

ORIGINAL ARTICLE

Blood Bilirubin Content in Neonatal Tetanus Patient with Hyperbilirubinemia during Treatment with Intravenous Diazepam

by

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Abstract

An evaluation on 128 neonatal tetanus patients with hyperbilirubinemia was done at the Department of Child Health, Dr. Cipto Mangunkusumo General Hospital, Jakarta. The patients were treated with high dosages of diazepam intravenously. This drug is potential to cause the increase of blood bilirubin, and in turn this latter condition is potential to cause kernicterus.

Of the 128 patients there were 70 males and 58 females. The age of the patients were mostly (79.6 %) 4 - 7 days.

Fourteen of the 128 patients showed the increase of their blood bilirubin content during the second day of treatment, but after that it declined gradually during the next 3 days. The mortality of the 14 patients was 8 (57.1 %), so far no kernicterus was recorded among them.

Among the 128 patients, 114 patients showed the decrease of their blood bilirubin content during the treatment. During 3 days the blood bilirubin content became less than 10 mg/dl. No kernicterus was recorded among those patients.

It was concluded that intravenous diazepam is not dangerous in patients with mild and moderate hyperbilirubinemia, and no kernicterus was recorded during evaluation.

Introduction

Diazepam is a compound of the 1,4-benzodiazepin group, having muscle-relaxing, anticonvulsant, and tranquillizing properties (1,2,3,4). Diazepam has been used widely in treating patients with tetanus and convulsions (1,2,3,4,5,6,7).

The vehicle for intravenous diazepam contains relatively large quantities of sodium benzoate, which is a very effective uncoupler of the bilirubin-albumin complex and may thus increase the risk of kernicterus (8), though studies in Gunn rats suggested that the amount of benzoate in diazepam is not high enough to

be considered as a serious risk (9). Shirky (10,11) stated that diazepam was contraindicated in infants. So there is still controversy in using intravenous diazepam to treat patients with hyperbilirubinemia. The most important component in producing kernicterus is the unconjugated indirect bilirubin.

The purpose of this paper is to evaluate the concentration of blood bilirubin in patients with neonatal tetanus and hyperbilirubinemia during treatment with intravenous diazepam.

Materials and Methods

The evaluation was done on 128 neonatal tetanus patients with mild and moderate hyperbilirubinemia, hospitalized at the Department of Child Health, Dr. Cipto Mangunkusumo General Hospital, Jakarta.

All patients were treated with intravenous diazepam with the dose of 8-15 mg/kg/24 hours. All patients were examined for their blood bilirubin content on the first, second, third, and fourth day of hospitalization.

Results

Of the 128 patients 70 were males and 58 females. Table 1 shows the age distribution of all patients. Most of the patients were at the age of 4-7 days. Of the 128 patients 102

(79.6%) were at the age of 4-7 days, only one patient was at the age of 3 days and 26 patients at the age of 8-12 days.

Table 1. Age distribution of 128 patients

Age (days)	No. of cases	%
3	1	0,8
4	7	5,4
5	24	18,7
6	28	21,9
7	43	33,6
8	6	4,6
9	7	5,4
10	7	5,4
11	3	2,4
12	2	1,6
T o t a l	128	100

Table 2. Data of 128 patients with hyperbilirubinemia

Blood bilirubin content	No. of patients	%
Increased	14	10,9
Decreased	114	89,1
T o t a l	128	100

Table 3. Mean blood bilirubin concentration of 14 patients during 4 days

Day	Mean blood bilirubin concentration (mg/dl)	S.D.
1 st	12.9	± 2.5
2 nd	15.0	± 1.8
3 rd	12.2	± 2.5
4 th	7.8	± 4.0

Table 2 shows that only 14 patients (10.9%) had increased blood bilirubin content while the other 114 patients (89.1%) showed decreased blood bilirubin content.

Table 3 shows the mean concentration of blood bilirubin of 14 patients. The mean concentration of blood bilirubin on the first day was 12.9 ± 2.5 mg/dl. During the second day the concentration increased, and the mean concentration was 15.0 ± 1.8 mg/dl, but during the third and fourth day the blood bilirubin concentration decreased. The mean concentration during the third day was 12.2

± 2.5 mg/dl, and during the fourth day 7.8 ± 4.0 mg/dl (below 10 mg/dl).

Table 4 shows the mean concentration of blood bilirubin of 114 patients. The lowest concentration was 10.2 mg/dl, and the highest 19.4 mg/dl. The blood bilirubin content decreased slowly during 4 days. The mean concentration of blood bilirubin on the first day was 13.4 ± 1.8 mg/dl, during the second day it was 11.0 ± 2.4 mg/dl, during the third day 9.0 ± 2.4 mg/dl, and during the fourth day 5.9 ± 2.6 mg/dl. During the third and fourth days the concentration had decreased to become less than 10 mg/dl.

REFERENCES

1. Femi-pearse D. Experience with diazepam in tetanus. *Br. Med. J.* 1966; 2 : 862-5.
2. Gastaut H, Naguet R, Poire R, Hassinari CA. Treatment of status epilepticus with diazepam. *Epilepsia* 1965; 6 : 167-82.
3. Hendrickse RG, Sherman PM. Tetanus in childhood : Report of a therapeutic trial of diazepam. *Br. Med.J.* 1966; 2: 860-1.
4. Parsonage MJ, Norris LA. Use of diazepam in treatment of severe convulsive status epilepticus. *Br. Med J.* 1967; 3:85-8.
5. Kazim E. Diazepam in tetanus. *Lancet* 1965; 1: 1162-5.
6. Liem WT, Damawan S, Ismael S, Sudigbia I, Suradi R, Munthe BG. The effect of diazepam on tetanus. *Paediatr. Indones.* 1970; 10:248-58.
7. Weinberg WA. Control of the neuromuscular and convulsive manifestation of severe systemic tetanus. Case report with a new drug, Valium. *Clin. Pediat.* 1964; 3:226-8.
8. Schiff D, Shan G, Stern L. Drug combinations and displacement of bilirubin from albumin. *Pediatrics* 1971; 48:139-41.
9. Nathenson G, Cohen MI, Mc Namara H. The effect of Na benzoate serum bilirubin of the Gunn rat. *J. Pediatr.* 1975; 86: 799-804.
10. Shirkey HC. Drug therapy. In: Nelson, Vaughan, Mc Kay, eds. *Textbook of Pediatrics*, 9th ed. Tokyo: WB Saunders, 1969: 233-312.
11. Shirkey HC. Tranquilizers. In: Shirkey, eds. *Pediatric drug Handbook*, 1st. ed. Philadelphia: WB Saunders, 1977: 176-83.
12. Volpe JJ. Bilirubin and brain injury. In Volpe eds. *Neurology of the newborn*. 1st. ed. Sydney: WB Saunders, 1981: 336-53.
13. Kliegman RM, Behrman RE. Jaundice and hyperbilirubinemia in the newborn. In: Behrman and Vaughan, eds. *Nelson textbook of Pediatrics*, 13th. ed. Tokyo: WB Saunders, 1987: 405-6.
14. Feigen RD. Tetanus. In Behrman and Vaughan, eds. *Nelson textbook of Pediatrics*, 13 th. ed. Tokyo: WB Saunders, 1987: 617-20.