A review of typhoid perforation in a rural African hospital

***E. A. Agbakwuru, A. R. K. Adesunkanmi, S. O. Fadiora, O. S. Olayinka, A. O. A. Aderonmu[1] and O. O. Ogundoyin**

Department of Surgery, Obafemi Awolowo University Teaching Hospital Complex, Ile–Ife, Nigeria &
[1]Ladoke Akintola University of Technology Teaching Hospital, Oshogbo, Nigeria.

Summary

In Wesley Guild Hospital Ilesa in the South – West region of Nigeria a retrospective study of 105 consecutive cases operated upon for typhoid perforation between January 1988 and November 2001 was carried out.

The ages of the patients were between 4 to 70 years with a mean age of 19.2 ± 8.81. There were 84 males (80%) and 21 females (20%) giving a ratio of 4:1. Diagnoses were based on clinical and radiological findings.

All the patients had laparotomy after resuscitations with intravenous fluids, electrolytes replacement, broad spectrum antibiotics, Nasogastric intubation/suctioning and urethral catherterisation. There were five negative laparotomies (4.8%). Eighty patients (76.2%) had a single perforation, while the rest 20 had multiple perforations. The perforations were located between 7cm and 100cm from the ileo-Caecal junction. Apart from the patients who had resection and primary anastomosis, 95(90.5%) had 2 layered closure of the perforation.

The most common complications were wound infections (26.7%). Intra-abdominal abscesses (9.5%) and would dehiscence (7.6%).

The mortality rate was 16.2% showing a remarkable improvement in the West African Subregions.

Keywords: ***Typhoid, Perforation, Rural-setting, Morbidity, Mortality.***

Résumé

Dans l' Hôpital Wesley Guild d'Ilesa dans la région sud-ouest du Nigeria, une étude rétrospective des 105 cas consécutifs, opéres atteints de la perforation typhoidique entre janvier 1988 et novembre 2001 a été effectuée. Les patients étaient dans la classe des 1 – 70s avec l'âge moyen de 19,2 ± 8,81.

Il y avait 84 males soit 80% et 21 femmes soit 20% ce qui rend une proportion de 4:1. Les diagnostiques ont été basés sur des résultats cliniques et radiologiques.

Tous les patients avaient subi le traitement de la laparotomie après des réanimation avec un replacement des liquides électrolyte intraveineux et sur antibiotique au spectre d'action très large, intubation/ventouse nasogastrique et cathétérisme urètre. Il y avait cinq laparotomies négatives soit 4,8%. Quatre vingt patients soit 76,2% avaient eu la perforation toute seule tandis que les autres vingt avaient des perforations multiples. Les perforations ont été situées entre 7cm et 100cm de la jonction caecum iléon. Sauf des patients qui avaient subi le traitement de la résection et anastomose primaire. 95 soit 90,5% avaient 2 fermetures en couche de la perforation.

Des complications les plus fréquentes étaient des blessures à travers des infections 26,7% abcès intra-abdominaux 9,5%, et des blessures a travers la déhiscence 7,6%. Le taux de la mortalité était 16,2% ce qui indique un progrès remarquable dans la sous région de l'ouest africain.

Introduction

Typhoid fever has remained a major public health problem in the developing countries of the World with an estimated annual incidence of 540 per 100,000[1].

It is a systemic bacteraemic infection caused primarily by human pathogens *Salmonella typhi* and *Salmonella paratyphi* which are endemic in the economically disadvantaged nations of Africa, Asia, South and Central America[1]. Man is the main source of the infection and transmission occurs through contamination of food or water with faeces or urine of a patient or chronic carrier[2]. It can also be transmitted via a formite contamination of the hand introduced into the mouth.

Despite the classical clinical features recognised and analysed by Byron and Roscoe five decades ago[3], selection of pathognomonic symptoms and signs for diagnosis of typhoid fever has sometimes proved difficult[4]. This difficulty becomes more intriguing in places (such as West Africa) where there is a number of diseases conditions though less grave but with initially similar features such as malaria, amoebic liver abscess, *Brucellosis,* and *Tuberculosis*[2-5]. This often delays diagnosis and institution of therapy which may contribute to high rate of perforation. After perforation, the complication is compounded by the release of *Enterobactericae, Bacteroides fragilis* as well as faecal matter from the gut lumen into the peritoneal cavity. These obviously highten the level of toxaemia and septicaemia with the clinical condition worsening . Unless prompt and appropriate therapy is instituted, the morbidity and mortality rate remains high.

