

# Postoperative Complications Of Typhoid Ileal Perforation In Children In Azare, Nigeria

A Nuhu, B Gali, S Dawha

## Citation

A Nuhu, B Gali, S Dawha. *Postoperative Complications Of Typhoid Ileal Perforation In Children In Azare, Nigeria*. The Internet Journal of Surgery. 2008 Volume 21 Number 1.

## Abstract

Typhoid ileal perforation (TIP) is one of the most serious complications of typhoid fever causing high morbidity and mortality in many parts of the West African subregion. Surgery is the current preferred method of treatment, with survivors having high rates of infective postoperative complications that are life-threatening. This is a retrospective review of 46 children out of 670 treated for typhoid fever, who underwent laparotomy for typhoid ileal perforation. The most common postoperative complications were wound infection, wound dehiscence and enterocutaneous fistulae. The mortality rate was 28.3% with 65% of deaths occurring in the first 3 postoperative days; due to septicaemia and later enterocutaneous fistula. This study highlights the challenges involved in the management of these complications in a resource-limited area.

## INTRODUCTION

Typhoid ileal perforation is one of the most lethal complications of typhoid fever, causing high morbidity and mortality in endemic areas<sup>1,2</sup>. Though surgical management is accepted and universally practiced by all surgeons, because it promptly clears the peritoneum of faecal soilage and seals off the perforation preventing further contamination, the postoperative course is still characterized by serious life-threatening complications<sup>3,4</sup>. Identification of these complications and minimizing their incidence by adequate supportive care will significantly improve the outcome<sup>4,5</sup>. Patients in our environment present late, making resuscitation prolonged and further delaying surgical intervention. This makes the management of typhoid ileal perforation a very serious challenge and strongly suggests that health workers and authorities should spend more energy and resources on the preventive aspect of this disease. It is a challenging surgical emergency in the developing world, including Nigeria<sup>6,7</sup>, with unacceptably high morbidity and mortality. This dismal outcome is further worsened by the high incidence of postoperative complications due to continuing peritonitis and septicaemia. This study reviewed the postoperative complications of typhoid ileal perforation as seen in North Eastern Nigerian children with the view to reducing them and thereby improving the outcome.

## MATERIALS AND METHODS

A retrospective study of all children (15 years and younger), with clinical features of TIP who underwent laparotomy in the surgical unit of the Federal Medical Center Azare Bauchi State Nigeria between January 2004 and September 2008 was carried out. The diagnosis was based on history, physical examination and the radiological finding of pneumoperitoneum on plain chest and abdominal radiographs. The acute management involved fluid resuscitation and correction of electrolyte derangements, together with preoperative blood transfusion where indicated. All the patients had antibiotic combinations of parenteral ceftriazone/ciprofloxacin, metronidazole and gentamycin. The adequacy of resuscitation was indicated by a urine output of between 0.5 and 1ml/kg body weight per hour. All the children had laparotomy under general anaesthesia and access to the abdominal cavity was via long midline, midline subumbilical or transverse supraumbilical incision in those under 5 years. The diagnosis was confirmed and degree of faecal peritonitis assessed. Single point perforations or widely spaced multiple perforations were closed in two layers after excision (debridement) of their edges, while multiple ones that were closely placed were removed by segmental resection of the ileum and primary anastomosis in two layers along standard lines. The distance from the ileocaecal junction was noted and where the perforations were in close proximity (<10cm & multiple), a right hemicolectomy was done. The peritoneal cavity was

thoroughly lavaged with warm normal saline and the abdomen was closed en-masse with Nylon 1 suture. The skin incision was also closed primarily. A peritoneal tube drain using Foley’s catheter was placed in all the patients. Nasogastric tube decompression was commenced in the preoperative period and maintained for 5-7 days postoperatively. The data was analyzed for age, sex, presenting clinical features, resuscitative measures, investigations, operative findings, operative treatment, postoperative complications and overall mortality.

