

A Clinical Study of the Spectrum of Gastrointestinal Perforations

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Abstract

Background: One of the most frequent acute abdominal crises in surgical clinics is intestinal tract perforation. Gastrointestinal tract perforations manifest clinically in a variety of ways, ranging from the typical severe acute abdominal pain at one extreme to mild or no symptoms in hospitalized patients with unrelated illnesses. The current study aimed to evaluate causes, signs and symptoms, management, and possible complications which develop in gastrointestinal perforations.

Methods: Based on the inclusion and exclusion criteria patients were selected and the demographic profile of the selected patients was collected based on pre-designed proforma which included the age, sex, and associated illnesses if any were recorded. The time interval between the admission and the time of intervention was also noted. Investigations were conducted, including those involving blood urea, blood sugar, serum creatinine, serum electrolytes, chest x-ray, blood grouping, x-ray abdomen, and another testing as needed.

Results: The commonest complaint by the cases in the study was abdominal pain in 100% of cases followed by vomiting in 80% of cases and distension of the abdomen was reported in 48.89% of cases fever in 35.56% of cases and constipation in 31.11% of cases. Among the site of perforations identified intraoperatively 46.67% cases of duodenal ulcer perforations were present. Followed by Gastric perforation in 13.33% of cases. Ileal perforations were seen in 11.11% of cases appendicular perforations in 4.44% of cases. All duodenal perforations were repaired using an omental patch, ileal perforations were closed primarily in a plane perpendicular to the lumen, and perforation axis resection and anastomosis were performed in cases of large perforations.

Conclusion: Duodenal ulcer perforation was the commonest cause of gastrointestinal perforation with a male preponderance. More common in the fourth and fifth decades of life. Alcohol and smoking were aggravating factors. The role of nonsteroidal anti-inflammatory drugs as the cause of perforation was little in this study group. Radiological evidence of pneumoperitoneum could not be established in nearly one-fourth of the patients. Simple closure with an omental patch with thorough peritoneal toileting was very much effective.

Keywords: Gastrointestinal perforation, Acid peptic disease, Peritonitis, Exploratory Laparotomy.

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Introduction

In India, perforation peritonitis is the most typical surgical emergency. Peritoneal treatment remains very demanding, challenging, and complex despite improvements in surgical methods, antimicrobial therapy, and critical care support. The range of perforation etiologies continues to diverge from those of western nations. [1] The majority of these perforations are emergencies that need to be identified quickly and treated surgically. [2] A larger part of the emergency workload is related to small intestinal, duodenal, and stomach perforations than to colonic perforations. [3-5] The most frequent causes in industrialized nations are diverticular disease and colonic cancer perforations, but infectious diseases like typhoid and appendicular perforations are more common in underdeveloped societies. Large intestine perforation is a disorder that can be deadly quickly and is brought on by sepsis from peritoneal infection with different enteric bacteria, both aerobic and anaerobic. The majority of intestinal perforation treatment is surgical repair of the perforation. Endoscopic, laparoscopic, and laparoscopic-assisted procedures are becoming widely used in place of traditional laparotomies. A duodenal ulcer can become perforated, allowing stomach and duodenal contents to leak into the peritoneal cavity and cause initial chemical peritonitis. Bacterial contamination of the peritoneal cavity may happen if gastroduodenal contents continue to leak. [6,7] The most frequent surgical emergency in India is peritonitis caused by the perforation of the gastrointestinal hollow viscus, and the illness spectrum there differs from that in the west. Enteric fever perforations are still common in India. Typhoid fever is endemic in India, especially among the poor. Medical management is effective in controlling typhoid fever before the perforation occurs. [8] The operational therapy of perforation is now limited to its complications due to the introduction of proton pump inhibitors and helicobacter pylori eradication in the

management of chronic peptic ulcer disease. Perforated duodenal ulcer, however, continues to be a serious and sometimes fatal consequence of chronic ulcer peptic illness. Despite improvements in surgical methods, antimicrobial treatment, and critical care support, peritonitis management remains extremely demanding, challenging, and complex. [7] This research was conducted to identify the etiological variables, clinical characteristics, age, and sex distribution, as well as the most prevalent types of perforations the management, and postoperative complications if any.

