ORIGINAL ARTICLE

Neonatal Tetanus Treated with Diazepam as Single Antispasmodic Agent

by

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Abstract

The use of diazepam as single antispasm in treating neonatal tetanus is better than the conventional therapy with the combination of phenobarbital chlorpromazine and diazepam. The dose of diazepam 10 mg/kg body weight/day can be increased for very severe cases. The overall mortality of this study is 50%. Incubation period of less than 7 day and temperature on admission of more than 39° C are important factors to contribute to the high mortality. The critical period of neonatal tetanus is 15 days.

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Introduction

The incidence of neonatal tetanus is still high in Indonesia. This high incidence may be due to ignorance, low socio-economic level and local customs associated with childbirth, which bring the expectant mothers to seek help from the "dukun kampung". The "dukun kampung" usually cuts the umbilical cord with unsterile tools, and then dresses the stump with a mixture of herbs.

The mortality rate of neonatal tetanus is still very high in our hospital (Sutejo et al., 1966, Sutejo and Sofyan Ismael, et al., 1970). Until 1970 we used the combination of phenobarbital and chlorpromazine as antispasm drugs to treat neonatal tetanus, and after that we added diazepam, but the mortality rate was still very high. Now we are trying to treat neonatal tetanus with diazepam as a single antispasm. We all know that diazepam has two distinct pharmacological properties, tranquilizing and muscle relaxing.

In experimental works the drug has been shown to block spinal reflexes in anesthetized cats (Randall et al., 1961). Due to this action we are trying this drug to treat neonatal tetanus.

The purpose of this study is to evaluate the result of diazepam as a single antispasm in treating patients with neonatal tetanus, and to examine all factors which might contribute to the severity of the disease.

Material and methods

Since September 1977 until February 1978, forty three patients of neonatal tetanus were hospitalized in the Department of Child Health, Dr. Cipto Mangunkusumo General Hospital, Jakarta. Of the 43 patients, nine were treated with the combination of phenobarbital, chlorpromazine and low dose of diazepam, but unfortunately all these 9 patients died. We excluded all of these 9 patients from our evaluation,so that our material consisted only 34 cases.

All of these 34 cases were given the same treatment consisting of :

— Intra venous fluid drip (IVFD) with 5% glucose : Physiologic saline = 4 : 1 during 48 — 72 hours. After that they were given their feeding through a gastric tube. The IVFD were maintained for giving diazepam intravenously.
— Procain penicillin 50.000 — 100.000 U/kg body weight/day + Kanamycine 15 - 25 mg/kg body weight/day or ampicillin 100 mg/kg body weight/day.
— Anti tetanus serum (ATS) 10.000 U/day intramuscularly for two days.
— Diazepam 2,5 mg intravenously slowly, and then 8 - 10 mg/kg body weight/day through the IVFD.
— Treatment of the umbilical cord was restricted to cleaning of the stump with 70% alcohol solution.
— Especially stressed was the cleaning of the respiratory tract during and after the spasms.
— Oxygen was given when necessary.

Results

All of the 34 patients were severe cases according to the criteria of Jenkins and Luhn (1962). Of the 34 patients 19 were males and 15 were females.

The overall mortality of the 34 patients is 17 (50%) (table 1).

TABLE 1: *Mortality of the 34 cases*

No. of cases	Died	Recovered	Mortality
34	17	17	50%

Table 2 shows the comparison between the mortality of the patients who were delivered by "dukun kampung" and midwife. From the table we can see that of the 26 patients who were delivered by a "dukun kampung" 14 (53,9%) died, while of the 8 patients who were delivered by a midwife only 3 patients (37,5%) died.

TABLE 2: *Mortality of the 34 patients who were delivered by "dukun kampung" and midwife.*

Birth	No. of cases	Died	Recovered	Mortality
"Dukun kampung"	26	14	12	53,9%
Midwife	8	3	5	37,5%
Total	34	17	17	

Table 3 shows the relationship between the age on admission and mortality. None of the 8 patients of 5 days old or younger recovered. Of those between 6 - 10 days old, 8 (40%) died, and 12 recovered. Of the six patients older than 10 days, one (16,8%) died and 5 recovered.

