

Spectrum of Perforation Peritonitis in Delhi: 77 Cases Experience

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Abstract Perforation peritonitis is the most common surgical emergency encountered by surgeons all over the world as well in India. The spectrum of etiology of perforation peritonitis in tropical countries continues to differ from its western counterpart. This study was conducted at Hindu Rao Hospital, Municipal Corporation of Delhi, New Delhi, India, designed to highlight the spectrum of perforation peritonitis in the eastern countries and to improve its outcome. This prospective study included 77 consecutive patients of perforation peritonitis studied in terms of clinical presentations, causes, site of perforation, surgical treatment, postoperative complications, and mortality at Hindu Rao Hospital, Delhi, from March 1, 2011 to December 1, 2011, over a period of 8 months. All patients were resuscitated and underwent emergency exploratory laparotomy. On laparotomy cause of perforation peritonitis was found and controlled. The most common cause of perforation peritonitis noticed in our series was perforated duodenal ulcer (26.4 %) and ileal typhoid perforation (26.4 %), each followed by small bowel tuberculosis (10.3 %) and stomach perforation (9.2 %), perforation due to acute appendicitis (5 %). The highest number of perforations was seen in ileum (39.1 %), duodenum (26.4 %), stomach (11.5 %), appendix (3.5 %), jejunum (4.6 %), and colon (3.5 %). Overall mortality was 13 %. The spectrum of perforation peritonitis in India continuously differs from western countries. The highest number of perforations was noticed in the upper part of the gastrointestinal tract as compared to the western countries

where the perforations seen mostly in the distal part. The most common cause of perforation peritonitis was perforated duodenal ulcer and small bowel typhoid perforation followed by typhoid perforation. Large bowel perforations and malignant perforations were least common in our setup.

Keywords Exploratory laparotomy · Emergency surgery · Perforation peritonitis · Primary repair · Stomas · Resection and anastomosis

Background

Peritonitis due to perforation of the gastrointestinal tract is the most common surgical emergency all over the world [1]. The spectrum of etiology of perforation differs from its western counter part [2]. The majority of patients present late, with purulent peritonitis and septicemia [3]. Surgical treatment for perforation peritonitis is highly demanding and very complex. The combination of improved surgical technique, antimicrobial therapy, and intensive care support has improved the outcome of such cases [4]. Objective of this study was to highlight the clinical presentation, causes of perforation, site, surgical treatment, postoperative complications, and mortality at Hindu Rao Hospital, Delhi, which is a tertiary care hospital.

Patients and Methods

This prospective study included 77 consecutive patients of perforation peritonitis, conducted in the surgical unit II, Department of General Surgery, Hindu Rao Hospital, New Delhi, India, over a period of 8 months from March 1, 2011 to December 1, 2011.

Perforation peritonitis is a common surgical emergency all over world. In India typhoid and tubercular perforation are common.

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Inclusion Criteria

All cases of peritonitis due to perforation of the gastrointestinal tract were included in this study.

Exclusion Criteria

All cases of primary peritonitis, corrosive, and postoperative peritonitis due to anastomosis leakage were excluded from the study.

All patients were studied in terms of clinical presentation, cause of perforation, site of perforation, treatment, redo surgery, postoperative complications, and mortality. After establishing the clinical diagnosis of perforation peritonitis, all patients were resuscitated and prepared for exploratory laparotomy. All these patients underwent emergency exploratory laparotomy. After opening the abdomen, the source of peritonitis was found and controlled. With adequate procedures, the abdomen was washed with 3–5 l of warm normal saline, drain placed in the abdominal cavity, and abdomen closed with Prolen No. 1. All patients were followed in the ward or ICU (intensive care unit) postoperatively with the cover of broad-spectrum antibiotics (cephalosporin + aminoglycoside + metronidazole) along with fluid and electrolyte balance. Drug regimen was not uniform in all patients. Data were collected and recorded on a predesigned research pro forma made for this study, and SPSS 10 version was used to analyze the data.

Results

Preoperative Data

A total of 77 patients were studied. The mean age was 33.9 years (ranges from 14 to 70 years) and the standard deviation was 14.1. Majority of patients were males (64 males and 13 females). The male-to-female ratio was 4.9:1. The majority of patients presented with the history of abdominal pain (96.6 %), abdominal distention (73.9 %), altered bowel habit (55.7 %), nausea or vomiting (52.3 %), fever (34.1 %), and shock (29.6 %) due to septicemia. Clinical presentation of patients varied according to the site and cause of perforation. Patients of duodenal ulcer perforation usually had a short history of pain originated in the epigastric region or upper abdomen. About 6.8 % patients gave the positive history of NSAID.