Material and Methods

This cross-sectional study was done in the Department of General Surgery, Prathima Institute of Medical Sciences, Naganoor, Karimnagar. Institutional Ethical approval was obtained for the study. Written consent was obtained from the participants of the study after explaining the nature of the study in the local language.

Inclusion criteria

1. Cases diagnosed with hollow viscus perforations clinically
2. Radiological confirmation of perforations
3. Males and Females
4. 20 years and above
5. Voluntarily willing to participate in the study

Exclusion criteria

1. Perforations due to malignancy.
2. Perforations of the esophagus.
3. Idiopathic causes of perforation.

The demographic profile of the selected patients was collected based on pre-designed proforma which included the age, sex, and associated illnesses if any were recorded. The time interval between the admission and the time of intervention was also noted. Investigations were conducted, including those involving blood urea, blood sugar, serum creatinine, serum electrolytes,

chest x-ray, blood grouping, x-ray abdomen, and another testing as needed. All of the patients who were admitted were revived using crystalloids, and after hemodynamic stability was attained and perforation was clinically confirmed, these patients had emergency laparotomies. By monitoring the bladder pressure, the intra-abdominal pressure was indirectly determined. Foley's catheter was used to catheterize the bladder. One needle was put close to the constricted urine drainage tube. It had two connections, one to the saline stand and the other to the manometer, on the three-way adapter. The saline solution is put inside the manometer. The bladder was injected with around 50ml of saline. The bladder catheter and manometer were then attached. The pressure in the bladder is shown by the manometer. The intra-abdominal pressure has a direct relationship with bladder pressure. To remove toxic fluid from patients who had had an acute shock, initial flank draining was performed. Once the patient's overall state had improved, perforation closure was performed. Preoperative antibiotics were given to all of the patients. During the laparotomy site of perforation, the degree of peritoneal

contamination was assessed. In all patients' bilateral flank drainage was kept irrespective of the degree of contamination. Postoperatively the patient was evaluated for the development of complications if any.

Statistical analysis: The data was collected and uploaded on an MS Excel spreadsheet and analyzed by SPSS version 22 (Chicago, IL, USA). Quantitative variables were expressed on mean and standard deviations and qualitative variables were expressed in proportions and percentages. The Chi-square test has been used to find the difference between two proportions.

Results

In this study based on the inclusion and exclusion criteria, n=45 cases were included out of which n=37(82.22%) were males and n=8(17.78%) were females. The age group of 41-50 years recorded the highest incidence of small bowel perforation in the patients studied with a maximum of 37.78% of cases. Out of all the cases, the age group 31 – 60 years had 84.44% of the cases. The mean age of the cases in the study was 47.56 ± 10.5 years. The detailed distribution of cases in the study is depicted in table 1.

Table 1: Age-wise and sex-wise distribution of the cases in the study

Age Group	Male	Female	Total (%)
21-30	2	0	2 (44.44)
31-40	8	1	9 (20.00)
41-50	10	2	12 (26.67)
51-60	14	3	17 (37.78)
61-70	3	1	4 (8.89)
71-80	0	1	1 (2.22)
Total	37	8	45 (100%)

About 88.89% of duodenal ulcers are associated with H. pylori infection. It is one of the most potent producers of urease. Hence it can be detected by urea breath test and Rapid urease assay. But this facility is not available in our set up and hence it cannot be detected as an association factor in this study. After H. pylori infection, ingestion of NSAIDs is the most common cause of peptic ulcer disease. NSAIDs are more prone to upper GI bleeding. In this

study, NSAIDs form an association with perforation in 11% of the patients studied. Alcohol and smoking increase the acid content in the stomach and impairs ulcer healing thereby resulting in duodenal ulcer and forming an association with the duodenal ulcer. In this study, Alcohol is associated with 56% of the patients studied, and smoking is associated with 33% of patients studied depicted in figure 1.

