Post Typhoid Ileum Perforation

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Abstract

Post typhoid ilium perforation is still prevalent in many developing countries. Despite the advances in
The management, the outcome in these patients in resource limited countries is still very poor. Despite various measures such as safe drinking water supply and safe disposal of waste, intestinal perforation from salmonellosis remains the most common emergency surgery performed. The incidence continues to rise, so also the mortality, despite new antibiotics and improvement in surgical technique This topic review was to review our experiences on to determine the prevalence, prognostic factors, morbidity, mortality and surgical management of post typhoid ilium perforation. The purpose of this topic review was to describe the prevalence, prognostic factors, morbidity, mortality and surgical management of post typhoid ilium perforation. We hoped that identification of this topic will help in prioritizing management and improving the quality of care in post typhoid ilium perforation. This topic is reviewed the recently published articles at high prestigious (PubMed, BMJ ،GHN ،CDC, Medical books, Net &, etc.) based on different (case control,retrospective,prospective…) clinical studies about post typhoid ilium perforation . Ilium perforation is still common and lethal complication of typhoid in endemic area. The ilium perforation represented about 8.5% of typhoid which need to emergency laparotomy. In this topic review has more information about post typhoid ilium perforation from many recent articles like describe below.

Introduction

Typhoid fever, a severe febrile illness caused primarily by a gram-negative bacillus Salmonella typhi, has continued to be a public health problem in many developing countries. Typhoid infection is generally transmitted by faeco-oral route and may occasionally lead to an epidemic, particularly in areas with poor sanitation and limited availability of clean, potable water. It is a global health problem that can have a devastating impact on resource-poor countries and it is estimated that more than 33 million cases of typhoid fever occur annually causing more than 500,000 deaths [3, 8, and 12]. While control of the infection has been achieved in developed countries by effective public health measures, developing countries continue to bear the burden of the disease, principally because many communities still fall short of standards for drinking water, hygiene and sanitation [7, 8]. The surgical complications of typhoid fever are a cause of significant morbidity and mortality in many parts of Africa, particularly in sub-Saharan Africa where standard medical facilities are not yet readily available. Intestinal perforation is a serious complication of typhoid fever and remains a significant surgical problem in developing countries, where it is associated with high mortality and morbidity, due to lack of clean drinking water, poor sanitation and lack of medical facilities in remote areas and delay in hospitalization

[11]. The rates of perforation have been reported in literature to vary between 0.8% and 18% [10, 13]. The high incidence of perforation in most developing countries has been attributed to late diagnosis and the emergence of multidrug resistant and virulent strains of Salmonella typhi . The disease affects mostly young adults who contribute enormously to the economy of third world countries [8, 14, and 16]. It also affects children and it is most common in people in the low socio-economic strata [15]. The management of typhoid intestinal perforation poses diagnostic and therapeutic challenges to general surgeons practicing in resource limited countries [6, 10, and 15]. Surgery is considered the treatment of choice in order to improve the chances of survival of patients with this condition, who most often present late. The management of these patients provides a number of unique challenges to the attending surgeon. Many of these patients present at and are managed in rural hospitals where resources are often very limited. The outcome of treatment of typhoid intestinal perforation may be poor especially in developing countries where late presentation of the disease coupled with lack of clean drinking water, poor sanitation, and lack of diagnostic facilities and emergence of Multi-drug resistant (MDR) strains of S. typhi resulting from inappropriate and indiscriminate use of antibiotics are among the hallmarks of the disease [20]. Late presentation, inadequate preoperative resuscitation, delayed operation, number of perforations and the extent of fecal peritonitis have been found to have a significant effect on prognosis [19,20].While mortality in the developed world has dropped to between 0% and 2% [28,30], mortality in the developing world remains high at between 9% and 22% . The reasons for this state of affairs have not been evaluated in our setting. Despite the high mortality and morbidity of typhoid intestinal perforation in developing world, relatively a little is known about the pattern of this disease and its prognostic factors in our set up.

Socio-demographic characteristics

72.1%patients were males and females were 27.9% with the male to female ratio of 2.6:1. Their ages ranged from 8 to 76 years with a median age of 18.5 years. The peak age incidence was in the 11-20 years age group accounting for 47.1% of cases. Most of patients, 82.7% had either primary or no formal education and more than eighty percent of them were unemployed. The majority of patients, 75.0%came from the rural areas and more than three quarter of them had no identifiable health insurance.

