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Critical Factors Effecting Morbidity and Mortality in Patients Operated for Typhoid Ileal Perforation

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ABSTRACT

Typhoid perforation is the most important surgical complication of typhoid enteritis and is associated with a significant morbidity and mortality. To determine the factors affecting morbidity and mortality in patients with typhoid intestinal perforation, the complete medical records of a pool of patients from two major teaching hospitals of Lahore were reviewed. A total of 39 patients diagnosed to have typhoid ileal perforation at operation included 27 patients operated in the emergency of South Surgical Ward, Mayo Hospital Lahore from January 1998 to Dec 2000, and 12 consecutive patients operated by the surgical team of Surgical Unit II, Shaikh Zayed Medical Complex, Lahore between December 2000 to May 2005. The average age was 26 years, the male-to-female ratio 4/1. The mean interval from admission to operation was 09 hours (range 05 hours – 03 days). Eight patients had more than one perforation at the time of operation. Primary repair of the perforation was performed in 22 % of the patients, ileostomy (primary repair and proximal loop ileostomy or exteriorization of perforation as a loop ileostomy) in 46%, and resection with end ileostomy and mucous fistula in 32%. No primary end-to-end anastamosis after resection was performed. Postoperative complications occurred more commonly in patients with delayed admission and/or severe peritonitis. Hospitalization was shorter and the postoperative complication rate lower in patients who underwent ileostomy. Three patients developed an enterocutaneous fistula requiring re-operation. The four deaths (10.25% mortality) resulted from overwhelming sepsis. The most significant factors affecting morbidity were prolongation of perforation-operation interval and severe peritonitis. No single operative procedure is best in all cases; therapy should be individualized and tailor made for every patient. Ileostomy appears to be an effective and safe procedure, particularly in patients with severe abdominal contamination and delayed presentation. Early diagnosis, aggressive resuscitation with fluid and electrolyte optimization and prompt operation may result in improved survival in these seriously ill patients.

Keywords: factors affecting prognosis, typhoid ileal perforation.

INTRODUCTION

Acute generalized peritonitis from typhoid ileal perforation is a potentially life-threatening condition. It is the most important surgical complication of typhoid enteritis with significant morbidity and mortality and is very common in the Indo-Pakistan sub-continent. The mortality ranges between 9 and 43%, with many of the survivors having severe wound infection and a history of long hospital stay.[1-4] Many factors, such as late presentation, inadequate pre-operative resuscitation, delayed operation, the number of perforations, and the extent of faecal peritonitis, have been found to have a significant effect on the prognosis.[5-8]

AIMS AND OBJECTIVES

To determine the factors affecting morbidity and mortality in patients with typhoid ileal perforation operated in two major teaching hospitals of Lahore. Shaikh Zayed Medical Complex affiliated with the Federal Post-graduate Medical Institute and Mayo Hospital, Lahore, Pakistan are both tertiary referral

centers with a general surgery residency training program.

PATIENTS AND METHODS

A retrospective analytical study in which the complete medical records of all consecutive patients who had typhoid ileal perforation confirmed at operation between January 1997 and May 2005 were critically reviewed.

To determine the factors affecting morbidity and mortality in patients with typhoid intestinal perforation, the complete medical records of a pool of patients from two major teaching hospitals of Lahore were reviewed. A total of 39 patients diagnosed to have typhoid ileal perforation at operation included 27 patients operated in the emergency of South Surgical Ward, Mayo Hospital Lahore from January 1998 to Dec 2000, and 12 consecutive patients operated by the surgical team of Surgical Unit II, Shaikh Zayed Medical Complex, Lahore between Dec 2000 To May 2005.

As the duration of the history of fever was not always clear, abdominal pain was considered to be the chief symptom for which the time duration was carefully recorded. The symptoms and signs were not different from the usual symptoms and signs of acute generalized peritonitis. However, diagnosis of enteric perforation was based upon a history of fever followed by acute onset of pain in the abdomen, signs and symptoms of perforation/peritonitis, a Widal test, usually supplemented by radiological findings of pneumoperitoneum and peroperative findings.

Preoperative investigations included chest and abdominal radiographs to detect air under the diaphragm in some of the patients, while blood cultures were done in a few patients. All patients had their packed cell volume (PCV) determined, and the serum electrolytes and urea levels were estimated. Also, diagnosis was further supported by operative findings of ileal perforation.

