Paediatrica Indonesiana 22 : 138 — 146.. July — August 1982.

ORIGINAL ARTICLE

Typhoid Fever in Children

by

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Abstract

One hundred and fifty eight cases of Typhoid fever in children are reported as a result of a one year study.

Blood Salmonella typhi culture was found in 52.3%, whereas Widal titer was positive in 57.9% cases. Fever and aneosinophilia were found in all of the 158 patients (100%), While 76.3% had constipation, 59.5% disturbance of consciousness, 98% leucopenia and 33.3% diarrhoea occurring in children below 5 years.

The result of treatment with chloramphenicol 75 mg/kg Bw/day, showed that the body temperature returned to normal in an average of 4.9 days after the administration of the drug, whereas hospitalization lasted 14.4 days (average). Three patients (1.9%) died because of perforation and bronchopneumonia and 5 failures were considered as caused by drug resistancy.

During this study the typhoid fever morbidity rate in the hospital was 8.1% with the case fatality rate as high as 1.6%. The highest outbreak happened at the beginning of the rainy season.

Presented at the Fifth National Indonesian Pediatric Congress, Medan, June 14 - 18, 1981. Received December 11st, 1981.

Introduction

In Indonesia Typhoid fever is an endemic disease and considered as one of the important health problems (Suharto, 1979; Sabdoadi, 1979), closely connected with the inadequacy of hygiene and sanitation.

Typhoid fever has been known since Hippocrates', the clinical symptoms and complications always differring from one area or period to another (Khosla et al, 1977; Joewono Rachmad and Soewandoyo Eddy, 1979) and to age group as well.

For example : clinical symptoms in children under 2 years differ from those of the older age group (Krugman, 1960); patients over 5 years show symptoms similar to adults, while in children under five years the symptoms are not specific.

The classic clinical symptoms found in the days before chloramphenicol was widely used as a drug of choice, are rare at present.

Since bacteriological or serological examination can only be done in very few hospitals with complete facilities, it is important to detect the clinical symptoms as early as possible in order to minimize misleading diagnosis especially for the junior physician.

Chloramphenicol is still the drug of choice for Typhoid fever at present (Woodward et al, 1948; Kaspan et al, 1979) but there is no uniformity in the dosage or duration of treatment suggested, although this is important for the success of antibiotic therapy.

The aim of this study is to investigate the problem of Typhoid fever in children in which clinical symptoms, blood examination, complication, treatment evaluation and seasonal outbreak will be discussed and reported.

Material and methods

Children suspected of having typhoid fever and admitted to the Gadjah Mada University Hospital, from October 1979 to October 1980 were included in this study.

The diagnostic criteria for thypoid fever were as follows :

1. Clinical symptoms :

— fever lasting 7 days or more.
— gastrointestinal discomfort such as constipation, anorexia, abdominal pain, nausea, vomiting and diarrhoea.
— involvement of the central nervous system, such as headache, convulsion and disturbance of consciousness.

2. Laboratory findings :

— peripheral blood picture as leucopenia and aneosinophilia.
— blood and bone marrow culture of Salmonella typhi and/or Widal titer for 0 antigen of 1/160 or a four fold rise in the second laboratory test one week later.

Treatment and nursing :

— absolute bedrest and soft diet until six days without fever. Then mobi-

lization is started and gradually solid food is given.
- chloramphenicol 75 mg/kg body weight/day in the same period.
- discharge from the hospital after nine days without fever if no complications occurs.

Results

During one year study (October 1979 — October 1980) 158 out of 181 suspected cases consisting of 89 males and 69 females were involved in this report (table 1), being 8.1% of all cases admitted in that department during the same period (158 out of 1928 cases), with the case fatality rate of 1.6%.

The laboratory findings were as follows :
- Salmonella blood culture positive was found in 52.3% of the cases.
- 57.9% had Widal titer positive (table 2).
- 57% were admitted during the first week of illness,, 40% during the second week and 3% during the third week of illness.
- 71% of the patients were sent by general practitioners, 73% of which with suspected diagnosis of typhoid fever, and 75% had been given chloramphenicol treatment prior to admission.

