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RESEARCH ARTICLE

EVALUATION OF AETIOLOGY AND CLINICAL OUTCOME OF NONTRAUMATIC FREE PERFORATION OF SMALL BOWEL

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ABSTRACT

Free small bowel perforation is frequently encountered in surgical practice with "trauma" being the most common cause. However, there are many non-traumatic causes too with a wide range of clinical presentation that can confuse the clinician. The resultant delay in diagnosis and treatment may then prove fatal for the patient. An effort has thus been made to find out the most frequent aetiologies, different clinical presentations with their treatment options and outcome. A prospective study of 30 patients admitted with a clinical diagnosis of non-traumatic small gut perforation was carried out over a period of 18 months. Pain abdomen was the presenting complaint in all patients (100%) followed by fever (68%) and vomiting (28%).On examination, 100% had abdominal tenderness,64% had distension,52% had obliteration of liver dullness and only 13% had rigidity. Straight X-ray abdomen in erect posture revealed free gas under diaphragm in 72% of patients only. Most common site of perforation was at the ileum.Most common aetiology was tubercular pathology followed by enteric fever and nonspecific inflammation. Ileostomy of the pathological site was the most commonly performed surgery followed by primary closure and resection anastomosis. Most common postoperative complication was wound infection and mortality was found to be 20%.

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INTRODUCTION

Small bowel perforation, especially of the terminal ileum, is a common abdominal emergency faced in surgical practice and comprises a large number of emergency admissions. Free perforations of the small bowel most commonly result from external trauma, blunt, perforating or penetrating. However they may also occur without any external trauma and are designated "spontaneous or non-traumatic perforations" (Putzki *et al.,* 1985). These spontaneous perforations usually tend to occur in previously diseased gut. The various causes of spontaneous small bowel perforation have been studied and they have been found to vary between developed and developing countries. In developed settings, the common causes encountered are: foreign bodies, primary neoplasia, diverticula, adhesions etc. On the contrary, in developing countries typhoid ulcers, intestinal tuberculosis, parasitic diseases and obstructive aetiology are well known causes (Putzki *et al.,* 1985). The ileum has been found to be the commonest site of spontaneous perforation (Kim *et al.,* 1975) with the perforation occurring within 60 cm of ileocecal valve. The prominent complication of typhoid fever, gut perforation, is seen in 3rd week and ileum is the main site of perforation (Kim *et al.,* 1975). Perforation of small bowel is a cause of obscure peritonitis, heralded by exacerbation of abdominal pain and is associated with tenderness, rigidity and guarding. However, in many patients, in a severe toxic state, there may be obscured clinical features with resultant delays in diagnosis and adequate surgical intervention (Santillana, 1991). Majority of the patients present with sudden onset of abdominal pain. A high index of suspicion is essential for early diagnosis of hollow viscus perforation as significant mortality and morbidity results from diagnostic delay (Kapoor *et al.,* 1985). Prognosis of small bowel perforation depends on the time of presentation, adequate pre-operative resuscitation, perforation – operation interval, number of perforation and the extent of peritonitis. Surgery plays an important role in the management of perforations. There are many controversies regarding ideal surgical procedure. Although classical treatment is simple closure of the perforation, mortality and morbidity is very high. Primary ileostomy, repair of perforation with ileotransverse anastomosis should be considered in patients

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with multiple perforations, unhealthy gut due to edema and inflammation. This study is undertaken to find out the age and sex incidence, etiological factors, clinical features and various surgical procedures for gastro intestinal perforations, and its complications.