Patients with generalized peritonitis due to other causes were excluded from the study.

All patients of typhoid perforation were treated as a surgical emergency. Pre-operative resuscitation included intravenous fluid replacement, correction of electrolyte derangements, nasogastric suction and commencement of intravenous antibiotics (ciprofloxacillin and metronidazole). Anaemic patients required blood transfusion. Adequate urine output and normal serum electrolytes and urea were considered as good end-points to adequate resuscitation. All efforts were made to operate on the physiologically optimized patient. Exploratory laparotomy was performed within the first 24 h in most patients; others were operated upon in the second 24 h, the delay being caused by the need for adequate resuscitation in almost all the cases. Postoperatively parenteral antibiotics were continued and after that oral quinolones were given for 10 to 14 days in every patient.

All patients were explored through midline or right para-median incisions except 2 in whom a pre-operative diagnosis of perforated appendix with localized peritonitis was made but they subsequently turned out to be suffering from typhoid ileal perforation. Operative findings were noted, and the amounts of pus and faecal material drained were estimated. The edge of ileal perforation was excised and closed transversely in two layers with 2/0-Vicryl. Alternatively, in the scenario of delayed presentation and/or unsuitable local factors related to the patient (advanced peritonitis, rest of the ileum unhealthy and oedematous or diseased), ileostomy in the form of either a distal repair with proximal loop exteriorization or a simple exteriorization of the perforation itself in the form of a loop ileostomy was done. In a few cases with extensive disease involving a segment of ileum or in some cases with multiple perforations, resection of the diseased segment of bowel was carried out with the formation of an end-ileostomy and a mucus fistula. Peritoneal lavage was carried out with copious amounts of normal saline. Drainage of the peritoneal cavity with either a tube drain or with multichannel/corrugated drains was carried out routinely in all cases prior to closure of the laparotomy incision.

The midline incisions were closed by mass-closure with interrupted stitches of Nurolon No. 0 or 1 while the two transverse/oblique right iliac fossa incisions were closed in layers with 0-chromic catgut to close the peritoneum and the posterior

rectus sheath, and 2/0 Vicryl to close the anterior rectus sheath. All the right paramedian incisions were closed in layers with a continous prolene No. 1 or 0 suture. The skin was closed with interrupted sutures of 3/0 prolene. Tension sutures were applied primarily in a few cases who presented late with advanced peritonitis and in all the patients who were re-explored.

Major complications related to wound infection were noted and the course of these morbid conditions was closely followed. These complications included wound dehiscence, residual intra-abdominal abscess, faecal fistula and death. The data on each patient were entered into a pro forma prepared for the study.

RESULTS

The complete medical records of 39 patients who had been operated upon for typhoid perforation between January 1999 and December 2004 were reviewed.

The average age was 26 years (range 13 – 51 years) and the male-to-female ratio 4/1. The sex and age distributions had no effect on the complication rate and post-operative outcome.

The duration of symptoms (the onset of severe abdominal pain) ranged from 02 to 13 days, with a mean of 03 days. Twenty-one patients (53.8%) presented within 02 days of symptoms (abdominal pain – data regarding duration of previous history of fever was deficient), with a mortality of 4.7% (01 out of 21 patients), while 16 patients (41%) presented after 02 days of symptoms with a mortality of 12.5% (02 out of 16 patients). Fifty percent mortality (01 out of 02 patients) was seen in those patients who presented after 10 days of symptoms. This particular gentleman who died was brought in from far-flung areas and had 13 days history of pain preceded by 15 days history of fever. The duration of symptoms had a very strong influence on the incidence of faecal fistula and mortality. Thus those who presented late developed faecal fistula and/or died from the disease, whereas early presentation favoured development of other complications. Faecal fistula adversely affected mortality rate.

Table 1: The over-all mortality in this series was 10.25% (04 out of 39 patients died).

