ileal perforation (4 cases) and limited resection in Crohn's disease (1 case).

Conclusion

Perforation peritonitis is commonest emergency encountered in surgical practice. Most of the patients present with generalized or localized abdominal pain, fever. Most common signs were Tenderness, Pneumoperitoneum, Abdominal distension, Dehydration, Shock. Duodenal perforation is most common followed by ileal and typhoid, Appendicular, Traumatic, Gastric ulcer, Tubercular ulcer, Crohn's disease. Common complications were wound infection followed by lung infection, reperforation, burst abdomen, pelvic abscess and DIC. Observed mortality is 8%.

Financial Support and sponsorship: Nil

Conflicts of interest: There are no conflicts of interest.

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Cite this article as: Dhandore CD and Reddy RP. Perforative peritonitis: our experiences. *Al Ameen J Med Sci* 2023; 16(2): 178-183.

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