However it has been shown that prompt, adequate resuscitation with fluids, electrolytes, antibiotics and surgical intervention may make a lot of positive difference in the overall survival rates[5-14]. Ajao O.G. in 1983[15] demonstrated that the use of steroids in addition to antibiotics and early[16] surgical intervention reduced the mortality rate in typhoid perforation.

Earlier on in 1980, Badejo and Arigbabu had used postoperative continuous tube irrigation with saline and Chloramphenicol and recorded very low mortality rate of 3%[17].

With the trend over the years from non operation to early surgery[6-14] steroid[13], in addition to antibiotics[2] plus continuous peritoneal irrigation and with improving facilities for making early diagnosis of typhoid perforation, it is expected that there should be corresponding decrease in mortality rate.

The purpose of this work was therefor aimed at Re-evaluating morbidity and mortality among our patients with typhoid perforation.

Patients and method

The case notes of 105 patients who were operated upon for typhoid perforation at the Wesley Guild Hospital, Ilesa, Nigeria over a 1-year period (January 1988 – November 2001) were studied. (This is one of the units of Obafemi Awolowo University Teaching Hospital Complex, Ile–Ife). The ages, sex, clinical features, perioperative investigations, operative find-

*Correspondence

ings, procedure carried out as well as outcome and complications were collected and analysed.

Results

The ages ranged between 4 years and 70 years with a mean age of (19.2 ± 8.81). The highest incidence occurred in the 11 to 20 years age group (Table 1 and Figure 1). There were 84 males (80%) and 21 females (20%) with male/female ratio (M:F) of 4:1 (Table 1).

The clinical features recorded (Table 2) showed that all

Table 1 Age and sex distribution of 105 patients operated upon for perforation

Sex	Age range							
	0–10	11–20	21–30	31–40	41–50	51–60	60 – 71	Total
Male	20	34	11	9	4	3	3	84
Female	7	9	2	3	0	0	0	21
Total	27	43	13	12	4	3	3	105
%	25.7	41	12.4	11.4	3.8	2.9	2.9	100

the patients had dehydration, abdominal pain, pyrexia and tenderness in the abdomen. Ninety-seven (92.4%) of them had fever while diarrhoea, occurred in (67.6%). Thirty-four patients (32.4%) had constipation, while only 17(16%) had decreased dullness over the liver area.

Seventy patients (66.7%) had abdominal X-ray films available for review. Out of these 70 patients, 54 (77.14%) had pneumoperitoneum.

The pre--operative diagnoses in most cases were based on clinical features and X-ray findings.

Histopathological examination of excised tissues from the edges of ileal perforations were typical of Chronic inflammation in the 92 patients (infiltration by monocytes, lymphocytes and plasma cells).

Table 2 Principal clinical features of the 105 cases operated upon for typhoid perforation.

	Symptoms and signs	No. of patients	percentage
1.	Fever	97	92.4
2.	headache	61	58.1
3.	Abdominal pain	105	100.0
4.	Consipation	34	32.4
5	Diarrhoea	71	67.6
6.	Vomiting	53	50.5
7.	Dehydration	105	100.0
8	Pyrexia	195	100.0
9.	Abdominal Distension	29	27.6
10.	Abdominal tenderness	105	100.0
11.	Reduced liver dullness	11	10.5
12.	Absent bowel sounds	70	66.7

Management

All the patients were resuscitated by administration of intravenous fluids (5% Dextrose saline and Ringers solution), decompression of upper gastrointestinal system with nasogastric tube, and urethral catheterization for urinary output (tissue perfusion) monitoring. Also intravenous broad spectrum antibiotics were administered based on previous reports[6,13] (Table 3).