**RESULTS**

Forty-six children, aged between 15 months and 15 years, underwent laparotomy for typhoid ileal perforation during the study period. They comprised 28 (60.8%) boys and 18 (39.1%) girls. The mean age was 9.5+/-3.22 years. The male:female ratio was 1.5:1. Twenty-six (56.5%) were between the ages of 8 and 12 years (Table 1). All the children presented with abdominal pain and features of acute peritonitis. Plain abdominal and chest radiographs showed free gas under the diaphragm in 16 (51.6%) of patients. The main electrolyte derangements seen were hypokalaemia and raised serum urea in 13 (28.3%) of the patients. Postoperative anaemia was seen in 37 (80.4%) of the patients. All the patients were resuscitated and underwent laparotomy through a transverse supraumbilical incision in those 5 years and younger, and a long midline or midline subumbilical incision for the older children. There were 76 perforations in all (mean 1.65). Thirty-one (67.4%) had single, 5 (10.8) had 2, another 5 had 3, and 4 patients had 4 perforations (Table 2). The highest number of perforations in a single patient was 14. The mean estimated size of the perforations was 23.35+/-13.46mm (range 10-80mm). Significant faecal peritonitis was seen in all the patients with moderate to massive soilage in 32 (69.6%). Eight (17.4%) had mild peritoneal soilage. Most of the perforations [38, (82.6%)] were closed in two layers after circumferential excision of the edges. One patient had wedge resection and closure and six (13.0%) had segmental ileal resection and primary anastomosis, while one had right hemicolectomy. All the perforations were on the ileum and within 5 to 60cm of the ileocaecal junction.

The most common postoperative complications were wound infection in 21 (45.6%), postoperative fever in 16 (34.7%) and anaemia in 38 patients (82.6%) (Table 3). Eight (21.0%) of the 38 patients who had simple closure and 1 (15.7%) of the six who had segmental ileal resection re-perforated within 4 to 9 days (mean 5.34+/-2.89) postoperatively and re-

exploration was done for 4 patients of whom 1 survived. The remaining 4 were managed conservatively as cases of enterocutaneous fistula of whom 1 survived. Five patients had postoperative adhesive intestinal obstruction and were managed conservatively in the first instance. Two had laparotomy in the 3rd and 4th month of follow-up. The overall mortality was 13 (28.3%). Three patients had incisional hernias and another three had burst abdomen. Malnutrition evidenced by severe weight loss was a common feature of all the patients. Death occurred 36 hours to 14 days (mean 6.2+/-5.4 days) postoperatively from septic complications and multiple organ failure. The mean duration of hospital stay for survivors was 22.89+/-12.34 days (range 6-46). The mean duration of follow-up was 4.83+/- 9.36 weeks (range 2-55).

**Figure 1**

Table 1: Age and sex distribution of 46 children with typhoid ileal perforation.

Age(years)	Males	Females	Frequency (%)
1-4	4	0	4 (8.7)
5-8	4	3	7 (15.2)
9-12	11	6	17 (37.0)
13-15	10	8	18 (39.1)
Total	29 (63.04)	17 (37.00)	46 (100)

Six hundred and seventy children were treated for typhoid fever, giving a perforation rate of 6.8%.

**Figure 2**

Table 2: Distribution of number of perforations as it relates to mortality.

No. of perforations	Frequency (%)	Mortality No. (%)
1	31 (67.4)	8 (25.8)
2	5 (10.8)	2 (40.0)
3	5 (10.8)	1 (20.0)
4	3 (6.5)	1 (33.3)
5	1 (2.2)	0 (0.0)
14	1 (2.2)	1 (100.0)
Total	87 (100)	13 (28.3)

NB: There were a total of 87 ileal perforations. The highest number of perforations in a single child was 14. The overall mortality rate was 28.3%.

**Figure 3**

Table 3: Postoperative complications

Postoperative complications	Frequency (%)
Wound infection	21 (45.6)
Postoperative fever	16 (34.7)
Reperforation	9 (19.7)
Wound dehiscence	6 (13.0)
Enterocutaneous fistula	4 (8.7)
Chest infection	4 (8.7)
Postoperative adhesions	5 (10.8)
Intraabdominal abscess	1 (2.2)
Incisional hernia	3 (6.5)
Burst abdomen	3 (6.5)

**DISCUSSION**

The outcome of typhoid ileal perforation is poor in our environment, with mortality of up to 20 to 50% and more than 50% developing postoperative complications after laparotomy in most series, especially if presentation is delayed<sup>4,7-10</sup>. The high mortality is a result of continuing peritonitis and gram-negative septicaemia in the postoperative period leading to multiple organ failure<sup>4</sup>. Furthermore, infective complications such as wound infection, wound dehiscence, burst abdomen, enterocutaneous fistula and postoperative pneumonia further worsen the already severe situation in these patients who are usually anaemic and frequently have major fluid and electrolyte derangements in the preoperative period<sup>4,7</sup>. This is the situation in areas where the presentation is late as found in this series.

