

MEDICAL PRACTICE

Outside Europe

Typhoid Fever in Young Children

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Summary

One hundred and fifty cases of typhoid in infants and young children are reported. In children over 5 years of age the features resembled those in adults, but in those under this age they were often nonspecific including fever, convulsions, diarrhoea, and vomiting. Attention is drawn to the importance of a blood culture in anaemic afebrile children who develop rigors and high fever after blood transfusions.

Introduction

Typhoid fever is a major health problem in Nigeria and still has a high mortality.^{1 2} A study of the clinical details of all typhoid patients admitted to the Wesley Guild Hospital, Ilesha, resulted in an increased awareness of the disease in all age groups, including young children. This paper records our experience during 1964-9 inclusive of 150 children under the age of 10 proved to have typhoid. All cases of paratyphoid are excluded.

Patients

During the six years a total of 357 patients suffering from typhoid fever were admitted to the hospital. Their age distribution is shown in Table I. Fifteen were aged under 1 year, of whom five were less than 6 months. The population at risk used for calculating percentages was derived from a village survey at Imesi near Ilesha by Woodland.³ It has usually been stated that the maximum incidence of the disease is in the age group 10-19 years, but no previous study has attempted to put the figures into the context of population

TABLE I—Age Scatter of Typhoid Patients Admitted to Hospital 1964-9

Patients	Age in Years						
	<2	2-5	6-9	10-19	20-29	30-39	≥40
Males	24	23	34	} 99	57	33	18
Females	27	17	25				
Total	51	40	59	99	57	33	18
Percentage of population at risk	9.3	12.3	22.1	22.1	10.0	12.3	11.9
Percentage of total admissions	14.3	11.2	16.5	27.8	16.4	9.2	5.0

at risk. Our figures show that the disease is no more rare in young children than in other age groups and may even be more prevalent. There is no significant difference in incidence between the sexes.

It has been suggested that the incidence of typhoid is greater at the beginning and end of the rainy season, but the figures are inconclusive. Most of the patients (60%) came from Ilesha, which has piped water and also more medical services. A previous paper² showed that villages with the best medical facilities transferred most cases for admission, and it was deduced that diagnosis depended on the availability and competence of medical care. There were pronounced fluctuations in the number of cases, a constant trickle being interspersed with major outbreaks.

Clinical Picture

Fever was present in almost every case. Malaria was not a major concomitant factor and parasites were present in only six patients. In 10 cases pyrexia became apparent only after transfusion for severe anaemia. Three children under the age of 1 year, admitted with kwashiorkor, dehydration, and convulsions respectively, were apyrexial. Febrile convulsions occurred in 28% of children aged under 3. The incidence decreased with age, though five children of over 5 years of age had convulsions. There were also nine cases of delirium

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and three of drowsiness, making with the cases of convulsions a total of 47 patients (30%) with signs of major nervous system involvement.

Diarrhoea was present in just over a third of the cases, and its incidence decreased with age. The incidence of vomiting, present in a similar number of cases, increased with age. Constipation was only an occasional feature. One-third of the children aged over 5 complained of abdominal pain, but it was difficult to elicit complaints of pain from younger children. Likewise general aches and pains were more common in the older age group.

Anaemia was a pronounced feature in the very young (Table II). Estimations were made by the oxyhaemoglobin method and using a photoelectric colorimeter. The number

TABLE II—Laboratory Procedures and Results by Age

	< 2 years	2-5 years	6-9 years
Total patients	51	40	59
Positive blood culture	34	22	21
Negative blood culture	1	3	4
Positive stool culture	10	2	0
Negative stool culture	1	5	5
Widal anti-O titre to 1/120	1	3	9
Widal anti-O titre 1/120+	11	12	25
Widal anti-H titre to 1/120	4	0	7
Widal anti-H titre 1/120+	3	3	19
Sickle positive	4	5	4
Hb not recorded	12	10	28
Hb less than 40% (20% in parentheses)	16 (4)	12 (2)	8 (0)
Hb 40-59 %	10	14	14
Hb 60%+	12	4	10
Patients transfused	10	10	9
Malaria positive on admission	4	1	1

of sicklers reflects the general population findings. Coincident malaria as a factor in the production of anaemia is not excluded by the small number of cases with a positive parasite count on admission, since most patients would have had routine dosage with antimalarials for their fever when they first attended an outpatient clinic, possibly several days before admission.