MATERIALS AND METHODS

The present study is an institution based prospective, observational study carried out in a tertiary care teaching hospital over a period of 18 months. The study included 30 patients admitted with a clinical diagnosis of perforative peritonitis with varying degree of shock and dehydration and undergone laparotomy, done by experienced surgeons and found to have free perforation. Patients with age less than 12 years, cases of duodenal perforation and cases with history of trauma were excluded. After initial evaluation of clinical findings and resuscitation all patients were screened with straight x-ray abdomen in erect posture and put for emergency laparotomy. Per operative pathological anatomy noted. Biopsy taken from perforation edge, resected specimen, mesenteric lymph node and peritoneum and sent for histo-pathological examination to find out the cause. Patients then undergone definitive operative procedure. Infective aetiologies were managed appropriately by proper chemotherapeutic agents. The overall outcome and complications were observed during the post-operative period.

RESULTS AND ANALYSIS

The age of the patients ranged from 14 years to 50 years. Mean age was 28.7 years. 36.67% were between 12-20 years, 20% between 21-30 years 33.33% were in the age group of 31-40 years and 10% were found to be elderly patients in the age group of 41-50 years. The incidence of nontraumatic small bowel perforation is more cmmom among males with a male: female ratio of 1.14:: 1. Pain abdomen was the commonest symptom (100%) followed by fever (66.67%). Pain abdomen and constipation was present in 19 patients (63.33%), while vomiting was present in 9 patients (30%) only.4 patients had diarrhea, 2 had melena and 7 patients gave history of anorexia and weight loss. Clinical examination revealed abdominal tenderness was present in all the patients (100%). Abdominal guarding and rigidity was present in 28 patients (93.33%).23 patients (76.67%) patients had absent peristaltic sound while in 19 patients (63.33%) there were abdominal distension and 14 (46.67%) had obliterated liver dullness. Mild to moderate dehydration was present in 27 patients (90%) 8 patients (26.67%) were in stage of shock at the time of admission they also have low urine output that was revealed on catheterization after admission. Investigation done in emergency was straight X-ray of abdomen, which revealed free gas under diaphragm in 20 patients (66.67%). Air-fluid levels were seen in 4 patients(13.33%) and 3(10%) had ground glass appearance.6 patients had USG at the time of admission which revealed free fluid in the peritoneal cavity 4 of them reported hollow viscus perforation. Widal test was done on 1st post-op day on 27 patients while 3 had report at the time of admission. Out of 30 patients 7(23.33%) showed a positive result.7 patients had total count more than 9000 in post-op period. Most of the patients (14-46.67%) had received operative intervention after 72 hours after the onset of acute symptoms.9 patients (30%) within 48-72 hours and 7 (23.33%) were operated within 24-48 hours. In this study 16 patients (53.33%) had fecal contamination of the peritoneal cavity, 7(23.33%) had seropurulent, 5(16.67%) had purulent and 2(6.67%) had bilious collection in the peritoneal cavity. Solitary perforation was noted in 23 patients (76.67%) while 5(16.67%) had double perforations and 2 patients had 3 or more perforations. The perforation was seen to be located throughout the small bowel ranging from 10 cm proximal to I-C (Ileo-Caecal) to 15 cm distal to D-J (Duodeno-Jejunal). Most common location found to be between 15-30 cm proximal to Ileo-Caecal junction seen in 17 cases (56.67%). Biopsy of the specimens obtained after laparotomy revealed tubercular perforation to be the most common cause.12 cases (40%) were diagnosed as tubercular perforation. 7 cases (23.33%) were due to typhoid perforation. Non-specific inflammation were reported in 5 cases (16.67%). While 3 cases (10%) were due to distal obstruction, 2 were reported to be Crohn's disease and in 1 case the histopathological report was Non-Hodgkin Lymphoma. The operative procedure performed were trimming of the perforation margin followed by primary closure in 5 cases (16.67%). Most commonly performed operation was ileostomy (18 cases-60%) followed by resection anastomosis (7 cases-23.33%). In the ileostomy group most commonly performed was loop ileostomy (10 out of 18 cases).

