

## **Features of Tetanus in Eight Adult Patients in İstanbul Metropolis**

*İstanbul Metropolünde İzlenen Sekiz Erişkin Tetanuslu Hastanın Özellikleri*

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Although tetanus is a vaccine-preventable disease, it still occurs due to deficiency in vaccination. We followed eight patients (median age 44 years; %75 men) with tetanus referred to our center between 1998-2002. They had contracted tetanus by surgical wound, burn, animal bite or minor wounds. Five of them had sought medical care when injured. Their wounds were treated (four patients), but tetanus vaccination was applied to only one patient, none were given tetanus immune globulin (TIG). Tetanus was fatal in half of the patients and death occurred within 2-30 days. Even minor injuries carry a risk for this highly fatal illness, and the patients' primary vaccination history is very important for treatment. Knowledge and awareness of healthcare workers, especially emergency department workers should be refreshed periodically. Wound treatment, TIG and tetanus toxoid applications are as important as primary immunization.

**Key words:** Tetanus vaccine; national vaccination program.

Tetanoz aşısı ile korunabilir bir hastalık olmasına rağmen aşılama kaynakları eksikliklere bağlı olarak hala görülebilmektedir. Biz 1998-2002 yılları arasında tetanozlu sekiz erişkin hastayı izledik (ort. yaşı 44, erkeklerin %75'i). Tetanoz, hastalarda cerrahi yaralanma, yanık, hayvan ısılığı ya da küçük yaralanmalarla oluşmuştur. Hastaların beşi yaralandığında tıbbi bakım görmüştür. Dört hastada yara bakımı yapılmış, ama sadece bir hastaya tetanoz aşısı uygulanmış ve hastaların hiçbirini tetanoz immünglobulini almamıştı (TIG). Tetanoz hastaların arasında fatal seyretti ve ölümler 2 ila 30. günler arasında gerçekleşti. Küçük yaralanmalar da bu fatalitesi yüksek hastalık için risk oluşturmaktadır ve hastaların primer aşılanma anamnezleri tedavi için çok önemlidir. Başta acil bölümlerde çalışanlar olmak üzere sağlık çalışanlarındaki, hastalığın bilinirliği ve farkındalık periyodik olarak yenilenmelidir. Yara bakımı, TIG ve tetanoz aşısı uygulamaları primer aşılama kadar önemlidir.

**Anahtar sözcükler:** Tetanoz aşısı; ulusal aşı programı.

Physicians of developing countries see patients with tetanus most frequently. In developed countries, patients who most likely run a fatal course are the elderly.

Tetanus is a vaccine-preventable disease. If the community is not immunized appropriately, the disease may not be preventable. Prevention is accomplished by vaccination. Tetanus toxoid

is a superior antigen; in people who have had primary immunization, protective antibody levels remain for about 10 years. Since tetanus disease does not induce immunity, persons should receive active immunization after recovery.<sup>[1]</sup>

We report here eight patients that we encountered during 1998-2002, in order to review the classical ways of acquiring the disease, i.e.

burn, animal bite, gynecological operation, foreign material (stone and orthopedic device) in wounds, contact of open wound with soil, and injection with non-sterile technique in wounds. These patients were referred to our center after the clinical picture of tetanus had become obvious (Table 1).

### CASE REPORT

**Patient-1:** A 63-year-old man had a cerebrovascular attack, fell on an electrical heater and sustained serious burns on his feet. He was admitted to the neurology service for stroke, and was also treated for his burns. After 13 days he developed the clinical signs of tetanus. In his personal history, no information about primary immunization could be obtained. No prophylaxis for tetanus had been administered after the injury.

**Patient-2:** A 37-year-old man had injured his foot with a nail. Trismus developed after eight days. Again, no information about primary immunization was obtained, but he reported being vaccinated against tetanus during his military service. He had been treated with one dose of tetanus toxoid vaccine, but no immunoglobulin was administered following the injury.

**Patient-3:** A 42-year-old farmer with a paronychial infection (abscess) on his finger had used a non-sterile injector (which he had used on animals before) to empty his abscess himself, and

he had continued his work with soil afterwards. After 10 days, stiffness of the jaw had started and he was admitted to a rural healthcare facility. No treatments with tetanus vaccine or immunoglobulin were administered, only antibiotics were given. He could give no information about his primary immunization, but he had done his military service.

**Patient-4:** This patient (56 years old) had a dog bite wound in his right inguinal area. After 11 days, spasms of the mouth and jaw muscles and back pain had started. Vaccination against rabies was administered after the bite, however no tetanus toxoid vaccine or immunoglobulin was given. There was no record of primary immunization in his history.