Patients who died all came at the end of the third week of the disease with complications, either bronchopneumonia or perforation (verified with operation).

The highest percentage of children at risk was in the age group between 5-10 years as shown in figure I, while no statistical differences were found between male and female.

The highest frequency of typhoid fever was found in the beginning of the rainy season ($r = 0.99$; $P < 0.05$/figure II).

The clinical symptoms were quite variable as shown in table 3a — 3b, with mostly fever, gastrointestinal discomfort and disturbance of consciousness. Disturbance of consciousness was more prominent in the age group of 5 years.

All patients had fever, with constipation (76.3%) as the prominent symptom in children over 5 years, while only a few (10.8%) had diarrhoea.

Splenomegaly as a specific sign, was shown in 20.3% of the patients, while "typhoid tongue" was found in all age groups as high as 87.8%.

Table 4 shows that most of the patients (94%) had leucopenia (below 10.000) with loss of eosinophilic cells in the peripheral blood (100%).

Response to treatment : only 5 patients out of 158 with chloramphenicol therapy showed resistancy (3.2%).

Of all patients 1 patient had recurrent episodes (0.6%)and 12 (7.6%) patients were taken home by their parents before completion of treatment.

Normal temperature was regained between 3 to 8 days after the administration of chloramphenicol with an average of 4.9 days.

The average of hospital stay was 14.4 days.

Complication :

Respiratory disturbance was among the most common complication (mostly bronchitis, table 5).

Two cases with gut perforation died after resection and one case with bronchopneumonia also finally died two days after admission.

Table 6 presents the correlation between nutritional status and complication, showing no difference between the patients with bodyweight under 80% of Harvard nutritious standard and above.

Discussion

Typhoid fever usually attacks children over 5 years of age (Sutedjo dan Supardan, 1961; Nafsiah Mboi et al, 1973; Suparno et al, 1970) with clinical symptoms varying from mild to severe. Many factors can influence the disease, such as body resistance and the use of drugs, which may influence the susceptibility to bacteria (Kaspan et al, 1979).

Fever is characteristic, which is similar to the findings of Kaspan et al, 1979; Joewono Rachmad and Soewandoyo Eddy, 1979; Soemarno et al, 1980.

Fever with shivering as in malaria was found in 30% of the patients over 5 years of age, similar to the finding of Khosla (1977). This fever might be due to endotoxin which affected the :

1. anterior hypothalamus or,
2. posterior hypothalamus by lowering the content of Calcium to 20% (Bachtin et al, 1978).

Disturbance of consciousness (apathy, sommolence and delirium) was found in 59.5% and more obvious in patients over 5 years, while other authors found this evidence in the range between 11.7% to 26.9% (Kaspan et al, 1979; Soemarmo et al. 1980) This disturbance of consciousness is related to endotoxemia causing deficiency in nicotinic acid resulted from a rise in the metabolism during fever (Iskandar, Z. et al 1978), but according to Khosla et al (1979) this neuropsychiatric disturbance has no connection with the fever and may be more related to the inadequacy of nutritional intake.

Splenomegaly, which is considered one of the specific signs, was found in this investigation in the percentage of 20.3%, and by others in the range between 12.5% to 36% (Soemarmo et al, 1980; Joewono Rachmad and Soewandoyo Eddy, 1979).

Roseolae, usually mentioned in textbooks, were never encountered, or perhaps roseolae cannot be observed because of the skin colour of Indonesian children. This has also been pointed out by Stuart and Pullen (1946) who found roseolae in 45% of white patients and only in 14.5% of negro patients. Diarrhoea in general is due to invasion of bacteria into the mucosa, although in some cases no evidence of invasion could be found.

Mostly the diarrhoea was caused by the presence of exotoxin. Diarrhoea was usually related to the presence of S. enteriditis, etc. (Bachtin et al, 1978).

