

Study of Various Factors to Improve Outcome in Enteric Perforation and Reduce Morbidity

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Abstract

Background: Intestinal perforation because of typhoid is quite common in the developing countries like India. Enteric perforation leads to generalised peritonitis and septicaemia. It is usually associated with high mortality and morbidity which further gets compounded at places where availability of medical facilities in India is poor. Clinical presentation may vary depending upon the time lapse between perforation and seeking an organised institutional care. Although there is tremendous improvement in diagnostics, antibiotics, operative technology and monitoring, yet morbidity and mortality of typhoid perforation remains high. In our centre, all patients are not taken up for further management. Patients who have normal chest and cardiac status with normal or near normal haematobiochemistry are taken so as to avoid unnecessary mortality and bad effects thereafter. Any patient where clinical evaluation suggests evidence of ARDS or septic shock are generally referred to a higher centre for better care and monitoring.

Materials and Methods: A total of 106 cases were studied where after applying screening/filter of cardiac status, chest status various clinical factors, hematological and biochemical factors, 88 cases (Table 2) were segregated for further management at our center. These 88 cases were proved to be of typhoid by widal test and /or blood culture and/or histopathology (Table 3) of the excised margins of the ulcer during exploratory laparotomy. After optimization, these patients were taken up for exploratory laparotomy by mid line incision. Operative findings consisting of volume and quality of peritoneal fluid (intestinal, feculent or pus or mixed) as well as site and number of intestinal perforations were recorded. All the peritoneal fluid was drained, perforation was repaired or resection carried out in two layers followed by thorough peritoneal lavage. A wide bore drain was placed in the pelvis and laparotomy wound was closed. Patient was closely monitored in post-operative period for vitals, urine output and general progress. Patient was started orally whenever passed flatus and bowel sounds returned. Any complication like superficial wound dehiscence or burst abdomen or stitch sepsis was accordingly managed. Stitches were removed on 12-14 post-operative day.

Result: In the present series there were total of 88 patients (Table 2). 60 were males and 28 were females. The mean age of the patients was 38.34 (± 12.08). Operation was done within 12 hours of onset of symptoms in 48 patients while 40 cases underwent surgery 12 hours of onset of symptoms. Morbidity was 9/48 (18.75%) in former group and 20/40 (50%) in later group. Detailed analysis revealed that delay was mostly before reaching the hospital. It was also found that 62 patients out of 88 had received some kind of treatment before reaching our hospital in form of intravenous fluids, antibiotics and analgesics. Remaining 26 patients reached the hospital directly without taking any treatment. It is the former group of 62 patients who had maximum delay obviously because of taking of some treatment before reaching this hospital. Out of 68 patients showing positive widal test, (Table 3) only 47 (69.11%) showed specific histological features of typhoid in the freshened margin of the ulcer. Remaining 21 (30.88%) showed non-specific inflammation. Majority of the operated patients of enteric perforation had single perforation (70 patients i.e. 79.54%), 16 patients (18.18 %) had two perforations and only 2 cases (2.27%) had multiple perforations requiring resection and anastomosis. Eighty six patients were managed by simple closure of perforation in 2 layers (inner by Polyglactin 910 continuous suture of 000 size while outer layer of interrupted silk suture of 000 size). Burst abdomen was found in 5.68 %, superficial dehiscence in 16.62% %, stitch abscess in 19.31 %, UTI in 3.40% as part of hospital acquired infection and residual intra-abdominal abscess was seen in 7.95 % patients. In the present series none had faecal fistula and there was no mortality. The duration of hospital stay ranged from 9 to 28 days with a mean of 14.8 days. Since mortality in the present series was nil due to initial screening at the hospitalization stage, we have analyzed the morbidity as prognostic factors

of better and eventless outcome and are given in Table 5.

Conclusion: To conclude, the present series has shown that morbidity and prolonged hospitalization occurs with factors like delayed presentation and surgery, copious peritoneal contaminated fluid (more than 1 liter) and multiple perforations.

Key words: Enteric perforation, Various factors, Morbidity

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INTRODUCTION

Intestinal perforation due to typhoid is quite common in the developing countries like India. Enteric perforation leads to generalized peritonitis and septicemia. It is usually associated with high mortality and morbidity which further gets compounded at places where availability of medical facilities in India is poor. Clinical presentation may vary depending on the time lapse between perforations and seeking an organized institutional care.

Although there is tremendous improvement in diagnostics, antibiotics, operative technology, and monitoring, yet morbidity and mortality of typhoid perforation remains high. All patients are not taken up for further management. Patients who have normal chest and cardiac status with normal or near normal hematobiochemistry are taken so as to avoid unnecessary mortality and bad effects thereafter. Any patient where clinical evaluation suggests evidence of acute respiratory distress syndrome or septic shock is generally referred to a still higher center for better care and monitoring. We are presenting a series of 106 cases of typhoid perforation over past few years where disease profile, operative profile, and outcome are analyzed and based on this various factors are found which improve clinical outcome and reduce morbidity.