Age in years	Total	
	No	%
12-20	11	36,67%
21-30	6	20%
31-40	10	33.33%
41-50	3	10%
>50	0	0%

Fig. 1. Age distribution

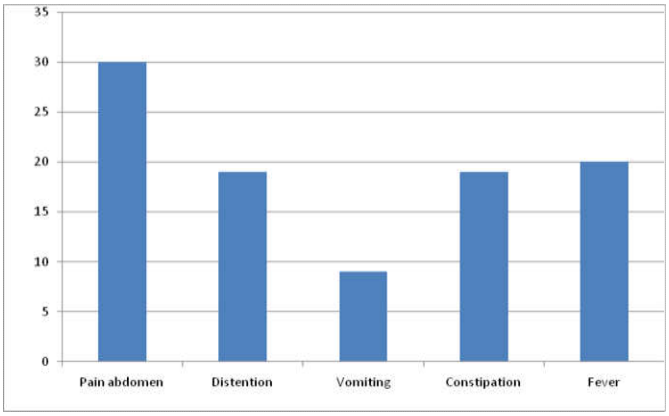
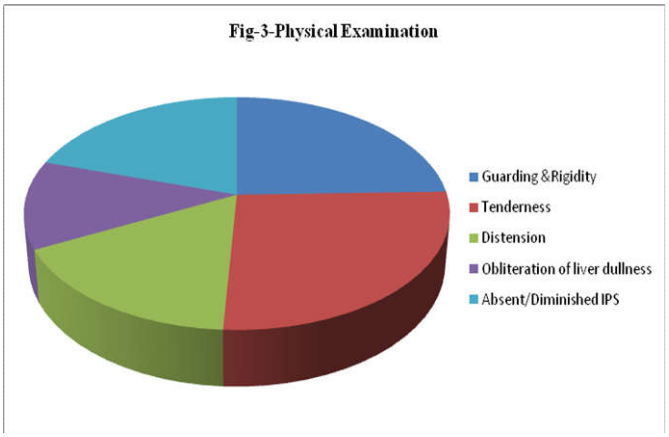


Fig. 2. Presenting Symptoms

The various complications encountered in this study were wound infection, burst abdomen, pulmonary complications, sepsis, intra-abdominal abscess and MODS (Multi Organ Dysfunction Syndrome). The overall complication rate was 76.67%.Wound infection was the most common complication (53.33%). The overall mortality rate was 16.67% (5 cases).Out of 5 cases 3cases (60%) were in the age group of 31-40 years and 1 each in the age group of 12-20 years and 21-30 years. In 4 out of 5 cases patient had received operative intervention >72 hrs after the onset of acute symptoms and the cause of

death was MODS due to sepsis in 4 cases and due to pulmonary complications in one case. The average hospital stay was 20.76 days. The development of complication was the cause for longer hospital stay.



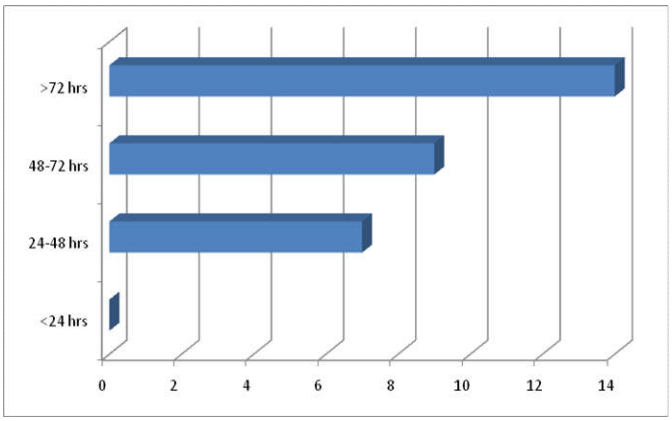
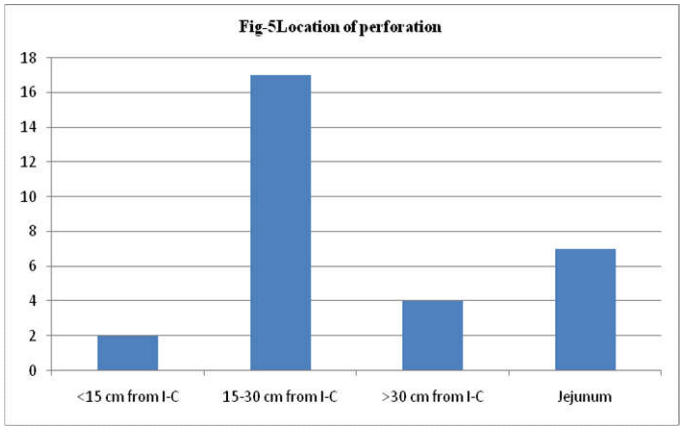