Patients with ileocecal tuberculosis mostly presented with the history of abdominal pain, abdominal distention, altered bowel habit, and nausea or vomiting. Patients with small bowel typhoid perforation also presented with the history of pain in the abdomen along with prolonged history of fever. Patients with perforated appendix presented with

the typical history of pain starting in the periumbilical region then shifting to the right iliac fossa, or originating directly in the right iliac fossa, and then spreading all over the abdomen. Only 62.1 % patients had an evidence of pneumoperitoneum on chest X-ray in erect posture. Cases of multiple air fluid levels on abdominal X-ray in erect position were 12.6 %, electrolyte imbalance and hypokalemia 2.3 %, hyponatremia 17.2 %, and raised blood urea and creatinine 31 %.

The time taken for resuscitation, diagnosis, and optimizing the patient for surgery was less than 12 h in 41.4 % while more than 12 h in 58.6 % (Table 1).

Operative Data

Perforated duodenal ulcer due to acid-peptic disease and small bowel perforation due typhoid were the most common causes of perforation peritonitis noticed in 26.4 % each, followed by small bowel tubercular perforations 10.3 %. The total number of perforation was seen in the colon (3.5 %), due to tuberculosis (1.1 %), malignancy (21.1 %) the rare cause of perforation peritonitis in our setup, trauma (1.1 %), and perforated appendix 3.5 % (Table 2).

Table 1 Preoperative data

S. No.	Variable	Number	Percentage (%)
1	Clinical presentation		
	Abdominal pain	74	96.6
	Abdominal distention	57	73.9
	Altered bowel habit	43	55.7
	Nausea/vomiting	40	52.3
	Fever	26	34.1
	Septicemia	23	29.6
	Positive history of NSAIDs	06	7.8
2	Positive findings on investigations		
	Pneumoperitoneum	48	62.1
	Air fluid level	10	12.6
	Hypokalemia	02	02.3
	Hyponatremia	13	17.2
	Raised blood urea and creatinine	24	31.0
3	Time for resuscitation		
	More than 12 h	32	41.4
	Less than 12 h	45	58.6
4	Associated comorbidity		
	Family history of tuberculosis	02	02.3
	Pulmonary tuberculosis	06	08.0
	Renal problem	14	18.4
	Diabetes mellitus	04	05.7
	Jaundice	01	01.3
	Hypertension	01	01.3

Table 2 Operative data

S. No.	Variable	Number	Percentage (%)
1	Causes of perforation		
	Acid-peptic disease		
	Duodenum	23	26.4
	Stomach	9	10.3
	Acid-peptic disease	8	9.2
	Fungal infection	0	0.0
	Malignancy	1	1.1
	Small bowel	40	46.0
	Tuberculosis	9	10.3
	Typhoid	23	26.4
	Unknown	8	9.2
	Colon	3	3.5
	Tuberculosis	1	1.1
	Malignancy	1	1.1
	Other	1	1.1
	Acute appendicitis	3	3.5
2	Site of perforation		
	Duodenum	23	26.4
	Ileum	34	39.1
	Jejunum	4	4.6
	Stomach	10	11.5
	Colon	3	3.5
	Appendix	3	3.5
	Cecum	2	2.6
	Rectum	0	0.0
3	Surgical procedure		
	Omentopexy	29	37.7
	Stoma	3	3.9
	Primary repair	25	32.5
	Resection and anastomosis	15	19.5
	Appendectomy	3	3.9
	Peritoneal toileting	2	2.6
4	Redo surgery		
	Tension suturing	1	1.3
	Stoma formation	2	2.6

The highest number of perforations was noticed in the small bowel—ileum 39.1 %, duodenum 26.4 %, jejunum 4.6 %, stomach 11.5 %, large bowel perforations, colon 3.5 %, appendix 3.5 %, and cecum 2.6 % (Table 2).

Most of peptic ulcer perforation was managed by an omentopexy (37.7 %). Small bowel perforations were managed by only stoma (3.9 %) and primary repair (32.5 %). Resection and anastomosis was 19.5 % in patients present with multiple small bowel perforation, appendectomy 3.9 %. Redo surgery was performed in those patients who developed wound dehiscence and abdominal collection, tension suturing 1.3 %, and stoma formation 2.6 % (Table 2)

Postoperative Complications

Postoperative complications recorded were wound infection 19.5 %, wound dehiscence 3.9 %, respiratory complications 7.8 %, septicemia 5.2 %, and abdominal collection 3.9 %. Patients with typhoid ileal perforation and ileocecal tuberculosis managed by resection anastomosis in emergency had an anastomosis leak in 3.9 %. Overall mortality was 13 %. Postoperative complication was noticed mostly in patients presented late with fecal peritonitis, septicemia, and associated comorbidity (Table 3).