Table 3 Antibiotics used pre and post-operatively in the typhoid perforation cases

Antibiotics	No. of patients	percentage
1. Chloramphenicol 250–500mg 6–hourly Gentamycin 80mg 8-hourly (mg per kg per day) Metronidazole 250–500mg 8 hourly	63	60.00
2. Chloramphenicol Metronidazole	21	20.00
3. Ciprofloxacin 100mg–200mg 12-hourly Metronidazole	16	15.2
4. Zinacef 370mg –750mg 12-hourly Metronidazole	5	4.8

Sixty percent of the patients had a combination of *Chloramphenicol. Gentamycin* and *Metronidazole* pre and post operatively. Twenty percent had *Chloramphenicol* and *Metronidazole* , 15.2% had *Ciprofloxacin, Gentamycin and Metronidazole*, while 4.8% had *Zinacef (CeftriZaxone) and Metroniodazole*. The operative findings were recorded in (Table 4). Using Mock CN *et al* classification[16] the degree of contamination assessed intraoperatively showed 20 patients (19%) with minimal contamination (peritoneal exudates limited to one quadrant of the abdomen with no obvious feacal spillage and eighty-nine patients (84.8%) with gross contamination (Purulent peritoneal exudates extending through more than one quadrant or obvious feacal spillage) Typhoid peritonism was noticed in 5 patients with no frank perforation (4.8%), while twenty 20 patients (19%) had multiple perforations (Table 4). All the perforations were in the distal ileum on the antimesenteric border. The shortest distance from the ileo caecal junction was 7cm and the longest distance was 1000cm.

Table 4 Operative findings

Findings	No. of patients	percentage
1. Purulent peritoneal fluid	89	84.4
2. Intestinal perforation	100	95.2
– Single	80	76.2
– Multiple 2 perf = 11 3 perf = 4 4 perf = 3 5 perf = 2	20	19.0
3. Local collection of purulent fluid	20	19.0
Both paracolic gutters	5	4.8
Subphrenic spaces	8	7.6
Pelvics	7	6.7
4. Faecal contamination	11	10.5
5. Negative laparotomy	5	4.8

Operative procedure

Table 5 Operative procedure

Procedure	No. of patients	percentage
1. Double layered closure after excision of edges	95	90.5
2. Resection and end to end anastomosis	5	4.8
3. Warm saline peritoneal lavage	105	100

Table 6 Post–operative complication

Complication	No. of patients	Percentage
Wound infection	28	26.7
Intra abdominal collections	10	9.5
Wound dehiscense	8	7.6
Hypertrophic scar	5	4.8
Incisional hernia	5	4.8
Entrocutaneous fistula	3	2.9
Re-Perforation	2	1.9
Intestinal obstruction	2	1.9
Death	17	16.19

Table 7 Mortality rate in patients operated upon for typhoid patients

Age group	Total No. of patients age group	Mortality	Mortality rate (%)	Over all MR No 105
0 – 11	27	2	7.4	1.9
11 – 20	43	5	11.6	4.8
21 – 30	13	7	53.8	6.7
31 – 40	12	3	15	2.9
>40	10	0	0	0
Total	105	17		16.2

A two layered closure with 2.0 chronic catgut and 2.0 silk was performed in 95 patients. Resection and primary end-to-end anastomosis was performed in 5 patients (with 4 to 5 perforations). All 105 patients had warm saline lavage; 95 patients had tube drainage placed in the recto-vesical pouch and brought out through a separate stab wound Primary skin closure was done in 27 patients while secondary closure was done in 78 patients. The time interval between diagnosis and operation was one day in 44 patients and two days in 61 patients.

Complications

The most frequent complications were superficial wound infection (26.7%) and intra abdominal abscess (9.5%). Wound dehiscence occurred in 8 patients (7.6%) (4 deep ones in those with secondary wound closure and 4 superficial ones in those with primary wound closure). Incisional hernias, hypertrophic scars occurred in 4.8% of the patients respectively while enterocutaneous fistulae, and re-perforation occurred in 2.9% and 1.9% of the cases respectively.

The overall mortality rate was 16.2%, it was highest among patients with multiple perforations and those with gross abdominal contamination.

With consideration of the number of cases in each age groups, the highest mortality rate was recorded in the 21–30 age group followed by 31–40 and 11–20 groups (Table 7). The male – Female mortality ratio was 3:1.

