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Original Research Article

Spectrum of gastrointestinal perforation peritonitis in 462 consecutive patients in tertiary care institute of North India

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ABSTRACT

Background: Gastrointestinal perforation is one of the common surgical emergencies in developing countries. The diagnosis is mainly clinical and is aided by radiological investigations. This study was designed to highlight the spectrum of hollow viscus perforation peritonitis in terms of etiology, clinical presentations, site of perforation, surgical treatment, postoperative complications, and mortality.
Methods: The study was a hospital‑based observational study and included 462 patients of perforation peritonitis (diffuse or localized) who were studied retrospectively in terms of cause, site of perforation, surgical treatment, complications, and mortality. Only those patients who underwent exploratory laparotomy for management of perforation peritonitis were included.
Results: Overall stomach was the most common site of perforation (33%). Ileum (26%) was the second common site of perforation. Duodenal perforations were seen in 88 (19%) cases whereas appendicular perforations were seen in 46 (10%) cases. Colonic perforations were least common. Acid peptic disease was the most common etiology of stomach perforations. Enteric fever (63%) was the most common etiology of jejuno-ileal perforation. Other causes include tuberculosis (23%), trauma (8%), malignancy (3%) and idiopathic in rest. Males were six times more commonly affected than females. Peak incidence was noted in the 2nd and 3rd decades of life.
Conclusions: Spectrum of perforation peritonitis cases in developing world is different from developed countries The Western literature suggests that foreign body, ischemia, radiotherapy, diverticula, and Crohn's disease are the main causes of perforations. In contrast to this, infection is the most common cause for perforations in developing countries.

Keywords: Perforation peritonitis, Small intestine, Peptic

INTRODUCTION

Gastrointestinal perforations constitute one of the commonest surgical emergencies encountered by surgeons.[1] Perforation peritonitis mostly results from the perforation of a diseased viscus. The spectrum of etiology of perforation is different between developing and developed countries.[2]The Western literature suggests that foreign body, ischemia, radiotherapy, diverticula, and Crohn's disease are the main causes of perforation, which are more commonly seen in elderly patients. In contrast to this, infection is the most common cause for perforations in developing countries. This includes acid peptic ulcer disease related to Helicobacter pylori infection, typhoid fever, and tuberculosis, which are quite common in young.[3,4] Despite of advancement of surgical techniques, antibiotic therapy and improved per and post-operative care, its management is complex and leads to high morbidity and mortality. Objective of this study is to highlight the spectrum of hollow viscus perforation peritonitis in terms of etiology, clinical presentations, site of perforation, surgical treatment, postoperative complications, and mortality.

METHODS

The retrospective study was conducted at the Department of General Surgery, Pt. B. D. Sharma Postgraduate Institute of Medical Sciences, Rohtak, Haryana and from 2014 to September 2020. The study population included 462 patients of perforation peritonitis (diffuse or localized) presenting to the surgical emergency, who underwent exploratory laparotomy. 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.

All the patients of suspected perforation peritonitis were resuscitated first and initial diagnosis was made on the basis of detailed history, physical finding and presence of pneumoperitoneum on erect abdominal X-ray. In all cases nasogastric tube was put for gastric aspiration. Urinary catheterization was done for monitoring urine output. Emergency investigations were done that included hemoglobin (Hb%), serum urea and electrolytes, random blood sugar and urine albumin and sugar. Ultrasound of abdomen was also done in all cases. On ultrasound presence of free fluid in peritoneal cavity, presences of specks of free air in peritoneal cavity are some of features suggestive of perforation peritonitis. In some of the cases, computed tomography (CT) abdomen was also done to confirm the diagnosis. After resuscitation, patients who were found fit for anaesthesia underwent exploratory laparotomy. On performing exploratory laparotomy, the operative findings were noted and the source of peritonitis was found. The operating surgeon decided the procedure to be performed. Peritoneal cavity was irrigated with warm normal saline. Intrabdominal drains were placed depending on peritoneal contamination and abdomen was closed after achieving complete hemostasis. All patients were then treated in the postoperative ward initially under the cover of parenteral broad spectrum antibiotics and fluids; orals were started on the appearance of bowel sounds. If a patient had complication, they were managed accordingly. All the patients were called for follow-up. Cases were studied with respect to clinical features at the time of presentation, comorbid conditions, radiological investigations, operative findings, and postoperative course. All statistical data were analysed using statistical package for the social sciences (SPSS) version 22.

Ethical consideration

This study was done after taking ethical approval from institutional ethics committee.

