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Research Article
Prospective

A Prospective study on Gastrointestinal Perforation Peritonitis in Andhra Pradesh, India

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Introduction: Perforation is defined as an abnormal opening in a hollow organ or viscus. All over the world, perforation peritonitis is the most prevalent surgical emergency tackled and treated by a surgical team. The etiology leading to peritonitis in tropical countries shows a different spectrum from its western world. 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. **Methods:** The study was a prospective observational study conducted from March 2016 to March 2019 in the Department of General Surgery, Great Eastern Medical School and Hospital, Andhra Pradesh. A total of 320 patients with perforation peritonitis were included in the study and underwent exploratory laparotomy. **Results:** Out of 320 patients, there were 276 males (86.25%) and 44 females (13.75%). Duodenal perforation was the most common type (34.38%), which was mainly due to Acid peptic disease followed by Jejunal and Ileal perforations. Wound infection was the most common complication. The mortality rate was 8.44% (27 patients). **Conclusion:** Early diagnosis, resuscitation with fluids, and timely surgical intervention are the most important factors deciding the fate of the patient with perforation peritonitis.

Keywords: Perforation, Peritonitis, Laparotomy, Gastrointestinal, Andhra Pradesh

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Introduction

Generalized peritonitis as a result of gastrointestinal perforation is a common surgical emergency in India [1]. Despite advances in perioperative care, antimicrobial therapy, and intensive care support, perforation peritonitis still has high morbidity and mortality [2-3].

Perforation is defined as an abnormal opening in a hollow organ or viscus. It is derived from the Latin *perforatus*, meaning "to bore through."

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 wide-geographical variations; in western countries with a preponderance of lower gastrointestinal perforations as opposed to upper gastrointestinal perforations in developing countries [4,5].

The spectrum of etiology of perforation is different between developing and developed countries [6,7] and there are a paucity of data from India regarding its etiology, prognostic indicators, morbidity, and mortality patterns [8].

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 Great Eastern Medical School and Hospital, Andhra Pradesh.

Methods

Type of study and Study Setting: A hospital-based prospective study conducted in the Department of General Surgery, Great Eastern Medical School and Hospital, Srikakulam, Andhra Pradesh.

Duration of the study: ; March 2016 to March 2019

Sample Size: 320 cases who presented to the emergency department and received a diagnosis of perforation peritonitis.

Inclusion criteria: All cases found to have peritonitis as a result of perforation in any part of the gastrointestinal tract at the time of surgery were included in the study.

Exclusion criteria: Patients presenting with the esophagus, pancreaticobiliary tree, or genitourinary tract perforation or undergoing laparotomy for primary peritonitis, tertiary peritonitis (anastomotic leak and fecal fistula), or pancreatitis

Data collection and procedures: All patients were evaluated for their presentation to the surgeon, radiological/sonological investigations done, etiology of perforation, and site of perforation, postoperative morbidity, and mortality. After establishing the clinical diagnosis of peritonitis secondary to perforation, all patients were resuscitated and simultaneously prepared for surgery after preoperative antibiotic prophylaxis with a broad-spectrum drug.

All patients underwent emergency exploratory laparotomy. After opening the abdomen, the source of peritonitis was located and controlled, with an adequate procedure. The abdomen was washed with 5 to 8 liters of warm normal saline, drains were placed in the general peritoneal cavity, and the abdomen closed with non-absorbable number 1 suture.

All Patients were followed in the postoperative ward or ICU (intensive care unit) with the cover of broad-spectrum antibiotics along with fluid and electrolyte balance.

Statistical analysis: All data related to the patient from admission to discharge was collected in a proforma after taking written consent. Data were analyzed using SPSS software version 17, and values are presented in numbers and percentages.

Results

There was a total of 276 male (86.25%) and 44 female (13.75%) patients in the present study (Table 1). In the present study, all the patients had pain abdomen (100%), followed by abdomen distension (93.75%), constipation (90.63%) and vomiting was present in 26.25% of cases (Table 2).

According to the site, gastric and prepyloric perforations comprised (18.13%) cases, while duodenal perforation was the most common type (34.38%) (Table 4), which were mainly due to Acid peptic disease (48.75%), Jejunal and Ileal perforations (33.45%) were due to typhoid, tuberculosis, and trauma. Appendicular perforations (11.25%) were the result of Acute appendicitis and large bowel perforations can be due to Malignancy or trauma (Table 4).

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 [Table 3].

The most commonly executed operative procedure was the simple closure of perforation either in a single or in a double layer in 65.3% of cases (Table 5).

In the present series, wound infection was the most common complication in 88 (27.5%), followed by pulmonary complications in 74 (23.13%), wound dehiscence in 26 cases (8.13%).

Electrolyte imbalances were seen in 10.63% of cases. Postoperative leak seen in 11 cases. In the present study, the mortality rate was 8.44% (27 patients). Mortality was more in patients of 61-80 years of age (Table 6).

Table 1: Gender distribution.

Gender	No. of patients	Percentage (%)
Male	276	86.25
Female	44	13.75
Total	320	100

Table 2: Chief complaints.