Splenic enlargement was recorded in 51 cases. The consistency rather than the size was significant, since many children in the community have enlarged spleens. A soft, tender, enlarging spleen which decreases in size with chloramphenicol treatment is a feature in these cases, and dullness on percussion of the left lower posterior axillary area of the thorax is a useful early sign of splenic enlargement.

Other features occasionally present were meningism, a tense anterior fontanelle in a 3-month-old child, failure to thrive, failure to breast-feed, and kwashiorkor. Respiratory infection was present in 27 cases.

Fewer than one-third of the cases were diagnosed within the week after the onset of the first symptom, usually fever. The delay was not always due to failure by the patient to attend early at hospital or village dispensary. In 37 cases the delay exceeded two weeks. No difference in diagnostic delay between the age groups was observed.

Laboratory Investigations

Bacteriology.—Most of the confirmatory tests are summarized in Table II. In the earlier years facilities for Widal testing were more often available than those for blood culture. In the last two years, for economic reasons, Widal testing was done only when the organism could not be isolated on culture. We prefer blood culture to stool culture at any stage of the illness, though in a larger series of over 500 patients blood culture has been positive only once in those taking chloramphenicol. Stool culture, however, has yielded positive results in patients already receiving treatment. Urine culture was not attempted. Culture of aspirated pus in cases of septic arthritis or osteomyelitis was sometimes the first indication of a typhoid aetiology. Cerebrospinal fluid culture was always

negative, even in patients with severe meningism or a tense fontanelle.

Haematology.—Reference has already been made to the frequency of anaemia. Of 79 patients whose white cells were counted 14 had fewer than 4,000 and 10 more than 12,000/mm³. A count above 15,000/mm³ was found in only five patients, of whom two had extensive osteomyelitis, one a basal pneumonia with consolidation, and one febrile convulsions and native medicine poisoning. The fifth had severe kwashiorkor and anaemia. It may therefore be assumed that a high white cell count in the absence of an obvious local disease focus is unlikely in the young typhoid patient.

Biochemistry.—Electrolyte and bicarbonate levels were only rarely measured. The blood urea was high in one child after blood transfusion and with a poor urinary output. The diazo test, popularized by Huckstep,⁴ was routinely used for screening outpatients, though its usefulness depends on the solutions used being freshly prepared.

Complications

Perforation of the ileum was not present in any child under 4 years old. The incidence increased rapidly with age. There were two cases in children aged 4 and eight cases in patients aged from 5 to 9. Treatment was divided equally between surgical and conservative regimens. Two of the three deaths after perforation were in the surgically treated group.

Haemorrhage from the terminal ileum was never gross in any patient, and there were only six patients with enough blood in their stool to merit comment. The only case with severe, sudden blood loss was in a child presenting with haematemesis. Jaundice was clinically present in 11 cases (7%). Bone and joint infections were present in six cases (4%).

Mortality

Death occurred in 15 cases (10%). This compares with an overall mortality of 11% among the total of 357 cases of typhoid fever studied, of whom the 150 cases among young children reported here were a part; with 14.3% over a 12-year period in another series;² and with 24% among the cases in Ibadan.¹ Six of the deaths were in children aged under 2. This represents a 12% mortality for the youngest age group, which contrasts with previous reports on the severity of the disease in the very young. In Ibadan more than half of the 29 children under 10 years of age died. Even in America, where the overall mortality is very low, Bradford⁵ reported an expected 10% mortality in children.

No single major factor can be stated as the cause of death in the majority of our cases. Postmortem examinations were not performed to distinguish between perforation, haemorrhage, or toxic myocarditis, all of which could have accounted for the distended abdomen (with audible bowel sounds), rapid pulse, cold extremities, and hypothermia so typical of the child about to die. One feature noted in retrospect is the rapid respirations, possibly acidotic, recorded in the case notes some days or hours before death.

It is hoped in future that it will be possible to obtain permission for a necropsy in all cases.