Fig. 4. Interval between onset of acute symptoms & operative intervention



Diagnosis	Number	%
Typhoid	7	23.33%
Tuberculosis	12	40%
Obstruction	3	10%
Ischaemia	0	0%
Crohn's Disease	2	6.67%
Radiation	0	0%
Malignant	1	3.33%
Nonspecific/Idiopathic	5	16.67%

Fig. 6. Post-op Diagnosis

Outcome	Number	%
Persistent Fever	6	20%
Wound Infection	16	53.33%
Burst Abdomen	5	16.67%
Entero - Cutaneous Fistula	0	0%
Intra Abdominal Abscess	1	3.33%
Pulmonary Complications	4	13.33%
Sepsis	6	20%
MODS	4	13.33%

Fig. 7. Outcome

Hospital stay	Number	%
5-10 days	5	16.67
11-20 days	11	36.67
21-30 days	10	33.33
>30 days	4	13.33

Fig. 8. Length of Hospital Stay

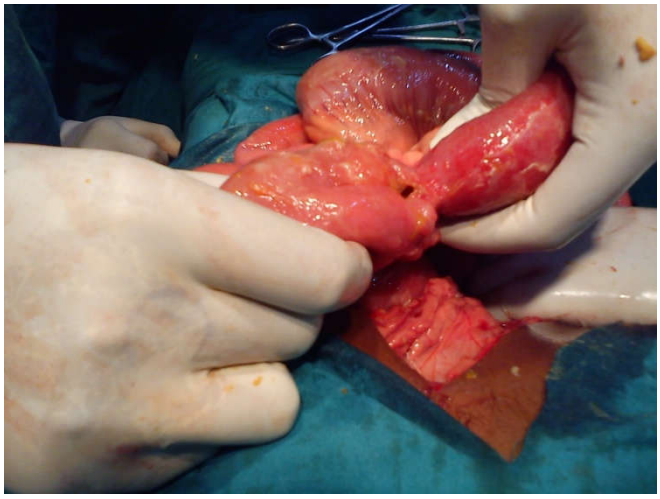


Fig.9. Perforation of jejunum with stricture

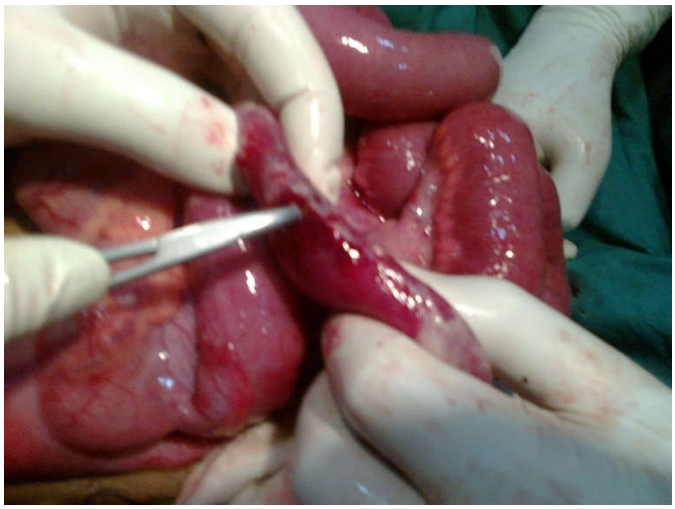


Fig.10. Enteric perforation of the ileum

DISCUSSION

Non traumatic small bowel perforation is still a common cause of obscure peritonitis. These cases often produces a diagnostic dilemma to the surgeons. Laparotomy is often carried out