TABLE 3 : *Relationship between the age on admission and mortality*

Age on admission (days)	No. of cases	Died	Recovered	Mortality
⩽ 5 days	8	8	—	100 %
6 — 10 days	20	8	12	40 %
⩾ 10 day	6	1	5	16,6%
Total	34	17	17	

Table 4 shows the relationship between the incubation period and mortality. Of the 25 patients with incubation period 7 days or less, sixteen (64%) died, while of the 9 patients with incubation period more than 7 days only one patient (11%) died.

TABLE 4 : *Relationship between incubation period and mortality*

Incubation period	No. of cases	Died	Recovered	Mortality
⩽ 7 days	25	16	9	64%
> 7 days	9	1	8	11%
Total	34	17	17	

Table 5 shows that most of the patients died during the first 5 days of hospitalization. Of the 17 dead patients, 13 patients died during 5 days of hospitalization. None died of 11 patients who were still alive more than 15 days.

TABLE 5 : *Relationship between mortality and duration of Hospitalization.*

Hospitalization	No. of cases	Died	Recovered	Mortality
1 — 5 days	13	13	—	100 %
6 — 10 days	4	2	2	50 %
10 — 15 days	6	2	4	33,3%
> 15 days	11	—	11	0 %
Total	34	17	17	

From table 6 we can see that the patients with the temperature on admission of more than 39°C have the highest mortality. Of the 9 patients 7 (77,8%) died.

TABLE 6 : *Relationship between mortality and temperature on admission*

Temperature on admission	No. of cases	Died	Recovered	Mortality
< 38°C	11	5	6	45,4%
38 — 39°C	14	5	9	35,7%
> 39°C	9	7	2	77,8%
Total	34	17	17	

Discussion

Ellis (1963) reported that there had been no deaths among 34 cases treated with curare and positive-pressure artificial respiration. Smythe et al., (1964) treated 186 and 97 cases with tubocurarine and intermittent positive-pressure ventilation.

They had a mortality of 21% and 10%, respectively, such a method of treatment is beyond the scope of most hospitals in Indonesia, due to the shortages of equipment and expert medical personnel. Simpler methods of treatment therefore are continuously being tried. Our methods are very simple and can be done in almost all hospitals in Indonesia.

The mortality of our cases (50%) is still very high, but if we compare with the cases of Sutejo et al, 1966 (80%) and Sutejo and Sofyan Ismael, 1973 (87%),

and Liem et al., 1970 (75,8%), this figure is much lower.

From tables 3 and 4 we can see that the age on admission and incubation period are important factors which contribute to the severity of the disease. Sixteen (64%) of the 25 patients with incubation period of 7 days or less died.

From table 5 we can see that 13 of 17 patients died during the first five days of hospitalization. In our opinion the dose of diazepam was not enough for these patients. With diazepam 10 mg/kg body weight/day these patients still had frequent convulsions. The doses of diazepam should be increased for these cases, but we were afraid that too high a dose of diazepam would depress the centrum of respiration. At the time we did not have an intensive care unit, so that an intermittent positive-pressure ventilation could not be performed. Since we have an intensive care unit, we are now trying to increase the dose of diazepam in treating neonatal tetanus.

Femi-Pearse (1966) and Khoo et al., (1979) had experiences on high dose of diazepam
tetanus. Femi-Pearse (1966) gave 40 mg/kg body weight/day for a neonate with a body weight of 3 kg for three days, and then the dose was decreased. This patient recovered during 3 weeks. Khoo et al., (1979) gave 20 - 40 mg/kg body weight/day and this diazepam was combined with phenobarbitone 10 - 15 mg/kg body weight/day.

Fourteen of 23 cases recovered with these combination of drugs. From table 5 we also can conclude that the critical period of neonatal tetanus is 15 days. No death was recorded among 11 patients who were hospitalized for more than 15 days.

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