

ORIGINAL ARTICLE

Tuberculous Meningitis at the Department of Child Health Dr. Pirngadi Hospital, Medan

by

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Abstract

Tuberculous meningitis was studied descriptively in 167 cases (1.19%) of 14082 hospitalized patients at the Department of Child Health Dr. Pirngadi Hospital, Medan in a period of the years 1985 to 1989.

The highest incidence was in the age group of under 3 years (46.11%) consisting 20.78% of the stage I, 54.55% stage II, and 24.67% stage III. The youngest age was five months (2 cases) and the oldest was 14 years old (3 cases). The case fatality rate was 27.54%, they were 2.17% stage I, 32.61% stage II, and 65.22% stage III. Stage III showed higher mortality rate than stage I and II ($p < 0.001$). The most frequent symptom was convulsion (43.71%) followed by fever (33.53%).

Contact with patients who had pulmonary tuberculosis were found in 56.28%. Positive tuberculin test was found in 17.96% and pulmonary radiological abnormalities in 57.48%.

The highest number of cases (51.50%) was group with cerebrospinal fluid cell count of 101 - 500/mm³. Cases which never got BCG immunization comprised 83.83%. The nutritional states on admission to the hospital were mild / moderate malnutrition in 67.07% and severe malnutrition in 32.93%.

Introduction

Tuberculous meningitis is an inflammation of meninges as a result of primary tuberculous complication. The most important primary focus was the lung, although it may occur in other origins such as, lymphnodes, bones, nasal sinus and gastrointestinal tract [1].

In Indonesia, tuberculous meningitis remains the most frequent disease in children, since the incidence is high [2]. The prevalence of patients with pulmonary tuberculosis by the 1980 survey in North Sumatera was 0.44% of population,

where the highest incidence was in babies and young children [3]. Appropriate care, early treatment, and regular long term therapy were needed to cure and to prevent sequelae. Tuberculous meningitis without treatment is fatal [4].

The purpose of this study is to evaluate the morbidity and mortality rates and the clinical pattern of tuberculous meningitis in a period of 5 years (1985 - 1989) at the Department of Child Health, School of Medicine, University of North Sumatera/Dr. Pirngadi Hospital, Medan.

Materials and methods

This study was designated retrospectively on cases of hospitalized patients in a period from January 1985 to December 1989 at the Department of Child Health, School of Medicine, University of North Sumatera/Dr. Pirngadi Hospital, Medan, using all medical records with the diagnosis of serous meningitis.

The diagnosis was established by anamnesis, clinical examination (if within 2 weeks of treatment they had complete recovery, the diagnosis was non tuberculous serous meningitis and they were excluded from this study: but, if after more

than 2 weeks there was no improvement they were diagnosed as tuberculous meningitis), radiological examinations and laboratory findings without bacteriological study.

The stages of this disease were classified by Lincoln's criteria. The nutritional state of the patients was classified by the PCM (protein calorie malnutrition) classification as by recommended by the 1975 Anthropometric Seminar (Lokakarya Antropometri 1975). For statistical analysis the Chi Square test was used with significance level of 0.05.

Results

Of the 14.082 cases admitted during 5 years (Jan, 1985 - December, 1989), 169 cases were serous meningitis, out of which 167 (1.19%) were tuberculous meningitis. Two cases of serous meningitis of non-tuberculous origin and were therefore excluded from the study.

Table II shows that most of the patients with tuberculous meningitis (76,65%) were in the age group of under five years, and the highest was in the age group of 0 to 3 years. But, there was no significant difference between males and the females ($p > 0.05$).

