

Tetanus diagnosed by clinical symptoms based on its current status in Japan

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Article History

Received: 22.11.2017

Accepted: 27.11.2017

Published: 30.11.2017

DOI:

10.36347/sjmcr.2017.v05i11.028



Abstract: An 82-year-old man with a left forearm injury due to a motorcycle accident waited 1 month to visit a medical facility. Three weeks after the accident, he experienced difficulty opening his mouth, and this symptom gradually worsened. As he had sign of trismus and inflammation in addition to no causative diseases involving the oral or temporomandibular joints, he received a diagnosis of tetanus and was treated with human tetanus immunoglobulin and Penicillin G at 12 million units per day. An incision was later performed to drain the collected fluid. After these treatments, his forearm and lockjaw completely subsided within 10 days. Both microscopic findings and culture of the fluid were negative for *Clostridium tetani*. The diagnosis of tetanus is clinical with no particular laboratory test. Key features to note when diagnosing tetanus include acute or subacute onset and muscle contracture, such as trismus, with no other medical cause.

Keywords: tetanus; diagnosis; treatment

I INTRODUCTION

Tetanus is due to infection with the bacterium *Clostridium tetani*, which is found in soil, dust and animal feces. It is a Gram-positive, spore-forming, obligate anaerobic bacillus. The incubation period can last from 1 to 60 days but is, on average, around 7 to 10 days [1]. *C. tetani* secrete the toxins tetanospasmin and tetanolysin, causing the characteristic “tetanic spasm,” a generalized contraction of the agonist and antagonistic muscles [1,2].

Specifically, tetanospasmin affects the nerve and muscle motor end-plate interaction, causing the clinical syndrome of rigidity, muscle spasms and autonomic instability. The typical clinical features of tetanus include lockjaw, a grim facial expression (risus sardonicus), generalized muscle spasms associated with severe pains, drooling, uncontrolled urination and defecation and back-arching spasms (opisthotonus) that may cause respiratory distress. Most commonly, trismus appears as the first symptom, with the progression of spasms throughout the rest of the body. These spasms can occur for up to four weeks, with a full recovery taking months [1]. Autonomic instability can also occur in these patients with a fever, dysrhythmia, labile blood pressure and heart rate, respiratory difficulties, catecholamine excretion and even an early death [1,2].

The incidence of tetanus is decreasing due to routine vaccination worldwide, including in Japan, where it is combined with other vaccines, such as those for pertussis and diphtheria [1]. In Japan from 2007 to 2011, some 89-123 (average 110) patients with tetanus per year were reported by the Ministry of Health, Labour and Welfare. In addition, prevailing vaccination for wounds as standard manner, mild case of tetanus

also has been reported in Japan [3,4]. We herein report a mild case of tetanus diagnosed based on the clinical symptoms alone.

CASE REPORT

An 82-year-old man suffered from a left forearm injury due to a motorcycle accident and waited for 1 month to visit a medical facility. Three weeks after the accident, he experienced difficulty opening mouth his mouth, and this symptom gradually worsened, forcing him to visit a local medical facility. As he had signs of trismus and inflammation on a blood examination in addition to no causative diseases involving the oral or temporomandibular joints according to a dental surgeon, he was transferred to our department under suspicion of a diagnosis of tetanus.

He had a history of myocardial infarction, right blindness due to retinal detachment and an overactive bladder. At arrival, his vital signs were as follows: Glasgow Coma Scale, E4V5M6; blood pressure, 174/94 mmHg; pulse rate, 90 beats per minute; body temperature, 36.8 °C. He had lockjaw (Figure 1) and painful left forearm swelling without redness. The chest roentgen and electrocardiogram findings were negative. Computed tomography (CT) of the left

forearm revealed fluid collection with subcutaneous edema (Figure 2). CT findings for the head, face and neck were negative. The results of the biochemical analyses of the blood on arrival were as follows: white blood cells, 10,700/ μ l; creatine phosphokinase, 379 IU/L and; C - reactive protein, 8.5 mg/dl.

He received a diagnosis of tetanus and was treated with human tetanus immunoglobulin (HTIG)

and Penicillin G 12 million units per day for 10 days. Initially, as his forearm did not have redness, this lesion was treated conservatively. However, the swelling and pain in this forearm deteriorated, so an incision was performed to drain the collected fluid. After these treatments, his forearm and lockjaw completely subsided within 10 days. Both the microscopic findings and culture of the fluid were negative for *C. tetani*.



Fig-1: The face of the present case. Lockjaw was noted

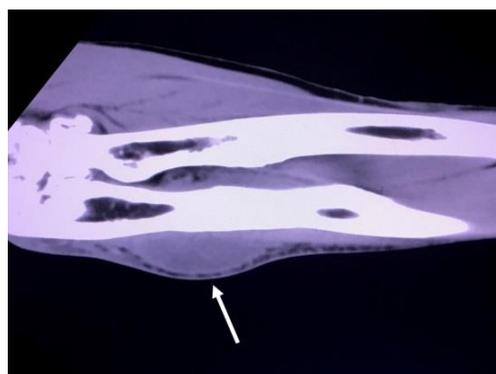


Fig-2: Computed tomography (CT) of the left forearm. The CT revealed fluid collection (arrow) with subcutaneous edema

DISCUSSION

The present case received a diagnosis of mild tetanus based on the clinical findings, such as trismus, which subsided following tetanus treatment without positive findings on bacteriological examinations. The diagnosis of tetanus is clinical with no particular laboratory tests available. The serum levels of anti-tetanus antibodies cannot be used for the diagnosis of an infection in Japan because Japanese patients may be positive for anti-tetanus antibodies due to routine vaccinations, especially for younger patients or the recently vaccinated [5]. While some clinicians may note a positive wound culture and be able to isolate the organism, Fukuda *et al.* reported only 1 case of positive culture for bacterial examinations among 156 patients (0.6%) clinically diagnosed with tetanus [6]. In addition, the positive findings may be false, given that *C. tetani* is ubiquitous and can easily contaminate the specimen [2]. As there are no particular laboratory tests available, it is important to note the key features when diagnosing tetanus, including acute or subacute onset,

muscle contracture, such as trismus, and dysphagia or neck pain with no other medical cause. In addition, some (but not all) patients may not have a history of injury.

The treatment of tetanus is based on the severity of the disease. The present case was mild, so intensive care was not required. All patients must have early wound debridement, antibiotic therapy and early intramuscular or intravenous administration of HTIG. The fluid in the forearm of the present case should have been drained at the first encounter. Although toxins are the main cause of the associated disease, Metronidazole has been shown to slow the progression of the disease. Penicillin is no longer universally recommended as the first-line therapy following the discovery that it might have synergistic effects with tetanospasmin [1]. However, in Japan, the injection of Metronidazole is not common, so the injection of Penicillin is still the first-line therapy [7,8].

CONCLUSION

We herein report a rare case of mild tetanus diagnosed based on the clinical symptoms with consideration of the current status of this infection in Japan.

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