Table of Distribution of age group by sex

Age group (in years)	*Males (%)*	*Females (%)*	*Total (%)*
0-10 9	8.7	1.9	10.6
11-20	34.6	12.5	47.1
21-30	16.3	7.7	24.0
31-40	5.8	4.8	10.6
41-50	1.9	1.0	2.9
51-60	1.9	-	1.9
61-70	1	-	1
> 70	1.0	-	1.0
Total	72.1	27.9	100

Clinical presentation of patients with typhoid intestinal perforations

Fever and abdominal pain were common to all the patients. The duration of illness (fever perforation interval) was within 14 days in 80.8% patients and more than 14 days in 19.2%patients. Most

Patients, 83.7% had perforation occurred prior to hospital admission, whereas in the remaining 16.3% patient's perforation occurred during the course of hospitalization. Perforation-admission interval was within 24 hours (early presentation) in 15.4% patients and more than 24 hours (late presentation) in 84.6% patients. Adequate antibiotic treatment prior to admission was recorded in 25.0%patients whereas inadequate antibiotic treatment was recorded in 69.2% patients. Antibiotic treatment prior to admission was not documented in 6 (5.8%) patients. Inadequate treatment prior to admission was significant predictor of intestinal perforation.

Table of Clinical features of patients with typhoid

Clinical features	*Percentage*
Fever	100
Abdominal pain	100
Vomiting	90.4
Diarrhea	84.6
Constipation	76.9
Abdominal distension	73.1
Dehydration	69.2
Shock	60.6
Feculent gastric aspirates	11.5
Jaundice	6.7

Investigations

Ninety-nine 95.2%of the patients had plain abdominal x-ray films available for review and demonstrated free gas under the diaphragm (pneumoperitonium) or moon sign in 74.7% of them. Ultrasound done in 53.8% patients detected free peritoneal collections in 85.7%patients. Widal's test was positive (i.e. titre ≥ 1 in 160 dilutions) in 94.2% patients. HIV status was known in 84.6% patients. Of these, 10.2%were HIV positive. Of the HIV positive patients, 44.4% patients were known cases on ant-retroviral therapy (ARV) and the remaining 55.6% patients were newly diagnosed patients. HIV status was not known in15.4% patients. CD 4+ count among HIV positive patients was available in only 7 patients and ranged from 43 cells/µl to 720 cells/µl with the mean of 224 cells/µl and standard deviation of 78 cells/µl. The median and the mode were 261 cells/µl and 172 cells/µl respectively. A total of three HIV positive patients 42.9% had CD4+ count below 200 cells/µl and 57.1% patient had CD4+ count of ≥200 cells/µl. Serum electrolytes revealed hypokalaemia and hyponatraemia in 37 %and 23% respectively Histopathological examination of excised specimens from the edges of perforations was typical of chronic inflammation (infiltration by monocytes, lymphocytes, plasma cells) in the 93.3% patients. Blood and stool cultures were not done in any of the patients

Operative Findings

All patients underwent to laparotomy. The perforation-surgery interval was within 24 hours in 13.5% patients and more than 24 hours in 86.5% patients. The interval between presentations at the Accident and Emergency department and surgery (waiting time) ranged from 1-10 hours with a median of 6 hours. On operation the abdominal cavity was heavily contaminated (generalized peritonitis) in 92.3% patients while in 7.7% patients the peritoneal cavity was having minimal contamination (localized peritonitis). Eighty-eight 84.6% had single perforation and the remaining 15.4% patients had multiple perforations. The median age of the patients with single perforation 45 years was significantly higher than that of those with multiple perforations (14 years).

Ileum was the most common part of the bowel affected and occurred in 86.2% of cases (Table 5). The median size of the perforations was 7.8 mm (2-28 mm). The median distance from ileocecal junction was 36 cm (range 8-98 cm). The amount of pus/faecal matter drained from the peritoneal cavity reflected the extent of contamination. The drainage was between 200 and 3000 mls with a mean of 628 mls. It was less than 1000 ml in14.4%patients and more than 1000 mls in 85.6% patients.

This table show distribution of patients according to anatomical site of perforations

ANATOMICAL SITE	PERCENTAGE
JEJUNUM	10.1
ILEUM	86.2
CAECUM	1.8
APPENDIX	0.9
ASCENDING COLON	0.9
TOTAL	100

Surgical Procedures

Perforations were surgically treated depending upon the number of perforations, general health status of patient and degree of faecal contamination. Simple closure of the perforations was the most commonly done procedure accounting for 78.8% of cases and this was generally done in two layers after excision the edges. 7.7%patients had re-operation between 3 rd and 14th day post-operatively as follows: 3.8% patients for intra-abdominal abscess and 1.9% patients for burst abdomen and enterocutaneous fistula each respectively. 3.8% patients were re-operated during the follow up period as follows: 2.9% patients underwent Mayo's repair for incisional hernia and 1.9% patient had laparotomy due to adhesive intestinal obstruction.