Table I. *Incidence of Tuberculous Meningitis*

Year	Number of patients	Cases	%
1985	2269	38	1.67
1986	2979	40	1.34
1987	3114	49	1.57
1988	3370	21	0.62
1989	2350	19	0.81
Total :	14082	167	1.19

Table II. *Distribution of Tuberculous Meningitis According to Age and Sex*

No	Age (yrs)	Cases			
		Female	Male	Total	%
1.	0 - 3	36	41	77	46.11
2.	3 - 6	16	35	51	30.54
3.	6 - 9	7	10	17	10.18
4.	> 9	11	11	22	13.17
Total :		70	97	167	100.00

$p > 0.05$

Table III. *Symptoms of Tuberculous Meningitis*

Complaints	Number of Cases	%
Convulsions	108	64.67
Fever	98	58.68
Decreased consciousness	80	47.90
Vomiting	21	12.57
Cough	9	5.39
Paralysis	6	3.59
Dyspnea	5	2.99
Neck stiffness	3	1.79
Diarrhea	3	1.79
Headache	3	1.79

Table IV. *Other Findings in Patients with Tuberculous Meningitis*

Examination	Result		
	Positive	Uncertain	Negative
Contact with patients who had Pulmonary Tuberculosis	94 (56.28%)	28 (16.76%)	45 (26.95%)
Abnormality on X-ray (Rontgenogram)	96 (57.48%)	45 (26.95%)	26 (15.57%)
Tuberculin Test	30 (17.96%)	-	128 (76.65%)
BCG	27 (16.17%)	-	140 (83.83%)

Table V. *Nutritional Status on Admission of Patients with Tuberculous Meningitis*

Age (yrs)	Wellnourished	Malnutrition		Total
		Mild/Moderate	Severe	
0 - 3	-	53	22	75
3 - 6	-	39	13	52
6 - 9	-	10	7	17
> 9	-	10	13	23
Total :	-	112 (67.07%)	55 (32.93%)	167

In this study the clinical findings were in 108 (64.67%) with convulsions, 98 (58.68%) with fever, and 80 (47.90%) with decreased consciousness.

Table IV shows that 94 cases (56.28%) had contact with patients who had pulmonary tuberculosis, and 96 (57.48%) had abnormalities on the Rontgenograms. Tuberculin test was negative in 128 cases

(76.65%), and most of the patients (140 cases = 83.83%) had had no BCG vaccination at all.

Table V demonstrates that most of the cases had mild/moderate malnutrition, namely in 112 cases (67.07%), and severe malnutrition was found in 55 cases (32.93%), while none was in a good nutritional state.

Table VI. *Cerebrospinal Fluid Cell Count*

Number of Cells/mm ³	Number of Cases	%
10 - 100	68	40.72
101 - 500	86	51.50
501 - 1000	8	4.79
> 1000	5	2.99

Table VII. *Distribution of Tuberculous Meningitis According to Age and Stage of the Disease*

Age (yrs)	Number of Cases	Stages		
		I	II	III
0 - 3	77	16	42	19
3 - 6	51	19	20	12
6 - 9	17	4	11	2
> 9	22	4	9	9
Total	167	45 (25.75%)	82 (49.10%)	42 (25.15%)

$p > 0.05$

Table VIII. *Association between Outcome and the Stages of Tuberculous Meningitis*

Outcome	Stage			Total
	I	II	III	
Survived	42	67	12	121
Died	1	15	30	46
Total :	43 (2.33%)	82 (18.29%)	42 (71.43%)	167

$X^2 = 57.748$ $df = 2$ $p < 0.001$

This study demonstrated that the highest number of cases was group with cerebrospinal fluid cell count of 101-500/mm³, namely in 86 cases (51.50%).

This study demonstrated that most of the patients were in stage II (82 cases = 49.10%), but there was no statistical sig-

nificance found ($p > 0.05$).

Death were found in 1 of 43 patients of stage I (2.33%), 15 of 82 patients of stage II (18.29%), 30 of 42 patients of stage III (71.43%). The stage of disease is highly associated with the mortality ($p < 0.001$).

Table IX. *Mortality of Tuberculous Meningitis by Age*

Age (yrs)	Number of Cases	Mortality	%
0 - 3	77	21	27.27
3 - 6	51	13	25.49
6 - 9	17	7	41.17
> 9	22	5	22.73
Total :	167	46 (27.54%)	

Table X. *Association of Nutritional State and Fatality*

Nutritional State	Number of Cases	Death	%
Wellnourished	-	-	-
Mild/Moderate malnutrition	112	29	25.89
Severe malnutrition	55	17	30.90
Total :	167	46	

$P > 0.5$

Table IX shows the mortality rate of 27.54%. Although most of the cases was found in the age group of 0 to 3 years, the highest age specific fatality rate was found in the age group of 6 to 9 years.

