

A REVIEW OF 43 CASES OF TETANUS NEONATORUM*

Işık Yalçın MD**, Nermin Güler MD***, Rejin Kebudi MD****
Ülker Öneş MD**, Nuran Salman MD*****

SUMMARY: Yalçın I, Güler N, Kebudi R, Öneş Ü, Salman N. (Department of Pediatrics, İstanbul University Faculty of Medicine at Çapa, İstanbul, Turkey). A review of 43 cases of tetanus neonatorum. Turk J Pediatr 34: 121-125, 1992.

Forty-three patients with neonatal tetanus admitted to the Infectious Diseases Ward of the İstanbul University Faculty of Medicine Children's Hospital at Çapa from 1982-1989 are presented. Thirty-two (74.4%) of the subjects were boys.

The overall mortality was found to be 60 percent and the mean incubation period 6.1 ± 20 days. The mean period between onset of symptoms and hospital admission was 1.7 days.

Thirty-nine (90.7%) of the 43 patients were unhygienic home deliveries and only two cases were delivered with a midwife in attendance. None of the mothers of the children in our series had been immunized with tetanus toxoid. The incidence of neonatal tetanus in Turkey is on the decline, but a fraction of the population, the so-called urban poor, is still at high risk for preventable diseases. Every contact an unvaccinated person has with a health care professional should be viewed as an opportunity for tetanus immunization. *Key words: tetanus neonatorum.*

Tetanus, a disease which can be prevented by active immunization, continues to be a serious threat to public health in many parts of the world. Its frequency varies widely from place to place and it is much higher in tropical than in temperate climates, although local customs are probably more important than climate in its etiology. In the developing world, the incidence of neonatal tetanus ranges between 5 and 60 per 1000 live births, and in some areas, deaths from tetanus account for 30-72 percent of neonatal mortality¹.

Despite the nationwide anti-tetanus immunization policy, tetanus, especially neonatal tetanus, continues to occur in Turkey². In this article, we review 43 cases of neonatal tetanus admitted to our hospital and discuss guidelines for the prevention of neonatal tetanus in Turkey.

Material, Methods and Results

The study population consisted of 43 neonatal cases of tetanus who had been admitted to the Infectious Diseases Ward of the İstanbul University Faculty of

* From the Department of Pediatrics, İstanbul University Faculty of Medicine at Çapa, İstanbul.

** Professor of Pediatrics, İstanbul University Faculty of Medicine.

*** Fellow in Pediatrics, İstanbul University Faculty of Medicine.

**** Pediatrician.

***** Associate Professor of Pediatrics, İstanbul University Faculty of Medicine.

Medicine Children's Hospital at Çapa from January 1982 to December 1989. There were 32 (74.4%) boys and 11 (25.6%) girls. The annual distribution of the patients is noted in Table I.

TABLE I: Annual Distribution of Patients

<u>Year</u>	<u>No. of Patients</u>
1982	6
1983	9
1984	8
1985	4
1986	3
1987	4
1988	4
1989	5
<u>Total</u>	<u>43</u>

All patients were residents of İstanbul or its environs and lived in close proximity to a hospital.

Thirty-nine (90.7%) of the 43 patients were born at home where the umbilical cord had been separated by either a pair of scissors, knife or razor blade. A midwife was in attendance at only two births and four were hospital deliveries.

The families were of low socioeconomic level. Most parents were either illiterate or had only attended primary school. None of the mothers had been previously immunized against tetanus.

The mean age of the patients on admission was 7.8 ± 2.4 days (range 3-16 days) and the mean incubation period was 6.1 ± 2.0 days (range 3-13 days). All families were aware of their baby's poor sucking and excessive crying, but only brought their infant to the hospital when spasms occurred. In all cases, diagnosis was based on clinical findings. On admission, sustained tonic contractions and spasms were observed in most patients. An opisthotonus posture was noted in five patients, cyanosis in six patients and generalized convulsions in two patients.

The mean hospitalization period was 18.3 ± 15.3 days (range 1-57 days). Twenty-six of the 43 neonates died. The overall mortality rate was 60.5 percent.