Discussion

The time of intervention has been demonstrated to be one of the prime factors affecting outcome of the treatment[5,6,12]. As has been reported by previous workers, the poor attempt by the adjacent loops of bowel to wall off the perforation cannot be relied upon as the loops are usually held together by fibrinous exudates which easily slide off with the return of good peristaltic movements[1,2,9].

Procrastinating after diagnosis[12] of perforation can only prolong the perforation operation interval. This may allow for more peritoneal contamination with subsequent poor prognosis[16]. The age and sex distributions are similar to most previously reported series[9,5,6,11,16–19].

Our figures show that typhoid perforation still occurred predominantly in males. The highest incidence appears in the first and second decades contrary to previous reports[6,11,12]. The mean ages have, however, remained the same[5,6,11,16 - 19].

The increasing occurrence in the first decade of life may be due to increasing number of younger children attending school away from home with the necessity of patronising food hawkers. There is also the habit of allowing these children to help themselves in the toilets with attending risk of faecal contamination.

The symptoms and signs of typhoid perforation have not changed much over the past 3 decades[5,6,11].

Pneumoperitoneum demonstrated radiologically can be useful in reinforcing late diagnosis of perforation. Similar experience had been reported by previous worksers[11,17,20].

There was no record of drug induced aplastic anaemia from the use of Chloramphenicol in this series. However, because of some reported cases of the complication in other centers in Nigeria[22] as well as large scale resistance to chloramphenicol[2,21] other drugs such as ciprofloxacin and ceftrizaxone[2,21] are currently being used.

As in many other reports most patients had only one perforation[10,11,12]. The location of the perforations occurred between 7cm and 100cm from the ileo-caecal junction. This range is similar to most reports[6,13,16] but the longest distance of 100cm in this series is not common.

Debridement with two-layered closure of the perforation is the recommended surgical procedure. Despite the recognised fact that delay between perforation and operation is associated with high mortality rate[5,6,8], our series show that 63 (60%) of the patients had to wait for duration of 24–48 hours after diagnosis of perforation before surgical intervention. These were mostly due to poor anesthetic risks as well as delay in estimating electrolytes and urea level in the serum by the chemical laboratory department.

There was enterocutaneous fistula in 2.9% while reperforation was recorded in only 19%. Similar findings had been reported by previous workers[11,12,18] though the frequencies were much lower in the present series probably due to improved method of management over these years. However, frequency of the wound sepsis has remained high[11,13,18]. This is not surprising as the abdominal operational wound is usually heavily contaminated at surgery from the peritoneal abscess commonly encountered (Table 4). This again stresses the need to leave the skin and subcutaneous layer open for secondary wound closure. The mortality rate recorded in this series in 16.2% The commonly reported mortality rate ranges from 20 – 40%[16,10,11,12–24]. Apart from the single report of 3% mortality rate from a comparative study where through and through peritoneal chloramphenicol – saline irrigation was used in Ile-Ife, Nigeria[17] rates as low as 3% have mostly been reported from various areas of the developed world with better economic conditions[23,24,25,26].

Thus, for the West African subregion, the mortality rate of 16.2% recorded in this series can be regarded as a remarkable improvement on surgically managed typhoid perforation. Although the number of patients offered the combination of Ciprofloxacin plus Metronidazole or Ceftrizaxone plus Metronidazole was small, the authors would suggest use of either of the combinations for typhoid perforation based on the observa-

tion that mortality improved with introduction of these drugs.

Also in this series, the highest mortality rate was recorded in the third decade. This is similar to other reports[13] the male – female ratio was 4:1 and this appears to be related to the studied population sex ratio.

Conclusion

Despite the global scientific development, typhoid fever and perforation have continued to be common. The symptoms and signs have not changed. There is however, an apparent improvement in the mortality rate of surgically managed typhoid perforation. Early report to hospital, early diagnosis, effective resuscitation and early surgical intervention continue to be emphasised. As a means of reducing occurrence of typhoid infection and later perforation, Governments should constantly be reminded to improve water supply, drainage systems, waste disposal systems, while individuals should be encouraged to practise good personal hygiene.

Acknowledgements

Our thanks go to Professor Ajayi A and Professor Dare O for their advice and the typist (Mrs. Ajayi O. Esther) for her secretarial assistance.

