# A 28-Year-Old Woman With Tetanus

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**Contribution to Emergency Nursing Practice**

- The current literature on tetanus indicates that it is not a commonly found disease in the United States, and few nurses are prepared to recognize clinical presentation of common signs and symptoms.
- This article contributes to the knowledge of epidemiology, common signs and symptoms, and treatment in the presentation of tetanus in a rural emergency department.
- Key implications for emergency nursing practice found in this article are recognition of early signs and symptoms, patient management, and education to promote a positive outcome.

A 28-year old ill-appearing white woman presented to a rural emergency department with complaints of muscles spasms and tightness in her jaw and abdomen. She stated that she cut her back on a nail at a cattle barn approximately 9 days before and had cleansed the wound with an over-the-counter antiseptic, then applied a polysporin ointment. No wound was noted on inspection of her back. She stated that her muscle spasms began with abdominal pain, which she attributed to onset of her menstrual cycle. The assessment by the triage nurse noted observable involuntary tongue curling and trismus (lockjaw). Additional assessment revealed chest tightness, shortness of breath but without accessory muscle use, and complaints of pain that radiated from her chest up to her neck and jaw. This pain was described as "the muscles feel like they are pulling to the back of my body" and were self-reported as 8/10 in intensity. She also stated that she had a fever as high as 38.5° C (101.3° F) over the course of the last 4 days as well as complaints of nausea and vomiting for the last 2 days.

In the emergency department, her vital signs were temperature: 37.5° C (99.5° F); heart rate: 65 beats per minute; respiratory rate: 16 breaths per minute; oxygen saturation: 98% on room air; and blood pressure: 114/65 mm Hg. The only notable past medical and surgical history included "lymph nodes taken from my abdomen because I had cat-scratch fever as a kid." She could not recall the exact year of her last tetanus booster vaccine but thought it was more than 12 years ago.

A tetanus toxoid IgG antibody was drawn in the emergency department, the results of which were positive, showing previous vaccination; however, a spatula test result was positive, and, combined with the presenting history and physical examination, tetanus was highly suspected. Additional laboratory studies in the emergency department included a creatinine phosphokinase (CPK). During her stay in the emergency department, she was given tetanus toxoid vaccine and tetanus immune globulin (TIG), then started on metronidazole IV. She also was prescribed diazepam for the muscle spasms and acetaminophen/hydrocodone for pain. She was admitted to the intensive care unit (ICU) for continued close observation. The patient was discharged home 3 days after admission with recommended follow-up for completion of tetanus vaccination series.

Tetanus is caused by a neurotoxin causing neuroparalysis and is produced by the *Clostridium tetani* bacterium.[1] Surveillance summaries estimate that, between 2001 and 2008, 233 new cases of tetanus were reported in the US.[3] There are an estimated 1 million cases of tetanus arising annually worldwide and an estimated 200,000 deaths.[2] Tetanus is a preventable disease with tetanus toxoid and childhood vaccination programs. Many diagnosed cases of tetanus are found in developing countries or impoverished lower socioeconomic areas where access to, or affordability of, the tetanus vaccine is not available. Tetanus is not transmitted from person to person but is commonly found in soil as well as feces of livestock animals. As in the case presented, tetanus is likely to cultivate in deep puncture wounds caused by dirty nails, wound or skin cuts, as well as animal bites.[3] In agricultural areas, many adults may harbor tetanus and also

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TABLE
**Initial clinical signs and symptoms of generalized tetanus**

| Assessment | Findings |
|---|---|
| Neuromuscular: spasms and tetany (painful) | Masseter muscle (lockjaw): inability to eat<br>Head and neck: dysphagia and risk for aspiration; laryngospasms; facial paralysis<br>Chest: shortness of breath; breathing difficulties<br>Abdominal rigidity<br>Bone fractures with severe muscle spasm |
| Central Nervous System | Headache; fever; sweating; seizures; autonomic dysfunction; malaise |
| Cardiovascular | Tachycardia or episodic rapid heart rate; elevated blood pressure |
| Respiratory | Hypoventilation; poor cough |

may carry the bacterium on skin surfaces. In rare occasions, tetanus has been linked to intravenous drug use and contaminated heroin.[3] In the US, older adults have the lowest rates of immunization.[6]

