

## Original Research Article

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# Perforation peritonitis: a clinical study regarding etiology, clinical presentation and management strategies

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## ABSTRACT

**Background:** Generalized peritonitis as a result of gastrointestinal perforation is a common surgical emergency in India. The present study was conducted to understand the spectrum of perforation peritonitis in terms of etiology, clinical presentation, site of perforation, surgical treatment, postoperative complications, and mortality encountered at Shyam Shah Medical College and Sanjay Gandhi Memorial Hospital Rewa (M.P.) India.

**Methods:** The study was a prospective observational study conducted from July 2018 to June 2019 in the Department of General Surgery, S. S. Medical College and Sanjay Gandhi Memorial Hospital Rewa (M.P.). A total of 280 patients with perforation peritonitis were included in the study and underwent exploratory laparotomy.

**Results:** Out of 280 patients, there were 234 males (83.57%) and 46 females (16.43%). Most common affected age group was 21 to 30 years (19.64%). Doudenal perforation was the most common type (35%), which were mainly due to Acid peptic disease (48.92%) followed by Jejunal and Ileal perforations (34.95%). In our study, a variety of operative procedures were performed depending on the patients general condition, peritoneal contamination, site of perforation, gut viability, and surgeon's decision. Wound infection was the most common complication (29.64%). Mortality rate was 7.5% (21 patients).

**Conclusions:** Perforation is diagnosed on clinical grounds immediately as patient reaches emergency department, time lost due to delayed hospitalization affects the outcome of standard surgical procedure. Selection of appropriate surgical procedure and postoperative care is helpful in early and uneventful recovery.

**Keywords:** Perforation peritonitis, Clinical study, Exploratory laparotomy

## INTRODUCTION

Generalized peritonitis as a result of gastrointestinal perforation is a common surgical emergency in India.<sup>1</sup> In spite of advances in perioperative care, antimicrobial therapy, and intensive care support, perforation peritonitis still has high morbidity and mortality.<sup>2,3</sup> Perforation is defined as an abnormal opening in a hollow organ or viscus. It is derived from the Latin *perforatus*, meaning "to bore through." The spectrum of etiology of perforation is different between developing and developed countries, and there is a paucity of data from

India regarding its etiology, prognostic indicators, morbidity, and mortality patterns.<sup>4,6</sup> The signs and symptoms of almost all cases of perforation peritonitis are typical and clinical diagnosis of peritonitis can be made in all patients. X-ray chest and abdomen, ultrasound whole abdomen and CT scan are the investigations that can confirm the diagnosis. Peritonitis usually presents as an acute abdomen. Local findings include generalised abdominal tenderness, guarding, rigidity, abdominal distension, decreased bowel sounds. Systemic findings include fever with chills or rigor, restlessness, tachycardia, tachypnea, dehydration,

oliguria, disorientation and ultimately shock.<sup>7</sup> Prognosis affecting factors are age, vitals, metabolic acidosis, malnutrition, personal habits of smoking, alcoholism and drug abuse, preoperative status, serum albumin, cause of perforation, site of origin of peritonitis, contamination in peritoneal cavity. Left untreated, peritonitis can rapidly spread into the blood (sepsis) and to other organs, resulting in multiple organ failure and death. The spectrum of gastrointestinal perforation is having a wide geographical variations; in western countries with preponderance of lower gastrointestinal perforations as opposed to upper gastrointestinal perforations in developing countries.<sup>8-10</sup> In majority, cases present late to the hospital with well-established generalized peritonitis with purulent or fecal contamination and septicemia of varying degree. Thus surgical management of perforation peritonitis becomes highly demanding and more complex. A combination of anti-microbial therapy, improved surgical technique, and intensive care support may improve the outcome of such cases. The present study was conducted to highlight the spectrum of hollow viscus perforation peritonitis in terms of etiology, clinical presentations, site of perforation, surgical treatment, postoperative complications, and mortality encountered at Shyam Shah Medical College and Sanjay Gandhi Memorial Hospital Rewa (M.P.) India.

## METHODS

The study was a hospital-based observational study conducted in the Department of General Surgery, Shyam Shah Medical College and Sanjay Gandhi Memorial Hospital, Rewa (M.P.).

