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Original Research Article

Observational study of small bowel perforation in a tertiary care hospital

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ABSTRACT

Background: Perforation of the small intestine causing peritonitis is the most common abdominal surgical emergency encountered in study region. Late presentations with sepsis and septic shock makes evaluation and management of these patients a formidable surgical challenge. The aim of this study was to identify the etiologies, clinical presentation, diagnostic dilemmas and modalities of treatment of the small bowel perforation of diverse etiology in this study region. Objective was to study the demography, etiology, pathology, clinical presentation and various surgical procedures in treatment of small bowel perforation in hospital.
Methods: This study was a prospective observational study conducted in the department of general surgery Rohilkhand medical college Bareilly, Uttar Pradesh, India from November 2015 to December 2016. 90 patients admitted in the emergency of this hospital who eventually turned out to be those of small bowel perforation were included in this study and an analysis of the demographic data, clinical presentations, radiological findings, site of perforation, surgical procedure performed, surgical complications and duration of hospital stay was done.
Results: Duodenal perforation was the commonest cause of small bowel perforation, contributing to 51 (56.66%) patients. Peptic ulcer disease accounted for 49 (96.07%) patients and blunt trauma abdomen for 2 (3.9%) of these patients. Jejunal perforations accounted for 9 (10%) patients and ileal perforations for 30 (33.34%) patients. Typhoid fever was the commonest cause of ileal perforation in 24 (80%) patients Blunt trauma abdomen was the commonest cause in 5 (55.55%) patients of jejunal perforations.
Conclusions: Indiscriminate use of NSAIDS/Steroids accounted for most of the peptic ulcer perforation in our region. The other additive factors include alcohol consumption and smoking.

Keywords: Exploratory laparotomy, Pneumoperitoneum, Small bowel perforations

INTRODUCTION

Perforation of the small intestine causing peritonitis is one of the most common abdominal surgical emergencies encountered in our region. Small bowel perforations are broadly classified into traumatic and spontaneous. Traumatic injuries are either blunt or penetrating. Blunt traumatic small bowel perforations include those caused by falls, blow from animals or blunt objects, bicycle handlebar injuries and motor vehicle accidents.[1] Stab wounds, bullet injuries, ingested foreign bodies (e.g., fishbone, needles, safety pins, magnets), endoscopic studies, ERCP with papillotomy, laparoscopy, laparoscopic cholecystectomy, are the common causes for penetrating small bowel perforations. The cause of spontaneous perforation in the duodenum include peptic ulcer disease due to *H. pylori* infection, chronic NSAIDS ingestion, chronic alcohol intake, cigarette smoking.[2]

The causes of spontaneous perforation in the ileum includes infectious diseases like enteric fever, tuberculosis, roundworm infestation, Meckel's diverticulum, radiation enteritis, Crohn's disease and malignancies like lymphoma, adenocarcinoma and melanoma.

In developing countries like India enteric fever is endemic due to low socioeconomic conditions, poor sanitation and poor personal hygiene. It is one of the most common cause of ileal perforation which occurs in the second and third week of illness.[3]This study has been undertaken to find out the age incidence, sex incidence, etiological factors, pathology, clinical features, diagnostic dilemmas and various surgical procedures required to treat small bowel perforations in our setup.

METHODS

This was Prospective observational study conducted in the department of general surgery Rohilkhand medical college and hospital on 90 adult patients admitted from the casualty and outpatient departments, who eventually turn out to have small bowel perforation during the period November 2015 to December 2016. All patient underwent exploratory laparotomy after routine hematological and radiological investigations.

RESULTS

Out of 90 patients, 73 (81.11%) of the patients were males and 17 (18.89%) were females with age groups ranging from 10 to 80 years with peak incidence between 21-30 years of age group (Table 1).

Table 1: Age and sex distribution (n = 90).

Age group (in years)	Male	Female	Total	Percentage
1- 10	0	0	0	0
11-20	12	2	14	15.55%
21-30	24	6	30	33.33%
31-40	11	7	18	20%
41-50	15	2	17	18.88%
51-60	5	0	5	5.5%
61-70	5	0	5	5.5%
71-80	1	0	1	1.11%
Total	73	17	90	100%

Mean ±SD = 34.37±13.76.

Table 2: Distribution of various symptoms.

Symptoms	Frequency	Percentage
Abdominal pain	90	100%
Fever	30	33.33%
Vomiting	35	38.88%
Constipation	30	33.33%
Abdominal distension	85	94.44%

Abdominal pain 90 (100%) patients and abdominal distension 85 (94.44%) patients were the commonest presenting symptoms in patients (Table 2).

Abdominal tenderness 90 (100%) patients, dullness over the abdominal flank 80 (88.88%) and sluggish or absent bowel sounds 78 (86.66%) patients were the commonest presenting signs on clinical examination (Table 3).

Table 3: Distribution of various signs.