For the emergency nurse, recognizing the common clinical signs and symptoms of tetanus is important for early recognition, diagnosis, and treatment. Clinical signs and symptoms often begin with muscle spasm seen initially in the masseter muscles: thus, the name "lockjaw" (Table).[1-3] The incubation period varies depending on the source, but ranges from 1 to 2 days up to 3 to 21 days, depending on the inoculation of the tetanus bacterium in body locations distant from the central nervous system, therefore having a longer incubation time.[2,3]

Obtaining tetanus immunization status is important but often unreliable. In addition, some persons who have been properly vaccinated may have lost their immunity or have insufficient immunity despite having a positive IgG antibody when tested.[4] The diagnosis of tetanus is based primarily on clinical signs and symptoms, and supportive care and treatment should not be delayed waiting for laboratory results.[2,5,6] One test that can aid in the diagnosis of tetanus is the spatula test. Performed at the bedside, a tongue depressor is carefully inserted into the oropharynx (Fig.). The result of the test is positive if the patient bites the tongue depressor or shows spasm of the masseter muscle and is negative is the patient gags and tries to expel it.[6-8]

FIGURE
Performance of a spatula test by touching the posterior pharyngeal wall with a spatula, which will cause the patient with tetanus to clench his or her mouth due to reflex contraction of the masseter muscle of the jaw.

This simple test had a specificity of 100% and sensitivity of 94% for diagnosing tetanus; however, a positive spatula test does not exclude other neuromuscular diseases clinically resembling tetanus.[7]

Treatment often provided in the emergency department for tetanus involves a 2-pronged approach of supportive care and neutralizing the neurotoxins produced by the *Clostridium tetani*. The administration of TIG assists in the neutralization of the neurotoxins but cannot inactivate any of the toxin already bound within the neurons.[5,6] TIG provides immediate short-term neutralization of circulating proteins that lead to muscle spasms.[5,6] To prevent ongoing production of toxin, antibiotics are given to assist in eliminating the bacterium. Metronidazole is first-line antibiotic choice; however, doxycycline may be an acceptable alternative. Other medications often prescribed for a patient with tetanus are benzodiazepines to help control muscle spasms and pain medications.[5,6] Standard wound cleansing and care should also be initiated.

Supportive care includes prevention of aspiration, hypoventilation leading to respiratory failure, and the common complications of immobility including venous thromboembolism. If muscle spasms are severe or prolonged, supportive care may include protection of the airway, prevention of fractures, and monitoring of electrolytes. Continued nursing assessment includes monitoring of clinical signs and laboratory findings indicating rhabdomyolysis as the cells release potassium, magnesium, and calcium, and the spasms cause muscle to release CPK and myoglobin.

Educating the patient is incumbent on the ED nurse. Knowledge of the disease and the clinical symptomology is important, as is the understanding of its pathophysiology. The nurse should inform the patient that muscle spasms may last for weeks, and full recovery may take months.[3] Exposure to *Clostridium Tetani* does not guarantee immunity, and recurrence of tetanus can occur if the patient does not receive active immunization.[2] Tetanus is a preventable disease, avoidable with childhood vaccination and booster. Long-term outcomes in tetanus cases vary by source and accessibility to higher level of health care. In developing countries without high-tech ICUs or ventilatory support, death from tetanus can exceed 50%.[4] In the US between 2001 and 2008, the case-fatality rate from tetanus was 13.2%. Mortality was seen to increase with older adults above the age of 65 years, in injection drug users, and 2-fold in persons with diabetes.[4]

Tetanus is rarely seen in emergency departments in the US and is preventable by immunization. Tetanus is diagnosed clinically, through recognition of its signs and symptoms, particularly muscle spasms. Symptoms of tetanus often begin with spasm (trismus) of the jaw: thus, the name "lockjaw." Progression of muscle spasms can lead to further assessment findings such as dysphagia, laryngospasm, or hypoventilation, and full cessation of spasms may take weeks to months. This case highlights the diagnosis of tetanus based on clinical signs and symptoms in light of a positive tetanus toxoid IgG antibody and patient-education considerations.

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