RESULTS

In this study 462 consecutive patients with perforation peritonitis were studied. Mean age was 38.32 years (range from 15 to 80 years). Majority of patients in our study were male 396 while there were 66 female patients. Male to female ratio was 6:1.

Table 1: Age and sex distribution of patients.

Age (years)	Sex		Total
	Male N (%)	Female N (%)	
<20	44 (73)	16 (27)	60
21-30	120 (90)	14 (10)	134
31-40	64 (84)	12 (16)	76
41-50	76 (90)	08 (10)	84
51-60	52 (87)	08 (13)	60
>60	40 (83)	08 (17)	48
Total	396	66	462

Values in parenthesis are percentages

Only 130 (28%) patients were presented within 24 hours of onset of symptoms, 162 (35%) patients presented between 24 to 72 hours and 170 (37%) patients presented 72 hours after the onset of symptoms. The clinical presentation of the patients varied according to the site of perforation (Table 2). The patient of duodenal-ulcer perforation usually had a short history of pain starting in epigastrium or upper abdomen along with generalized tenderness and guarding. The patients with small bowel perforation presented with prolonged history of fever followed by the appearance of pain in lower abdomen. Abdominal distention was found in 78% along with vomiting in 74% and non-passage of flatus and stool in 71% cases. 15% of the patients were in shock at the time of admission. Appendicular perforations had characteristic pain starting in the periumbilical area or right iliac fossa along with vomiting (74%) and fever (23%). They had localized guarding (77%) or rebound tenderness in right iliac fossa (68%). Per rectal digital examination showed tenderness in 54% cases.

Chest X-ray or X-ray flat plate abdomen showed free gas under diaphragm in a majority of perforations (76.2%), but the maximum proportion was found in acid peptic ulcer diseases (97%), followed by enteric (96.6%) and tubercular (90.5%). None of the patients of appendicular perforation showed evidence of gas under diaphragm on erect chest X-ray multiple air fluid levels in X-ray abdomen erect view suggesting the presence of obstruction in association with perforation were noticed in 24% patients. Dyselectrolytemia including hypokalemia and hyponatremia was seen in about one fourth patients. Raised blood urea was seen in about one third patients.

In our study, overall stomach was the most common site of perforation (33%). Ileum (26%) was the second common site of perforation. Duodenal perforations were seen in 88 (19%) cases whereas appendicular perforations were seen in 46 (10%) cases. Colonic perforations were least common.

Acid peptic disease was the most common etiology of stomach perforations. Enteric fever (63%) was the most common etiology of jejunoileal perforation. Other causes include tuberculosis (23%), trauma (8%), malignancy (3%) and idiopathic in rest (Table 3 and 4). A total of 36

patients had perforation in the appendix. Colonic perforation were least common among all types of perforations.

Table 2: Preoperative clinical parameters.

Parameters	N (%)
Duration of symptoms (hours)	
<24	130 (28)
24-72	162 (35)
>72	170 (37)
Symptoms	
Abdominal pain	453 (98)
Abdominal distension	360 (78)
Vomiting	342 (74)
Non passage of flatus/stool	328 (71)
Diarrhea	74 (16)
Signs	
Tachycardia (pulse rate >110)	379 (82)
Tachypnoea (respiratory rate >20/min)	296 (640)
Hypotension (SBP<90 mmHg)	69 (15)
Fever	97 (21)
Investigations	
Pneumoperitoneum on chest X-ray	268 (58)
Air fluid levels on abdominal X-ray	111 (24)
Abnormal electrolyte	106 (23)
Raised blood urea	148 (32)
Presence of metabolic acidosis in BGA	97 (21)

Values in parenthesis are percentages

Table 3: Sites of perforation.

Site	N (%)
Stomach	152 (33)
Duodenum	88 (19)
Jejunum	37 (08)
Ileum	120 (26)
Appendicular	46 (10)
Colonic	19 (04)

Values in parenthesis are percentages

Table 4: Etiology of perforations.

Parameters	N (%)
Gastroduodenal	
Acid peptic disease	140 (92)
Malignancy	12 (08)
Small bowel	
Typhoid	99 (63)
Tuberculosis	36 (23)
Traumatic	13 (08)
Malignancy	05 (03)
Idiopathic	04 (03)
Large bowel	
Trauma	06 (33)
Malignancy	12 (67)

Values in parenthesis are percentages

In the study, a variety of operative procedures were performed depending on the patients' general condition, peritoneal contamination, site of perforation, gut viability, and surgeons' decision. The most commonly executed operative procedure was the Graham's omental patch repair 240 (52%). Simple closure of perforation either in a single or in a double layer was done in 55 (12%) cases. Resection anastomosis was done in 32 (07%) patients. Stoma surgery had to be performed in 72 (16%) patients.