References

1. Review Van–Basten JP, Stockenbrugger R. Typhoid perforations. Review of the literature since 1960: tropical and Geographical Medicine 1994; 46: 336 – 339.
2. Aal Hamour Abuobeida Abdel. Typhoid and paratyphoid (enteric fever) Africa Health 1966; 18: 41 – 15.
3. Byron MS, Roscoe LP. Typhoid clinical analysis of 360 cases. Arch of Intestinal Medicine 1946; 78: 629 – 661.
4. Parry EHO. Typhoid fever in: Parry EHO Ed. Principles of Medicine in Africa (2nd Ed.) Oxford University Press 1984; 268 – 276.
5. Ejips Van Der Werf and Fional S. Cameron typhoid perforation of the ileum. Review of 59 cases. Trop and Geog Med. 1990; 42: 330 – 336.
6. Archeampong EQ. Typhoid ileal perforation why such mortalities. Br. J. Surg. 1973; 63: 317 – 321.
7. Adeloye A. Typhoid fever in: Adeloye A and Davey's companion to surgery in Africa (2nd Ed.) Churchill Living stone 1987, 309 – 316.
8. Buler I, Knight J, Nath SK, Spleenlman P, Roy SK, Azad mak. Typhoid fever complicated by intestinal perforation. A fatal disease requiring surgical treatment. Review of Infect. Dis. 1985; 72: 244 – 56.
9. Bitar R, Tarplay J. Intestinal perforation in typhoid fever. A historrical and state of art review. Review of Infect. Dis. 1985, 7, 2: 257 – 71.
10. Ikeme AC, Anan CO. A clinical review of typhoid fever in Ibadan. J. Nig. Med. Association 1966; 4: 26 – 35.
11. Olurin EA, Ajayi OO. Bohrer SP. Typhoid perforation J Roy. Coll. Surg. Edin 1972; 17: 353 – 363.
12. Ajao OG. Typhoid perforation. Factors affecting mortality and norbidity. International Surg. 1982; 67: 317 – 319.
13. Archeampong EQ. Operative treatment of typhoid perforation of the bowel. Br. Med J. 1969; 3: 273 – 276.
14. Badoe EA. Potassium losses in typhoid peritonitis in Korrle Bu Teaching Hospital, Ghana Med. J 1973; 12: 188 – 190.
15. Ajao OG, Ajao A, Johnson Tinuke. Methylprednisolone sodum succinct (solumedrol) in the treatmeent of typhoid perforation (A preliminary report). Transactions of the Royal Society of Tropical Medicine and Hygiene 1983; 78: 573 – 576.
16. Mock CN, Amaral J, Visser LE. Imoprovement in survival from typhoid heal perforations. Ann. Surg. 1991; 215: 244 – 249.
17. Badejo OA, Arigbabu AO. Operative treatment of typhoid perforations with peritoneal irrigation: A comparative study. Gut 1980, 21: 141 – 5.
18. Adesunkanmi ARK, Ajao OG. Perforated typhoid and perforated appendicitis: A prospective study of 76 patients. Nigeria med. J. 1996; 30: 20 – 22.
20. Murya SD, Gupta HC, Liwari A, Shanna BD. Typhoid bowel perforation. A review of 264 cases. Int. Surg. 1984; 69: 155 – 8.
21. Mandal BK. Salmonella typhi and Salmonellas. Gut 1994; 35: 726 – 728.
22. Durosinmi MA and Ajayi AA. A prospective study of Chloramphenicol induced aplastic anaemia in Nigeria. Tropical and Geographical Medicine 1993; 44: 159 – 161.
23. Kim JP, Oh SK, Jarret F. Management of ileal perforations due to typhoid fever. Ann Surg. 1975, 181: 88 – 91.
24. Meret DF, Imedigwu OO. Tarplay JL. Perforated typhoid enteritis. Operative experience with 108 cases. Ame J. Surg 1989; 157 – 423 – 427.
25. Keenan JR, Hadley GP. The surgical management of typhoid perforation in children Br. J. Surg. 1981; 7: 928 – 929.
26. Li FWP. Surgical management of typhoid perforation of typhoid perforation of the intestine. Br. J. Surg. 1963; 50: 976 – 979.