

Prognostic Factors in Typhoid Ileal Perforation: A Prospective Study of 53 Cases

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Background: Typhoid ileal perforation remains a serious complication of typhoid enteritis with high morbidity and mortality in many tropical countries.

Aims and objectives: To determine the prognostic factors in typhoid perforation in Kano, Nigeria.

Methodology: Fifty-three consecutive patients with typhoid perforation managed surgically were prospectively studied at the general surgical unit of Aminu Kano Teaching Hospital Kano, from March 2004 to February 2006.

Results: There were 26 (49.1%) males and 27 (50.9%) females, with age range of 2–55 years and a mean \pm SD of 12.2 ± 10.2 years. The morbidity was 49.1% and the most common post-operative complications included wound infection, wound dehiscence, burst abdomen, residual intra-abdominal abscesses and enterocutaneous fistula.

Mortality was 15.1% and was significantly affected by multiple perforations, severe peritoneal contamination and burst abdomen (p value <0.05 , odds ratio >1).

The mean duration of hospital stay for survivors was 16.1 days with a range of 8–57 days.

Conclusion: This study has attempted to determine the factors that statistically influence mortality in typhoid perforation in our environment.

Key words: prognosis ■ typhoid perforation

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INTRODUCTION

Typhoid fever is endemic in poor and underdeveloped countries of the world causing fatal complications such as intestinal perforation, which leads to generalized peritonitis, septicemia, fluid and electrolyte derangements. Typhoid intestinal perforation is a common cause of surgical acute abdomen in our envi-

ronment.^{1,2} The incidence of perforation varies considerably,³ with the West African subregion having one of the highest perforation rates in the world (15–33%), and the reasons for this remain speculative.⁵

Despite decades of improvement in patient care, the morbidity and mortality of typhoid perforation remain high, and this is related to multiple variable factors.^{4,8}

This prospective study was carried out to determine the prognostic factors in typhoid ileal perforation in Kano, northwestern Nigeria, and to compare our findings with results from other parts of the world. The identification of the outcome factors will help in decision-making, prioritizing management and improving the quality of care.

PATIENTS AND METHODS

Fifty-three consecutive patients with typhoid perforation underwent laparotomy at the general surgical unit of Aminu Kano Teaching Hospital in Kano during the period from March 2004 to February 2006.

Diagnosis was mainly clinical, Widal test, supplemented by radiological findings of pneumoperitoneum, intraoperative findings of ileal perforation and an acutely inflamed and edematous terminal ileum.

Preoperatively, all the patients had intravenous fluids to correct fluid and electrolyte deficits; broad-spectrum antibiotic coverage, including chloramphenicol and metronidazole; nasogastric suction; and urethral catheterization. Anemic patients had blood transfusion.

Relevant preoperative investigations included packed cell volume, urea and electrolytes, and chest and abdominal radiographs to detect air under the diaphragm.

All the patients had exploratory laparotomy via long lower-midline incisions after adequate resuscitation. Operative findings were noted, and the amount of pus and fecal material drained were estimated. The edge of the ileal perforation was excised, and double-layer closure was done with chromic catgut 2/0 and silk 2/0. In some patients, ileal resection and anastomosis, right hemicolectomy with ileo-transverse anastomosis were done. Copious peritoneal lavage was done with warm saline, with a drain in the pelvis, and mass closure of the abdo-

men was done using nylon-1. The skin was closed with interrupted stitches using nylon-2/0.

The postoperative outcome was closely monitored, and the data on each patient were entered into a pro forma prepared for the study.

All data were analyzed using the Epi Info™ software version 5. Multivariate analysis was used to determine the influence of the study variables on the outcome factors. The differences were taken as significant only if the p value is <0.05 and the odd ratio is >1.

RESULTS

There were 26 (49.1%) males and 27 (50.9%) females, thus the male:female ratio was 0.9:1. Their ages ranged from 2–55 years with a mean ± SD of 12.2 ± 10.2 years. Forty-four out of the 53 patients (83.0%) were children and young adults. The age distribution in relation to mortality is shown in Figure 1. The mean age of survivors was 12.32 ± 10.4 years and 11.63 ± 11.7 years for nonsurvivors. The difference was not statistically significant (Student’s t test = 51, p>0.05)

Eight (15.1%) patients died, and the prognostic factors for mortality in typhoid perforation using multivariate analysis are shown in Table 1.

The mean duration of symptoms prior to presentation was 12.5 ± 6.3 days, with a range of 1–30 days. Twenty-nine (54.7%) patients presented within two weeks of onset of illness with a mortality of 6.9% (two out of 29 patients), and 24 (45.3%) presented after two weeks with 25.0% mortality (six out of 24 patients). This did not appear to significantly influence mortality [P=1.061,

OR=0.723 (0.245–11.023)]. Eight (15.1%) patients were operated within 24 hours with no recorded deaths, while 45 patients (84.9%) were operated after 24 hours and a mortality rate of 17.8% (eight out of 45 patients). The difference was not significant statistically [P=0.572, OR=0.214 (0.091–4.132)].

