

Neonatal tetanus in the southeast of Turkey: risk factors, and clinical and prognostic aspects

Review of 73 cases, 1990-1999

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SUMMARY: Yaramış A, Taş MA. Neonatal tetanus in the southeast of Turkey: risk factors, and clinical and prognostic aspects-a review of 73 cases, 1990-1999. *Turk J Pediatr* 2000; 42: 272-274.

Although neonatal tetanus (NT) can be prevented by immunization of expectant mothers and by good hygiene and asepsis during delivery, it is still a common cause of neonatal mortality in developing countries. The objective of this study was to determine indicators in NT. We reviewed the clinical records of 73 neonates admitted to the Pediatric Infectious Diseases Ward of Dicle University Hospital, Diyarbakır, Turkey, with the diagnosis of NT.

Delivery had occurred at home by untrained traditional birth attendants in all cases. None of the mothers had immunization with tetanus toxoid during pregnancy. The median age of infants at presentation was 7.3 days and the mean age at onset of symptoms was 5.6 ± 2.8 days. The overall mortality was found to be 52 percent. Mortality was significantly associated with an incubation period of 4.3 days or less and fever.

The incidence of NT in Turkey is on the decline due to widespread tetanus toxoid use in pregnant women, but in some regions, especially in the so-called rural poor areas, there is still risk of preventable diseases. Hygienic deliveries and immunization of pregnant women are very important for the prevention of NT deaths, and universal prenatal care, including education programs on appropriate perinatal and cord care, can significantly reduce NT incidence and mortality in developing countries.

Key words: neonatal tetanus, prognostic factors, Turkish children.

Neonatal tetanus (NT), which can be effectively prevented through immunization and clean delivery practices, continues to be a serious threat to public health in many parts of the world. Community-based NT mortality surveys helped to determine the true incidence of NT and revealed that, before immunization and clean delivery programs were well established, approximately one million children contracted NT each year, of which 800.000 died. Mortality rates varied markedly by locality, ranging from 0 to 70 NT deaths per 1.000 live births¹.

Unfortunately, NT continues to occur in Turkey, despite the nationwide anti-tetanus immunization policy. In this article, hospital records of 73 cases of NT were evaluated to identify the possible factors affecting prognosis and the clinical features.

Material and Methods

The study population consisted of 73 cases of NT who had been admitted to the Infectious Diseases Ward of Dicle University Hospital, Diyarbakır, Turkey, from February 1990 through May 1999. There were 52 males and 21 females. Untrained traditional birth attendants delivered all patients at home, and none of the mothers had immunization with tetanus toxoid or healthcare services during pregnancy. All of the families were of low socioeconomic level. Most parents were either illiterate or had only attended primary school.

Results

The mean age of infants at admission was 7.3 ± 8.9 days (range 3-5), and the mean incubation period was 5.6 ± 2.8 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. On admission, sustained tonic contractions and spasms were observed in most patients and diagnosis was based on clinical findings. Razor blade (48%), scissors (30%), and knife (22%) were the instruments used to cut the cord in non-hygienic conditions. Spasticity (78%), lack of sucking (73%), trismus (67%), fever (45%), omphalitis (38%), risus sardonicus (18%) and opisthotonus (12%) were the most common presenting signs and symptoms. High fever was present in 24 of the 38 patients that died and in only 13 of 35 survivors ($p < 0.05$). The mean incubation period was 4.7 ± 2.9 days for the fatal cases and 6.5 ± 1 days for the survivors ($p < 0.05$). The median hospitalization period was 6.3 days for the fatal cases and 27.8 days for the survivors. Conventional treatment consisted of diazepam for sedation, tetanus antitoxin and benzylpenicillin. Subsequent infections were treated using the appropriate antibiotic. All patients were kept in quiet, darkened rooms, and movement was kept to a minimum. The Student's *t* test was used for statistical analysis.

Discussion

Neonatal tetanus (NT) is a major cause of mortality in developing countries, with over 800,000 deaths estimated to occur annually. It is endemic in 90 countries throughout the world¹. The incidence of NT in Turkey is on the decline due to widespread tetanus toxoid use in pregnant women, an increasing number of hospital births and improvements in postpartum hygiene², but the population of some regions, especially the so-called rural poor, is still at risk for preventable diseases.

In most parts of the world, particularly in developing countries, reported NT cases appear to be more common in males than in females³. In our study, most cases (71%) were males. The incubation period, severity of illness, preterm birth, infant's weight, secondary infections, age at onset, fever, risus sardonicus, opisthotonus, and mode of treatment all affect survival in NT⁴⁻⁸. In this study, mortality was significantly associated with an incubation period of 4.3 days or less and presence of fever. High fever was present in 24 of the 38 patients that died and in only 13 of the 35 survivors ($p < 0.05$). Age at onset of symptoms was found to be 5.6 ± 2.8

(mean) days, and the fatal cases showed a significantly shorter mean incubation period (4.3 ± 8.6) than the survivors, which is in accordance with results from other studies^{4,5,7,9,10}. The case fatality rate of neonatal tetanus ranges between 25-90 percent with therapy, depending on the intensity of supportive care¹¹. In this study, this rate was determined to be 52 percent, which substantiates the reports of other centers in our country^{2,5,6,12,13}.

