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ORIGINAL ARTICLE

Diarrhoeal Disease Associated With Measles In Infants And Children

by

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Abstract.

The incidence and mortality of gastroenteritis associated with measles in infants and children had been assessed retrospectively in 1497 babies and children admitted to the Child Health Department/Dr. Pirngadi General Hospital Medan in the period of January to June 1982.

Of these 1497 children, 698 suffered from gastroenteritis and 94 from measles. Of these 94 measles cases, 49 had diarrhoea and 13 had PEM (26.53%).

The overall mortality of gastroenteritis was 14.61%, while the mortality of gastroenteritis associated with measles was 28.57%.
The case fatality rate of gastroenteritis with measles and PEM was 35.5%. The highest age specific case fatality rate of gastroenteritis was in the age group of 0 – 6 months.

The feasibility of active vaccination against measles at the early age of 6 months should be seriously considered.

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Introduction

Measles is an acute, highly contagious disease with great variations in prevalence, severity and mortality rate. The distribution is world wide. The disease usually runs a mild form with a low mortality rate in developed countries. In developing countries however, measles is still one of the main child health problems with a high case fatality rate.

The essential lesions of measles are found in the skin, mucous membrane of the nasopharynx, bronchi, intestinal tract and in the conjunctivae (Nelson, 1979). The diarrhoea often associated with measles in developing countries may be a disposition of the infection of the epithelial tissues of the gut (Morley, 1973). Diarrhoea in measles can be accompanied by a protein-losing enteropathy and malabsorption (Dossetor, 1975). Beside diarrhoea and the protein-losing enteropathy, measles may predispose to severe malnutrition because of the extreme loss of appetite during the disease.

Sunoto (1978) reported that the case fatality rate of acute gastroenteritis with dehydration in Jakarta was 6%. Tumbelaka (1978) found a case fatality rate of 3 to 14%. Nurhayati (1982) in Medan found the overall case fatality rate of gastroenteritis among hospitalized patients to be 6.8% (1979), 12.92% (1980), and 10.28% (1981). The case fatality rate of measles at the Dr. Pirngadi General Hospital Medan was 26.1% (Rangkuti, 1980). In Manado the mortality of measles among hospitalized patients was 13.8% (Muzief, 1982).

The purpose of this paper was to report the incidence and mortality of gastroenteritis associated with measles in infants and children at the Child Health Department of the Dr. Pirngadi General Hospital Medan.

Material and method

The medical record of infants and children who were admitted to the Pediatric ward of the Dr. Pirngadi General Hospital since January until June 1982 with either measles or gastroenteritis were collected and reviewed. Gastroenteritis was defined as the passing of watery faeces with a frequency of 4 times daily or more. The diagnosis of measles was based on fever, catarrhal symptoms, Koplik's spots followed by the characteristic maculopapular rash.

Results

1. Since January to June 1982, 1497 infants and children had been hospitalized. During this period the number of cases of gastroenteritis was 698, and that of measles 94. Gastroenteritis constituted 46.6% and measles 6.3% out of the total admission.
2. Measles complicated by gastroenteritis in this period was found in 49 cases. So measles enteritis comprised 7.02% of all cases of gastroenteritis and 52.12% of all cases of measles.
3. Age distribution.
   3.1. The age distribution of the gastroenteritis patients is depicted in Table 1. Five hundred and thirty two out of the total 698 cases namely 76.2% were aged under 2 years. Preponderance was in the age group of 6 – 12 months namely 292 cases (41.8%).
   3.2 The age distribution of measles can be seen in Table 1. Most cases were in the group of 6 months – 3 years, namely 65 cases (69.1%).

3.3. The age distribution of measles associated with gastroenteritis can be seen in Table 1. Cases of measles with gastroenteritis were mostly found in the age group of 6 months – 3 years, i.e. 38 cases (36.7%).

4. Sex.
Sex difference was statistically significant ($p < 0.01$) in the cases suffering from gastroenteritis (397 males and 301 females). This was not so($p > 0.05$) in the cases with measles (46 males and 48 females), nor in the cases with measles plus gastroenteritis (29 males and 20 females).