MATERIALS AND METHOD

A total of 106 cases were studied where after applying screening/filter of cardiac status, chest status various clinical factors, hematological, and biochemical factors, 88 cases were segregated for further management at our hospital, SGT Medical College. These 88 cases were proved to be of typhoid by Widal test and/or blood culture and/or histopathology of the excised margins of the ulcer during exploratory laparotomy.

Soon after the decision of admitting the patient for further management, a detailed history was taken with particular emphasis on duration of fever, abdominal pain, and constipation. Detailed physical examination was carried out laying emphasis on chest and cardiac status. The urine output was recorded, and the patient was routinely catheterized for monitoring urine output. Simultaneous fluid resuscitation and antibiotics, etc., were started and an abdominal radiograph in erect posture was taken to see the gas under diaphragm.

After optimization, these patients were taken up for exploratory laparotomy by midline incision. Operative findings consisting of volume and quality of peritoneal fluid (intestinal, feculent or pus, or mixed) as well as site

Table 1: Prevalence of various symptoms in present series n=88

Symptoms	Male (%)	Female (%)
Pain abdomen	60 (100)	28 (100)
Fever	60 (100)	28 (100)
Vomiting	51 (85)	28 (100)
Constipation	60 (100)	28 (100)
Bradycardia	22 (36.66)	05 (17.85)

Table 2: No of perforations n=88

No of perforations	No of cases (%)
Single perforation	70 (79.54)
Two perforations	16 (18.18)
Multiple perforations	2 (2.27)

Table 3: Various tests

Test showing positive evidence of typhoid	No of cases (%)
Positive Widal test	68/88 (77.27)
Positive histological evidence	47/68 (69.11)
Non-specific inflammation on histology	21/68 (30.88)

Table 4: Various complications n=88

Complications	Number of patients (%)
Burst abdomen	5 (5.68)
Superficial dehiscence	12 (16.63)
Stitch sepsis	17 (19.31)
UTI	3 (3.40)
Fecal fistula	0
Intra-abdominal abscess (PUO)	7 (7.95)

UTI: Urinary tract infection

and number of intestinal perforations were recorded. All the peritoneal fluid was drained, perforation was repaired or resection carried out in two layers followed by thorough peritoneal lavage. A wide bore drain was placed in the pelvis and laparotomy wound was closed. The patient was closely monitored in post-operative period for vitals, urine output, and general progress. The patient was started orally whenever passed flatus and bowel sounds returned. Any complication such as superficial wound dehiscence or burst abdomen or stitch sepsis was accordingly managed. Stitches were removed on 12–14 post-operative day.

RESULTS

Mean duration of symptoms from onset to presentation in the hospital was 12.2 ± 5.1 days with range of 3–18 days. 56 patients presented within 2 weeks while 32 presented after 2 weeks from the onset of symptoms. Morbidity was 9 from former group and 20 in later group [Table 5].

Table 5: Variables associated with morbidity

Parameters	Factors	Number of cases/percentage having morbidity (%)
Sex	Male	17/60 (28.33)
	Female	9/28 (32.14)
Duration of symptoms	Within 2 weeks	9/56 (16.07)
	>2 weeks	20/32 (62.5)
Delay in operation	<12 h	9/48 (18.75)
	>12 h	20/40 (50)
No of perforations	Single perforation	2/70 (2.85)
	Two perforations	6/16 (37.5)
	Multiple perforations	01/2 (50)
Amount of peritoneal fluid	<1 L	17/88 (19.31)
	>1 L	22/88 (25)
Burst abdomen		5/88 (5.68)
Type of operation	Simple closure	18/86 (20.93)
	Resection and anastomosis	01/2 (50)

In the present series, where a total of 88 patients were taken in after applying the screening criteria on a total of 106 patients. Of these, 60 were males and 28 were females, the male-to-female ratio being 2.14:1. The mean age of the patients was (38.34 ± 12.08), youngest being 18 years of age while oldest being 52 years of age. The various clinical features with which they presented are given in Table 1 where abdominal pain was almost universal complaint.

As far investigations are concerned, all 88 patients showed gas under diaphragm. Ultrasonography was done in all the patients and showed free fluid ranging from ++ to +++ with dilated loops virtually in all the patients. Widal test was positive in only 68 patients (77.27%), and blood culture was positive in 16 patients only.

Operation was done within 12 h of onset of symptoms in 48 patients while 40 cases underwent surgery 12 h of onset of symptoms. Morbidity was 9/48 (18.75%) in former group and 20/40 (50%) in later group.

Average delay from onset of symptoms to operation was 18 h which included time taken for optimization for surgery after hospitalization by way of administration of intravenous fluids also. Average time taken for optimization was 3.8 h. Detailed analysis revealed that delay was mostly before reaching the hospital. It was also found that 62 patients out of 88 had received some kind of treatment before reaching our hospital in the form of intravenous fluids, antibiotics, and analgesics. Remaining 26 patients reached the hospital directly without taking any treatment. It is the former group of 62 patients who had maximum delay obviously due to taking of some treatment before reaching this hospital.