Discussion

Perforation peritonitis is the most common surgical emergency in the younger age group [5]. As noticed in our study, the mean age was 33.9 years. The majority of patients in our study were males (males 83.1 % and female 16.9 %). Another study also showed more male patients of perforation peritonitis, with male-to-female ratio of 3:1 [6]. Perforation of the proximal part of the gastrointestinal tract was more common [7], which is in contrast to the studies from western countries where perforations are common in the distal part [8]. Duodenal ulcer perforation and ileal typhoid perforation were the most common perforation noticed in our study. Another study conducted by Gupta and Kaushik shows the same result [9]. It is noticed in our study that proper hydration, good antibiotic cover, and simple closure of the perforation using an omentopexy significantly decrease mortality rate [10]. There are other treatment options for perforated peptic ulcer such as Billroth I, Billroth II, and truncal vagotomy drainage procedure [11, 12]. Laparoscopic repair of perforated gastroduodenal ulcer by running suture is an option [13]. Gastric ulcer rarely presents with perforation peritonitis; gastric perforations are related to the widespread use of NSAIDs [14]. As seen in our study, 7.8 % patients have positive history of NSAIDs. Perforation is a rare complication of gastric carcinoma, accounting for less than 1 %. Perforated gastric ulcer has high incidence of malignancy [15]. As seen in our study, out of 9 gastric perforations 1 was malignant.

Table 3 Postoperative complications

S. No.	Complications	Numbers	Percentage (%)
1	Wound infection	15	19.5
2	Wound dehiscence	3	3.9
3	Respiratory complication	6	7.8
4	Septicemia	4	5.2
5	Abdominal collection	3	3.9
6	Anastomosis leak	3	3.9
7	Mortality	10	13.0

Causes of ileal perforations noticed in our study were tuberculosis and typhoid. Primary intestinal tuberculosis is uncommon in European and North American countries today [16]. Tuberculosis is a disease that can affect any part of the body at any age in eastern countries. The most common site of extrapulmonary tuberculosis is the ileocecal region and terminal ileum [17]. It can be fatal even in the young and fit [18]. Tubercular Ileal perforations present alone or in combination with cecum. Ileocecal tuberculosis presents as a mass in the right lower quadrant, or obstruction due to stricture in the ulcerative type of tuberculosis with perforation peritonitis [19]. The most common complication of small bowel tuberculosis was obstruction due to the narrowing of the lumen by hyperplastic ileocecal tuberculosis or stricture of small intestine and perforation in the ulcerative type of tuberculosis, which are commonly multiple [20, 21]. Management of tubercular perforation of ileum depends on the condition of the gut, general condition of the patient, and the number of perforation.

Ileocecal tuberculosis was managed by right hemicolectomy with or without stoma, perforation along with multiple stricture resection anastomosis with a covering stoma or only stoma [22, 23]. Typhoid enteric perforations were managed by either primary repair or only stoma, depending on the condition of the gut and general condition of the patient and also managed laparoscopically [24]. Primary repair of the typhoid perforation is a safe and effective treatment [25]; as seen in our study, 26 % patients were managed by primary repair.

Colorectal perforation is a rare cause of perforation peritonitis seen in 3.9 % patients. Malignancy is a rare cause of perforation peritonitis; in our setup, peritonitis due to malignancy was seen only in 2.6 % of cases as compared to the western counterpart [26, 27]. Perforation peritonitis has a high mortality rate. The overall mortality ranges between 6 and 27 % [9, 28]. High mortality depends on the site and cause of perforation. The death rate from perforated duodenal ulcer was 32.2 % and from perforated gastric ulcer was 20.1 % [12]. Different studies show the different mortality—gastric perforation 36 % [29], enteric perforation 17.7 % [30], and colorectal perforation 17.5 % [31]. Our mortality was comparatively low (13 %), might be due to the formation of only stoma in emergency in patients with serious illness and omentopexy in all patients present with gastroduodenal perforation due to acid-peptic disease. Factors contributing to the high mortality and postoperative complications are advanced age, late presentation, delay in the treatment, septicemia, and associated comorbidity. Respiratory complications are the known risk factors for the high mortality [32]. Relook laparotomies and intestinal stoma have a definite role to play in perforation peritonitis [33]; as seen in our study, 3.9 % patients went through redo surgery, intestinal stoma, and tension suturing. Factors contributing

to redo surgery were persistent septicemia due to abdominal collection, interloop abscess, anastomosis leakage, and burst abdomen.

Conclusion

In conclusion, the spectrum of perforation peritonitis in India continues to differ from western countries. Perforations are seen mostly in the small bowel rather than the large bowel. Majority of perforations are noticed in the duodenum due to acid-peptic disease and small bowel typhoid followed by small bowel tuberculosis. Majority of perforations in the large bowel are due to tuberculosis and perforated appendix. Malignancy was the least common cause of perforation peritonitis in our setup. Aggressive resuscitation and early minimum surgery are required to avoid the high morbidity and mortality. Major complications noticed are the wound infection and wound dehiscence. Overall mortality was 13 %.

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Competing Interests The authors declare that they have no competing interests.

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