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Typhoid Intestinal Disease: Management of Patients With Multiple Perforations

La maladie typhoïde intestinale: Gestion de malades aux perforations multiples

Adeniran JO, Taiwo JO
Paediatric Surgical Unit, University of Ilorin Teaching Hospital, Ilorin, Kwara State, Nigeria

Abstract:
Background: To review the management given to patients with multiple ileal and/or colonic perforations from typhoid intestinal disease over a 5-year period. Patients and Methods: All patients who had more than one ileal perforation or had one or more colonic perforations from typhoid disease from January 2001 to December 2005 were retrospectively reviewed. Patient's age, site and number of perforations, pre, -and intra-operative management, and postoperative complications were retrieved from patients case notes.

Results: Twenty-seven patients (15 males, 12 females) had multiple perforations during the study period. The age range was 4- 14 years (mean 9.2years). Twelve patients had 2 perforations, 3 patients had 3, 3 patients had 4 perforations, one patient each had 14, 27 and 32 perforations. Seventeen patients had trimming of the ulcer edges and simple double-layer closure, 2 had segmental resection and 8 had right hemicolectomy. The wounds of 5 patients healed primarily, 15 had superficial wound infection, 4 had wound dehiscence, 3 had faecal fistula. Three patients died as a result of late presentation and septicaemia.

Conclusion: There appears to be a rise in multiple ileal and/or colonic perforations caused by typhoid enteritis poses. Early referral to tertiary health institutions, adequate resuscitation, prompt operative intervention and close post-operative management will decrease morbidity and mortality.

Key Words: Typhoid, Perforation, Ileal, Colonic

Resumé
Arrière-plan: Examiner la gestion, au cours de cinq années, des malades ayant subi une perforation multiple de l'iléon et/ou du côlon suite à une typhoïde intestinale. ***Malades et méthodes:*** Nous avons revu tous les malades qui, entre janvier 2001 et décembre 2005, avaient subi plus d'une perforation de l'iléon ou du côlon à la suite de la typhoïde. Nous avons retiré des dossiers médicaux les renseignements concernant l'âge des malades, l'emplacement et le nombre des perforations, la gestion intraopératoire et les complications postopératoires. ***Résultats:*** Vingt-sept malades (15 mâles, 12 femmes) ont eu des perforations multiples pendant la période de l'étude. La tranche d'âge était de 4 à 14 années (moyenne 9, 2 années). Douze malades ont eu 2 perforations, 3 malades en ont eu 3, 3 malades ont eu 4 perforations, trois malades ont eu, chacun, 14, 27 et 32 perforations respectivement. Dix-sept malades ont subi l'égalisation des bords de l'ulcère et une simple fermeture à double-couche, 2 malades ont eu une résection segmentaire et 8 ont subi l'hémicolectomie à droite. Les blessures de 5 malades ont guéri primairement, 15 malades ont eu une infection superficielle de la blessure. Chez quatre, on a constaté la déhiscence de la blessure et 3 ont eu une fistule fécale. Trois malades sont morts à cause de la consultation tardive et de la septicémie. ***Conclusion:*** Il semble y avoir une augmentation des perforations multiples de l'iléon et/ou du côlon causées par les poses de l'entérite typhoïde. La morbidité et la mortalité peuvent être réduites par la consultation immédiate d'un établissement de santé, par une réanimation adéquate, une intervention chirurgicale ponctuelle et une bonne gestion postopératoire. ***Mots-clés:*** Typhoïde, Perforation, Iléon, côlon.

Introduction

Typhoid disease has been virtually eradicated from developed countries. Because of lack of access to good health care, decent water supply, safe disposal of waste, poor personal hygiene and illiteracy, the scourge of this disease continues to cause high mortality among children in developing countries[1,2] and a 'mill around the surgeon's neck.[3] Typhoid intestinal perforation remains the commonest indication for emergency operation done in children above 3 years in our unit.[4] More patients present yearly to our unit with intestinal perforation than any tertiary hospital in Nigeria. We see more perforations per patient and more involvement of the colon.[5]

We have reported 1 patient with 14

Correspondence: Dr. J. O. Adeniran, P. O. Box 5708, Ilorin, Kwara State, Nigeria. E-mail: adeniranjodr@yahoo.com

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perforations (13 ileal, 1 colonic) and another with 27 perforations (19 ileal, 8 colonic).[6] Both survived. We recently managed a girl with 32 perforations (17 ileal, 15 colonic) who also survived. This paper details our experience with this difficult sub-set of patients and how we manage them.

Patients and Methods

All patients who were managed for more than one ileal perforation or had one or more colonic perforations caused by typhoid disease from January 2001 to December 2005 at the Paediatric Surgical Unit University of Ilorin Teaching Hospital Ilorin, Nigeria, were retrospectively reviewed. Patient's age, site and number of perforations, pre, -and intra-operative management, and postoperative complications were retrieved from patients case notes.