Of 68 patients showing positive Widal test, only 47 (69.11%) showed specific histological features of typhoid in

the freshened margin of the ulcer. Remaining 21 (30.88%) showed non-specific inflammation; but since they all had positive Widal test, they were eventually considered cases of enteric perforation.

Majority of the operated patients of enteric perforation had single perforation (70 patients, i.e., 79.54%), 16 patients (18.18%) had two perforations, and only 2 cases (2.27%) had multiple perforations requiring resection and anastomosis. 86 patients were managed by simple closure of perforation in two layers (inner by Polyglactin 910 continuous suture of 000 size while outer layer of interrupted silk suture of 000 size).

The complications encountered are listed in Table 4. Burst abdomen was found in 5.68%, superficial dehiscence in 16.62%, stitch abscess in 19.31%, urinary tract infection in 3.40% as part of hospital-acquired infection, and residual intra-abdominal abscess was seen in 7.95% patients. In the present series, none had fecal fistula and there was no mortality. The duration of hospital stay ranged from 9 to 28 days with a mean of 14.8 days.

Since mortality in the present series was nil due to initial screening at the hospitalization stage, we have analyzed various factors for better and eventless outcome and are given in Table 5.

DISCUSSION

Ileal perforation following typhoid fever is still one of the most common causes of peritonitis in developing and underdeveloped world. It is reported to be rare phenomena in the western world. Males have been found to be dominantly affected in the present series. Males are said to be more exposed to the infection with an increased risk of necrosis and perforation due to the immune mechanism and genetic predisposition.^[1] Typhoid disease is a disease of young productive age group. Although the age group profile of the present series compares well with some of the published series.^[2-4] Yet, the mean age of the present series is slightly higher than other series.^[5]

The presenting symptoms and clinical features are by and large quite similar to any other acute abdominal condition. The decision of laparotomy was largely taken by the fact of the presence of gas under diaphragm in patient having features of generalized peritonitis on clinical evaluation (100%). The diagnosis of enteric perforation is of course suspected by a history of fever and positive Widal test (77.27%). After reviewing the histological profile of freshened edges of the ulcer, it was found that even those who had positive Widal test, histologically, there were no

specific findings suggestive of typhoid and showed only non-specific inflammation (30.88% of those showing positive Widal test).

The delay in operation, wherever occurred was mainly due to prehospital constraint, namely, taking some form of treatment outside or transport or non-availability of transport or sometimes non-availability of the decision-making attendants like parents.

Typhoid fever is caused by *Salmonella typhi* in areas where poor socioeconomic strata and unhygienic conditions prevail. The incubation period is 1–14 days and clinical features start with bacteremia, high-grade fever, and signs of systemic sepsis. Blood counts are generally low which was seen in majority of our patients, i.e., 86/88 (97.72%). Bradycardia was found in 17.85% patients. Later, bacteria localize in Peyer's patches where capillary thrombosis leads to necrosis and perforation takes place usually in the 3rd week of the disease. The terminal part of intestine (approximately 60 cm) is particularly edematous and friable. Late presentation, delay in operation, multiple perforations, and presence of copious peritoneal fluid (laden with pus and feculent material to the tune of more than 1 L) adversely affects the outcome, i.e., mortality or morbidity. The quality of peritoneal fluid and delay in operation also determines the friability of gut. The literature also mentions that profuse peritoneal exudates do affect the outcome.^[3,6]

Surgery offers best chance of survival in enteric perforation.^[7] Although a variety of procedures are undertaken for enteric perforation, namely, closure, resection and anastomosis, and ileostomy, in the present series, majority of cases settled with simple closure of perforation and resection and anastomosis were needed in only 2 patients (50%). Fecal fistula is a catastrophic complication, but luckily was not seen in the present series due to initial screening of cases at the hospitalization stage. Burst abdomen did of course occur in (5.68%) patients.

Mortality of the present series is nil largely due to the fact the cases were screened at the initial stage and serious cases requiring care at tertiary care center were referred at the outset. Nonetheless, the mortality is reported in the range of 9–43%^[3] in the literature. However, the reports of mortality are 6.8% from Nepal^[2] and 10.5% from India.^[4] Mortality rates reported from the western world are 1.5–2% where socioeconomic infrastructure is well developed.^[8]

Incidence of fecal fistula is zero, in present series, but it is reported to be 3.8%,^[9] 7.8%,^[2] 8%,^[3] and 16.5%.^[4] Burst abdomen added to the morbidity in the present series.

To conclude, the present series has shown that gender, delayed presentation and surgery, copious peritoneal contaminated fluid (more than 1 L), and multiple perforations are various factors that improve outcome in enteric perforation and reduce morbidity.

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