suspecting a perforated appendicitis or a duodenal ulcer. The mean age in our study was higher than other studies (Nguyen *et al.,* 2004) as the children below 12 years were excluded from the study and causes other than typhoid perforations were considered. In our study male: female ratio is 1.14:: 1 which is comparable to other studies but the ratio is somewhat less (Agarwal, 1996; Nguyen *et al.,* 2004; Eggleston and Santoshi, 1979; Gibney, 1989; Askari and Shah, 1990; Talwar *et al.,* 1997). Pain abdomen was the commonest symptom (100%) among all the patients as shown in some studies followed by fever (66.67%). They also reported diarrhea and melena in 42% and 28% cases respectively, which in our study is 13.33% and 6.67%.In this study constipation was present in 63.33% cases which is slightly higher than what Gandhi *et al.* has reported (40%). Chouhan *et al.,* (1982) reported obliteration of liver dullness in 64.8% cases and silent abdomen in 68.3% patients. In our study it is found to be (46.67%) and (76.67%) respectively, whereas Gandhi *et al.* (Dhar, 1990) found absent bowel sound in 90% cases and obliterated liver dullness in 60% cases. Straight X-ray abdomen in erect posture revealed free gas under diaphragm in 20 patients (66.67%), which correspond available literature (Askari and Shah, 1990; Talwar *et al.,* 1997). Air-fluid levels were seen in 4 patients (13.33%) and 3 (10%) had ground glass appearance. Widal test is a non-specific serological test. However, in the endemic area it is usually taken as base for giving specific treatment. The antibody titre of more than 50 or raising titre on repeated occasion against O and H antigens are considered positive. In our study it was positive in 7 patients (23.33%). Chouhan *et al.,* (1982) and Rathore *et al.* reported 70.1% and 67.24% positive widal reports. The probable cause of low percentage of positive widal test in our study is that it was done in al cases irrespective of the presence or absence of fever and the duration of the fever. It was negative in those cases where perforation was due to causes other than typhoid. Almost half of the patients, 46.67% had received definitive operative intervention after 72 hours of onset of acute symptoms and none of them atteneded hospital within 24 hours of onset of acute symptoms. All the delays were pre-hospital. except 1 male patient, a known alcoholic who presented with features of acute onset pain in the epigastric region of one day and straight X-ray revealed no free gas under diaphragm. In this case our provisional diagnosis was acute pancreatitis and it was only the next day that an USG reported to be a case of suspected hollow viscus perforation and we operated upon the patient that very day and it came out as a case of double perforation of the terminal ileum. The pre-hospital delays were due to the fact that most of the cases came from remote areas where the medical facilities are scarce.