Table X shows that the nutritional states was not associated with the mortality in patients with tuberculous meningitis ($p > 0.05$).

Discussion

In the last five years, the number of patients with tuberculous meningitis admitted, ranged from 19 to 49 per-year with a prevalence of 1.9%. Jo Kian Tjaj (1964-1972) found 1.14% of all hospitalized cases while Bistok Saing (1987-1982) found 1.14% and Salmin (1980-1984) 1.23% of all cases/years [5,6,7].

Most of them (46.11%) were in the age group of under 3 years. This condition had also been reported by others like Sondang Tambunan (1979) who reported the age group of under 3 years in 55.81%, Salmin (1980-1984) found 51.96%, but Bistok Saing reported 60.60%

in the age group of under years (1987-1982), and Komalarini (1974-1983) reported 87.60% in the age group of under five years [6,7,8,9]. This may be caused by the fact that the children in this age group are still in close contact to with their parents, who might be the source of infection, or, it may be associated with the low body defence mechanism in this age group.

In general, patients admitted to the Department of Child Health, Dr. Pirngadi Hospital, Medan were in the advanced stage (stages II for 49.10% and stage III for 25.15%).

The mortality was associated with the stage of disease during treatment (Table VIII). In this study the case fatality rate was 27.54% (46 patients). Salmin (1980-1984) reported a figure of 28.92%, Bistok Saing (1978-1982) 39%, Sondang Tambunan (1979) 37.21%, and Jo Kian Tjaj (1964-1972) 47.8% [5,6,7,8].

Of the 46 fatal cases, stage III had the highest mortality rate (65.22%), followed by stage II (32.61%), and stage I (2.17%). Salmin reported (1980-1984) that the mortality rate of stage III was 30.43%, stage II 27.50%, and stage I 22.22%. Sondang Tambunan (1979) reported the mortality rate of Stage III 23.26%, stage II 10%, and stage I 0% (8). According to Nelson the mortality rate of stage III was 68.4%, and 15% for stage II. The higher mortality rate was found in the more advanced stages with a statistically significant difference ($p < 0.001$). This study demonstrated the existence of a history of contact with pulmonary tuberculosis in 56.28%. Salmin (1980-1984) reported 37.25% and Son-

dang Tambunan (1979) 83.72% [7,8].

In this study, lung disorders confirmed by thorax roentgenograms were found in 57.48% and this is quite similar to what was reported by Salmin (60.29%) [7].

Tuberculin test is one of the diagnostic procedures in children who have tuberculous Mycobacterium (10). In our cases, only 17.96% showed a positive test. Salmin (1980-1984) reported 8.82%, and Sondang Tambunan 6.97% [7,8].

This might be due to the severe tuberculous meningitis and the fact that patients usually come in the advanced stage of their disease so that the tuberculin test may be negative, because of the anergic reaction [4]. There may be another possibility for the negative tuberculin test, namely, the nutritional state as found in this study revealing that all of the patients were malnourished.

Most of our cases (83.83%) had had no prior BCG Vaccinations. The change in cerebrospinal fluids (Table VI) was also quite similar to previous studies [7,8].

Conclusions

1. Of the 14082 hospitalized cases in a period of 5 years, 1.19% had tuberculous meningitis.
2. The highest incidence (46.11%) was found in the age group of 0 to 3 years.
3. Most of the patients were malnourished (67.07%), the mortality though, was not associated with the nutritional state.
4. Most of the patients (57.48%) had abnormal roentgenograms of the chest.
5. Most of the cases (83.83%) had had no prior BCG vaccination.
6. In general, the patients presented to advanced Stages of the disease.
7. The case fatality rate was 27.54%, and the highest rate was found in patients with Stage III of their disease (65.22%).

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