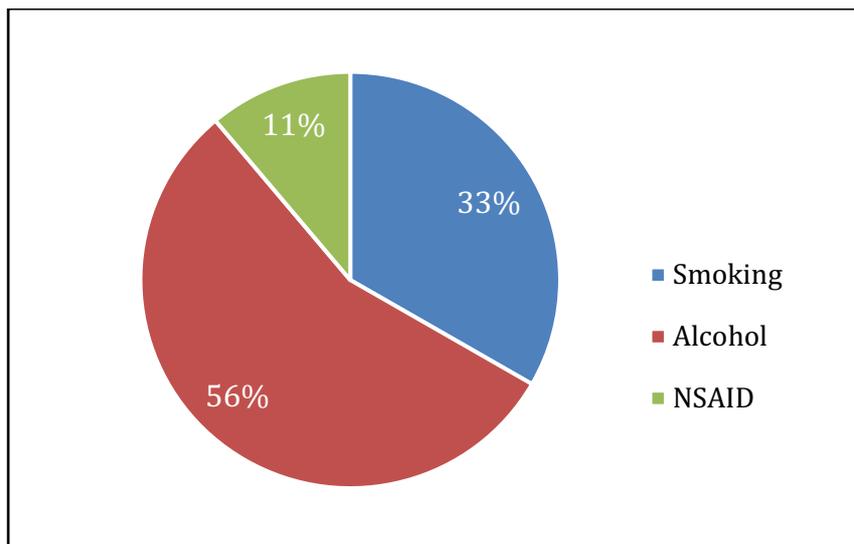


Figure 1: History associated with gastrointestinal perforations

The commonest complaint by the cases in the study was abdominal pain in 100% of cases followed by vomiting in 80% of cases and distension of the abdomen was reported in 48.89% of cases fever in 35.56% of cases and constipation in 31.11% of cases the distribution of symptoms is given in figure 2.

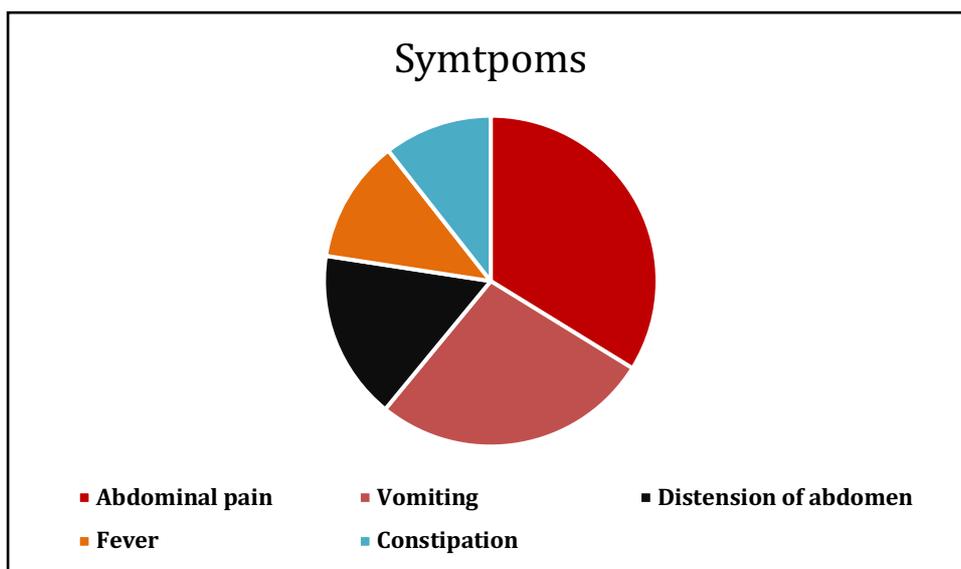


Figure 2: Symptoms of the patients included in the study

Among the site of perforations identified intraoperatively 46.67% cases of duodenal ulcer perforations were present. Followed by Gastric perforation in 13.33% of cases. Ileal perforations were seen in 11.11% of cases appendicular perforations in 4.44% of cases and 2.22% of cases were unknown perforations depicted in figure 3.