The peripheral blood picture showed leucopenia and aneosinophilia, as written in textbooks.

Summary

From the investigation it was found that the highest incidence of typhoid fever was in children aged 5 - 10 years, without any differences regarding the sex of the patients.

Certain clinical symptoms as :

— fever,
— gastrointestinal discomfort (constipation, diarrhoea),
— typhoid tongue,
— disturbance of consciousness,
— splenomegaly,

plus simple laboratory data : leucopenia and aneosinophilia, can lead to the correct diagnosis of typhoid.

Every year outbreaks occur, with their peak in the months of November and January, during the rainy season.

TABLE 1 : *Distribution of age and sex among the patients*

Age (years)	Male	%	Female	%
0 — 1	4	2.5	0	—
> 1 — 2	0	—	2	1.3
> 2 — 5	17	10.8	10	6.3
> 2 — 5	51	32.3	40	25.3
> 10	17	10.8	17	10.8
	89	56.4	68	43.7

$p > 0.05$

TABLE 2 : *Laboratory findings*

Specimen	Number	Weeks						Total percentage
		1st		2nd		3rd		
		Cases	%	Cases	%	Cases	%	
Culture								
Blood	158	47	29.7	32	20.2	—	—	49.9
Bone marrow	6	—	—	1	16.7	3	50	66.7
Stool	158	—	—	3	1.9	23	14.5	16.4
Urine	158	—	—		0.6	—	—	0.6
Serologic:								
Widal	158	6	3.7	83	52.5	2	1.2	57.9

TABLE 3a : *Clinical findings based on patients complaints*

Symptoms \ Age (yerrs)	<2 n : 6	%	>2-5 n : 27	%	>5-13 n:125	%	Total	%
1. Fever	—	100	27	100	125	100	158	100
2. Constipation	—	—	18	66.7	101	80.8	119	76.3
3. Anorexi	—	66.6	25	92.6	82	33	111	70.3
4. Abdominal pain	—	—	11	40.7	100	80	111	70.3
5. Headache	—	—	9	33.3	70	56	79	50
6. Nausea	—	—	16	59.2	63	50.4	79	50
7. Vomiting	—	16.6	6	22.2	40	32	47	29.7
8. Cough	—	66.7	9	33.3	34	27.2	47	29.7
9. Diarrhoea	6	83.3	9	33.3	3	2.4	17	10.8
10. Epistaxis	4	—	1	3.7	8	6.4	9	5.7
11. Convulsion	1	—	2	7.2	3	2.4	5	3.2
12. Chill	4	—	—	—	4	3.2	4	2.5
13. Normal stool	5	25	—	—	3	2.4	4	2.5
14. Melena	1	—	—	—	3	2.4	3	1.9

TABLE 3b : *Clinical findings based on physical examination*

Signs \ Age (yerrs)	<2 n : 6	%	>2 - 5 n : 27	%	>5 - 13 n : 125	%	Total	%
1. Typhoid tongue	4	66.7	24	88.9	110	88	138	87.3
2. Dry & fissure line	3	50	22	90.5	103	82.4	128	81
3. Apathy	—	—	5	18.5	30	24		
Somnolence	—	—	7	25 9	27	21 6	94	59.5
Delirium	—	—	3	11.1	22	17.6		
4. Splenomegaly	—	—	9	33.3	23	18.4	32	30.3
5. Meteorismus	—	—	10	37	37	29.6	47	29 7
6. Meningismus	—	—	—	—	2	1 6	2	1.3

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6. Meningismus	—	—	—	—	2	1 6	2	1.3

TABLE 4 : *White blood cell count in the patients based on their age*

Leucocyt \ Age (years)	<2 n : 6	%	>2 - 5 n : 27	%	>5 - 13 n : 125	%	Total	%
< 5.000	—	—	14	52	71	57	85	53.8
> 5.000 — 10.000	3	50	10	31	53	42	66	41.8
>10.000	3	50	3	11	1	1	7	4.4