Signs	Cases	Percentage
Tachycardia	75	83.33%
Pallor	20	22.22%
Tenderness/rebound tenderness	90	100 %
Guarding/rigidity	65	72.22%
Dullness over abdominal flank	80	88.88%
Bowel sounds absent or sluggish	78	86.66%
Obliteration of liver dullness	55	61.11%

Duodenal perforation was the commonest cause of small bowel perforation 51 patients (56.66%) were reported followed by ileal perforations 30 patients (33.34%). Jejunal perforations accounted only for 9 (10%) patients (Figure 1).

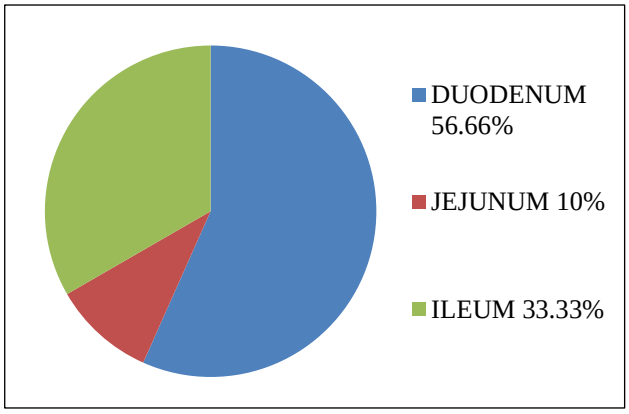


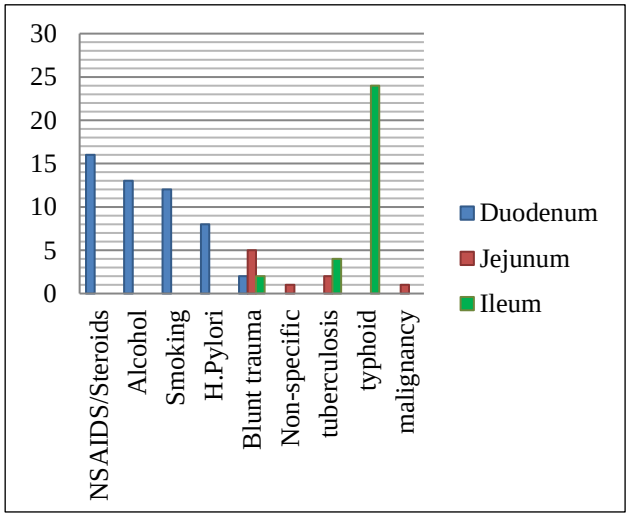
Figure 1: Anatomical distribution of site of perforation.

In duodenal perforation, peptic ulcer disease was the commonest cause, accounted for 49 (96.07%) patients followed by blunt trauma abdomen in 2 (3.9%) patients. The various etiologies for peptic ulcer disease were indiscriminate use of NSAIDS/steroids 16 (32.65%) patients followed by alcohol 13 (26.53%) patients, smoking 12 (24.48%) patients and H. pylori 8 (16.32%) patients.

In jejunal perforation, blunt trauma was the commonest cause in 5 (55.55%) patients, followed by abdominal tuberculosis 2 (22.22%) patients, malignancy 1 (11.11%) and non-specific inflammation in 1 (11.11%) patient. Ileal perforation accounted for 30 patients (33.34%) in which enteric fever perforation was the commonest accounting for 24 (80%) patients followed by tubercular

perforation 4 (13.33%) patients and blunt traumatic perforation in 2 (6.6%) patients (Figure 2).

Figure 2: Distribution of various etiologies of small bowel perforation.



Duration of illness in patients before operation varied from 1 to 5 days. Plain x-ray chest PA view and x-ray abdomen AP erect was diagnostic of pneumoperitoneum in 55 patients (61.11%) and on USG abdomen showing free fluid in 70 patients (77.77%). CECT Abdomen was carried out in 5(5.5%) patients of trauma to exclude associated injuries. 15 patients (16.66%) had bilateral pleural effusions, 8 (8.8%) were having HBsAg viral marker positive, 40 (44.44%) had leukocytosis by gram positive bacterial peritonitis and 8 (8.8%) patients had leukocytopenia signifying gram negative bacterial peritonitis.

All peptic ulcer perforations were seen in the anterior wall of the first part of duodenum, single in number, size less than 3 cm in diameter and were operated using the Cellan Jones omental patch repair. 2 cases of traumatic duodenal perforations due to blunt injury were in the anterior wall of the second part of duodenum, single in number, size 2 cm in diameter and they were operated by primary duodenorraphy.

In cases of jejunal perforation, 6 (66.66%) patients of blunt trauma and non-specific inflammation having minimal fecal peritoneal contamination simple primary repair was carried out and for 3 (33.33%) patients of tuberculosis and malignancy required segmental resection and anastomosis.

Ileal perforations were single in number and were present in the distal terminal part of ileum, in the anti-mesenteric border 15-20 cm from the ileo-ccal junction. Exteriorization of the ileum as loop ileostomy was done in all 24 (80%) patients of enteric perforation in the background of severe fecal peritoneal contamination. In 5 (16.66%) patients of tubercular etiology, single perforation was present just above the tubercular stricture, single in number and they were operated by segmental resection and anastomosis and 2 (6.6%) cases of blunt trauma leading to minimal fecal peritoneal contamination were operated by simple primary repair.