Results

One hundred and thirty-one patients were operated for typhoid intestinal perforation during the 5-year period. One hundred and four (79.4%) had single perforations, 27 (20.6%) had more than one ileal perforation or one or more colonic perforations. Out of the 27, there were 15 males and 12 females. Age range was 4yrs to 14 years (Table 1).

Blood was taken for PCV, Urea and electrolytes, malarial parasites, blood cultures and Widal's tests. One unit of blood was X-matched. Vigorous resuscitation was done with 0.9% saline and 4.3% dextrose in 1/5 normal saline made up with 50% dextrose to 10% dextrose solution. Naso-gastric tube was inserted for gastric decompression. Urinary catheter was then inserted and hourly urine output maintained at 2-3ml/kg/hr. Parents who could afford it bought one of the fluoroquinolones. Poor parents bought chloramphenicol. This was added to metronidazole and gentamycin to complete the triple antibiotic regimen. Poor parents were allowed to sign an undertaking so that necessary operations could be done with payment settled later.

The patients were usually too ill for the routine halothane/nitrous oxide/oxygen combination with pavlon to paralyze for relaxation. Patients were initially given oxygen by face mask for about 5 minutes. Intramuscular ketamine was then given at 5mg / kg. Intravenous ketamine was next given at 1mg/ kg for rapid intubation. The incision site

Table 1: Age Distribution in Patients with Multiple Perforations

Age (Yrs)	No of Patients	%
1-2	Nil	-
3-4	1	3.7
5-6	7	25.9
7-8	4	14.8
9-10	6	22.2
11-12	6	22.2
13-14	2	7.4
>14	1	3.7
Total	27	100.0

Table 2: No of Perforations in Patients

No of Perforations	No of Patients
1	1
2	12
3	3
4	3
5	1
6	3
7	1
>10	1
>20	1
>30	1
Total	27

Table 3: Surgical Management

Type of Operation	No of Patients	%
Simple Closure	17	63.0
Segmental Resection	2	7.4
Right Hemicolectomy	8	29.6
Total	27	100.0

Table 4: Postoperative Complications

Type of Operation	No of Patients	%
Wound Infection	15	55.6
None	5	18.5
Wound dehiscence	4	14.8
Faecal fistula	3	11.1
Burst abdomen	Nil	-

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was then infiltrated with lignocaine. Supplementary oxygen only was given to maintain PO2 at 100. Intravenous ketamine was given at intervals to maintain anaesthesia.

All patients had right paramedian incisions. The faeces in the peritoneum was sucked out. Small bowel was inspected first (starting from the caecum) and all perforations identified. The rest of the bowel was then inspected. Use of Babcock forceps to mark sites of perforations was discouraged to prevent damage to the already friable and oedematous bowel. Multiple ileal perforations far apart were individually trimmed, and closed in 2 layers (PDS + Silk). Multiple ileal perforations close together were treated by segmental ileal resection. Ileal perforations less than 10cm from ileo-caecal junction and/or colonic perforations were treated by right hemicolectomy. Seventeen patients (63%) had trimming of the edges of the perforations and simple double-layer closure, 2 had segmental resection, 7 (25.9%) had right hemicolectomy (Table 3). The peritoneum was generously lavaged with 2-3 liters of warm normal saline.

A corrugated rubber drain was bi-valved. One part was inserted in the pelvis and the other in the right paracolic gutter. Two tension sutures of 0/nylon were inserted, and mass closure done with nylon. Skin was closed loosely with 2/0 nylon.

The triple antibiotics were continued for 72 hrs. Gentamycin was then discontinued. The 2 other antibiotics were continued parenterally for 3 days and changed to oral cefuroxime and metronidazole for 2 wks. The catheter was used to strictly monitor the hourly urine output. After 48 hours postoperatively, most patients were stable and catheters were usually removed. The wound were routinely inspected on the 4th day. If there were any signs of infection, alternate sutures were removed, and daily dressing commenced with honey. The naso-gastric tube was usually removed when the patient had passed stool 2-3 times. Graduated feeding was then commenced. The rest of the stitches were removed on the 8th to 10th post-operative day. Tension sutures were removed on the 15th postoperative day. Drains were removed when copious drainage from the peritoneum was minimal-usually the 5th post-operative day. Twelve patients had 2 perforations each, 3 and 4 patients had 3 perforations each, and 1 patient each had 14, 27 and 32 perforations (Table 2).