Table of Surgical treatment of perforations

Surgical procedure performed	*Percentage*
Simple double layered closure	78.8
Bowel resection with anastomosis	9.6
Right hemicolectomy + ileo-transverse anastomosis	7.7
Exteriorization of perforation with ileostomy	1.9
Appendectomy	1.9
Total	100

Clinical Outcome

Post-operative complications was 39.4% as shown in table. Surgical site infection was the most common post-operative complication accounting for 44% of cases.

The overall length of hospital stay (LOS) ranged from 7 to 64 days with a median of 28 days. The median LOS for non-survivors was 6 days (range 1-10 days). Patients who had post-complications stayed longer in the hospital. Mortality rate is about of 23.1%.

Table of Postoperative complications in typhoid ileal perforation

Complication	Number (%)
Surgical site infection	44
Hypertrophic scar	24
Septic shock	20
Incisional hernia	16
Enterocutaneous fistula	6
Re-perforation	6
Intra-peritoneal abscess	4
Septic arthritis	2

Follow up of Patients

Of the survivors, 95.0% patients were discharged well and the remaining 5.0%were discharged against medical advice. No patients were discharged with permanent disabilities. Twenty-eight 35.0%patients were available for follow up at three month after discharge and the remaining 65.0% patients were lost to follow up.operation and death was 1.7 days. The highest number of cases was observed in patients aged 20 years and younger, with the least occurrence in those between 41 and 50 years of age

Patients were admitted for a period of 1–42 days. The mean duration of admission was 17.29 days for survivors and 2.93 days for those who died. The overall mortality rate was 30 %. A greater percentage of females survived, but the difference did not reach statistical significance. About mortality 6.7% died on the operating table, 13.6% died within 24 h, and another 9.7% died later than 24 h postoperatively. However, all the deaths occurred within 4 days postoperatively.

Discussion

Intestinal perforation is the most serious complication of typhoid fever in the developing world that presents a challenge to surgeons in that perforation leads to high morbidity and mortality, but development of perforation is also unpredictable. The incidence of the disease varies considerably in different parts of the world [28]. The incidence of typhoid intestinal perforation had previously been reported as an indication of endemicity of typhoid fever in any locality. In

most parts of the world, perforation rate ranges from 0.6% to 4.9% of enteric fever cases [8, 35], but in West Africa, higher rates of 10%-33% have been reported. In this review, the rate of typhoid intestinal perforation represented 8.5% of cases which is significantly lower than that reported in Western Africa [29, 31]. High rate of intestinal perforation in this region may be due to a more virulent strain of Salmonella typhi among West Africans, coupled with increased hypersensitivity reaction in the Peyer's patches in this sub region, where the perforation rate is higher than other endemic areas. These differences in the incidence of the disease reflect differences in the rate of risk factors for typhoid intestinal perforation from one country to another. The highest incidence of typhoid intestinal perforation occurred in the first and second decades of life. Post typhoid ilium perforation was more common in males than in females. The exact reason for this male preponderance is not known although it is possible that men have an increased risk of exposure to typhoid fever resulting from spending longer time and consuming more food outdoors that may lead to more frequent contact with the causative bacteria. Intestinal perforation resulting from typhoid fever has been reported to be more prevalent in people with low socio-economic status [15, 21, 23,]. This observation is reflected in our study where most of patients had either primary or no formal education and more than eighty percent of them were unemployed. The clinical presentation of typhoid intestinal perforation in our patients is not different from those in other geographical areas [6, 15, 26, and 27] with fever and abdominal pain being common to all the patients. In our study, perforation occurred early in the course of the disease and this has been recognized by others. Patients who perforate during the first two weeks of the illness appear to have a better prognosis [36]. It has been observed that compromised nutritional status could possibly play a role in the poor prognosis of the patient who has been ill for more than 2 weeks and then develops a perforation. In topic review [15,23,28], the diagnosis of typhoid intestinal perforation in this study was made from clinical evaluation, laboratory investigation, identification of free air under the diaphragm on abdominal and chest radiographs (moon sign) and operative findings such as typical perforation on anti-mesenteric border, purulent collection and adhesion of bowel loops with friable pussy flecks. The value of the radiological investigation has been compared with other writers and with current radiological techniques; 80-90% of cases are correctly diagnosed. For the accurate diagnosis of typhoid intestinal perforation,

Blood for culture and sensitivity, urine for culture and sensitivity and stool for culture and sensitivity or bone marrow are required.