Hospital mortality was found to be strongly associated with multiple perforations, severe peritoneal contamination and burst abdomen. Thirty-eight patients (71.7%) had single perforations and 15 (28.3%) had ≥2 perforations. Three (7.9%) patients with single perforation died, while multiple perforation significantly affected the outcome with a mortality rate of 33.3% (five out of 15 patients) [P=0.023, OR=4.445 (0.212–16.701)]. The size of the perforations was <0.5 cm in 44 (83.1%) cases, while nine (16.1%) had sizes ranging from 0.5–2 cm.

The quantity of peritoneal fluid ranged from 100–1,600 ml with a mean of 718 ml. Forty-five (84.9%) patients had volumes <1,000 ml and four died (8.9%); and eight (15.1%) had >1,000 ml and a significant effect on mortality with four (50.0%) deaths [P=0.027, OR=3.261 (1.086–7.329)].

The majority of patients, 34 (64.2%), had primary simple closure of the perforations, whereas 19 (35.8%) had ileal resection with end-to-end anastomosis. Five out of 34 patients with simple closure (14.7%) and three of the 19 patients (15.8%) with ileal resection died. The difference was not significant [P=0.96, OR=0.396 (0.266–8.132)].

Twenty-six (49.1%) patients developed various postoperative complications, which included wound infec-

Table 1. Variables associated with prognosis

Variable	Mortality	Chi Square/t Test	*df	P Value
Sex				
Male	2/26	4.89	1	<0.05
Female	6/27			
Duration of Symptoms				
Within 2 weeks	2/29	3.40	1	>0.05
After 2 weeks	6/24			
Timing of Operation				
<24 hours	0/8	1.60	1	>0.05
>24 hours	8/45			
Number of Perforations				
Single	3/38	5.60	1	<0.05
Multiple	5/15			
Amount of Peritoneal Fluid				
<1,000 ml	4/52	4.84	1	<0.05
>1,000 ml	4/8			
Burst Abdomen	4/6	14.2	1	<0.05
Fecal Fistula	1/2	1.16	1	>0.05
Septicemia	2/2	7.43	1	<0.05
Type of Operation				
Ileal resection	3/19	0.0076	1	>0.05
Simple closure	5/34			

*df: degree of freedom

tion in 14 (53.8%), wound dehiscence in two (7.6%) and burst abdomen in six (25.1%). Others included residual intra-abdominal abscess in four (15.4%) patients and enterocutaneous fistula in two (7.6%). Only burst abdomen had a significant effect on mortality. Four out of six patients (66.7%) with burst abdomen died [P=0.012, OR=2.164 (0.882–11.036)].

The duration of hospital stay for survivors was 8–57 days with a mean of 16.1 days.

DISCUSSION

This study has shown that mortality in typhoid perforation is significantly influenced by multiple perforations, severe peritoneal contamination and postoperative burst abdomen. There was a preponderance of females in this study is in contrast to male predominance in other series.^{4,5,9} Males are said to be more exposed to the infection⁹ with an increased risk of necrosis and perforation probably due to immune mechanisms and genetic predisposition.¹⁰ Typhoid perforation is a disease in the young productive age group with, 83% of our patients in the first and second decades of life, compared to second and third decades in some published series.^{4,5,9}

Mortality rates from typhoid perforation range from 9–43%.⁵ The mortality rate of 15.1% in this study is comparable to 12% from a previous retrospective study from this center,¹ 12.1% from Lagos,¹¹ 17% from Ile-Ife,⁷ and 28% from Ibadan,⁵ Nigeria. These figures are much higher than the rates reported from other tropical countries such as 6.8% from Nepal,⁴ and 10.5% from India.⁹ However, mortality rates of 1.5–2% have been reported from some parts of the developed world, where socioeconomic infrastructures are well developed.¹²