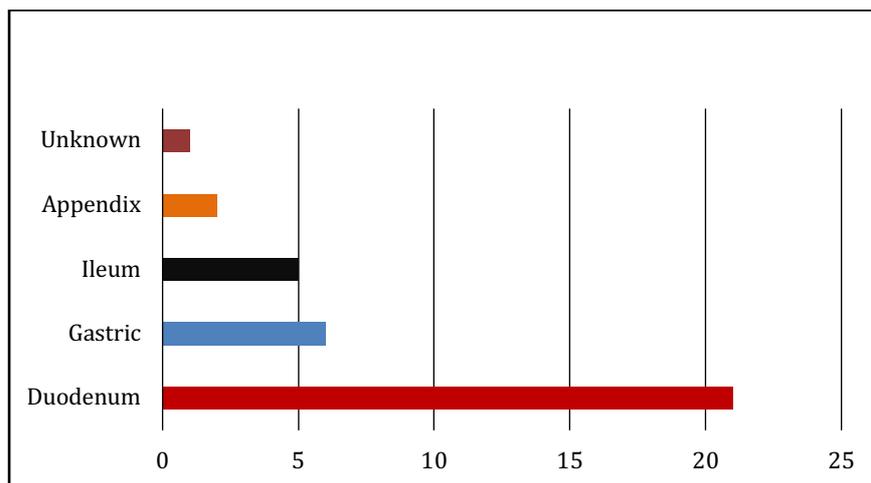


Figure 3: Sites of perforation in the cases of the study

Among the causes of small bowel perforation in this study duodenal ulcer perforations were seen in 46.67% of cases. Typhoid ileal perforations in all the n=5(11.11%) cases. The cases with death in the study out of n=45 cases n=3(6.67%) cases death occurred and n=2 cases occurred due to septicemia with Diabetes Mellitus, n=1 cases due to post-operative cardiac arrest. Among the cases where the death occurred n=2 cases had Intra-abdominal pressure of > 30 cm and n=1 case had abdominal pressure of 25 – 27 cm.

All duodenal perforations were repaired using an omental patch, except one patient who was treated conservatively since he had a sealed perforation and was hemodynamically stable, as demonstrated by a CECT abdomen and urograffin exam. Gastric prepyloric perforations were closed by an omental patch. In cases of ileal perforations all were closed primarily in a plane perpendicular to the lumen and perforation axis resection and anastomosis were performed in cases of large perforations. The rate of complications is depicted in table 4.

Table 4: Rate of complications in the cases of the study

Complications	Frequency (%)
Surgical site infection	5 (11.11)
Residual abscess	1 (2.22)
Respiratory tract infection	1 (2.22)
Enteric fistula	1 (2.22)
Death	3 (6.67%)

Discussion

The current study tried to explain several tertiary-level elements that contribute to gastrointestinal perforation. In contrast to western research, where the mean age is between 45 and 60 years, perforation peritonitis is a surgical emergency that is regularly observed in tropical nations like India. It typically affects young men in the prime of their lives. The mean age in this research was 47.56 ± 10.5 years, which is comparable to previous studies done in this

field. [9,10] In our investigation, we observed a predominance of males n=37(82.22%). The most important form of presentation in our study was abdominal pain in 100% of cases. Vomiting was the next common form of presentation found in 80% of cases, distension of the abdomen was reported in 48.89% of cases, fever in 35.56% of cases, and constipation in 31.11% of cases. Similar observations were made by AM Ghooi et al., [11] and Desa et al., [12] in their studies. In this study alcoholism and smoking were the major