High fever was present in 11 of the 26 (42.3%) patients that died and in only three of the 17 (17.6%) survivors ($p < 0.05$). The mean incubation period was 5.6 ± 1.3 days for the fatal cases and 6.9 ± 2.5 days for the survivors ($p < 0.05$). The mean hospitalization period was 8.2 ± 8.9 days for the fatal cases and 31.3 ± 11.4 days for the survivors.

Conventional treatment consisted of diazepam for sedation and tetanus antitoxin and benzylpenicillin. Subsequent infections were treated using the appropriate antibiotic. All patients were kept in quiet, darkened rooms, movement was kept to a minimum, and all unnecessary handling of the patient was avoided.

The Student-*t* test, and the Fisher and Yates tests were used for statistical analysis.

Discussion

Tetanus is a serious illness with high mortality. It occurs mainly in populations in which facilities for the care of its victims are least available².

In most parts of the world, particularly in developing countries, reported neonatal tetanus cases appear to be more common in males than in females³. In our study, most of our patients (74%) were males.

Our study indicates that the annual distribution of hospitalized neonatal tetanus patients has declined in recent years (Table I). The incidence of neonatal tetanus in Turkey is on the decline due to widespread tetanus toxoid use in pregnant women, an increasing number of hospital births, and improvements in post-partum hygiene⁴.

Age at onset, severity of illness, preterm birth, secondary infections and mode of treatment all affect survival in neonatal tetanus⁵. Our results show that a short incubation period and fever are signs of poor prognosis.

The case fatality rate of neonatal tetanus ranges between 25-90 percent with therapy, depending on the intensity of supportive care⁶. The İstanbul University Faculty of Medicine Children's Hospital at Çapa is one of the most developed university clinics in Turkey. In spite of intensive care and adequate treatment, the mortality rate from neonatal tetanus is quite high. In our patients, this rate was determined to be 60.5 percent which substantiates the reports of other centers in our country^{4,7-9}.

The age at onset of symptoms is one of the most important factors influencing prognosis. In our study, this period was found to be 6.1 ± 2.0 (mean) days and the fatal cases showed a significantly shorter mean incubation period than the survivors, which is in accordance with results from other studies^{7,10,11}.

In this study, the mean period between onset of symptoms and hospital admission was found to be 1.7 days. In a recent paper published by the Hacettepe University Faculty of Medicine in Ankara, this period was reported as 2.2 days⁴ while the same period was found to be 3.2 days in Pakistan¹². This may be due to inadequate information regarding diseases in the community and the application of traditional treatment at home.

Although İstanbul is located in a more developed part of Turkey, its population is heterogenous. In 1988, neonatal tetanus was a cause of 30 of the 4230 neonatal

deaths reported in İstanbul Municipality¹³. The mortality rate of neonatal tetanus can be used as a criterion to evaluate the quality of mother and child health services and the effectiveness of immunization programs. Approximately five cases of neonatal tetanus are encountered annually in a hospital population which indicates that a fraction of the population, the so-called urban poor, is still at high risk for preventable diseases.

Tetanus is a totally preventable disease. Results of conventional treatment have been disappointing in neonatal tetanus. The prevention of neonatal tetanus is important not only because of the high mortality rate associated with the disease, but also because sequelae in survivors are not uncommon¹⁴. This indicates an urgent need for promotion of hygienic deliveries and tetanus immunization of pregnant women in underdeveloped regions where neonatal tetanus continues to be a cause of death due to inappropriate handling of the cord and lack of maternal immunity^{15,16}.

Most newborns in the world are susceptible to tetanus because their mothers have not received two or more doses of tetanus toxoid. It has been estimated that from 1986 to 1989, only 15-25 percent of pregnant women in developing countries received at least two recent doses of tetanus toxoid^{17,18}. None of the mothers in our series were immunized against tetanus.

Epidemiologic studies in Turkey show that the majority of infants with neonatal tetanus are born to mothers not previously immunized for tetanus, which is in accordance with studies reported from other countries^{4,6}.

The major problem in tetanus prevention today is the difficulty involved in delivering routine immunization to those in need. Every contact that a susceptible female of child bearing age has with a health care professional should be viewed as an opportunity for updating her tetanus immunization status.

