

Case Report

A 25-Year-Old Male Presenting with Tetanus

Urgent message: Unusual as the diagnosis may be in 2009, patients with symptoms of what is later confirmed to be tetanus may be more likely to present to urgent care than to other practice settings.

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Introduction

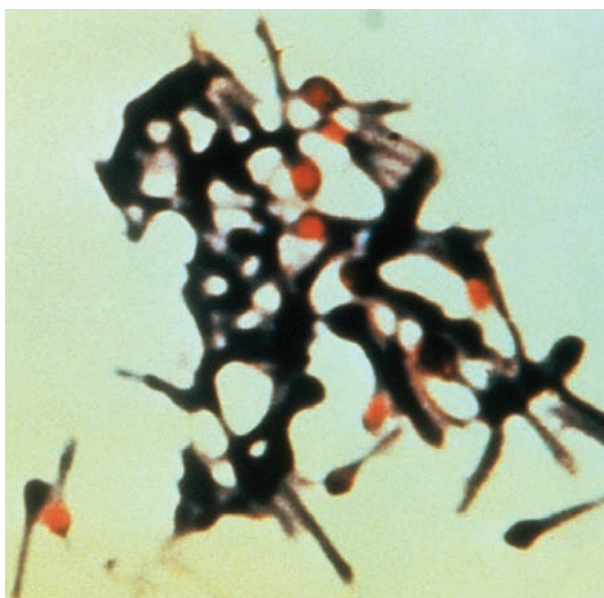
Tetanus, a toxin-mediated infection of gram-positive bacteria *Clostridium tetani*, is a rare presentation in the 21st century. Since 2000, there have been fewer than 50 cases per year reported in the United States.¹

However, at-risk patients such as unimmunized children, unboosted adults, intravenous drug (particularly heroin) users, undocumented workers, or foreign travelers may still present with this potentially lethal infection (10% to 20% mortality).²

Due to their appeal to underserved or itinerant patients, urgent care clinicians may be called upon to diagnose this uniquely dangerous condition more frequently than those practicing in other settings, as evidenced by the encounter detailed here.

Case

MJ, a 25-year-old Hispanic male landscaper, presented to the Cathedral Square Urgent Care Center in down-



Micrograph of *Clostridium tetani* bacteria.

Source: Centers for Disease Control and Prevention Public Health Image Library (<http://phil.cdc.gov>).

town Milwaukee six days after sustaining a puncture wound to the right thigh while pruning bushes. Initially, he cleaned the wound with water and peroxide, then dressed it with a triple-antibiotic ointment.

At presentation, he complained of a three-day history of fever, chills, and generalized muscle aches, culminating in a one-day history of increasingly severe tightness and pain of his jaw, chest, and abdominal muscles. He stated that he was unable to open his mouth, complained of difficulty swallowing, and felt short of breath.

MJ's medical and surgical history was negative; he was taking no medications, and had no allergies. He was a non-smoker, rare alcohol drinker, and admitted to occasional (nasal) cocaine use.

Born in Mexico, he had lived and worked in the United States for eight years. He was unaware of his childhood immunization history, and had never re-

Differential Diagnosis for Tetanus

- Dystonic drug reaction
- Globus hystericus/conversion disorder
- Hypocalcemia
- Rabies
- Black widow envenomation
- Thyrotoxicosis
- Strychnine poisoning
- Meningitis/encephalitis
- Subarachnoid hemorrhage/hemorrhagic stroke

ceived a booster for tetanus.

Initial exam revealed the following:

- Temperature: 103.4° F
- Pulse: 106
- Respiration: 28 breaths/minute, shallow
- BP=110/68
- Pulse oximetry 97% room air

MJ appeared anxious and dyspneic, without cyanosis. There was no rash or lymphadenopathy. Bilateral masseter muscle spasm was palpable, and the patient was unable to open his mouth more than 2 cm.

Cardiopulmonary exam was normal, and the abdomen was scaphoid. Visible and palpable thoracic and abdominal muscle spasm was noted. His right thigh wound appeared to be healing well, without erythema or swelling.