The cases included in the study were patients of all ages presenting with gastrointestinal perforation and undergoing emergency laparotomy between July 2018 to June 2019. Total 280 patients were included. Patients presenting with esophagus, pancreatobiliary tree, or genitourinary tract perforation or undergoing laparotomy for primary peritonitis, tertiary peritonitis (anastomotic leak and fecal fistula), or pancreatitis were excluded from the study. Patients who didn't give consent for operation and patients who couldn't be operated because of poor general condition or died before operation are also excluded from the study. All patients admitted to our hospital with acute pain abdomen or history of blunt trauma/ penetrating trauma abdomen was evaluated with detailed history of their illness with onset and duration of presenting symptoms. A history of any other comorbid illness and personal habits was also taken. After a general and abdominal examination (suggesting perforation peritonitis), an X-ray abdomen upright was obtained. A diagnosis of gastrointestinal perforation was made on the basis of history, clinical examination, and presence of free gas under diaphragm on abdominal X-ray. In the rest of the cases, ultrasonography [USG]/computed tomography (CT) abdomen/paracentesis (four-quadrant aspiration – 4QA) was done to confirm the diagnosis. As soon as the diagnosis was made, resuscitation was started

with large volume of crystalloids (blood transfusion if necessary), nasogastric suction to empty the stomach, and broad spectrum antibiotics were administered. Following adequate resuscitation, patients underwent exploratory laparotomy by a midline incision, and based on the intraoperative findings, the further management was decided. The operating surgeon decided the procedure to be performed. Peritoneal cavity was irrigated with warm normal saline (3-5 litres). Intra-abdominal drains were placed depending on peritoneal contamination and abdomen was closed after achieving complete hemostasis. Postoperatively, intravenous antibiotics were given for 5–10 days after the operation. The drug regimen was not uniform and was based on the cause of perforation and degree of contamination. Standard postoperative care was provided to each patient. In case of uneventful recovery, patients were discharged from the hospital when they had a good appetite; they were accepting orally and had good ambulation. If a patient had complication, they were managed accordingly. All the patients were called for follow-up 15 days after surgery and after that as per requirement.

The data was entered in Microsoft Excel and analysed. The values are presented in number and percentages.

## RESULTS

In our study, maximum number of patients (19.64%) belongs to age group 21 to 30 years (Table 1). There was total 234 male (83.57%) and 46 female (16.43%) patients in our study (Table 2). In the present study all the patients had pain abdomen (100%), followed by abdomen distension (95%), constipation (88.57%) and vomiting was present in 22.85% cases (Table 3).

**Table 1: Age wise distribution.**

Age group (years)	No. of patients	Percentage (%)
<b>0-10</b>	15	5.38
<b>11-20</b>	36	12.88
<b>21-30</b>	55	19.64
<b>31-40</b>	48	17.14
<b>41-50</b>	52	18.57
<b>51-60</b>	43	15.38
<b>61-70</b>	22	7.88
<b>71-80</b>	06	2.14
<b>&gt;80</b>	03	1.07
<b>Total</b>	280	100

**Table 2: Gender distribution.**

S.no.	Gender	No. of patients	Percentage (%)
<b>1</b>	Male	234	83.57
<b>2</b>	Female	46	16.43
<b>Total</b>		280	100

**Table 3: Chief complaints.**

S.no.	Complaint	No. of patients	Percentage (%)
1	Pain in abdomen	280	100
2	Abdominal distension	266	95
3	Constipation	248	88.57
4	Vomiting	64	22.85
5	Diarrhoea	12	4.29
6	Fever	96	34.28

According to the site, gastric and prepyloric perforations comprised (16.43%) cases, while duodenal perforation was the most common type (35%) (Table 5), which were mainly due to Acid peptic disease (48.92%) 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 (Table 4). All gastroduodenal perforations were managed with omentopexy (113), primary closure with omentopexy (20), primary closure with omentopexy with gastrojejunostomy with or without feeding jejunostomy (11), in small-bowel perforation primary closure (34), primary closure with proximal stoma (37), Perforation site stoma (11), resection anastomosis (04), resection anastomosis with proximal diversion stoma (06), and resection with double barrel ileostomy (03) were done. Among cases of ileal perforation ileostomy was done in 57 (68.6%), in the appendicular perforation, appendectomy (26) was done. In colorectal perforation, primary closure with proximal loop ileostomy, primary closure with proximal loop colostomy, resection and anastomosis, resection and anastomosis with proximal ileostomy were done (Table 6). In present series, 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 seen in 9 cases. In our study, the mortality rate was 7.5% (21 patients). Mortality was more in patients of 61-80 years of age (Table 7).

**Table 4: Cause of perforation.**

S.no.	Cause	No. of patients	Percentage (%)
1	Acid peptic disease	137	48.92
2	Appendicitis	29	10.36
3	Typhoid	37	13.21
4	Tuberculosis	31	11.07
5	Trauma	38	13.57
6	Malignancy	5	1.79
7	Amoebiasis	3	1.07

**Table 5: Site of perforation.**

S.no.	Site	No. of patients	Percentage (%)
1	Gastric and prepyloric	46	16.43
2	Duodenum	98	35.0
3	Jejunum	15	5.35
4	Ileum	83	29.6
5	Appendix	29	10.36
6	Colon and rectum	09	3.21

As evident by above Table 5 maximum number of patients had duodenal perforation (35.0%).