Complications	Presentation within 02 days. *n*=21	Presentation after 02 days. *n*=18
Wound Infection	17 (80.95%)	15 (83.33%)
Wound Dehiscence	01 (4.7%)	03 (16.6%)
Residual Abscess	02 (9.5%)	02 (11.11%)
Faecal Fistula	01 (4.7%)	02 (11.11%)
Mortality	01 (4.7%)	03 (16.6%)

The mean interval from admission to operation was 09 hours (range 05 hours – 03 days). Thirty-six patients were operated upon within 24 h of presentation. Two of these patients died due to overwhelming sepsis (mortality 5.5%). Two patients were operated upon within 48 h. The delay was caused by the need for adequate resuscitation before operation. One of these patients died (mortality 50%). One patient was operated after 03 days of admission and died after surgery (100% mortality). This delay in surgery was partly due to a delay in diagnosis as the patient had initially been admitted to a medical unit, had a long history with advanced peritonitis and required prolonged pre-operative resuscitation.

Thirty-one (79.5%) patients had solitary perforations while 08 (20.5%) patients had more than one perforation at the time of operation. Mortality and morbidity in relation to the number of perforations is shown in Table 2.

Table 2: Morbidity and Mortality in relation to number of perforations.

Complication	Solitary Perforation *n*=31 (%)	Multiple Perforations *n*=8 (%)
Residual abscess	03 (9.6%)	01 (12.5%)
Fecal Fistula	01 (3.2%)	02 (25%)
Mortality	01 (3.2%)	03 (37.5%)

Multiple perforations strongly favoured the development of faecal fistula and were also strongly associated with a higher mortality.

The size of perforations ranged from 0.5-4 cm, mean of 1.2±0.7 cm., while distance of the

perforations from ileocaecal junction ranged from 4-60 cm, mean of 28.3±13.3 cm. All the ileal perforations were located in the anti-mesenteric border of the intestine.

The degree or extent of contamination of the peritoneal cavity was reflected by the amount of pus/faecal matter drained. Although data regarding the exact amount of pus/faecal matter drained from the peritoneal cavity is inaccurate, it was an observation that morbidity and thereby mortality were directly related to the volume of the effluent evacuated. Incidentally, three of the four patients who died had in excess of 1.5 litres of pus/facecal matter drained from the peritoneal cavity. One of these patients had approximately 6 litres of contaminant in the abdomen.

Primary repair of the perforation was performed in 09 patients (23.07 %), ileostomy (either in the form of a primary repair and proximal loop ileostomy or as an exteriorization of the perforation itself as a loop ileostomy) was done in 18 patients (46.15%), and resection of grossly diseased bowel with end ileostomy and mucous fistula in 12 patients (30.76%). Two of these patients presented with overt lower gastro-intestinal hemorrhage and clinical features of peritonitis. A pre-operative diagnosis of typhoid hemorrhage was made in both the patients. However both patients were found to have typhoid ileal perforations within 6 inches of the ileocaecum at laparotomy and both underwent limited right hemicolectomy with end-ileostomy and mucus fistula formation. Both patients stopped bleeding post-operatively. No primary end-to-end anastamosis after resection was performed in this series. Hospitalization was shorter and the postoperative complication rate lower in patients who underwent ileostomy.

Postoperative complications occurred more commonly in patients with delayed admission and/or severe peritonitis. The overall post-operative complications recorded were pulmonary infections in 18 patients (46%) wound infection in 32 patients (82.05%), wound dehiscence in 04 patients (10.25%), residual intra-abdominal abscess in 04 patients (10.25%), and faecal fistula in 3 patients (7.69%). All the three patients with faecal fistula underwent re-exploration. Mortality was 66.66% in those with faecal fistula. Overall, of the 4 patients (10.25%) who suffered mortality, three patients (75%) died within 5 days post-operation and the last patient was dead within 10 days. Survival beyond this period tended to indicate a high probability of complete recovery. All the four deaths resulted from overwhelming sepsis.

Overall Complications	*n*=39 (%)
Pulmonary complications	19 (46%)
Wound Infection	32 (82.05%)
Wound Dehiscence	04 (10.25%)
Residual Abscess	04 (10.25%)
Faecal Fistula	03 (7.69%)
Total mortality	**04 (28%)**

Survivors had hospital stays ranging from 12 to 45 days.

