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CASE REPORT

# A forgotten diagnosis in emergency department: tetanus

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**Abstract:** *Introduction:* Tetanus is a serious and acute life-threatening disease caused by toxins of "Clostridium tetani". Although it is generally a disease of developing countries, its lower incidence is encountered also in developed countries. Since the principal treatment of this disease is known to be based on vaccination and wound care, the emergency physicians play a key role in its management.
*Material and method:* In the present study, we reviewed its uncommon clinical course along with demographic and clinical features of five cases that have presented with various complaints to our Emergency Department. Presenting signs, demographic features, injury history, and the time from the occurrence of injury to the beginning of symptoms were evaluated.
*Results:* Four of five cases were female. The mean age of cases was 56.8 (34–73). Three of them had hand injury, one had foot injury, and the fifth case had facial injury. The initial symptoms included difficult jaw movement, back muscle spasm, and pain. Two cases died.
*Conclusion:* Tetanus cases may present to ED with different symptoms. Therefore, physicians should be aware of the early signs of tetanus. Careful and meticulous wound management of cases presented to ED following an injury should be considered a significant factor, which can help in reducing the tetanus cases *(Tab. 2, Ref. 18).* Full Text in free PDF *www.bmj.sk.*
Key words: differential diagnoses, immunization, tetanus, wounds.

Tetanus is a serious and acute life-threatening disease caused by toxins of "Clostridium tetani" (1). Although it is generally a disease of developing countries, its lower incidence is encountered also in developed countries (2, 3). Since the principal treatment of this disease is known to be based on vaccination and wound care, the emergency physicians play a key role in its handling (2). Along with their significant role in prevention of the disease, they also have an important role in recognizing new tetanus cases and their management in the emergency setting. The diagnosis of tetanus cases is based on clinical signs and physical examination (4, 5). Most common presenting symptoms of tetanus are trismus, opisthotonus, and muscle spasms (4). Although the disease is vaccine-preventable, it has a high mortality rate, and the presenting symptoms may be uncommon or suggestive of other conditions (6, 7). In the present study, we reviewed its uncommon clinical course along with demographic and clinical features of five cases that have been presented with various complaints to our Emergency Department (ED) and eventually diagnosed as tetanus.

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## Materials and methods

The present study includes five cases presented to ED of University Medical Faculty, and diagnosed as tetanus during a period of six months beginning with June 2007. The information concerning the cases was obtained from patient files. The presented signs, demographic features of patients, injury history, and the period from the occurrence of injury to the beginning of symptoms were evaluated. Clinical findings and the diagnostic process of cases carried out at ED were assessed in detail. The data concerning the history of tetanus immunization following the injury, the applied treatment modalities, ventilator support, and intensive care programs were reviewed. All the data were analyzed by SPSS 10.0 for windows computer program.

## Results

Four of five cases were female. The mean age of cases was 56.8 (34–73). While three of the cases had hand injury, one had foot injury, and the fifth case had facial injury. Even though one of the cases had presented to a healthcare center immediately after the injury, two cases were not immunized by tetanus vaccine (Tab. 1). The information on immunization history could be gained from only one of the cases. Other four cases did not remember their tetanus immunization status.

The mean duration of period from injury to the occurrence of first symptom, was 7.2±3.8 days. The mean duration of period from injury to the presentation to ED was 10.4±5.5 days.

**Tab. 1. Epidemiologic characteristics of the cases diagnosed as tetanus in ED.**

| Case | Age | Gender | Occupation | Vaccination | Ig | Injury Type |
|---|---|---|---|---|---|---|
| 1 | 34 | Female | Farmer | + | – | Domestic accident (sharp object injury) |
| 2 | 55 | Female | Housewife | – | – | Domestic accident (sharp object injury) |
| 3 | 63 | Male | Farmer | – | – | Work-related injury (fall from a tractor) |
| 4 | 73 | Female | Housewife | + | – | Domestic injury (blunt trauma while using a tool) |
| 5 | 59 | Female | Housewife | + | – | Work-related injury (penetrating trauma while using a tool) |

**Tab. 2. Presenting symptoms of the cases in the ED.**

| Presenting Symptom | Number of Cases (n=5) |
|---|---|
| Spasm and pain in jaw | 5 |
| Neck and back pain | 4 |
| Dysphagia | 2 |
| Sweating | 2 |
| Speech disorder | 2 |
| Headache | 1 |

The initial symptoms included difficulty in jaw movement, back muscle spasm, and pain. While four cases showed neck and back pain, two cases had dysphagia, and two had sweating (Tab. 2).