Treatment

Chloramphenicol in the usually accepted dosage of 25-50 mg/kg daily in divided doses was the drug of choice. It was given parentally only when the patient was vomiting. The temperature seldom returned to normal before the end of the first week, though we found that higher doses of chloramphenicol for the first two days hastened the fall in temperature. Prednisolone likewise hastened a fall in temperature

and may be used in very toxic children, though only for a brief period and with full awareness of its danger in relation to the ulcerated bowel wall. It is perhaps significant that the need for corticosteroids has diminished over the years as the use of intravenous infusions has increased.

In addition to requiring blood and electrolyte replacements, unconscious children were often also suffering from hypoglycaemia as a result of native medicine poisoning and therefore in urgent need of 50% glucose infusion. Acidosis—a clinical diagnosis, in many cases manifested by deep, sighing breathing—required immediate 50-100 ml of 4.2% bicarbonate infusion before correcting sodium and potassium losses.

Blood transfusion for severe anaemia produced in 10 cases a swinging fever which was later proved to be due to typhoid fever (paratyphoid organisms were grown on culture in an even greater number of similar cases).

Conclusion

Typhoid fever is reportedly rare in infancy and early childhood.^{5,6} Ikeme and Anan¹ reported only 29 cases in patients under the age of 10 in a total of 214 typhoid admissions to the Ibadan Teaching Hospital. Huckstep⁴ reported from East Africa a series of 240 cases of which 56 were in children aged between 2 and 15, and only six of these were less than 5. Pobee⁷ failed to report one case in a patient under 10 years of age from a fever hospital in Accra. These reports contrast markedly with our series, where 42% of all patients seen in the hospital were under 10 years of age.

The presentation of typhoid fever in children aged over 5 closely resembles that in older patients. Younger children and infants have more non-specific symptoms. Fever, with or without convulsions, diarrhoea and vomiting, dehydration, and anaemia are all common paediatric problems anywhere in the world, and especially in the tropics. Many children with malaria or an infectious disease present with clinical features resembling those of typhoid fever. Suspicion is of paramount importance in the diagnosis of typhoid, and when there is an epidemic greater care should be taken to exclude it in any young child who is febrile.

We have found the diazo urine test a useful, simple, and cheap test which the nursing staff can put in hand before the patient sees the doctor. The reagents must always be freshly made or the results can be misleading. Blood culture

and, in cases with diarrhoea, stool culture are the most rewarding diagnostic procedures. In differential white cell counts eosinophils are usually decreased or absent in typhoid.⁶ A high white count, certainly above 15,000/mm³, makes a diagnosis of typhoid less certain.

In the last two years of our study the importance of doing blood cultures in children who develop rigors and swinging fever after transfusion for severe anaemia became apparent. In the first few positive cases it was thought that the donor blood had been infected, but this was disproved by negative culture of the remaining donor blood. It seems that severely anaemic children with typhoid are sometimes too ill to be pyrexial. I could find no previous reference to this phenomenon in the literature on typhoid, and, as already mentioned, this sequence of events is even more common with paratyphoid. Severe anaemia in an infant or young child without other apparent cause must suggest a possible diagnosis of enteric fever.

The low incidence of haemorrhage and ileal perforation in children aged under 5 confirms previous reports. These two factors are the major cause of death in typhoid fever, and the more favourable prognosis in infants is probably related to their relative immunity to severe ileal ulceration.

Without the clinical assistance of all the doctors in the paediatric department this report would not have been possible. Most patients under 2 years were collected during the period when Dr. M. Duggan was paediatrician, and to her must go the credit for recognizing the association of typhoid with anaemia. Dr. C. A. Pearson, medical superintendent and physician, and Mr. L. Beyer, laboratory superintendent, have also made their own distinctive contribution.

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General Practice Observed

New Record Folder for Use in General Practice

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Summary

A new concept for filing medical records in general practice is described, based on an A4-size folder; in

experimental use in 40 practices doctors were generally in favour of the new system.

Introduction

In 1967 a project was started in Wantage with the aim of designing a new record folder for general practice. Over the past three years we have experimented with possible alternatives. Our view is that the general practitioner's record is the key document to the whole of the patient's medical history,

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