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Original Research Article

Incidence and management of intestinal perforation in typhoid: a prospective, observational study

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ABSTRACT

Background: Intestinal perforation is a common surgical problem, which need proper attention. Typhoid is the most common cause of bowel perforation. With the concept of a correct diagnosis of perforation in reference to its etiology and further study of etiological factor (typhoid) in relation to epidemiology, surgical treatment and outcome, the present study has been undertaken.
Methods: It is a prospective, observational study in which 50 cases of enteric perforation admitting in SMS Hospital at JAIPUR were observed. All patients of enteric perforation peritonitis were evaluated by detailed history, clinical examination and radiological as well as laboratory investigations. After initial resuscitation patient were treated by operative procedures. Postoperatively progress report, morbidity and mortality data were observed.
Results: Mean age of patients was 26.38 years. Male to female ratio was 4:1. Enteric perforation is more common in patients with poor nutritional status and rural area. Primary repair of perforation was done in patient with small perforation with relatively healthy bowel, while ileostomy was done in patients with large perforation of longer duration, multiple perforations and edematous bowel with necrotic patches. Mortality was highest in patients who underwent primary repair and proximal loop ileostomy (33.3%) and lowest in patients in which exteriorization of the perforation as loop ileostomy was done (10.3%).
Conclusions: The time interval between occurrence of perforation and starting of specific therapy is the most important factor in deciding the ultimate outcome of the typhoid perforation patient and operative procedure is another important factor in deciding the outcome.

Keywords: Enteric fever, Enteric perforation, Intestinal perforation, Typhoid

INTRODUCTION

Intestinal perforation is a common surgical problem, which need proper attention. It stands fifth among the acute abdominal emergencies. It is essential to have a correct pre-operative etiological diagnosis because prognosis ultimate depends on the cause of the perforation. Typhoid is the most common cause of bowel perforation, which mainly affects the small intestine.[1] The commonest site of enteric perforation is terminal part of ileum. With the concept of a correct diagnosis of perforation in reference to its etiology and further study of etiological factor (typhoid) in relation to epidemiology, surgical treatment and outcome, the present study has been undertaken.

METHODS

The present prospective study was performed on 50 patients of enteric perforation peritonitis admitted SMS hospital, Jaipur from 2004 to 2005. All patients of enteric perforation peritonitis were included in this study. Patient

with history of traumatic perforation and immunocompromised, were excluded. All patients of perforation peritonitis were evaluated by detailed history. Clinical examination done and all vital parameters recorded. Apart from routine blood investigations, Widal test was done. Radiological examination includes flat plate abdomen in erect posture and X-ray chest. Biopsy from perforation margin was taken for histopathological examination.

After initial resuscitation patient were treated by operative procedures. Postoperatively progress report, morbidity and mortality were observed. After confirmation of diagnosis of perforation, decision was taken regarding the operative intervention after considering the following points: time elapsed after acute onset of abdominal pain, general condition of patient.

When general condition was poor, the patient was treated by inserting an abdominal drainage tube, intravenous fluid, blood transfusion and broad spectrum antibiotics. If much time had elapsed after acute pain or general condition of the patient was not fit for surgery under GA then surgery was carried out under LA through laparotomy via Rutherford-Morrison incision.

Operative treatment

After appropriate resuscitation patient underwent surgery. Surgery was conducted under general anaesthesia. Exploratory laparotomy was carried out through either right paramedian incision or lower midline incision. Peritoneal cavity was almost always found contaminated with fecopurulent fluid. The infected peritoneal fluid was cleared with suction and peritoneal lavage done with normal saline. Then the site of perforation was identified and various operative procedures used in enteric perforation were: simple repair by single layer or double layer interrupted suture by 3-0 vicryl or 3-0 silk, repair of distal perforations and loop ileostomy from proximal perforation, loop ileostomy.

Biopsy from the edges of the perforation was taken and sent for histopathological examination. The tube drain was put in the pouch of Douglas and abdomen was closed in layers. Postoperatively all patients were kept NBM and continued Ryle's tube aspiration till 5th or 6th postoperative days when bowel sounds are heard or patient passed flatus.

During postoperative period patients were intensively observed for development complications like wound infection, burst abdomen, paralytic ileus, faecal fistula, repair or anastomotic leakage, pulmonary complication, toxemia, renal failure, intraperitoneal abscesses, enteric encephalopathy etc. Those patients who developed leakage of repair or anastomosis were lately converted to ileostomy.