Only one case had an increased body temperature, namely up to 37.5 °C. Vital signs of the remaining cases were evaluated as being normal.

While three cases had neck stiffness during physical examination, all cases were conscious. Only two cases were immediately diagnosed with tetanus based on the initial signs presented to ED, whereas the other three cases had different initial diagnoses in the emergency setting. These different diagnoses were temporomandibular joint dysfunction in two cases and peritonsillar abscess in one case.

While all the cases received tetanus immunoglobulin (T Ig) as part of initial therapy, three cases were given metronidazole and two cases were given penicillin G. All cases received benzodiazepine (diazepam and midazolam) infusion against muscle spasms during their monitoring. One case was transferred abroad to another healthcare center due to the relatives' request after a 40-day follow-up period. The mean period of hospital stay for the other four cases was 7.5±4.5 days. During the treatment of three cases, intensive care and ventilation support were required. Tracheotomy was performed in all of those three cases. Two cases died on their 4th and 5th days of treatment in ICU due to respiratory failure.

## Discussion

Tetanus is an acute, frequently fatal disease caused by contamination of wound by Clostridium tetani (5). Clostridium tetani can be found in a vegetative or spore form. In soil or animal faeces, it is found in form of very resistant spores (5). They enter the wound and as the oxygen level of tissue decreases, they may turn into a toxin-producing vegetative form. The presence of factors such as dead tissue, foreign body, or infection in the wound site facilitates the conversion of Clostridium tetani spores into its toxin-producing vegetative form (8). Therefore, the wound care of patients presented to ED should be carried out carefully, while wound debridement is considered a useful method in preventing the toxin production and improving the oxidation reduction potential of infected tissue (5).

The infrequent nature of tetanus along with many daily cases of wound management carried out in EDs increase the importance of emergency physician in prevention of tetanus (9). There is no laboratory test to confirm the tetanus diagnosis (5, 10). The benefit of wound culture is very limited (5).

Tetanus is known to occur among elderly, individuals working on farms, and cases with wounds contaminated with soil (11). Unusually, a majority of our cases were housewives who sustained injuries at home. Cases of self-adminstration of injections, particularly the heroin addicts should be considered a group at increased risk for tetanus.

In 10 % of cases with tetanus, no previous injury is described (5). Regarding our cases, the recollection of an injury from the past, especially if of minor extent, was not easy. Nevertheless, all patients eventually confirmed that they had sustained a similar injury. According to literature, 72 % of tetanus cases have reported not to have finished their primary immunization (12). The fact that only one of our cases was able to give information on immunization, suggests that people still do not pay enough attention to tetanus immunization.

Additional vaccinations performed on adults in order to increase immunization, increased use of machines in agriculture (widespread machine usage), employment of chemical fertilizers in place of natural animal manure, and routine vaccination program applied to children in the past 50 years, have all helped to reduce the annual incidence rate of tetanus (5). Most of the patients diagnosed with tetanus were found not to have received a proper prophylactic treatment following injury (5). Two cases in our series had no prophylactic treatment. Another even more remarkable point is that one of those had presented to a health center before being admitted to our ED. This event indicates that tetanus prophylaxis is still an important issue for our country.

The mean incubation period for tetanus is known to be two weeks (24 hours-1 month) (5, 13). In our cases, the duration of time between injury and occurrence of symptoms varied considerably. It is known that as this period becomes shorter, the prognosis of the disease worsens (5). These periods for our patients who died in the hospital were four days and eight days. In our cases, the period between the occurrence of first symptom and the diagnosis was long in general. This might be due to considering other diseases for differential diagnosis or patients ignoring their symptoms.

