

Fifteen years of typhoid perforation in children in Ibadan: still a millstone around the surgeon's neck

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Abstract

Objective: To study the disease of typhoid in children over a significant period of time, in this case 15 years to see whether there have been any changes in presentation, mode of treatment, morbidity and mortality rates.

Method: A retrospective study of 183 children operated on for typhoid ileal perforation in 15 years.

Results: All the patients were resuscitated with intravenous infusions of normal saline, nasogastric tube decompression, correction of deranged electrolytes. Antibiotic treatment was started with intravenous chloramphenicol and metronidazole with or without gentamycin prior to 1996 and intravenous ofloxacin (ciprofloxacin or pefloxacin) with metronidazole from 1996 till date. All patients had exploratory laparotomy under general anaesthesia and endotracheal intubation with closure of the perforations in two layers for most of the patients and ileal resection with end-to-end anastomosis or right hemicolectomy in a few patients.

Conclusion: Incidence rates at 5-yearly intervals seem to be decreasing and mortality rates seem to be increasing. Complications seem to remain unchanged in spite of different surgical techniques and newer anti-salmonella drugs.

Key words: Typhoid perforation, children, morbidity, mortality

Introduction

Perforated typhoid ileitis remains a serious disease, causing significant morbidity and mortality in both adults and children. About 50% of all admissions for perforated typhoid are in the paediatric age group.^{14, 18, 35} It is disheartening that an infectious disease like this can continue to cause sorrow for so long without control in spite of all the published work done on this disease.

We have moved into an age when the world is now described as a global village with information dissemination and communication facilities beyond our hitherto wildest dreams, yet the spectre of this dreadful disease over the last 15 years is still as menacing as it was 30 years ago.

This paper aims to examine the impact of the evolution of different surgical techniques, newer antibacterial drugs and supposedly improved living conditions on the picture of this dreadful disease.

Materials and Methods

A retrospective study of 183 patients operated on for typhoid ileal perforation spanning 15 years. The case files, operating room records were studied. All the patients were resuscitated with intravenous infusions of Normal saline, nasogastric tube decompression, correction of deranged electrolytes. Antibiotic treatment was started with intravenous chloramphenicol and metronidazole with or without gentamycin prior to 1996 and intravenous ofloxacin (ciprofloxacin or perfloxacin) with metronidazole from 1996 till date. All patients had exploratory laparotomy under general anaesthesia and endotracheal intubation with closure of the perforations in two layers for most of the patients and ileal resection with end-to-end anastomosis or right hemicolectomy in a few patients.

Results

Age range was 3 to 14 years. There were 111 males and 72 females. M: F ratio = 1.5:1.

Majority of patients (73.2%) were between 7 and 12 years (134). The mean age was 8.75 years. Seasonal incidence revealed twin peaks; April, May, June and December, January.

Clinical features

Most of the patients presented two weeks after developing a febrile illness. Persistent abdominal pain with distension occurred after ten days of this fever, which was unresponsive to antimalarials. The shortest presentation was a one-day history of fever, abdominal pain and distension.

Many patients presented in hospital within 48 hours of developing abdominal pain and distension. All patients had generalised abdominal tenderness. Vomiting was recorded in all the patients. Ninety percent of the patients were febrile

at presentation with the range of recorded temperatures between 36.5 to 40°C. The mean temperature was 38.4°C. There was no record of any patient having jaundice in this series. The mean pulse rate was 127/minute (range 89 to 168/minute) while the mean respiratory rate was 45/minute (range 20 to 80/minute).

The packed cell volume range was 26 to 45% with a mean of 32% and after adequate rehydration was 20 to 33% with a mean of 27%.

One hundred and sixty-eight electrolyte and urea results were available. The mean potassium was 3.6 meq/liter (range 2.3 to 5.4 meq/liter), mean bicarbonate was 18.1 meq/liter (range 10 to 35 meq/liter), mean urea was 57 meq/liter (range 10 to 180 meq/liter). Radiological examinations comprising plain chest and/or abdominal x-rays in the erect positions were requested in 143 patients. Of these 87 had pneumoperitoneum (61%) in addition to multiple air/fluid levels whilst the others had multiple air/fluid levels only (44 patients) and scanty bowel gas-shadows (12 patients).

Operative treatment

At operation the amount of fecopurulent peritoneal fluid recorded ranged from 350 to 900 millilitres with an average of 550 millilitres. Multiple perforations were seen in 15.3% of the patients (28 patients), range of 2 to 8 perforations, mean of 3 perforations.

Majority had single perforations (84.7%). The distances of these perforations from the Ileocaecal junction ranged from 2.5 to 40 centimetres with a mean of 18.5 cm. The operations performed included simple closure in two layers in 174 patients, ileal resection and end-to-end anastomosis in 4 patients and right hemicolectomy in 5 patients.