DISCUSSION

Typhoid perforation of the ileum is seen frequently in Pakistan, with a preponderance among males, similar to observations of other previous authors.[1,3,4,8] One possible reason for this may be due to the fact that enteric fever is more common in males, possibly because of more exposure to infection. The age range and mean age of our patients were also similar to previous findings of other authors.[2,3,7,8]

Although the prognosis of typhoid ileal perforation remains poor according to most reported series in similar environments, the overall mortality in our patients was much lower (10.25%)[1-6] We found, as was the experience of most other authors, the overwhelming incidence of wound infection and other wound related complications (dehiscence) in the survivors.[2,8-10,12]

Symptoms and signs were not different from those in other geographical areas, with a mean duration of symptoms (onset of abdominal pain) before presentation being 03 days, and 50% of the patients presenting within 2 days of onset of symptoms, with fever, headache and generalized abdominal pain being the major complaints. These findings are in agreement with previous reports of early perforation being very common in West Africa.[1,6,13]

Late presentation and delay in operation were

associated with high mortality and a high incidence of faecal fistula, whereas early presentation was associated with the development of other complications, although mortality was far lower in the latter group.[1,3,5] The need for adequate resuscitation resulted in a delay before operation in some of our patients who had presented in a poor state, which was also found to affect the outcome adversely.[6,9,10,12] We have not found any differences in survival between male and female patients; neither have we found the patients' ages to be an important prognostic factor. Our findings are in agreement with previous studies.

The presence of single perforations and moderate peritoneal contamination favored the development of complications, such as wound infection, wound dehiscence and residual intra-abdominal abscess, in those patients who survived to develop these complications. We, however, found the presence of multiple perforations and severe peritoneal contamination to be associated with a very poor prognosis, with a mortality of 37.5% in accordance with previous studies.[1-10]

Today it is accepted that the treatment of typhoid perforation is surgical.[14] Adequate resuscitation, correction of electrolyte disturbance, appropriate antibiotic therapy and surgery have proven to be essential for a successful outcome.[1-3,32] Not only has surgical intervention sharply reduced mortality from 70—100% to about 30%,[3-5] but also early surgical intervention has further improved the prognosis as validated by the present study and also documented by the work of various other authors[3,6,9,10,12,16,32]

Many surgical options have been used, ranging from simple peritoneal drainage under local anaesthesia in moribund patients.[2,4,16] Excision of the edge of the ileal perforation and simple transverse closure, either in a single layer or in two layers, have been the most widely practiced procedure in almost all the other series.[2,6,10,14,16-19,31] Two-layer closure of the perforation with or without an omental patch has been most successful, although we did not make use of an omental patch to buttress a repair in any of the patients in our series.[17,18,31] The value of continuous post-operative peritoneal irrigation is doubtful and we did not use it in any of our patients.[20,21,31] Neither did we make use of a tube ileostomy in any of our patients. Some workers have described this procedure using a size wide bore Foley catheter, passing it through either the perforation or a separate stab wound in the healthier part of the ileum.[4,17,23-27] The procedure has been described as quick, simple and effective in decompressing the bowels; and that it prevents further contamination of the peritoneal cavity from either leakage of a repaired perforation or fresh perforation. Although variable results have been shown by various authors with this technique, the previous experiences of the primary author with a tube ileostomy have not been encouraging and thus the technique was not used in any of our patients.[17,23-27] Many workers[16,18,19,22,31] claimed that segmental resection of the involved bowel may be necessary in the presence of multiple perforations and a severely diseased terminal ileum. Recently, some workers have recommended segmental resection and primary end-to-end anastomosis of the diseased perforated ileum.[26] Other workers advocated closure of the perforation with end-to-side ileo-transverse colostomy/by-pass; this diverts the involved bowel out of the main intestinal stream.[29,30] None of these procedures was carried out in any of our patients. Depending on circumstances we closed the abdominal wall with tension sutures. The use of a tension closure so as to prevent possible wound dehiscence has been demonstrated by various other workers.[7,8] A laparostomy was used in only one of our patients who underwent re-operation for a post-operative faecal fistula.[22]

Our policy in managing these critically ill patients is to carry out a quick and effective procedure aimed to remove the existing collection and halt further contamination followed by peritoneal irrigation and closure of the abdominal wall. The aim is to carry out a life saving operation.

CONCLUSION

The most significant factors affecting morbidity were prolongation of perforation-operation interval (late presentation, delayed operation), multiple perforations, severe peritoneal contamination and post-operative faecal fistula. No single operative procedure is best in all cases; therapy should be individualized and tailor made for

every patient. Ileostomy appears to be an effective and safe procedure, particularly in patients with severe abdominal contamination and delayed presentation. Early diagnosis, aggressive resuscitation with fluid and electrolyte optimization and prompt operation may result in improved survival in these seriously ill patients.

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