Surgical intervention is considered to be the standard treatment of choice for patients with typhoid intestinal perforation [16]. In keeping with other studies [12, 15, 25-28] all patients in the present study underwent surgical treatment. One of the many factors affecting the surgical outcome in patients with typhoid intestinal perforation is time interval between duration of illness and surgical intervention (perforation-surgery interval). Early surgery can minimize the complications while delayed surgery leads to severe peritonitis and septic shock. In the present study, the majority of patients were operated more than 24 hours after the onset of illness. Similar observation was reported by other studies done in developing countries. The presence of single intestinal perforations in majority (84.6%) of our patients is consistent with other reports [6, 15, 29, and 30].

Patients with multiple perforations had significantly high mortality

Rates compared to those with single perforations. Whereas the ileum was the most common

Site of typhoid perforation in the present study, colonic involvement was very rare which is consistent
With other studies [12, 15, 22,, 25,26].
Early surgical interference is the optimal treatment
Option for perforation. However, the type of surgery to be applied is controversial. Many surgical techniques have been used, ranging from excision of the edge of the ileal perforation, and simple transverse closure in two layers; as done for majority of our patients, segmental intestinal resection and primary anastomosis especially in multiple perforations or right hemicolectomy where the caecum is involved. Whereas, better results are reported with simple closure, in many series [15, 25, 26], others favour segmental ileal resection and anastomosis. So for managing of these patients is a simple closure in solitary perforations and segmental intestinal resection and primary anastomosis in multiple perforations, right hemicolectomy where the caecum is involved and ileostomy for severe peritoneal contamination are options.
The use of antibiotics has been extensively discussed in the past. Chloramphenical with metronidazole used to be the antibiotic of choice [6, 15] and is still used in some centers [23]. With increasing resistance of the organisms to Chloramphenical, Cephalosporins (e.g. Ceftriaxone) and Quinolones (e.g. ciprofloxacin) came into being with metranidazole added for the anaerobes and gentamicin for the gram negative pathogens. This is the regimen commonly used in our centre. However, a recent study done in our centre has shown resistance of the organisms to this combination and highly sensitive
To Imipenem and meropenem . But unfortunately these drugs may not be readily available in many third world countries.
Surgical site infection was the most common postoperative complications. High rate of surgical site infection may be attributed to contamination of the laparotomy wound during the surgical procedure.
In the developing world, mortality rates from typhoid perforation have been reported to range from 9-22%. The mortality rate of 23.1%.
High mortality rate of 39.0% was also reported in Nigeria by Meier et al. Exceptionally low mortality rates of 1.5-2% have been reported from some parts of the developed world, where socioeconomic infrastructures are well developed [21]. The reasons for the high mortality are multifactorial. In more articles high mortality rate was attribute to delayed presentation, inadequate antibiotic treatment prior to admission, shock on admission, HIV positivity, low CD4 count (< 200 cells/µl), high ASA classes (III-V), delayed operation, multiple perforations, severe peritoneal contamination and presence of postoperative complications. Self-discharge by patient against medical advice is a recognized problem

Conclusion

Typhoid intestinal perforation is still endemic and carries high morbidity and mortality. The rate of typhoid intestinal perforation represented ranging (0.6-33%) or 8.5% of total cases
Delayed presentation, inadequate antibiotic treatment prior to admission, shock on admission, HIV positivity, and low CD4 count (< 200 cells/µl), high ASA classes (IIIV), delayed operation, multiple perforations, severe peritoneal contamination and presence of postoperative complications were the main predictors of mortality in this study. Early and appropriate surgical intervention, effective perioperative resuscitation, postoperative intensive care

procedures, safe anesthesia, and delivery of wide-spectrum antibiotics with low resistance are highly recommended in the management of typhoid intestinal perforation in this region. Emphasis should be on preventive measures such as safe drinking water and appropriate sewage disposal, and typhoid vaccination.

Core Tip

Typhoid perforation in low-middle-income countries has still a disappointing outcome, related to surgical and not surgical constraints: (1) safe water and sanitation are lacking in high risk settings like slums or overcrowded areas; (2) currently available diagnostic facilities have inherent limitations; (3) multiple drugs resistant bacteria are an increasingly threatening problem; (4) vaccination programs in some high risk regions, like sub-Saharan Africa, have not yet been carried out; (5) surgery is often delayed; (6) in peripheral facilities postoperative intensive care is problematic and often unsuitable; and (7) surgical standards and guidelines are not available due to the lack of sound prospective studies.

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