**Patient-5:** A 21-year-old woman was admitted to the hospital for stiffness of the jaw and spasm of the legs. Although she had fever, trismus, rigidity of the abdominal muscles and other signs of tetanus, no site of entrance was obvious. The wound that was considered responsible for the clinical picture was only a minor cut on her hand, which had healed by the time when signs had developed. No information about her primary vaccination could be obtained from her personal history.

**Patient-6:** A 62-year-old man had fallen on the ground and had wounded his forehead slightly. After five days, paralysis developed on the right

**Table 1. Features of patients**

Patient	Type of injury	Age	Sex	Location	Antibiotic	Debridement	Incubation period	Results
1	Burn	63	M	Foot	Metronidazole	+	13 days	Exitus
2	Cut	37	M	Hand	Metronidazole	+	8 days	Exitus
3	Non-sterile injection	42	M	Hand	Metronidazole	+	10 days	Cure
4	Dog bite	56	M	Inguinal area	Metronidazole	+	11 days	Exitus
5	Injury	21	F	Hand	Metronidazole	-	10 days	Cure
6	Falling and foreign object-stone	62	M	Forehead	Metronidazole	+	5 days	Exitus
7	Cut-orthopedic device	25	M	Hand	Metronidazole	+	8 days	Cure
8	Operation-hysterectomy	46	F	Pelvic area	Metronidazole	-	15 days	Cure

side of his face. At the time of injury, he was not treated against tetanus. He had done his military service, but could give no information about his primary immunization. The wound in his forehead had healed well, but a small mass could be palpated in the wound, which proved to be a foreign body (stone) afterwards.

**Patient-7:** A 25-year-old man had a cut and fracture in his hand, which was treated with internal fixation and a cast. One week later he had put out the cast because of a burning sensation in his hand and had seen a yellowish green purulent discharge. One day later contractions in his extremities and trismus developed. During fracture treatment he was not given either tetanus toxoid or TIG. He had served in the military but had no history of primary immunization.

**Patient-8:** A 46-year-old woman had total abdominal hysterectomy, with an uneventful postoperative period. No infection had developed on the incision site, but she had contractions in her face and neck after 15 days. She was not given either tetanus toxoid or TIG post-operatively and no history of primary immunization was present.

## DISCUSSION

İstanbul is both a metropolis, and also an important center of medical services that many patients from far and near cities utilize.

Figure 1 shows the detected and reported number of tetanus patients between the years 1993 and 2002. The graph also shows the Ministry of Health data and data concerning the whole of Turkey. The number of tetanus patients have decreased from hundreds in 1990's to tens after 2000 for the whole of the country.<sup>[2]</sup>

The median age of our patients was 44 years; youngest 21, oldest 63 years old. Our patients were over 35 years of age, except two patients. The incubation period was about 10 days. The patients with an incubation period shorter than 10 days had a worse prognosis and only one of our patients with a short incubation period (<10 days) survived. This relation between a short incubation period and a poor prognosis was mentioned before.<sup>[3,4,5]</sup> Durán-Nah et al.<sup>[4]</sup> reported that 79% of their 112 reported cases of

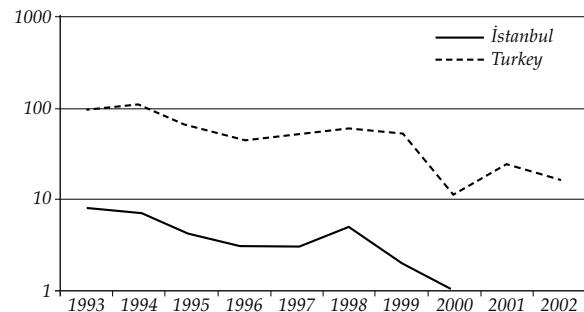


Fig. 1. The number of tetanus patients according to years.

tetanus had an incubation period longer than 10 days, and these cases had a better clinical prognosis. Miranda-Filho et al.<sup>[5]</sup> followed up 152 cases during 1990-1995 and found significant relation between mortality and the incubation period, and also between the early appearance of clinical symptoms and mortality. Saltoglu et al.<sup>[3]</sup> reported that 54% of the tetanus cases resulted in death, but those with a short incubation period had a mortality rate of 81%.