Because the nerves with short axons are affected in the generalized form of the disease (most common form), the first symptoms are encountered in facial muscles. The initial symptoms are known to be pain and spasm in the masseter muscle followed by neck, torso and extremities (5). The most common presenting symptoms of the cases in ED include trismus, opisthotonus, spasm, neck stiffness, dysphagia, abdominal rigidity, risus sardonicus, and respiratory failure (4, 14, 15). Even though the first symptom observed in almost all of our cases was related to the jaw, the delay in considering tetanus as a differential diagnosis is a remarkable aspect of the process.

In tetanus, the experience of rigidity after muscle spasm is followed by trismus development. The characteristic facial expression is called "risus sardonicus" (5). The examination of our cases in ED revealed no 'risus sardonicus' appearance. However, in almost all of their clinical follow-up widespread muscle spasms were seen.

The disruption of autonomic nervous system in tetanus cases generally occurs as sympathetic hyperactivity. It occurs during the second week of tetanus and contributes significantly to mortality and morbidity (5). One of our cases had experienced a serious hypertensive attack during the follow-up period which was believed to be due to sympathetic overactivity.

The treatment and monitoring of those patients should be carried out in intensive care units. In order to prevent reflex convulsive spasms, environmental stimulators should be reduced. Three of our cases required intensive care treatment. Other cases have been treated in a setting with minimal level of environmental stimulation.

Tetanus Immunoglobulin (T Ig) was given to all of our cases. Human T Ig which is used in tetanus treatment shows its effects by neutralizing the toxins within circulation. Although T Ig shows no effect on resolving the symptoms, it reduces the mortality rate (5). While the optimal dose is not known yet, 3000–6000 U tetanus toxoid is applied via intramuscular (IM) route. It should be applied before wound debridement due to toxins that are to be expected to be released during the debridement. It is not necessary to repeat the dose. Its half-life is 28 days (5).

Despite the controversial nature of using antibiotics in the treatment, it is used in classical approach. The preferred parenteral antibiotic is metronidazole (5). Benzodiazepines are used as muscle relaxants against spasms. During the treatment of all our cases, these drugs were needed. Moreover, in treatment of autonomic dysfunction which could develop into tetanus cases, $\alpha$ and $\beta$ adrenergic blocker agents are preferred (5). In one of our cases (Systolic Blood Pressure >150 mmHg), such a drug (Dilatrend®, Carvedilol, Roche SpA, Segrate MI Italy) was used effectively due to uncontrollable hypertension.

The maintenance of open airways is very important in tetanus patients. Active immunization should be applied to all patients recovered from tetanus. It should be kept in mind that overcoming this disease does not result in immunity (5). Therefore, 0.5 mL toxoid should be administered via IM route right after the injury and within six weeks up to six months (5).

Global tetanus incidence is thought to be 18/100,000/year. In our country, the incidence in 2003 was 0.02/100,000 (16). Despite providing optimal treatment, the mortality of patients with tetanus is very high, as seen in our cases. It is known to be approximately 30–50 % (17, 18).

One of the limitations of our study was the number of patients diagnosed with tetanus. The number is so small, because tetanus is very rarely seen in our country and we believe this fact did not have a significant influence over the results of present study.

The uncommon incidence of tetanus generally leads to its exclusion from differential diagnosis of cases presented to ED. Moreover, tetanus cases may present to ED with various symptoms. Therefore, the physicians should be aware of the early signs of tetanus. The fact that tetanus patients have difficulty in recollecting the injury they have had is another factor which complicates the establishment of diagnosis. However, early diagnosis of tetanus is vital. The public should be informed about routine vaccination programs and importance of additional vaccinations to reduce the incidence of tetanus. Careful and meticulous wound management of cases presenting to ED following an injury should be considered a significant factor which could help in reducing the tetanus cases.

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