Ryle's tube was taken out usually on 5th postoperative day when there was no abdominal distension, bowel sounds were present, patient had passed flatus, 24 hours nasogastric tube aspirate was less than 100 ml and patient was able to take oral. Drains were removed on postoperative day 5th or 6th when output was less than 100 ml and it was of serous nature. After removal of Ryle's tube the patient was given liquid diet on the same day.

Semisolid diet was started on the next day and solid diet was started when patient was tolerating the semisolid diet well. Patient with ileostomy were usually readmitted after 6-8 weeks, when the patient general condition had improved. Either ileostomy closure or end-to-end anastomosis is performed in double layer.

Statistical analysis

Quantitative data were presented in terms of means and standard deviation, and qualitative/categorical data were presented as absolute numbers and proportions.

RESULTS

In this study, mean age of patients was 26.38±2.73 years (range; 15-58 years). The maximum number of patients with typhoid perforation (76%) was presented in 2nd & 3rd decade of life. Male to female ratio was 4:1.

Incidence of typhoid perforation was maximum (50%) during the month of June to September. Rainy season favors the feco-oral route of transmission of typhoid bacilli. Enteric perforation mostly occurs in labors (38%) and students (26%). According to socioeconomic status, 44% cases were of middle class and 56% of lower class and none from higher socio-economic status. This shows that enteric perforation is more common in patients with poor nutritional status.

Most of the patients of enteric perforation were from the rural area. In our study, 70% cases were from rural areas and rest 30% were from urban areas out of which 8% were from urban slums. Around 86% cases used well or water tank as their water supply. This observation showed that typhoid infection is transmitted by infected water.

Maximum patients (70%) with enteric perforation reported within 72 hours of illness. Pain abdomen was the most common (100%) presenting complaint followed by abdominal distension, vomiting and constipation. Abdominal tenderness was the presenting sign in all cases (100%). Rigidity, guarding and fever, obliteration of liver dullness were presented in more than 95% of cases of enteric perforation. Tachycardia, tachypnoea and high temperature were present in majority of the cases. Widal test was done in 43 patients, in which 27 patients (62.8%) showed positive result. Gas under diaphragm in flat plate abdomen x-ray was present in 94% patients.

Biopsy from edge of enteric perforation was taken in 40 cases. In 95% patients, biopsy from the edge of perforation reveled acute and chronic inflammatory cells and mononuclear cells infiltration. In intra-operative findings peritoneal fluid was feculent in 70% cases, single perforation was presented in 82% cases and terminal ileum was most common site of perforation (96%).

Table 1: Mortality rate of various operative procedures.

Operative procedure	Number of patients	Mortality N (%)
Primary repair with peritoneal drainage	10	1 (10)
Distal perforation repair with proximal loop ileostomy	9	3 (33.3)
Loop ileostomy	29	3 (10.3)
Resection terminal ileum with end ileostomy	1	0 (0)
RA terminal ileum	1	1 (100)

Various operative procedures were performed in enteric perforation. Of the 50 patients, exteriorization of the perforation as loop ileostomy was done in 29 patients, primary repair was done in 10 patients and primary repair with proximal loop ileostomy was done in 9 patients. Resection of perforated ileum with ileo-ileal anastomosis, resection of terminal ileum with end ileostomy was done in one of each case. Mortality was highest in patients who underwent primary repair and proximal loop ileostomy (33.3%) and lowest in patients in which exteriorization of the perforation as loop ileostomy was done (10.3%) (Table 1).

Table 2: Mortality rate in relation to duration of illness.

Duration of illness (in hours.)	Number of patients	Mortality N (%)
0-12	1	0 (0)
13-24	9	0 (0)
25-48	13	1 (7.7)
49-72	12	1 (8.3)
73-96	5	1 (20)
≥ 5 days	10	5 (50)

Wound infection was the most common complication (38%), followed by chest complications (28%), toxemia (14%), paralytic ileus (12%), thrombophlebitis (10%) and burst abdomen (8%). In our study, mortality rate was 50% in patients presenting after 5 days of illness, while no mortality seen in patients presented within 24 hours of illness (Table 2).