factors for the risk of perforation. P Devi et al., [13] and LN Meena et al., [14] have shown that NSAID misuse is commonly associated with perforations. The study from the USA on 430 patients with perforations revealed nearly 50% of the cases were due to trauma, this shows trauma is an important causative factor in developed nations. [15] In most of the cases, 75.55% in the study presented with abdominal pain within 24 hours of the onset of symptoms. 17.78% presented after 24 hours of the onset of the symptoms and 4.44% presented later than 48 hours. It was observed in this study that the patients who presented within 24 hours of the onset of pain and the course of preparation of patients were less than 12 hours post admission the intraoperative difficulty was lesser and the operative field was found to be clear. [16] The postoperative phase was very uncomplicated for the patients who arrived within 24 hours, and their recovery and morbidity were both quick and low in comparison. Because most patients had a pre-existing acid peptic illness, the gastroduodenal region was the most frequently perforated area. There was an anterior perforation in all instances. In this investigation, posterior perforation was not seen. However, it is crucial to be aware of this dangerous illness since the timely and comprehensive surgical examination, drainage, and, when necessary, final surgery, offer patients the best chance for life. The emergence of H. pylori eradication medication and the availability of efficient medicinal treatments for acid peptic illness had eliminated the need for definitive surgery at the time of perforation closure. In most Hospitals, open surgery is still the preferred form of care. Although the laparoscopic approach enables perforation closure, it does not allow for enough lavage of all quadrants to completely eradicate all peritonitis aftereffects. For early instances, minimal access surgery may be helpful. All the patients in the current study underwent open surgery.

Conclusion

Duodenal ulcer perforation was the commonest cause of gastrointestinal perforation with a male preponderance. More common in the fourth and fifth decades of life. Alcohol and smoking were aggravating factors. The role of nonsteroidal anti-inflammatory drugs as the cause of perforation was little in this study group. Radiological evidence of pneumoperitoneum could not be established in nearly one-fourth of the patients. Simple closure with an omental patch with thorough peritoneal toileting was very much effective.

References

1. Dorairajan LN, Gupta S, Deo SVS, Chumber S, Sharma L. Peritonitis in India-A decades experience. *Tropical Gastroenterology*. 1995; 16:33–38.
2. Yeung KV, Change MS, Hasio CP, Huang JF. CT evaluation of gastrointestinal tract perforation. *Clin Imaging* 28: 329-333.
3. Nair SK, Singhal VS, Sudhir Kumar. Non-traumatic intestinal perforation. *Ind J Surg* 1981;43(5):371- 378.
4. Munro A. Perforated peptic ulcer in emergency abdominal surgery. Jones Peter F, Krukowski Zygmunt H, Youngson George G. Ed, Chapman and Hall Medical 3rd edn:1998; p. 163-176.
5. Jordan Paul H, Charles Morrow. A perforated peptic ulcer in abdomen. *The Surgical Clinics of North America* 1988;68(2):316-331.
6. Siu WT, Chau CH, Law BK, Tang CN, Ha PY, et al. Routine use of laparoscopic repair for perforated peptic ulcer. *Br J Surg* 2004; 91: 481-484.
7. Hainaux B, Agneessens E, Bertinotti R, De Maertelaer V, Rubesova E, et al. Accuracy of MDCT in predicting the site of gastrointestinal tract perforation. *AJR Am J Roentgenole* 2006; 187: 1179-1183.
8. Jhobta RS, Attri AK, Kaushik R, Sharma R, Jhobta A. Spectrum of perforation peritonitis in India-review of

- 504 consecutive cases. *World J Emerg Surg.* 2006 Sep 5; 1:26.
9. Dandapat MC, Mukherjee LM, Mishra SB, Howlader PC. Gastro Intestinal perforations. *Indian J Surg.*1999; 53: 189-93.
 10. Shah HK, Trivedi VD: Peritonitis- Study of 110 cases. *Indian Practitioner* .1988;41:855-60.
 11. Ghooi AM, Punjwani S. Acute abdominal emergencies: Clinical over view. *Ind J Surg* 1978; 140: 182-189.
 12. Desa LA, Mehta SJ, Nandkarni KM, Bhalerao RA. Peritonitis: A study of factors contributing to mortality. *Ind J Surg* 1983; 593-604.
 13. Devi PS, Manikantan G, Chishti M. Gastrointestinal perforation: a tertiary care center experience. *Int surgery J.* 20 17;4(2):709-13.
 14. Meena LN, Jain S, Bajiya P. Gastrointestinal perforation peritonitis in India: A study of 442 cases. *Saudi Surg J* 2017; 5:116-21.
 15. Noon GP, Beall AC, Jordan GL. Clinical evaluation of peritoneal irrigation with antibiotic solution. *Surgery.* 1967; 67:73.