5. Protein Energy Malnutrition.
In the cases of gastroenteritis, 16.3% had PEM, of whom 4.6% were with severe malnutrition. In cases of measles with gastroenteritis, the number of cases with PEM was 13 (26.5%).

6. Gastroenteritis mortality (Table 2).
The mortality rate of gastroenteritis in this period was 14.6%.
The age specific case fatality rate under 2 years was 16.5%. Peak mortality was encountered at the age group of 0 – 6 months (25.6%).
The case fatality rate at the age group of 6 – 12 months was 13.4%.

7. Measles mortality (Table 3).
The overall mortality rate of measles was 26.6%, whereas in the age group of 6 months – 1 year, 1– 2 years, 2 – 3 years and 3 – 4 years, the mortality rates were 30 – 33.3%.

8. The highest age specific fatality rate of measles with gastroenteritis (Table 2), was at the age of 6 months – 2 years, namely 36.6%, with the peak at the age of 6 – 12 months (38.9%).

9. The case fatality rate of measles associated with gastroenteritis and PEM was high, namely 38.5%.

10. The most common accompanying diseases beside gastroenteritis were pneumonia and encephalitis.

Discussion

In the period of January to June 1982, 72.6% out of the total cases of gastroenteritis were under 2 years. The highest age specific prevalence of gastroenteritis was encountered in the age group of 6 – 12 months.
This is in contradiction to the findings of Brotowasisto (1974) who found that the the highest diarrhoeal attack rate in Indonesia was encountered at the age group of 1 – 2 years. Hernawan (1978) also found the highest age incidence in the age group of 6 – 12 months (Table 1).

The case fatality of measles associated with gastroenteritis in this period was 28.6%. It even becomes higher (38.5%) when accompanied by PEM (Table 2).
Muzief (1982) encountered a mortality of 30% in hospitalized cases of measles with severe malnutrition and 13.8% in cases of measles with mild malnutrition.

The overall mortality rate of gastroenteritis was 14.6% with the highest age specific case fatality rate at the age of 0 – 6 months (25.6%). So the case fatality rate of measles associated with gastroenteritis is twice that of the total gastroenteritis cases (Table 2). The highest age specific case fatality rate of measles associated with gastroenteritis was also found at the age group of 6 – 12 months, namely 38.9% or one and half times higher than the case fatality rate of gastroenteritis for this age group. Measles associated with gastroenteritis, pneu-

monia, PEM and encephalitis had the highest mortality (66.7%).

Conclusions

1. Of all hospitalized gastroenteritis cases, 7% was associated with measles.
2. Of all the cases of measles under 1 year of age, 82.6% had enteritis in addition.
3. The highest prevalence of measles with gastroenteritis was found at the age of 6 – 12 months (36.7%).
4. The cases fatality rate of measles associated with gastroenteritis (28.6%) is twice that of gastroenteritis (14.6%) but approximated the overall fatality of measles (26.6%).
5. The case fatality rate of measles associated with gastroenteritis and malnutrition was very high (38.5%).

Table 1. *Age distribution of cases with gastroenteritis, measles and measles associated with gastroenteritis.*

Age	GE			Measles			Measles with GE		
	♂	♀	Total No.	♂	♀	Total No.	♂	♀	Total No.
0 – 6 months	66	51	117	1	–	1	1	–	1
6 – 12 months	172	120	292	16	6	22	12	6	18
1 – 2 years	69	54	123	11	12	23	8	4	12
2 – 3 years	17	18	35	9	11	20	4	4	8
3 – 4 years	13	9	22	3	6	9	–	2	2
4 – 5 years	14	9	23	4	4	8	2	3	5
5 + years	46	40	86	2	9	11	2	1	3
Total	397	301	698	46	48	94	29	20	49

Table 2. *Age distribution and mortality rate of gastroenteritis (measles) and non-measles), measles with gastroenteritis, measles with gastroenteritis and PEM).*

