

Tetanus: A Report of Two Cases and Review of Literature – A Continuing Threat to the Elderly in Japan

Abstract

Tetanus has become rare in industrialized countries, largely due to the effectiveness of immunization. However, the elderly are susceptible to tetanus because many have not received primary immunization; the incidence of tetanus in Japan is still 120 cases/year. The initial symptoms of tetanus, such as trismus and dysphagia, are observed in the orofacial region. However, because of the disease's rarity, the clinician may be unfamiliar with the clinical presentation and may not suspect tetanus. We report two cases of elderly patients with generalized tetanus. Both patients presented trismus and/or dysphagia and consulted three different departments before the diagnosis of tetanus. Japanese clinicians will encounter tetanus more frequently than practitioners in other countries. Dental surgeons should be familiar with the clinical appearance of tetanus and should consider this disease in a nonimmunized patient presenting as an atypical case of trismus and dysphagia.

Keywords: *Dysphagia, tetanus, trismus*

Introduction

Tetanus is a severe, life-threatening infectious disease prevalent worldwide. This disease has become rare in industrialized countries;^[1] however, in Japan, over 120 cases were reported in 2014.^[2]

The symptoms of tetanus are so characteristic that a presumptive diagnosis can be made in most cases. However, because of the disease's rarity, clinicians are unfamiliar with the clinical presentation and may not suspect the disease. Given tetanus's severe and potentially fatal outcomes in untreated patients and a chance for full recovery if properly managed, familiarity with the disease, such as its clinical features, pathogenesis, complications, and principles of management, is important for every clinician.^[3]

Here, we report two cases of tetanus and review the trend and clinical features of tetanus in Japan to highlight the required knowledge and appropriate response of dentists in clinical situation.

Case Reports

Case 1

An 88-year-old man was referred to the oral and maxillofacial department with

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a complaint of trismus. The patient had difficulty in opening his mouth 11 days before. The symptom aggravated, and he presented to an orthopedic clinic 7 days earlier. An orthopedic surgeon suggested temporomandibular joint disorder. The patient consulted a general dental practitioner and was administered antibiotics and analgesics for 3 days under a diagnosis of an orofacial infection 5 days before. However, trismus did not improve. He had a medical history of hypertension, which was well controlled with azilsartan. He said that he had struck his right cheek with a nail hammer, which penetrated the skin while repairing his house about 35 days before the onset of trismus. Extraoral examination revealed increased tone in the bilateral masseters with a severe trismus [Figure 1]. There were no extraoral swellings or masses, and the wound at the right cheek had already healed. A panoramic radiograph showed normal temporomandibular joints, and computed tomography revealed no obvious odontogenic infection. Laboratory examinations, including C-reactive protein and creatine phosphokinase levels, were within normal limits. Tetanus was diagnosed on the basis of the clinical findings. The patient was referred to the Department of Infectious Diseases, where he was admitted. The patient was treated with tetanus toxoid 0.5 mL intramuscularly, human tetanus

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Figure 1: Clinical view of case 1 at the first visit. (a) Risus sardonicus. (b) severe trismus

immunoglobulin 3000 units, and metronidazole 500 mg intravenously every 8 h. The neuromuscular manifestations gradually improved, and he was discharged 2 weeks after admission. He had not received a tetanus vaccine before.

Case 2

A healthy 62-year-old female was referred to the oral and maxillofacial department by her otolaryngologist. She had experienced difficulty in swallowing the day before her first visit. Opening her mouth became impossible, and dysphagia progressed significantly in the last 24 h. She first consulted an internist, and a clinician referred her to an otolaryngologist. Temporomandibular joint disorder or odontogenic infection was suspected. She said that she had gotten a splinter of the tree in her foot while gardening 30 days before. She had severe trismus, with an interincisal opening of 15 mm [Figure 2]. Extraoral examination revealed that the masseters were in spasm bilaterally. Under the diagnosis of tetanus, the patient was treated in similar modalities as in case 1. On day 3, trismus became severe (mouth opening, 7 mm) and dysphagia worsened. However, from day 5, these symptoms improved. On day 16, she recovered well and was discharged. She had no memory regarding prior tetanus immunizations.