Morbidity and mortality

Hospital stay for survivors was 11 - 54 days (mean 24.6 days). Wound infection occurred in 87.5% (160) patients.

Partial wound dehiscence occurred in 40 patients leading to incisional herniae (21.86%). Faecal fistula occurred in 29 patients (16%) of which 13 patients died.

The mortality rate was 21.3% (39 patients, 17 males and 22 females) with a male: female ratio of 1: 1.3. Twenty of these patients died within 24 hours postoperatively, 6 died about 3rd to 5th day whilst 13 of the 29 patients with faecal fistula died about 20 to 29 days post operation.

Incidence rates

A look was taken at the 5-year incidence rates, mortality rates and male: female ratios for comparison; the results are as follows:

From 1985 to 1990, a total of 76 patients were operated upon, 48 males and 28 females (M: F ratio of 1.7: 1) with 12 mortalities (Mortality rate of 15.7%, 2 males, 10 females).

The period 1990 to 1995 saw a total of 62 patients, 36 males and 26 females (M: F ratio of 1.4: 1) with a mortality rate of 21% (13 patients died, 7 males, 6 females). 1995 to 2000 yielded 46 patients, 27 males and 19 females (M: F ratio of 1.4: 1) with 14 mortalities giving a mortality rate of 30.4% (8 males and 6 females).

Discussion

A millstone is described figuratively as a very heavy burden¹ and when it is around one's neck it is synonymous with "a sea of troubles", "a thorn in the side" and "a crown of thorns"², to mention a few.

Describing typhoid perforation as the surgeon's millstone aptly explains the problems involved with managing this disease in terms of the mental anguish experienced (by both the family members of the patient and the involved surgeon) regarding the morbidity, mortality and economic drain that ensues.

A total of 183 patients in the paediatric age group were operated on in

the 15-year period studied with a male preponderance, which agrees with the reports perused,^{3-26, 29,30,35} 73.2% were within 7 and 12 years, the age when close parental supervision relaxes. Our mean age was 8.75 years; others have reported 7 years, 7.2 years and 11.4 years (Guatemala³, Natal⁴ and Ogbomoso⁵ respectively). The twin peaks observed correlated to the rainy and dry season and one or both were reported by other authors,^{3, 4,6,7,8} however the study in Ogbomoso, Nigeria did not observe any seasonal variation⁵.

The clinical features of this disease viz. fever; abdominal pain, abdominal distension and vomiting have been fairly constant over the last 30 years and render this disease recognizable.^{5, 7,9-11}

Most of our patients are anaemic on presentation as suggested by their packed cell volume. This may be due to haemolysis and bone marrow suppression from sepsis and also from an immunological basis.^{6, 12} Cardiovascular instability may be inferred from the tachycardia and tachypnoea that most of the patients presented with; toxic myocarditis and secondary bronchopneumonia are complications of this disease that may be contributory.^{6, 12}

Many authors have found the incidence of pneumoperitoneum to be between 50-80% which agrees with our findings of 61%,^{3,6-8,13} however the relevance of this examination is yet to be determined with regards to diagnosis and prognostication^{4, 5,6,8,11,15,16}.

The types and frequencies of the various postoperative complications have remained fairly constant and have not changed much over the last 33 years regardless of the surgical technique. (Table 1). The mortality rates similarly have remained largely unchanged averaging 31% with a few reports below 10%^{14,17} and below 20%.^{11,16,18-20}

The various surgical procedures that have been tried for this disease will only be listed here as they have been already adequately analysed in other reports.¹⁶

Table 1: Post-operative complications in various published reports

Complications	Archampong 1969	Olurin 1972	Kuruwilla 1978	Eggleston 1979	Arigbabu 1980	Lizarralde 1981	Keenan 1984	Rahman 1998
Respiratory	16.5%	---	13%	20.5%	11.1%	17%	57%	---
Wound infection	53%	79.3%	26%	6.4%	---	---	33%	40.7%
Intraabdominal abscess	1.65%	31%	---	3%	10%	8%	---	---
Fascial dehiscence	2.5%	12%	6.4%	4%	37.5%	34%	---	8.8%
Faecal fistula	3.3%	20.7%	6.5%	5%	10%	8%	10%	2.2%
			13%	5%	10%	8%	10%	
			9%	10%	10%	8%	10%	
			23.23%	13.6%	10%	8%	10%	

These procedures include blind drainage, simple closure in one layer, simple closure in two layers with or without simple drainage or with continuous peritoneal irrigation, purse-string closure, simple closure plus total parenteral nutrition, wedge excision, ileal resection with end to end anastomosis, end to side ileotransverse anastomosis, side to side ileotransverse anastomosis, right hemicolectomy, ileostomy and finally, lateral tube ileostomy using a T-tube.^{3-26, 29,30,35}

The proponents of each have tried to justify the techniques but many admitted that though mortality rates have not changed or even became higher^{4, 8,16,21}, the morbidity of surgery may be reduced by side to side ileotransverse anastomosis^{8, 16,20,21}. My comment on that, borne out of personal experience on an adult patient, is that a fatal Beri-Beri consequent upon a blind loop created by an efficient defunctioning of the distal ileum and ascending colon can occur 5 years later. The author's opinion is that one should practice what works in that centre or locality.