In the present study, razor blade (48%), scissors (30%), and knife (22%) were the instruments used to cut the cord in non-hygienic conditions. Spasticity (78%), lack of sucking (73%), trismus (67%), fever (45%), omphalitis (38%), risus sardonicus (18%) and opisthotonus (12%) were the most common presenting signs and symptoms. The mean incubation period was 4.7 ± 2.9 days for the fatal cases and 6.5 ± 1 days for the survivors ($p < 0.05$). The median hospitalization period was 6.3 days for the fatal cases and 27.8 days for the survivors. All patients studied were products of unhygienic home deliveries and none of the patients were delivered with a midwife in attendance. Inexperienced persons delivered most of the patients. Demographic characteristics of all patients are shown in Table I.

Table I. Demographic Characteristic of All Patients

Number in group	73
Mean age at admission (range)	7.3 ± 8.9 days (3-25)
Mean incubation period	5.6 ± 2.8 days
Fatal cases	4.7 ± 2.9 days
Survivors	6.5 ± 1 days
Sex (M/F)	51/22
Birth weight	
Mean	3.433 ± 70 g
Range	2.800-4.750 g
Instruments used to cut the cord	
Razor blade (%)	48
Scissors (%)	30
Knife (%)	22
Number of unhygienic home deliveries (5)	100
Prenatal tetanus immunization (%)	0
Most common presenting signs and symptoms	
Spasticity (%)	78
Lack of sucking (%)	73
Trismus (%)	67
Fever (%)	45
Omphalitis (%)	38
Risus sardonicus (%)	18
Opisthotonus (%)	12
Median hospitalization period (days)	
Fatal cases	6.3
Survivors	27.8
Deaths (%)	52

Epidemiological 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 our present study and studies reported from other countries^{2,11}. Tetanus is a totally preventable disease. Risk factors in NT are reduced by the birth attendant washing his/her hands using a cleaned cord-cutting tool, by the education of mothers, promotion of hospital delivery (particularly in rural areas), prenatal tetanus immunization of all pregnant women, and by topical antimicrobials against neonatal tetanus applied to the umbilical cord wound during the first several days of life¹⁴⁻¹⁶.

The prevention of NT is important not only because of the high mortality rate associated with the disease, but also because sequelae in survivors are not uncommon¹⁷. The World Health Organization has adopted the goal of eliminating NT worldwide, and a major strategy for its prevention is the administration of at least two properly spaced doses of tetanus toxoid (TT) to women of childbearing age in high-risk areas to passively protect their newborns at birth¹⁸.

REFERENCES

- Whitman C, Belgharbi L, Gasse F, Torel C, Mattei V, Zoffmann H. Progress towards the global elimination of neonatal tetanus. *World Health Stat Q* 1992; 45: 248-256.
- Büyükgebiz B, Çevik N, Oran O. A retrospective study of neonatal tetanus cases. *Çocuk Sağlığı ve Hastalıkları Dergisi* 1987; 30: 127.
- Stanfield JP, Galazka A. Neonatal tetanus in the world today. *Bull WHO* 1984; 62: 647-669.
- Davies-Adetugbo AA, Torimiro SE, Ako-Nai KA. Prognostic factors in neonatal tetanus. *Trop Med Int Health* 1998; 3: 9-13.
- Yalçın I, Güler N, Kebudi R, Öneş Ü, Salman N. A review of 43 cases of tetanus neonatarum. *Türk J Pediatr* 1992; 34: 121-125.
- Gürses N, Aydın M. Factors affecting prognosis of neonatal tetanus. *Scand J Infect Dis* 1993; 25: 353-355.
- Kurtoğlu S, Caksen H, Öztürk A, Çetin N, Poyrazoğlu H. A review of 207 newborns with tetanus. *JPMMA J Pak Med Assoc* 1998; 48: 93-98.
- Osinusi K, Njinyam MN. A new prognostic scoring system in neonatal tetanus. *Afr J Med Sci* 1997 26: 123-125.
- Garcia-Palmieri MR, Ramirez R. Generalized tetanus: analysis of 202 cases. *Ann Intern Med* 1957; 47: 721.
- Adams EB. The prognosis and prevention of tetanus. *S Afr Med J* 1968; 42: 739-743.
- 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: 707-726.
- Ildirim I. A new treatment for neonatal tetanus. Antitetanic serum and prednisolone given together intrathecally. *Türk J Pediatr* 1967; 9: 89-95.
- Yalaz K, Işık IH. Results of diazepam therapy in neonatal tetanus. *Çocuk Sağlığı ve Hastalıkları Dergisi* 1971; 14: 21-28.
- Hlady WG, Bennett JV, Samadi AR, et al. Neonatal tetanus in rural Bangladesh: risk factors and toxoid efficacy. *Am J Public Health* 1992; 82: 1365-1369.
- Leroy O, Garenne M. Risk factors of neonatal tetanus in Senegal. *Int J Epidemiol* 1991; 20: 521-526.
- Bennett J, Macia J, Traverso H, Banoagha S, Malooly C, Boring J. Protective effects of topical antimicrobials against neonatal tetanus. *Int J Epidemiol* 1997; 26: 897-903.
- Anlar B, Yalaz K, Dizmen R. Long-term prognosis after neonatal tetanus. *Dev Med Child Neurol* 1989; 31: 76-80.
- Dietz V, Milstein JB, van Loon F, Cochi S, Bennett J. Performance and potency of tetanus toxoid: implications for eliminating neonatal tetanus. *Bull WHO* 1996; 74: 619-628.