**Table 6: Operative procedure performed.**

Site of perforation	Operative procedure	No. of patients
Gastro-duodenal	Omentopexy	113
	Primary closure with omentopexy	20
	Primary closure with omentopexy with gastrojejunostomy with/without feeding jejunostomy	11
	<b>Total</b>	144
Jejunal	Primary closure with/without feeding jejunostomy	12
	Resection and anastomosis with/without feeding jejunostomy	3
<b>Total</b>		15
Ileal	Primary closure	22
	Primary closure with proximal loop ileostomy	37
	Perforation site ileostomy	11
	Resection and anastomosis	4
	Resection and anastomosis with proximal loop ileostomy	06
	Resection with double barrel ileostomy	03
<b>Total</b>		83
Appendicular	Appendectomy	29
	Primary closure with proximal loop ileostomy	5
	Primary closure with proximal colostomy	2
	Resection and anastomosis	1
	Resection and anastomosis with proximal ileostomy	1
<b>Total</b>		9
<b>Grand total</b>		280

**Table 7: Complications.**

S. no.	Complication	No. of patients	Percentage (%)
1	Wound infection	83	29.64
2	Respiratory complications	62	22.14
3	Dyselectrolytaemia	31	11.07
4	Abdominal collection	19	6.78
5	Wound dehiscence	22	7.86
6	Leak	9	3.21
7	Mortality	21	7.5

## DISCUSSION

Perforation peritonitis is one of the most common surgical emergencies in developing nations like India.<sup>1</sup> In our study, maximum number of patients (19.64%) belong to age group 21 to 30 years which is supporting the fact that patients of this age group are involved in heavy alcohol consumption, smoking and analgesic drug abuse. Maximum cases of perforation peritonitis are male (83.57%) as some behaviours, such as tobacco chewing, smoking, drinking alcohol and outdoor work are more frequent among men, thus increasing the risk of PUD and perforation and also traumatic perforation, especially in young adults. Most consistent feature is the pain and it is present in almost all the patients.<sup>11</sup> In the present study all the patients had pain abdomen (100%), followed by abdomen distension (95%), constipation (88.57%) and vomiting was present in 22.85% cases. Vomiting was more common in appendicular perforation. Fever was significantly more commonly observed in appendicular and enteric perforations.

According to the site, 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. Similar observations were noted by Jhobta et al in their study on 504 patients.<sup>5</sup>

In our study, a variety of operative procedures were performed depending on the patients general condition, peritoneal contamination, site of perforation, gut viability, and surgeon's decision. All gastroduodenal perforations were managed with omentopexy (113), primary closure with omentopexy (20), primary closure with omentopexy with gastrojejunostomy with or without feeding jejunostomy (11), GJ or FJ were done in cases of large perforations or in patients with poor general condition to avoid the risk of post-operative leak.

In small-bowel perforation primary closure (34), primary closure with proximal stoma (37), perforation site stoma (11), resection anastomosis (04), resection anastomosis with proximal diversion stoma (06), and resection with double barrel ileostomy (03) were done. Among cases of ileal perforation ileostomy was done in 57 (68.6%) which is due to poor preoperative nutritional status of patients, delayed arrival of patients to hospital and poor general condition of patients. In the appendicular perforation, appendectomy (26) was done. In colorectal perforation, primary closure with proximal loop ileostomy, primary closure with proximal loop colostomy, resection and anastomosis, resection and anastomosis with proximal ileostomy were done.

In present series, 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. Pulmonary complications are due to delayed mobilization, whereas gross intraperitoneal contamination, poor nutrition and anaemia are responsible for wound infection, wound dehiscence. Postoperative leak was seen in 9 cases. Chalya study has shown the commonest postoperative complications were surgical site infections (48%) and pneumonia (28%).<sup>12</sup> In our study, the mortality rate was 7.5% (21 patients). Mortality was more in patients of 61-80 years of age which is similar to Chalya et al and Goud et al as patients in this age group have poor nutritional status and associated comorbidities.<sup>12,13</sup>

## CONCLUSION

Perforated peritonitis is a disease of young and middle aged adults. More commonly affects males than females. typhoid, trauma, tobacco chewing, smoking, alcohol, inadvertent use of analgesics are most common predisposing factors for perforated peritonitis and patients inability to get proper and complete treatment is responsible for perforation. Delay in hospitalization due to initial treatment by homemade medicines and non-availability of essential surgical care further complicates the perforation in this region. Perforation is diagnosed on clinical grounds immediately as patient reaches emergency department, time lost due to delayed hospitalization affects the outcome of standard surgical procedure. Selection of appropriate surgical procedure and postoperative care is helpful in early and uneventful recovery. Early diagnosis of perforation peritonitis, emergent and appropriate surgical procedure, prompt treatment for enteric fever and avoidance of various predisposing factors can help to reduce the morbidity and mortality associated with this global disease.

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