23 patients (76.67%) had solitary perforation which is almost similar to available literature (Kapoor *et al.,* 1985). The most common location was the terminal ileum ranging 15cm to 30 cm proximal to I-C junction which is corroborative of most of the previous studies. Histologically, the presence of mainly macrophages and lymphocytes and necrosis of Peyer's patches with ulceration of the intestinal mucosa is suggestive of typhoid perforation. Presence of Mallory cells at the site of perforationor in adjacent lymph nodes is confirmatory. Presence of caeseating granuloma in the background of inflammation and necrotic lymphnode is suggestive of tubercular perforation. Nonspecific inflammation of the terminal ileum was another predominant cause. In such cases, the pre and per-operative findings were similar to that of typhoid fever but no laboratory evidence of the disease was found. Worldwide the most common cause of non-traumatic small bowel perforation is typhoid fever (Keenan, 1984). In our study most common cause of perforation is tubercular perforation.This is probably due to reduction in typhoid fever by public measures such as provision of clean water supply, safe disposal of sewage and instruction in personal hygiene,the increased incidence of drug defaulter of tuberculosis and development of MDR tuberculosis. In our study the most commonly performed operation was ileostomy (18 cases-60%) followed by resection-anastomosis (7 cases-23.33%) and primary closure (5cases-16.67%).The optimal surgical procedure, however, has been a matter of debate (Keenan, 1984; Talwar *et al.,* 1997). Excision of the ulcer margins and primary closure is a simple and effective procedure which has been successfully used in various series (Bansali *et al*.). Complete exclusion of the repair by ileotransverse anastomosis (Keenan, 1984) or partial exclusion using a lateral tube ileostomy have been advocated to reduce the incidence of post-operative fistulae (Dhar, 1990, Agarwal, 1996). Neither procedure has been entirely successful in doing so and is moreover associated with a high mortality rate (Nguyen *et al*., 2004; Eggleston and Santoshi, 1979). Bowel resection has also been done previously. Resection is recommended (Askari and Shah 1990, Gibney, 1989) if three or more perforations are present. Keeping in view of the general condition of the patient extent of peritoneal contamination and surrounding gut condition maximum patient in our study has undergone ileostomy.

Outcome

The overall complication rate was 76.67%. The various complications were wound infection, burst abdomen, pulmonary complications, sepsis, intra-abdominal abscess and MODS. Wound infection was the most common complication (53.33%).The overall complication rate is bit higher in our study probably because of the late presentation and gross contamination of the peritoneal cavity as compared to various studies conducted (Dhar, 1990; Askari and Shah, 1990). Interestingly no patient in our study developed fecal fistula probably because a large number of patients has undergone ileostomy. There were five deaths (16.67%) in this study, which is far less than that reported (more than 50%) in various studies (Dickson and Cole, 1964; Eggleston and Santoshi, 1979) this may be due to less extensive and safer procedure like ileostomy was adopted in most of the cases. Complications were mostly observed in patients who had prolonged time interval between the development of acute symptoms and operative intervention and heavy feculent contamination of the peritoneal cavity and mortality is more in those who had severe toxemia in addition to the problems described above (Dhar, 1990; Welch and Martin, 1975). The average hospital stay was 20.76 days ranging from 5 days to 45 days. Akgun *et al.,* reported average hospital stay in their study was 12 days while Kouame *et al*., reported an average of 30 days (ranging from 8 to52 days) in their study. The development of complications was the main cause of longer hospital stay.

Conclusion

The study showed that the non-traumatic small bowel perforation is quite a common cause of obscure peritonitis in our setup. Most of the patients are teenagers followed closely by those in their thirties with a male preponderance. Commonest complaint was pain abdomen followed by fever, constipation and vomiting while abdominal tenderness, guarding and rigidity were the common finding on clinical examination. Straight X-ray abdomen though a very useful investigation in emergency set-up to find out any free gas under diaphragm, indicative of bowel perforation, it must be kept in mind that a negative finding does not exclude it. Mainly the terminal 15-30 cm of the small bowel is affected in the disease process and most of the perforations are solitary. If we consider the jejunum and ileum as a whole it is the tubercular perforation that is the commonest cause of this perforation followed by typhoid perforation and non-specific inflammation. Factors like delay in presentation, long perforation-operation interval and the extent of peritoneal contamination influence the outcome. Exteriorization of the unhealthy, diseased and perforated gut appears to be a safe procedure as far as the patient's survival and post-op complication is concerned. To conclude, the morbidity and mortality from non-traumatic small bowel perforation could be reduced by early patient presentation to the appropriate health care centre and prompt surgical intervention after proper resuscitation and none the less optimum post-op care.

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