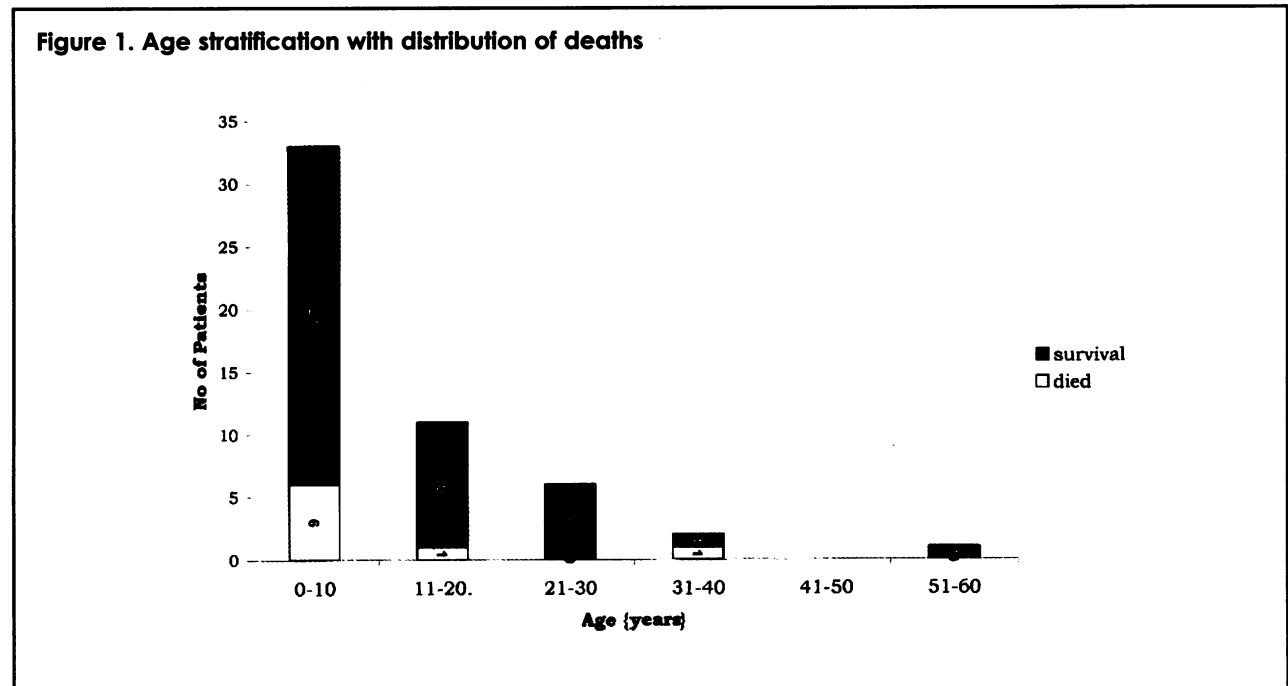
The outcome of typhoid perforation is affected by

multiple variable factors.^{4,11,13} In this study, as in others, the age and sex of the patients had no significant effect on mortality,^{5,11} which is at variance with other reports.^{14,15} Similarly, mortality was not affected by late presentation, timing of surgical intervention, type of procedure and postoperative fecal fistula. However, this study has validated the association of mortality with multiple perforations,^{4,5,9} but this finding is in contrast with some series.¹¹ We also found out that mortality is affected by profuse peritoneal exudate similar to recent published reports from Nigeria,^{5,11} and it is a reflection of the degree of fecal peritoneal contamination. Profuse peritoneal fluid is typical of typhoid perforation, as usually there is no attempt at localization of the perforation. Fecal peritoneal contamination can result in overwhelming sepsis and fatal outcome.

Surgical intervention in typhoid perforation offers the best chance of patient survival,³ but the type of operation performed is unrelated to mortality and morbidity as in this report and others.^{5,9} The choice of the procedure undertaken to deal with the perforation should be dictated by the number of perforations and the state of the terminal ileum.³ Simple closure, which is performed by many surgeons, is the quickest procedure, gives good results and is cost effective. Intestinal resection with anastomosis is, however, indicated in multiple perforations, gangrenous bowel or severely diseased terminal ileum, but extensive procedures under prolonged anesthesia should not be done to avoid fatal outcome. Lifesaving operations in such situations include exteriorization, ileostomy¹⁶⁻¹⁸ and ileo-transverse colostomy as advocated by Eggleston and Santoshi.¹⁹

Postoperative outcome, which has been shown to adversely affect mortality, includes enterocutaneous fistula,^{4,9} but it was not found to significantly affect mortal-

Figure 1. Age stratification with distribution of deaths



ity in this study. Fecal fistula resulted from repair leaks in 3.8% of cases in this report, which is low when compared with 7.8%, 8% and 16.5% in some series, respectively.^{4,5,9} Postoperative burst abdomen contributed significantly to mortality, as 66.8% of those who developed this complication died. Burst abdomen was associated with fecal fistula, severe peritoneal contamination and wound infection in this study.

Survivors of typhoid perforation are faced with various postoperative complications, such as wound infection and wound dehiscence, with prolonged hospitalization and increased cost of management. Attempts have been made at reducing the incidence of wound infection by delayed primary closure, but they have not been quite effective.²⁰

In conclusion, this study has shown that mortality in typhoid perforation is significantly affected by multiple perforations, copious peritoneal fluid and burst abdomen; and some of the survivors with fecal fistula, wound infection and wound dehiscence are faced with prolonged hospital stay.

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