Fifteen patients (55.6) had superficial wound infection, 4 had wound dehiscence (2 needed secondary closure under local anaesthesia). Two patients had faecal fistula which closed spontaneously (Table.4). The patient with 14 perforations had high out-put faecal fistula. At re-laparotomy the anastomosis had disrupted, and there was another ileal perforation. She had a temporary ileostomy which was closed 1 month later. Three patients, who were referred late, died of septicaemia in the immediate postoperative period. The patients with 14, 27 and 32 perforations all survived.

Discussion

Despite extensive public health measures, the no of children presenting in our unit with intestinal perforation from typhoid disease continues to rise. We also see more cases of perforation from typhoid intestinal disease than any other tertiary institution in Nigeria.[5] Rahman[7] in 2001 reported 106 cases of operated typhoid perforations over a 16-year period (an average of 6.6 patients per year). Irabor,[3] in Ibadan, Western Nigeria, reported 183 cases over 15 years (12.2 patients per year), and Edino,[8] in North West Nigeria, 21 children in 6 years (average of 3.5 patients/year). Over the last 5 years 130 patients have been operated in this unit (average of 26 patients per year). This represents an increase from 2001 of almost 400%! The greatest no of perforations from Rahman and Irabor series were 8 with no colonic perforations.

Edino had 1 caecal perforation, but no colonic parferation. We see more colonic perforations than our counterparts in other teaching hospitals in Nigeria. We recently reported a patient with 14 (13 ileal, 1 colonic) perforations and another with 27 perforations (19 ileal, 8 colonic); both survived.[6] We recently managed a girl of 5years with 32 perforations (17 ileal, 15 colonic), she too survived. This is the highest number of perforations in a single patient we could find in the English literature. We do not have facilities to phage-type these organisms. It may be that we are dealing with a more virulent strain of salmonella or a peculiar

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decrease in host resistance in our setting.[7-9] A completely different type of organism may be responsible for the colonic perforations.

Many patients present after spending several days in a peripheral hospital. They would be dehydrated, septic and would have exhausted their funds. Intensive resuscitation, prompt use of parenteral antibiotics and accurate measurement of hourly urine output would be necessary to prevent unnecessary mortality. Deferment of payment, as done in our unit, allows us to save the patient while the parents pay later for the services. Unnecessary investigations are avoided to conserve funds. Once generalized peritonitis has been clinically confirmed, neither abdominal ultrasound or abdominal X-ray was done because no extra useful information was expected and valuable fund would be conserved.

There is an on-going research in our unit on the choice of antibiotics after typhoid perforation in children. Although others[10] have found fluoroquinolones and cephalosporins, and imipenam and meropenem more effective, most patients in our unit cannot afford these costly drugs. The cheaper and time-tested chloramphenicol seems as good. Because we cannot assay aminoglycoside levels, we always stop gentamycin after 72 hours.

We favour paramedian incisions. Our intestinal anastomosis is usually done with outer interrupted Lambert stitches using silk and inner continuous PDS or vicryl. We usually apply 2 tension sutures to prevent excessive tension on the paramedian wound. This, we believe, prevents burst abdomen. Drains are always inserted in the pelvis. The pelvis is the most dependent when the patient lies propped in bed. Most drains could be removed on the 4th or 5th day. Fifty to 90% of wounds are infected following operations for typhoid perforations.[7] Many patients have wound infection and/or wound dehiscence. The rectus muscle forms the bed for such wounds, and allows quick granulation from its good blood supply. Many cases are referred late, are hypoalbuminimic and susceptible to poor wound healing. There was no patient with burst abdomen in this series. We have found inspecting the wound on the 4th day, removal of alternate sutures and subsequent daily honey dressing to be useful. Faecal fistula after typhoid operation remains the commonest cause of mortality after 72 hours[3,8] because the patients lose fluids, electrolytes and nutrients quite rapidly. There were 3 cases of faecal fistula in our series. In our experience if the dressing needs to be changed only once a day, and the patient is still passing stool per rectum, the patient can be managed expectantly. If the fistula is high-output, such that the dressing is changed more than 3-4 times per day or the patient stops passing stool per rectum, we assume that a major circumference of the bowel is involved.

We routinely defunction the bowel by a stoma.[6] Defunctioning the bowel allows early resolution of the intraperitoneal sepsis and permits early oral feeding.

Multiple operations for faecal fistula caused one preventable mortality in Edino series. Three patients died in the early postoperative period from late presentation and septicaemia. Early presentation, prompt and vigorous resuscitation, and early operative intervention should prevent such disasters.

In conclusion the incidence of typhoid intestinal perforation continues to rise causing an unacceptable morbidity and mortality in many developing countries despite current public health measures. Children above 3 years are usually affected. Single perforations are most common but multiple ileal and/or colonic perforations not common previously now begin to occur. Effective typhoid vaccine to cover all strains of salmonella is urgently desired.

Our hope is that this detailed outline will serve as template for other surgeons working in typhoid-endemic areas in the management of this sub-set of patients.

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