

ORIGINAL ARTICLE

Treatment of Neonatal Tetanus with High Dosage Diazepam

by

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Abstract

A retrospective study on neonatal tetanus, among patients hospitalized at the pediatric ward of Dr. Pirngadi Hospital Medan, had been conducted from January 1987 through December 1991. There were 75 cases out of 13,581 patients hospitalized (0.55%) in that period, consisting of 44 boys (58.66%) and 31 girls (41.33%) with an overall case fatality rate of 33.33%.

Of 18 patients with an incubation period of 5 days or less, 12 (66.66%) died, while of 4 patients with an incubation period of more than 10 days, there were not any death at all. Diazepam had been given in a dosage of 10-40 mg/kg body weight/day. Diazepam of 10-19 mg/kg body weight/day was given to 4 cases, and the case fatality rate was 25%. Of 42 cases treated with diazepam of 30-40 mg/kg body weight/day, the case fatality rate was 42.85%. The duration of hospitalization varied between ten hours to 34 days. All deaths (25 cases) occurred within the first seven days of hospitalization. The most common accompanying disease was bronchopneumonia (6 cases). Endotracheal intubation were performed on 11 cases, while the mechanical ventilator in 1 case with a case fatality rate of 27.27% and 0% respectively.

Introduction

Among diseases preventable by immunization, neonatal tetanus is still frequently encountered in patients treated at the pediatric ward of Dr. Pirngadi Hospital Medan, and the fatality rate is still high [1]. These high incidence and fatality rate may be due to ignorance, low socioeconomic level and local customs associated with child births [2,3,4].

According to those factors, the treatment of neonatal tetanus is still a major challenge to the medical profession [cited from 4].

The classic treatment of neonatal tetanus consists of anti tetanus serum to neutralize the toxin; anti convulsants to over-

come the spasms; antibiotic and supportive measures [5,6].

Benzodiazepam an anti convulsant as the compound of 1,4 benzo diazepam has much been used recently [7]. Diazepam, clinically, has three distinct pharmacological properties, i.e. muscle relaxant, anti convulsant and hypnotic [3,7]. This drug has a wide margin of safety; and is free of significant side effects [7,8].

The purpose of this study is to evaluate the results of high dosage diazepam in treating cases with neonatal tetanus at the Department of Child Health; Medical School; University of North Sumatera/Dr. Pirngadi Hospital, Medan.

Materials and Methods

This study was done retrospectively from 1st January 1987 until 31st December 1991 on neonatal tetanus cases admitted to the Department of Child Health, Medical School, University of North Sumatera/Dr. Pirngadi Hospital, Medan.

The data, collected and reviewed from Medical Record of neonatal tetanus cases, consisted of :

1. Child birth condition.
2. Mother's immunization status
3. Age of admission
4. Incubation period
5. The total dose of diazepam which has been given. In the treatment's protocol of neonatal tetanus patients in the Department of Child Health Medical School, University of North Sumatera / Dr. Pirngadi Hospital Medan, diaze-

pam is given as follows [5]:

- On admission, the dosage applied was 2-10 mg to overcome the spasms followed by maintenance with the average dose of 10-40 mg/kg body weight/day intravenously (perbolus) every 3 hours.
- In cases, where spasms were could not be adequately controlled, the dosage should be increased by 10-15% and the schedule rearranged.
- When the spasms were well controlled, the dosage should be continued for 2-3 days, and then reduced gradually by 10-15% .
- 6. Duration of hospitalization
- 7. Intensive management
- 8. Accompanying diseases
- 9. Number of death

Results

During the five years period (1st January 1987 - 31st December 1991) there were 75 cases of neonatal tetanus out of 13,581 patients hospitalized (0.55%) at the Pediatric ward of Dr. Pirngadi Hospital Medan. Of these, 44 (58,67%) were boys and 31 (41,33%) were girls (Table I).

Fifty of these 75 cases (66,66%) were born at home, attended by a "Dukun Kampong", and 25 of them had their umbilical cords cut with an unsterile tool and the stump in 19 cases were applicated with traditional medicine stuff.

Of these 75 cases, just 4 mother (5,33 %) had been immunized against tetanus though all got only one shot.

Table II shows the relationship between incubation period and the fatality rate. The majority of cases (53) had an incubation period of 6-10 days, and a fatality rate of 24.52% . None of the 4 cases with an incubation period of more than 10 days died.

The dosage of diazepam applied in the present study was 10-40 mg/kg body

weight [5].

Table III shows the relationship between the total dose of diazepam and case fatality rate. Diazepam within a dose of 10-19 mg/kg body weight/day was given to 4 cases with a fatality rate of 25%; while in 29 cases with a dose of diazepam of 20-29 mg/kg body weight/day, the fatality rate was 20.68% and of in 42 cases with a dose of diazepam of 30-40 mg/kg body weight/day, the fatality rate was 52.8% .

All deaths (25 cases) in the present study, occurred among 48 cases with the duration of hospitalization of 7 days or less (Table IV).

Bronchopneumonia was the accompanying disease among 6 cases of neonatal tetanus of which 2 cases died (33.33%) (Table V), while sepsis was found in only 1 case who finally recovered.

Classic treatment, endotracheal intubation with manual intermittent balloon resuscitation and mechanical ventilator had been done on 63 cases; 11 cases and 1 case respectively; with fatality rates of 33.33% , 27.27% and 0% respectively.