Discussion

Tetanus is a neurologic disorder caused by tetanospasmin, a powerful protein toxin produced by *Clostridium tetani*. Vaccination has made tetanus a rare disease in industrialized countries, but recent case reports emphasize that this very deadly but preventable disease is once again gaining attention among certain patient populations, such as elderly people or immunocompromised patients.^[4,5]

In Japan, with the introduction of preventive immunization in 1968, the incidence of tetanus has dramatically declined. However, annual incidence might have been underestimated before a report of tetanus to the Japan Ministry of Health, Labor, and Welfare was obliged in 1999. In fact, between 2005 and 2014, 1153 cases of tetanus occurred, giving an average annual incidence of 0.91/1 million population^[2,6] [Table 1]. This average annual incidence is quite similar to that in Italy (1.0/1 million population),



Figure 2: Photograph of case 2 at the first visit showing severe trismus

Table 1: Reported tetanus cases, deaths, and mortality rate in Japan

Year	Number of reported tetanus cases	Deaths	Mortality rate
1950	1915	1558	81.4
1960	820	605	73.8
1970	243	160	65.8
1980	50	45	90.0
1985	43	28	65.1
1990	47	26	55.3
1995	45	13	28.9
2000	91	10	11.0
2001	80	12	15.0
2002	106	9	8.5
2003	73	7	9.6
2004	101	9	8.9
2005	115	7	6.1
2006	117	5	4.3
2007	89	7	7.9
2008	123	10	8.1
2009	113	9	8.0
2010	106	14	13.2
2011	118	7	5.9
2012	118	8	6.8
2013	128	5	3.9
2014	126	9	7.1

which has accounted for most cases reported annually in the European Union. These annual incidences are 10-fold higher than in other countries such as the United States, Australia, Germany, and the Netherlands.^[7]

Clinically, tetanus comprises four symptomatic types: generalized, local, cephalic, and neonatal.^[3] Generalized tetanus is the most common form; earlier symptoms usually occur within 2 weeks after infection and include descending/ascending muscle rigidity.^[8] Shorter incubation and onset time are associated with more severe disease and poorer prognosis. Two cases presented in this report were

consistent with generalized tetanus. Its incubation period was considerably long,^[5,9] which might make the diagnosis of tetanus difficult for clinicians.

Tetanus diagnosis is primarily based on clinical symptoms because no specific laboratory diagnostics exist for tetanus. Although the initial definitive diagnosis is difficult, tetanus should always be considered in elderly patients presenting with acute onset of trismus and dysphagia because the elderly show these symptoms more frequently than younger patients.^[9]

Survival depends on rapid treatment with antitoxin, high-dose sedatives, muscle relaxants, and adequate supportive care. Specific therapy includes intramuscular administration of tetanus immunoglobulin to neutralize circulating toxin before it binds to neuronal cell membranes. In Japan, the mortality rate of tetanus was 55.3% in 1990. However, it has improved, and the mortality rate between 2005 and 2014 was 7.0%.^[2,6] Modern intensive care management may have prevented death from acute respiratory failure.

According to the results of a serologic survey in Japan in 2013, the percentage of individuals with protective antibody levels (>0.1 IU/ml) was 86.7% in the age group 30–34 years and declined with an increase in age; 81.5% (40–44 years) and 16.9% (50–54 years). Only 7.0% people in the age group 60–64 years had protective antibody levels.^[10] These results indicate that the elderly are at high risk of tetanus infection; therefore, this disease remains a threat in Japan.

In summary, Japanese clinicians will encounter tetanus more frequently than practitioners in other countries. Dental surgeons should be familiar with the clinical appearance of tetanus and should consider this disease in a nonimmunized patient presenting as an atypical case of trismus and dysphagia.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and

other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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