Thirty-nine (90.7%) of the 43 patients we studied were unhygienic home deliveries and only two patients were delivered with a midwife in attendance. Most of the patients were delivered by inexperienced persons. Similar studies from Turkey indicate that most infants are delivered under such circumstances and that when a midwife is in attendance, neonatal tetanus is a rare occurrence⁴.

Increasing the number of trained midwives may be effective in reducing the incidence of neonatal tetanus as well as decreasing neonatal mortality due to tetanus and other causes.

Despite the existence of a nationwide antitetanus immunization policy whereby women are vaccinated before and during pregnancy in Turkey, the occurrence of neonatal tetanus, even in large cities, suggests the need for more vigorous efforts emphasizing risk groups living in urban areas.

Acknowledgements

The authors wish to thank Prof. Keriman Tinaztepe, Associate Prof. Turgay Coşkun and Prof. Olcay Neyzi for their advice in the preparation of this manuscript.

REFERENCES

1. MacLennan L. Prevention of neonatal tetanus in developing countries. *Sixth International Conference on Tetanus, December 3-5, 1981*. Lyon: Collection Foundation Mérieux, 1982, pp. 113-22.
2. Berkowitz FE. Tetanus. In Nelson JD (ed). *Current Therapy In Pediatric Infectious Disease*. Philadelphia: B.C. Decker Inc, 1986 pp 189-191.
3. Stanfield JP, Galazka A. Neonatal tetanus in the world today. *Bull WHO* 62: 647, 1984.
4. Büyükgebiz B, Çevik N, Oran O. Neonatal tetanoz vakalarının retrospektif incelenmesi (epidemiolojik yaklaşım). *Çocuk Sağlığı ve Hastalıkları Dergisi* 30: 127, 1987.
5. Salimpour R. Follow-up studies in tetanus neonatorum. *Proceedings of the XIII International Congress of Pediatrics, Vienna, 1971, Vol VI*. Vienna: Verlag Wiener Medizinischen Akademie, 1971, pp 402-405.
6. Orenstein WA, Wassilak SG. Tetanus. In Evans AS, Brachman PS (eds). *Bacterial Infections of Humans: Epidemiology and Control* (2nd ed). New York: Plenum Pub, 1991, pp 707-726.
7. Yalaz K, Işık IH. Neonatal tetanozda diazepam tedavisi ile alınan sonuçlar. *Çocuk Sağlığı ve Hastalıkları Dergisi* 14: 21, 1971.
8. Ildırım I. A new treatment for neonatal tetanus: antitetanic serum and prednisolone given together intrathecally. *Türk J Pediatr* 9: 89, 1967.
9. Saraçlar M. Neonatal tetanoz tedavisi. *Çocuk Sağlığı ve Hastalıkları Dergisi* 9: 206, 1966.
10. Garcia-Palmieri MR, Ramirez R. Generalized tetanus: analysis of 202 cases. *Ann Intern Med* 47: 721, 1957.
11. Adams EB. The prognosis and prevention of tetanus. *S Afr Med J* 42: 739, 1968.
12. Daud S, Mohammad T, Ahmad A. Tetanus neonatorum. (A preliminary report on the assessment of different therapeutic regimens) *JPMA* 31: 105, 1981.
13. Bulut A, Shorter F, Gökçay G, Neyzi O. Mortality in the 0-5 year age group in İstanbul City in 1988 (unpublished data).
14. Anlar B, Yalaz K, Dizmen R. Long-term prognosis after neonatal tetanus. *Dev Med Child Neurol* 31: 76, 1989.
15. Réthy L, Réthy LA. Active anti-tetanus immunisation of females to control neonatal tetanus. *Lancet* 1: 616, 1986.
16. Athavale VB, Pai PN, Fernandez A, et al. *Tetanus neonatorum*. *Prog Drug Res* 19: 189, 1975.
17. Neonatal tetanus. The Invisible Killer. Update WHO, Geneva, 1986.
18. Expanded Programme on Immunization, Information System, WHO/EPI/GEN/89.2, July 1989, p 1.