Complaint	No. of patients	Percentage (%)
Pain in abdomen	320	100
Abdominal distension	300	93.75
Constipation	290	90.63
Vomiting	84	26.25
Diarrhoea	8	2.5
Fever	132	41.25

Table 3: Cause of perforation.

Cause	No. of patients	Percentage (%)
Acid peptic disease	156	48.75
Appendicitis	34	10.63
Typhoid	39	12.19
Tuberculosis	35	10.94
Trauma	41	12.81
Malignancy	4	1.25
Strangulation of bowel	11	3.44

Table 4: Site of perforation.

Site	No. of patients	Percentage (%)
Gastric and prepyloric	58	18.13
Duodenum	110	34.38
Jejunum	15	4.68
Ileum	92	28.75
Appendix	36	11.25
Colon and rectum	9	2.81

Table 5: Operative procedure performed.

Operative procedure	No. of patients	Percentage (%)
Simple closure*	209	65.3
Stoma formation**	46	14.38
Appendectomy	36	11.25
Resection anastomosis	19	5.94
Definitive procedure***	10	3.13
Total	320	100

*Simple closure: Simple closure with or without omental patch/FJ/GJ,

**Stoma formation: Simple closure/resection anastomosis with diversion ileostomy/colostomy/resection with end stoma with distal mucous fistula/exteriorization of perforation as stoma,

***Definitive procedure: Billroth type I/II, right/left hemicolectomy, pancreaticoduodenectomy with GJ/FJ/HJ/PJ. FJ: Feeding jejunostomy, GJ: Gastrojejunostomy, HJ: Hepaticojejunostomy, PJ: Pancraticojejunostomy

Table 6: Complications.

Complication	No. of patients	Percentage (%)
Wound infection	88	27.5
Respiratory complications	74	23.13
Dyselectrolytaemia	34	10.63
Abdominal collection	21	6.56
Wound dehiscence	26	8.13
Leak	11	3.43
Mortality	27	8.44

Discussion

In the present study among 320 patients, 86.25% (276) of them were males and 13.75% (44) of them were females. All types of perforation occurred more frequently in male patients. All studies related to perforation peritonitis show a male preponderance, although the male-to-female ratio varies from 1.34:1 to 7:1 [2,7,9-12]. A possible reason for this finding may be smoking and alcohol intake, which is more frequent among men, thus increasing the risk of perforation.

In all types of perforations, patients were reported more in the <50 years' age group except in the malignant type of perforation where it was more in >50 years' age group. Similar observations were found by Jhobta et al [7] Gupta et al [11] and Ramakrishnaiah et al [12]. This finding is in contrast to studies in the Western countries where perforation primarily occurs in the elderly [13].

This is related due to the difference in the etiology. The Western literature suggests that foreign body, ischemia, radiotherapy, diverticula, Crohn's disease, etc. are the main causes of perforation, which are more commonly seen in elderly patients.

In contrast to this, infection is the most common cause of perforations in developing countries. This includes acid peptic ulcer disease related to *Helicobacter pylori* infection, typhoid fever, and tuberculosis, which are quite common in the young [9,14-16].

Abdominal pain was noted in all patients presenting with perforation followed by distension in 93.75% and constipation in 90.63%. Vomiting was significantly more common in appendicular and strangulation type. Diarrhea was significantly more common in the 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 [11,12], Jhobta et al [7] found abdominal pain in 98%, while Afridi et al [17] reported a similar history in 78% of patients. Clinical presentation of the patients varied according to the site and cause of perforation.

According to personal history, in the present study, NSAID usage was observed more in strangulation type, acid peptic ulcer disease, and enteric perforation patients. Higher NSAID intake in peptic ulcer diseases is for treatment of some other pain, while in enteric fever, it was for management of fever.

The proportion of the patients who had a history of chronic smoking was more in peptic perforation followed by strangulation. Alcohol users were more exposed to the traumatic type of perforation because of the higher risk of road traffic accidents and assaults. All these findings were found significant.

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

The most commonly executed operative procedure was simple closure in 65.3% cases of the perforation, resection anastomosis in 5.94%, stoma in 14.38%, appendicectomy in 11.25%, and definitive procedure in 3.13%.

Similar observations were noted by Jhobta et al [7] with simple closure being the most commonly executed operative procedure in 60% of patients.

In the present study, Wound infection was the most commonly observed postoperative complication followed by a Lung infection. Similar observations were made by Afridi et al [17] while Jhobta et al [7] found Lung infection to be the most common complication.

In the present study, the mortality rate was 8.44% (27 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 [18,19].

Conclusion

Peptic ulcer disease leading to perforation, perforated appendicitis, typhoid, and tubercular perforations are the commonest causes of gastrointestinal perforations.

What does the study add to the existing knowledge

Early diagnosis, resuscitation with fluids, and timely surgical intervention are the most important factors deciding the fate of the patient with perforation peritonitis.

Author's contribution

Dr. G. Someswara Rao: Concept, study design

Dr. B. Visweswara Rao: Manuscript preparation

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