Leucopenia : 98%
Aneosinophilia : 100%

TABLE : *Types of complications found*

Age (years)	<2	%	>2 - 5	%	>5 - 13	%	Total	%
1. Decubitus	—	—	—		—	—	—	—
2. Bronchitis	—	—	6	22.2	19	14.4	25	15.8
3. Bronchopneumonia	—	—	2	7.4	—	—	2	1.3
4. Otitis media	—	—	2	7.4	—	—	2	1.3
5. Intestinal haemorhagia	—	—	—	—	1	0.8	1	0.6
6. Intestinal perforation	—	—	—	—	2	1.6	2	1.3
7. Myocarditis	—		1	3.7	6	4.8	7	4.4

TABLE 6 : *Correlation between types of complication with nutritional status*

Complications	Nutritional status	
	⩾ 80%	< 80%
1. Decubitus	—	—
2. Bronchitis	13	12
3. Bronchopneumonia	—	2
4. Otitis media	1	1
5. Intestinal haemorrhagia	—	1
6. Intestinal perforation	—	2
7. Myocarditis	5	2

$p > 0.05$

FIG. I : *Age distribution among patients*

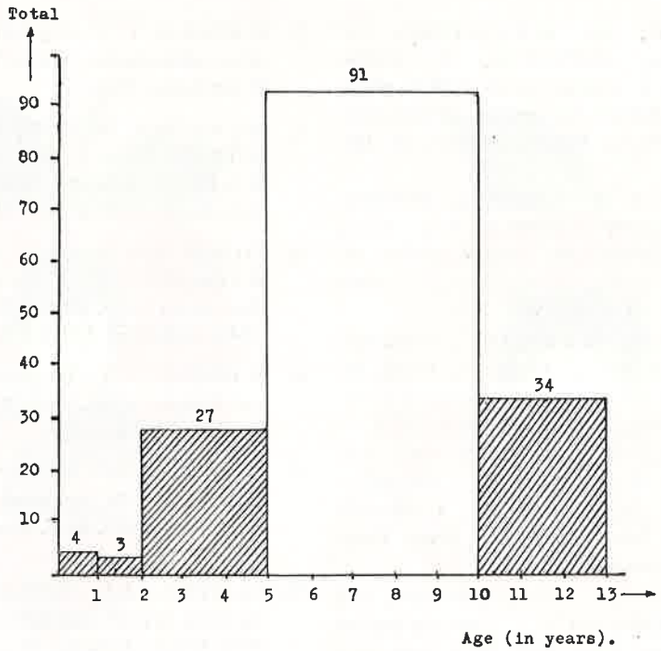
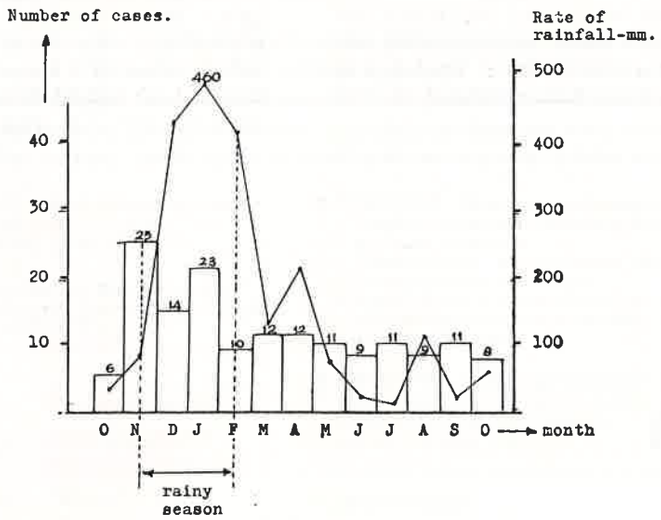


FIG. II : *Correlation between number of typhoid fever cases and rate of rainfall*



(r : 099; p∠ 005)

Note : Rate of rainfall in Yogya was obtain from the Department of Meteorology and Geophysics, Adisucipto Air Force Base, Yogyakarta.

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