Wound dehiscence requiring secondary suturing was the commonest early post-operative complications seen in 18 (47.36%) patients, followed by surgical site infections 8 (21.05%) patients, respiratory infections 6 (15.78%) patients, fecal fistula 4 (10.52%) patients and paralytic ileus in 2 (5.2%) patients (Table no 4).

Table 4: Distribution of various post-operative complications.

Early complications	No. of cases	Percentage
Wound dehiscence	18	47.36%
Surgical site infection	8	21.05%
Respiratory infection	6	15.78%
Fecal fistula	4	10.52%
Paralytic ileus	2	5.2%

The total hospital stays ranged from 5-40 days, with mean of 22 days. There were 5 post-operative mortalities recorded in patients who presented late to us more than 72 hours from the time of perforation and all were present in patients of typhoid ileal perforation.

DISCUSSION

Small bowel perforations is one of the commonest surgical emergencies in developing nations especially in the rural areas. We have reported 90 patients of small bowel perforations. Most of the patients presented in the age group of 21-30 years with a male preponderance which is similar to that reported by Ansari AG et al in his study.[4] The mean age in current study was 34.37 years which was close to mean age of 33.72 years reported by Shah S and Gandhi JP and 36.3 years reported by Atamanalp et al.[5,6]

The most common site of small bowel perforation was duodenum 56.66% followed by ileum 33.34% and jejunum accounted for only 10% cases and the same was reported by Seth S and Agrawal KK, duodenum being the commonest site followed by ileum and jejunum in their study.[7] Abdominal pain and distension was the commonest presenting symptoms reported in our patients and the same being reported by Shrivastava D et al.[8] Abdominal tenderness, dullness over the abdominal flank and sluggish or absent bowel sounds were the commonest presenting signs on clinical examination reported in current study. Indiscriminate use of NSAID and steroids in villages accounted for the high incidence of the duodenal perforation (56.66%) in study series which is in sharp contrast to the decreasing trends of-29.9% in the western literature.[9] In current study the preponderance of peptic ulcer perforation in young population may be due

to life style pattern with increased stress, smoking habits, alcohol consumption and irregularity in meals.

Blunt abdominal trauma following road traffic accidents was one of the commonest cause of jejunal perforation in current study and the same was reported by Goudar BV et al.[10]

Typhoid ileal perforation was the commonest cause of ileal perforation in current study and tended to occur after the second and third week of illness and the same was observed by Mahapatra S et al in his study.[3] It is one of the most common infectious cause of small bowel perforation in developing countries like ours with poor basic sanitation and drinking water facilities.

Pneumoperitoneum on plain erect chest x-rays and abdominal x-rays was diagnostic of perforation in 61.11% cases which is similar to that reported by JP Singh et al (reported 50-70% cases in his study).[11] Ultrasonography of the abdomen which is highly operator dependent was diagnostic in 77.77% of cases which was close to 73.7% cases as reported by Hebber AK in his study.[12]

All patients underwent exploratory laparotomy within 6-10 hours of presenting in the emergency room after brief period of rehydration and correction of electrolyte imbalance which probably resulted in high survival rate.

Cellan Jones omental patch technique for duodenal perforations attributed to peptic ulcer disease for size upto 3 cm in diameter was the preferred procedure as it is a simple procedure and can be accomplished in a very short time and this same operative procedure was reported by Gupta S and Kaushik R in their operative study for management of duodenal perforation.[13] Primary duodenorrhaphy was performed in only two cases of blunt traumatic duodenal perforations resulting from the blows delivered by wild animals and both these perforations were in the anterior wall of the second part of duodenum having size up to 2 cm in diameter.

Exteriorization of the ileum as loop ileostomy was done in all patients of enteric perforation in current study and this procedure was considered much safer procedure in the background of severe fecal peritoneal contamination which significantly decreases the mortality as compared to other surgical procedure and the same was reported by Shah S and Gandhi JP in their study of the 'role of ileostomy in enteric perforation'.[14] In all patients of tubercular ileal perforation, segmental resection and anastomosis was done and this same procedure was reported by N.O. Aston and AM de Costa in their study of tubercular perforation of the small bowel..[15]

CONCLUSION

In our region, indiscriminate use NSAIDS/Steroids prescribed by the local practitioner and addiction to tobacco and alcohol by substantial number of rural people attributed to high incidence of peptic ulcer disease leading to duodenal perforation. Jejunal perforation following blunt abdominal trauma is the commonest presentation in road traffic accidents. The high rate of typhoid fever leading to perforation after 2nd week of illness have been attributed to the patients of low socioeconomic status having poor basic sanitation and poor drinking water facilities.

The etiological factors in our region is very different from that of western countries where the NSAIDS / steroids is in sharp contrast to the decreasing trends in this western world and typhoid fever is eliminated in these developed parts.

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