Typhoid surgery is an emergency that is usually done "after hours" thus carried out by different cadres of doctors.²² The advice given traditionally in the U.C.H. Ibadan is to do the simplest and quickest¹⁶ in order to reduce time spent under anaesthesia, this is why simple closure in 2 layers is traditionally practiced unless other factors influence the operation e.g. multiple perforations too close together or too close to the ileocaecal junction, then ileal resection or a right hemicolectomy may be preferred.^{4, 11,22-24} The mortality rates quoted in publications from the U.C.H. Ibadan are 31%, 36%, 28%, 28.6%, 25% and 25%^{7,13,16,26,30} to which this study's report of 21.3% is now added. These values are at par with various rates quoted for other surgical techniques except the anecdotal rates below 10%.^{3-26,29,30,35}

In the mid-1990s antibacterial drug therapy for typhoid changed to the

ofloxacin because of emerging chloramphenicol resistance^{4, 27} and also because these new drugs were reputed to be rapidly bactericidal, less toxic and treatment time was shorter.^{28,31,32}

From 1995 till 2000, the absolute numbers of patients in this study reduced but the mortality rate increased from 15.7% (1985-1990) to 30.4%. Increased virulence of the bacterium, increased host susceptibility because of poverty and malnutrition and emerging resistance to the ofloxacin may have contributed to this.

We have looked at 15 years of typhoid perforation in children in Ibadan yet we have found no appreciable improvement in the results quoted 30 years ago and now.

Why such mortalities? These may be due to factors related to the disease, the patient and the environment.

The disease

Typhoid affects several organs in the body⁴ especially the heart, lungs, kidneys and intestinal tract.^{9, 34} This is mediated either via endotoxins¹² and/or Shwartzmann/Sanarelli type of hypersensitivity reaction³³. Death of the organism supposedly releases an endotoxin which causes cloudy swelling and necrosis of the heart and voluntary muscles respectively in addition to laryngitis, bronchitis and pneumonia due to either the bacterium itself or secondary bacterial invaders following a general lowering of resistance from the toxæmia.¹²

The Shwartzmann/Sanarelli phenomenon characterizes the capability of endotoxins of producing shock by some type of sensitisation.³³ The original observations of Sanarelli were generalized whilst the Shwartzmann phenomenon was a local effect³³. Thus the ulceration of the Peyer patches at the second coming of the typhoid bacillus is an example of initial sensitisation and subsequent damage occurring locally^{11, 16,33} and this may occur in a generalized manner to

damage the heart, lungs, liver, kidneys, spleen and the bone marrow. It has been reported that antibiotics do not prevent the complications of bleeding and perforation,^{8-10,15,22,24,27} thus lending credence to the afore-mentioned mechanism.

The patient

The paediatric patient with a less-than-optimum immune system, malnourished because of poverty,¹⁷ born to ignorant semi-literate parents who obtain drinking or cooking water from any source, live in dwellings where sanitary disposal of human and animal waste is lacking³⁵ is defenceless towards the ravages of this disease.

The environment

Lack of pipe-borne potable water supply is the bane of many developing countries. If indeed there is pipe-borne water, in many instances it is not potable! The permissiveness of a new democratic dispensation allowed all sorts of "pure-water" being sold in sachets to an unwary public coupled with unfulfilled political promises about providing pipe-borne water to their constituencies enabled the typhoid scourge to endure. The fastest selling antibacterial agents, in Ibadan, Nigeria, are those to cure typhoid. Thus it is not surprising that fake ofloxacin and fake chloramphenicol are now being sold. We have reports showing that resistance of the salmonella to ofloxacin has occurred in some areas³⁶, but the author has not seen any report from Nigeria yet however this does not negate the possibility.

By the time the unfortunate child presents to the hospital, he/she is already anaemic with cardiopulmonary strain, questionable renal integrity and septicaemia and whatever operation the child is exposed to can only benefit roughly one out of three and the survivors will end up having any one of wound infection, burst abdomen, faecal fistula or bronchopneumonia.

The way forward must include a WHO global initiative to ensure potable water to as many nooks and crannies of developing countries as possible, development of effective typhoid vaccines and probably another look at standardising usage of corticosteroids which may help protect the vulnerable tissues from endotoxaemia and hypersensitivity-related damage.^{4, 7,8,16,23,26,35}

Typhoid perforation at present may well be the "mammary cancer" of gastrointestinal infectious lesions where the more elaborate its attempted cure the less one achieves. The surest cure necessarily lies in its prevention.^{4, 35} A severance of the faeco-oral link will save the lives of many children.

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