Age	GE			Measles with GE			Measles with GE and PEM		
	Total No.	Death	%	Total No.	Death	%	Total No.	Death	%
0 – 6 months	117	30	25.6	1	1	100	–	–	–
6 – 12 months	292	39	13.4	18	7	38.9	5	2	40
1 – 2 years	123	19	15.4	12	4	33.3	3	1	33.3
2 – 3 years	35	6	17.1	8	1	12.5	2	1	50
3 – 4 years	22	1	4.5	2	–	–	1	–	–
4 – 5 years	23	1	4.5	5	1	20	2	1	50
5 + yeras	86	6	6.9	3	–		–	–	–
Total	698	102	14.6				13	5	38.5

Table 3. *Age distribution and mortality rate of measles.*

Age	Measles		
	Total No.	Death	%
0 – 6 months	1	1	100
6 – 12 months	22	7	31.8
1 – 2 years	23	7	30.4
2 – 3 years	20	6	30
3 – 4 years	9	3	33.3
4 – 5 years	8	1	12.5
5 + years	11	–	–
Total	94	25	26.6

Table 4. *Measles, complication and mortality.*

Measles and complication	Total No.	Death	%
Measles	45	11	24.4
Measles + GE	10	–	–
Measles + GE + Pn	12	2	16.7
Measles + GE + Enc	5	1	20
Measles + GE + Pn + Enc	9	6	66.7
Measles + GE + PEM	4	–	–
Measles + GE + Pn + Enc + PEM	3	2	66.7
Measles + GE + Pn + PEM	6	3	50
Total	94	25	26.6

Pn = pneumonia, Enc = encephalitis
PEM = Protein Energy Malnutrition.

REFERENCES

1. BROTOWASISTO : Epidemiologi Penyakit Diare. Proceedings Seminar Rehidrasi, Jakarta, 26 – 29 Agustus 1974.
2. DOSSETOR, J.F.B.; WHITTLE, H.C. : Protein-losing enteropathy and malabsorption in Acute Measles Enteritis. Br. med. J. ii : 592 - 593 (1975).
3. HERNAWAN; SUNOTO; TITUT S. PUSPONEGORO; SUHARYONO. : Treatment of Acute Infantile Gastroenteritis dehydration acidosis with Ringer's lactate and Glucose-Electrolyte Solution. Paediatr. Indones. 18 : 83 - 90 (1978).
4. MORLEY, D. : Severe measles. Paediatric Priorities in the Developing World, 1st Ed. pp. 207 - 230 (Butterworths, London 1973)
5. MUZIEF MUNIR; I MUSTADJAB; WULUR, F.H. : Measles and Its Problems. A Clinical analyses of hospitalized patients under 5 years of age. Paediatr. Indones. 22 : 49 - 64 (1982).
6. NELSON : Textbook of Pediatrics, 11th Ed. Asian Edition, pp. 857 - 862. (Igaku Shoin, Tokyo 1979).
7. NURHAYATI HAMID; HELMI LUBIS; SUTANTO, A.H.; HELENA SIREGAR. : Gastroenteritis di Bagian Ilmu Kesehatan Anak FK USU RS. Dr. Pirngadi Medan. Kumpulan Naskah PIB ke-VIII BKGI, Semarang (1982).
8. RANGKUTI, S.M.; NASRI NAZIR; SUTANTO, A.H.; ASWIN LUBIS; HELENA SIREGAR : Measles Morbidity and Mortality in the Department of Child Health, Dr. Pirngadi Hospital Medan, 1973 - 1977. Paediatr. Indones. 20 : 139 - 144 (1980).
9. SUNOTO; ADNAN S. WIHARTA; J. SULIANTI SAROSO. : Diarrhoeal disease in Indonesia. Paediatr. Indones. 18 : 332 - 359 (1978).
10. TUMBELAKA, W.A.F.J.; SUNOTO. : Death due to Diarrhoea; before and after First National Seminar of Dehydration. Paediatr. Indones. 18 : 319 - 327 (1978).