None of these patients had had a complete childhood vaccination. The male patients are considered to be vaccinated with at least one dose during their military service. Alexander et al.<sup>[6]</sup> states that, the last patients reported in USA occurred in people who had not completed primary vaccination and if there is not a complete vaccination history in patients with injury, TIG application is compulsory. Also, in another study, persons who did not have a tetanus booster for the last 10 years were vaccinated and antibody levels were measured afterwards. It was found that protective levels of antibodies were not achieved, and the authors suggest that physically injured persons with unknown vaccination history should receive TIG with vaccine.<sup>[7]</sup> The study of Massari et al.<sup>[8]</sup> shows us the problems we will encounter in the future. In 1995, 831 of their 1435 patients had an incomplete history of vaccination history, and were offered TIG, but 42 (5%) patients refused. Hüllstrung et al.<sup>[9]</sup> conducted a study, considering 15 IU as protective, and found protective levels of antibodies in adults over 65 years of age who had completed three doses of tetanus toxoid vaccination. Atabay and Gokoglu<sup>[10]</sup> found that, among persons who

had completed primary tetanus vaccination series and had routine tetanus boosters every 10 years, 97.4% had protective antibody levels. This rate is 53% in persons who had incomplete tetanus vaccination series.

Injuries which may lead to tetanus disease are various. Olsen and Hiller<sup>[11]</sup> reported two patients, who were 86 and 46 years old and the causes were a chronic decubitus ulcer and a periodontal abscess. Apart from these, minor injuries (e.g. inappropriate injections in especially IV substance abusers) may result in tetanus.<sup>[12]</sup>

The case fatality ratio is stated to be increased in people aged over 65 years.<sup>[13,14]</sup> Newborns and elderly people are at greatest risk of death from tetanus.<sup>[15]</sup> From the patient series of Saltoglu, 54% died.<sup>[3]</sup> Yuce<sup>[16]</sup> reported 10 patients between 1983-1985 from İzmir and their mortality rate was 50% which is similar to our patients, and those getting well had an incubation period over 10 days.<sup>[17]</sup> Mortality rate of our patients was 50%. Average age of the survivors was 34 and in death cases was 55 and incubation period of the death cases was longer.

In our eight patients, five had sought medical care and had wound treatment but only one patient received one dose of tetanus vaccine, and no TIG was administered to any patient. After hospitalization in our center, we gave one dose of tetanus vaccine to all the patients and we also administered TIG to seven of them. We debrided the wounds of six patients and gave antibiotics (metronidazole) to all eight of them. Antibiotic therapy was completed to 10 days in all except the fatal patients. The duration of hospitalization was about 21 days. All the patients were treated in the ICU.

In the prevention of tetanus disease, the knowledge and awareness of the healthcare workers is very important. Some may have sufficient knowledge but insufficient practice about the prophylaxis of the disease. Ahmed et al.<sup>[18]</sup> reported in their study about an emergency department in Karachi that; when an injured patient applied to the emergency unit, 35% of the physicians administered only tetanus vaccine at the time of presentation, 43% administered only

TIG, and 2% administered both vaccine and TIG, and only 13% recommended the patient to complete the vaccination schedule. Health care workers in the emergency departments should be regularly trained, the vaccine should be present in emergency services, the clinicians should review the vaccination status of all patients, and they should not be contented with vaccination only, but also consider use of TIG.

In Turkey, the primary immunization schedules end with the 6th dose of the vaccine in the 8th class of the primary school. Afterwards, men are vaccinated during their military service and women during pregnancy, against neonatal tetanus. Taking into consideration the decreasing levels of antibody titers with advancing age, an adult immunization program should be developed and a better registration system should be constituted. Adults are under high risk for tetanus; either because their childhood vaccines or booster doses were not administered, or their protective antibody levels are decreased with age.

Considering all these, the following must be performed for injured patients;

- Evaluate the wound thoroughly, remove all foreign materials as part of proper wound care and give antimicrobial agents.
- The patient must be reviewed properly about previous vaccination status, age, education level, underlying diseases, and having done his military service or not.
- Evaluation for the need of TIG administration must be done properly for each case.
- Patients should not be left with one dose of vaccination, if necessary a whole vaccination program should be arranged.
- Patients with unknown or uncertain vaccination histories and who have not had a tetanus booster dose for the last 10 years, and who apply with an injury carrying risk for tetanus, should receive both tetanus vaccine and TIG and antibiotics. The vaccination program should be continued. The compulsory application of tetanus vaccine seems to affect the age and gender distribution of the disease.

Extended Immunization Programme (EIP Circular 2008/14) which has already been approved by Ministry of Health in 2008, was arranged to contain not only pregnant women or women at childbearing age but also other adult population for tetanus immunization.<sup>[2]</sup>

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