Discussion

The incidence of neonatal tetanus seems to diminish in recent years. In this study, we found 75 cases in year 1987 - 1991 (Table I). As an illustration, in the study of Lubis, et al. (1982-1986) in the same place there were 153 cases of neonatal tetanus [1].

The overall fatality rate in the present study was 33.33% . In the study of Lubis, et al. (1982-1986) at the same hospital, the fatality rate was 35.95% [1].

Incubation period is an important factor which contributes to the case fatality rate [4]. In our series, it was observed that among 18 cases with incubation periods of five days or less, the fatality rate was 66.66% (Table II). This is similar to the study of Soetomenggolo at the Medi-

cal Faculty University of Indonesia / Dr. Cipto Mangunkusumo Hospital revealing that among 25 cases of neonatal tetanus with incubation periods of 7 days and less, the mortality rate was 64% [3]. The study of Sunarto, et al. (1968-1969) at Dr. Sardjito Hospital Jogjakarta and Ismudiyanto, et al. (1979-1980) from Dr. Soetomo Hospital Surabaya found that among their neonatal tetanus cases with incubation periods of 5 days and less, the mortality rate were 100% [6,9]. This means that a short incubation period will influence the severity and prognosis of the disease [3,5,10].

In this study, 18 (42.08%) out of 42 cases which was given diazepam in a total maximal dose of 30-40 mg/kg body

weight/day, died (42.85%) (Table III). It was lower than that of the studies of Rampengan, et al. (1983-1987) from Gunung Wenang Hospital, Manado and of Daili, et al. (1969-1970), from University of Andalas Padang, stating that diazepam given in total doses of 5-10 mg/kg body weight/day to their neonatal tetanus cases, gave a mortality rate of 80% and 75% respectively [11,12].

This difference might be due to several factors influencing the severity and prognosis of the disease including incubation period, age on admission and the dose of diazepam not enough to control the spasms. Despite the fact that diazepam in a total maximal dose of 40 mg/kg body weight/day, could make the case fatality rate lower in severe cases, case fatality rate could not totally be declined. It was in accordance with the report of Ismudijanto, et al. (1979-1980) from Dr. Soetomo Hospital Surabaya, that among 48 cases, given diazepam in total dose 40 mg/kg body weight/day, the mortality rate was 43.75% [9].

In the present study, all 25 deaths occurred within the first 7 days of hospitalization (Table IV). It is similar to previous studies of Soetomenggolo, et al. (1977-1978) from Dr. Cipto Mangunkusumo Hospital and Sugitha, et al. (1981-1982) from University of Udayana Denpasar [3,4].

Table V shows that the most prevalent

accompanying disease in the present study was bronchopneumonia (6 cases) (6%) but it was lower than that found by Ismudijanto (1979-1980) who reported their 21 cases of neonatal tetanus were accompanied by bronchopneumonia [9]. Bronchopneumonia could be caused by accumulation of secretion in the lower part of respiratory tract [9].

In this study mechanical ventilation was used just in one case and this case recovered. While 3 out of 11 cases with endotracheal intubation with manual intermittent balloon resuscitation died (27.27%) (Table VI). Mechanical ventilation has obviously led to a better result as it prevents laryngeal spasm due to continuing spasm. Ellis (1963) reported that there were no deaths among their 34 cases treated with mechanical ventilation, while Smythe (1964) who treated 97 cases of neonatal tetanus with mechanical ventilation found that the mortality rate was 10% [cited from 1]. Hasan (1980) in Dr. Cipto Mangunkusumo Hospital had treated 2 cases of neonatal tetanus with mechanical ventilation and both cases recovered [13].

The use of muscle relaxant with mechanical ventilation in developed countries with modern facilities has led to a better result as well, whereas in developing countries due to lack of facilities, the classic treatment still remains a routine therapy [6,13].

Summary

There were several known factors influencing the severity and prognosis of neonatal tetanus.

High dosage of diazepam is safe and useful in treating cases with neonatal tetanus.

Table I. *Incidence of neonatal tetanus*

Year	Number of patients hospitalized	Boys	Girls	Total	%
1987	3114	14	8	22	0.70
1988	3370	13	8	21	0.62
1989	2350	7	6	13	0.55
1990	2717	7	6	13	0.47
1991	2030	3	3	6	0.29
Total	13581	44	31	75	0.55

Table II. *Incubation period related to case fatality rate*

Incubation period (day)	No. of cases	No. of death	% Death
< 5	18	12	66.66
6 - 10	53	13	24.52
> 10	4	-	00.00
Total	75	25	33.33

Table III. *The total dose of diazepam related to case fatality rate*

Dosage mg/kgbw/day	No. of cases	No. of death	% Death
10 - 19	4	1	25
20 - 29	29	6	20.68
30 - 40	42	18	42.85
Total	75	25	33.33

Table VI. *Relationship between duration of hospitalization and case fatality rate*

Duration of hospitalization (day)	No. of cases	No. of death	% Death
< 7	48	25	52.08
8 - 14	16	-	-
15 - 21	6	-	-
> 21	5	-	-
Total	75	25	33.33

Table V. *Accompanying diseases*

Accompanying diseases	No. of cases	No. of death	% Death
Bronchopneumonia	6	2	33.33
Sepsis	1	-	0
Total	7	2	28.57

Table VI. *Management of cases*

Type of management	Total	Death	% Death
Classic treatment	63	22	3.33
ETT + Balloon resuscitation	11	3	27.27
Mechanical ventilation	1	-	0
Total	75	25	33.33

ETT = Endotracheal tube

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