The most common complication after laparotomy for typhoid ileal perforation is wound infection. This was observed in 45.1% of our patients, which is similar to other

studies<sup>7,8,11</sup>. Various techniques have been used in the past to reduce the incidence of wound infection including delayed primary closure of skin and subcutaneous tissue, allowing for free egress of bacteria-laden fluid<sup>12,13</sup>. Availability of potent anti-salmonellal antibiotics in combination with metronidazole and gentamicin have modified these practices and today, primary closure of the wound including the skin is widely practiced with good results<sup>14</sup>. The high rate of wound infection is related to the gross peritoneal contamination seen in most of the patients. Wound failure and other infective complications may also be related to tissue hypoxia due to anaemia, which was seen in 50.8% of our patients in the postoperative period, in keeping with earlier reports<sup>4,7,8</sup>. According to earlier reports<sup>11,15</sup>, suture failure, which could lead to wound dehiscence and anastomotic breakdown, leading to intra-abdominal abscesses or enterocutaneous fistula invariably lead to higher mortality and prolonged hospital stay among survivors<sup>4</sup>. In this series, enterocutaneous fistula occurred in four patients, 3 of which died and the remaining patient was managed conservatively with a mean hospital stay of 16 weeks. It seems that enterocutaneous fistula is one of the most serious complications encountered. Extremely high rates of postoperative complications, with mortality of up to 65% have been reported in the past<sup>16</sup>. These are mainly the consequences of pre- and postoperative anaemia, continuing peritonitis and septicaemia. The morbidity rate in this series was 52.1%.

This review agrees with previous reports that underscored the benefits of aggressive preoperative fluid resuscitation<sup>5</sup>, including correction of electrolyte imbalance, especially hypokalaemia, which was present in 48.2% of our patients and blood transfusion for all anaemic patients<sup>4,8,11</sup>. Combination of intravenous antibiotics (ciprofloxacin/ceftriaxone against the Salmonella Organism and metronidazole and gentamycin to cover for secondary infection by anaerobes and gram-negative organisms, respectively)<sup>4,7,17</sup> and prompt surgical intervention<sup>5,9,10,12</sup> can reduce the postoperative morbidity and mortality. A long midline incision and a tranverse supra-umbilical incision will give a good and quick access to the peritoneal cavity in the older children and younger ones (below 5 years), respectively; the lesion is diagnosed, closed and profuse peritoneal lavage done with warm normal saline. Simple closure of the perforation in two layers after debriding of the edges was done in the majority of our patients, as seen in other studies<sup>1-7</sup>. Simple closure where possible is preferred over more extensive procedures because our patients are

usually very ill; therefore, a minimum but adequate surgical intervention is performed. Other reports showed better results with segmental resection of the ileum and primary anastomosis<sup>18,19</sup>.

Postoperative enterocutaneous fistula was a major cause of morbidity and mortality in our series in keeping with earlier studies. There were four children who had enterocutaneous fistulae and 3 died, the lone survivor had the longest hospital stay. Infected wounds were treated by daily or twice daily dressing using dilute hydrogen peroxide in the initial instant followed by pure honey, appropriate antibiotics were given orally, based on the bacteriology of the wound swabs and secondary closure was effected when the wound was clean enough. All other complications were dealt with accordingly. Those with burst abdomen were treated as surgical emergencies; after closure of the wound, 3 to 4 tension sutures were placed for burst abdomens using Polypropylene or Nylon sutures in 3 patients. Five patients who had postoperative adhesive intestinal obstruction were managed conservatively in the first instance. Two had laparotomy in the 3rd and 4th month of follow-up. Those with reperforations and intraabdominal abscesses while still on admission had laparotomy and drainage of abscesses with segmental resection of the ileum. Of the 3 patients with incisional hernias, 2 had successful repairs done 9 and 12 months after the first laparotomy. The third was lost to follow-up. The true incidence of incisional hernia following surgery for TIP is most likely to be higher than suggested by this series, as follow-up is generally poor in this environment. The mortality rate of 28.3% is comparable to earlier series in the sub-region<sup>13,14</sup>, but very recent studies have shown considerable improvement in operative management of this condition<sup>19</sup>. This may be related to better awareness of the disease condition and early presentation to hospital. The multiple postoperative complications were directly responsible for the increased mortality.