DISCUSSION

In this study, all cases were diagnosed as perforation peritonitis by clinical examination and X-ray FPA abdomen. Of the 50 patients, 47 patients were diagnosed by gas under diaphragm in X-ray FPA and rest 3 patients were diagnosed by clinical examination. Most of the patients of enteric perforation were presented in 2nd and 3rd decade of life as compared to peptic perforation, which occur in 4th and 5th decade.[2-4]

Incidence of typhoid perforation was maximum in rainy season which favors the feco-oral route of transmission of typhoid bacilli. Socio-economically the enteric perforation patients belong to lower class (56%) and (44%) to middle class based on three variables-education, occupation and residential address (Kuppuswamy scale).[5]

Park mentioned that enteric fever was common where water supplies and sanitation were sub-standard.[6] Both seasonal variation and epidemiological status favor faeco-oral route of transmission of typhoid bacilli by infected water. Patients of enteric perforation usually presented with symptoms of acute pain abdomen followed by distension of abdomen, constipation and vomiting. Similar results were also observed by other series.[1,3,7]

The Widal test in diagnosis of enteric perforation was not of much value because it taken long time to appear, negative results are of no value and within two hours of antibiotic therapy the test rendered negative. In present study, Widal test was positive in 62.80% of cases (27 out of 43 cases). This test was positive in approximately 72% cases in other series.[1,8] In present series, diagnosis of enteric perforation was done mainly by the clinical features, which was also mentioned in other studies.[7,9]

In our study, all patients of enteric perforation were treated by operative intervention. In case of enteric perforation surgical management has proposed in literature.[1,10-13] These authors suggested that the operation gives opportunity to know the exact pathology. At the same time, infected peritoneal fluid can be drained and if multiple perforations are present, these can be treated likewise. In contraindication to this, some author advocated conservative line of treatment because these patients tolerate surgery poorly and chance of high post operative leakage.[3,14] All perforations were presented at antimesentric border. Kaul et al advised the ileostomy because the causes of majority of postoperative complications appear to be the toxic intestinal contents which are either spilled into the peritoneal cavity or absorbed from previously paralyzed intestine.[15] Ileostomy through the site of perforation, as described is simple, safe and short procedure in a critically ill patient with necrotic bowel.

Repair of distal perforation and proximal loop ileostomy was done in 9 cases in our study. This operation done when two or more perforations were present or perforation present near the IC junction. Lizarralde also advocated the repairs of perforation with lateral tube ileostomy. This was done when terminal ileum was involved and proximal ileum relatively healthy. It diminished the intraluminal pressure of the intestine.[16] On histological examination of the biopsy from edge of perforation mononuclear cells infiltration was seen in 55% of cases. Nair et al also reported similar findings; mononuclear cells infiltration was seen in 57.69% of cases.[1] Kaul et al reported 100% mononuclear cells infiltration in his series.[15]

In the present series none of the case was found to have faecal fistula as postoperative complication, because in this series ileostomy was done in cases in which terminal ileum was edematous, friable and necrotic patches were present. Mortality rate is directly related to duration of perforation and perforation operation interval.[1,12,17,18] If patient receive treatment within first 12 hours has no mortality as stated by Nair et al.[1] In present series only 10 cases operated within 24 hours with no mortality. The highest mortality (50%) was seen in patients treated 5 or more days after the onset of perforation. This is also supported by other studies.[12,17]

The mortality rate was differing in different operative procedures. In our study, the mortality rate in primary repair with peritoneal drainage was 10%. In other series, the mortality rate was ranging from 19.35% to 58.69%.[12,13,18] Mortality rate was quite high in other series as compared to our study. This may be because of proper selection of patient. As this procedure was used in those patients in which perforation was small, gut was healthy around perforation and duration of perforation is short.

In ileostomy and distal perforation repair with proximal loop ileostomy, the mortality was 10.34% and 33.33% respectively. The combined mortality in all ileostomy procedure was 15.75%. Kaul BK reported 22.2% mortality and Lizarralde reported 34.8% mortality in lateral ileostomy.[15,16] The mortality in ileostomy procedure was high in comparison to primary repair with peritoneal drainage because this procedure used in single large perforation with disease involving whole terminal ileum, marked peritoneal soiling, long perforation duration and multiple perforations.

Resection and anastomosis of ileum was done in one patient, which was died. Eggleston et al and Karmarkar et al used this operation in enteric perforation and found that results are disappointing with mortality rate from 33.3%-66.6%.[17,18] In present series, the overall mortality of enteric perforation was 16%, which was consistent with other series (14.6%-25%).[9,12,15] Vargas reported 3% mortality and Rathor et al reported 41% mortality, which was quite high.[19,20] In the present series, mortality was still high because of long duration of interval between perforation and treatment.

CONCLUSION

The time interval between occurrence of perforation and starting of specific therapy is the most important factor in deciding the ultimate outcome of the typhoid perforation patient and operative procedure is another important factor in deciding the outcome.

Primary repair of perforation can be done in patient with small perforation with relatively healthy bowel, while ileostomy is better in patients with large perforation of longer duration, multiple perforations and edematous bowel with necrotic patches. Although ileostomy increases the morbidity of the patients but definitely prevent the mortality in critical ill patients.

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