In the study population, the most commonly observed post-operative complication was lung infection in 148 (32%) patients followed by wound infection in 130 (28%) patients (Table 5). In our study, the overall morbidity rate was 42.8% (198 patients) and the mortality rate was 8% (37 patients). The mean hospital stay was 8.8 days with a standard deviation of 3.74 days. The maximum duration of stay was 39 days (Table 5).

Table 5: Post-operative complications.

Complications	N (%)
Pneumonia	148 (32)
Wound infection	130 (28)
Abdominal collection	42 (9)
Septicemia	83 (18)
Acute renal failure	46 (10)
Burst abdomen	83 (18)
Anastomotic leak	55 (12)
Mortality	37 (8)

Values in parenthesis are percentages

DISCUSSION

Perforation peritonitis is one of the most common surgical emergencies in developing countries like India.[1] In our study mean age was 38.32 years. This finding is consistent with various other Indian studies but is in contrast to studies in the Western countries where perforation primarily occurs in the elderly.[2,3] This is related due to the difference in the etiology of perforation peritonitis. The Western literature suggests that foreign body, ischemia, radiotherapy, diverticula, and Crohn's disease are the main causes of perforation, which are more commonly seen in elderly patients.[4,5] In contrast to this, infection is the most common cause for perforations in developing countries. This includes acid peptic ulcer disease related to *Helicobacter pylori* infection, typhoid fever, and tuberculosis, which are quite common in young.[6] Majority of the patients were male, this is accordance with other studies related to perforation peritonitis showing a male preponderance, although the male to female ratio varies from 1.34:1 to 7:1. Possible explanation for this finding may be smoking and alcohol intake, which is more frequent among men, thus increasing the risk of perforation. In majority of the cases, the presentation to the hospital was late (>24 hours) with well-established generalized peritonitis. Most common presenting symptom was abdominal pain (98%) followed by

abdominal distension (78%) and vomiting with non-passage of flatus and stool (71%). Diarrhea was significantly more common in appendicular type, while fever was significantly more commonly observed in appendicular and enteric perforations. Pain abdomen was the universal presenting symptom in other studies on perforation.[2,4] Jhobta et al found abdominal pain in 98%, while Afridi et al reported a similar history in 78% patients.[5,6]

More commonly the perforations involve the proximal part of the gastrointestinal tract (about 60%) this being in contrast to studies from the western countries, where perforations are common in the distal part.[7] In our study stomach is the most common site of perforation; this is in contrast to various other Indian studies.[8,9] Probable explanation for this is that this study was done in northern part of India where smoking is a very common habit especially in males. Smoking has been associated with increased incidence of gastric ulcers. In small intestine perforation most common etiology was typhoid fever (63%) followed by tuberculosis (23%) and trauma (8%). This finding is consistent with some other Indian studies but in contrast to Western literature where infection contribute only 2-3% of perforations whereas around 15–20% cases are due to malignancy.[10,11] This shows that malignancy is not a common cause of perforation peritonitis in our setup as compared to our western counterparts.[12]

Lung infection was the most commonly observed postoperative complication followed by wound infection. Lung infection was significantly higher in proportion in malignant, tubercular, and peptic perforations. The higher incidence of wound infection may be because majority (38.51%) of patients presented late (>72 hours) to the hospital with well–established peritonitis and majority were older group.[13,14] Similar observations were made by Jhobta et al while Afridi et al found wound infection to be the most common complication in 42% patients.[5,6]

CONCLUSION

Perforation peritonitis is one of the commonest surgical emergencies encountered by general surgeon. The Western literature suggests that foreign body, ischemia, radiotherapy, diverticula, and Crohn's disease are the main causes of perforations. In contrast to this, infection is the most common cause for perforations in developing countries. This includes acid peptic ulcer disease related to *Helicobacter pylori* infection, typhoid fever, and tuberculosis. Peptic ulcer perforation, perforating appendicitis, typhoid, and tubercular perforations are the major causes of gastrointestinal perforations. The developing world has more perforation peritonitis cases involving the upper gastrointestinal tract, while the western world has a predominance of lower gastrointestinal tract perforations. Early surgical intervention under the cover of broad spectrum antibiotics preceded by adequate aggressive resuscitation and correction of electrolyte imbalances is imperative for good outcomes minimizing morbidity and mortality.

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