The findings in this series demonstrate that typhoid ileal perforation is a continuing challenge to the general and paediatric surgeon practicing in developing countries. This complication requires prompt surgical intervention in patients who are already desperately ill with varying degrees of preoperative anaemia, severe electrolyte derangements and overwhelming sepsis. There are also life-threatening postoperative complications which the surgeon has to deal

with to reduce mortality. There is no substitute to aggressive and adequate fluid and electrolyte resuscitation with blood transfusion where necessary in the preoperative and postoperative periods. The perforations should be closed in two layers and the peritonium copiously lavaged with warm normal saline.

### References

1. Keenan JP, Hadley GP. The surgical management of typhoid perforation in children. *Br J Surg* 1984; 71: 928-929.
2. Ajao G. Typhoid perforation: factors affecting mortality and morbidity. *Int Surg* 1982; 67: 317-319.
3. Archampong EQ. Operative management of typhoid perforation of the bowel. *Br Med J* 1969;3: 271-276.
4. Abantanga FA, Wiafe-Addai BB. Postoperative complications after surgery for typhoid perforation in children in Ghana. *Pediatr Surg Int* 1998; 14: 55-58.
5. Mock C, Denno D, Visser LE, Maier R. Aggressive fluid resuscitation and broad spectrum antibiotics decrease mortality from typhoid ileal perforation. *Trop Doct* 1995; 25: 115-117.
6. Rahman GA, Abubakar AM, Johnson AW, Adeniran JO. Typhoid ileal perforation in Nigerian children; An analysis of 106 operative cases. *Pediatr Surg Int* 2001; 17: 628-630.
7. Ameh EA. Typhoid ileal perforation in children: A scourge in developing countries. *Ann Trop Paediatr* 1999; 19: 267-72.
8. Uba AF, Chirdan LB, Iteun AM, Mohammed AM. Typhoid intestinal perforation in children: a continuing scourge in a developing country. *Pediatr Surg Int* 2007; 23: 33-39.
9. Akoh JA. Prognostic factors in typhoid perforation. *East Afr Med J* 1993; 70: 18-21.
10. Meier DE, Tarpley LJ. Typhoid intestinal perforation in Nigerian children. *World J Surg* 1998; 22: 391-323.
11. Gupta V, Gupta SK, Shukla VK, Gupta S. Perforated typhoid enteritis in children. *Postgrad Med J* 1994; 70: 19-22.
12. Adesunkami AR, Ajao OG. Typhoid ileal perforation: the value of delayed primary closure of abdominal wounds. *Afr J Med Med Sci.* 1996; 25: 31-35.
13. Benard HR, Cole WR. Wound infection following partially contaminated wounds: effects of delayed primary closure of skin and subcutaneous tissue. *JAMA* 1963; 184: 290-2.
14. Usang UE, Sowande OA, Ademoyiwa AO, Bakare TIB, Adejuyigbe O. Outcome of primary closure of abdominal wounds following typhoid perforation in children in Ile-Ife, Nigeria. *Afr J Paediatr Surg* 2009; 6: 31-34.
15. Nguyen VS. Typhus perforation in the tropics: Apropos of 82 cases. *J Chir Paris* 1994; 131: 90-95.
16. Khana AK, Misra MK. Typhoid perforation of the gut. *Postgrad Med J* 1984; 60: 523-525.
17. Kurlberg G, Frisk B. Factors reducing mortality in typhoid ileal perforation. *Tran R Soc Trop Med Hyg* 1991; 85: 793-5.
18. Ameh AE, Dogo PM, Attah MM, Nmadu PT. Comparison of three operations for typhoid perforation. *Br J Surg* 1997; 4: 558-9.
19. Shah AA, Wani KA, Wazir BS. The ideal treatment for typhoid enteric perforation resection and anastomosis. *Int Surg* 1999; 84: 35-38.

**Author Information**

**Ali Nuhu, MBBS, FWACS**

Department of Surgery, University of Maiduguri Teaching Hospital

**B. M. Gali, MBBS, FWACS**

Department of Surgery, University of Maiduguri Teaching Hospital

**S. Dawha, MBBS**

Department of Surgery, Federal Medical Center Azare