A clinical diagnosis of tetanus was made and the patient was given advanced cardiac life support transport to a nearby hospital, where he was admitted to the intensive care unit.

Remarkable studies

- WBC: 12.6 (normal <10), 80% neutrophils
- C-reactive protein: 4.5 (normal <0.5)
- Renal, hepatic, electrolytes, calcium, and thyroid tests: normal
- Urine: + for cocaine, otherwise unremarkable
- Chest x-ray: clear
- 12-lead EKG: sinus tachycardia without ectopy
- CT scan of the neck: normal

In the ICU, the patient was treated with IV crystalloid, IV diazepam, and IV penicillin G 4 million units every four hours. He also received tetanus immunoglobulin 3000 units IM. Rapid clinical improve-

ment was documented over the next 48 hours, and the patient was discharged on hospital day 3 feeling well.

At discharge, his WBC was 9.4, he was afebrile, and blood and urine cultures were negative.

Pathogenesis

Clostridium tetani is a spore-forming bacterium found universally in soil, feces, and animal intestinal tracts. It is resistant to heat, desiccation, and disinfectants. Entering the body through a wound, the spores germinate, forming tetanospasmin, a CNS toxin that spreads through blood and lymphatics to block the release of neurotransmitters. This leads to unopposed muscle contraction and spasm, and, occasionally, seizures and autonomic dysfunction. The shortest peripheral nerves are the first to deliver toxin to the CNS, which leads to the early symptoms of facial spasm and back and neck stiffness.

Clinical Features

The median incubation period for *Clostridium tetani* is seven to eight days, typically with the shorter incubation time equating to more severe illness.

There have been three clinical tetanus syndromes described:

- Local tetanus, involving muscle spasm in the immediate area of an inoculating wound (rare).
- Cephalic tetanus, with isolated cranial nerve involvement (usually CN VII) following head trauma or middle-ear infection (rare).
- Generalized tetanus (80% of all cases), characterized by trismus (lockjaw), widespread muscle spasm, and difficulty swallowing due to pharyngeal muscle involvement. Fevers, sweats, hypertension, tachycardia are common. Rarely, dysrhythmias and seizures can occur and raise concern for a poor prognosis.

A diagnostic bedside test, described as the “spatula test,”³ requires touching the posterior oropharynx with a tongue blade, with a normal response triggering a gag reflex. If tetanus is present, however, a reflex spasm of the masseter muscles causes the patient to bite down on the tongue blade.

In 400 patients, this test had a sensitivity of 94% and a specificity of 100%; no adverse events (i.e., laryngospasm) were provoked by the test.

There are no laboratory findings diagnostic for tetanus. A modest leukocytosis is common, but wound cultures are positive in only 30% of cases, and blood cultures are rarely positive even in the presence of generalized tetanus. Laboratory

tests are most helpful in excluding other causes of tetanic spasms (i.e., thyroid-stimulating hormone, low blood calcium, toxin screens).

A focused history (including medications, exposures, medical problems, and prodromal symptoms), and a thorough physical exam will usually eliminate most of the previously listed conditions. A febrile patient with possible tetanus exposure, clear mentation, a non-focal neurologic exam, and generalized tetany and spasm should be considered to have tetanus until proven otherwise.

Medical Management

Once the diagnosis of tetanus is seriously considered, a dark and quiet environment should be secured for the patient to prevent reflex spasms, and unnecessary procedures and manipulations should be avoided. Transport to an ICU setting should be initiated quickly, as about two-thirds of patients with more severe clinical manifestations eventually require intubation and ventilation.

Tetanus immune globulin (TIG) is recommended for all patients suspected of having tetanus. It is effective in removing unbound toxin from the patient, but cannot affect toxin already bound to nerve endings, so early use is advised. The generally recommended dose is 3000 units to 5000 units IM for adults and children. Infiltration of a small portion of the dose around the wound, if identified, is recommended, but has not been conclusively proven effective.

Metronidazole is the current antimicrobial of choice (30mg/kg/day given q6hrs, maximum 4 g/day) given PO or IV.

Parenteral penicillin G (100,000 U/kg/day given q4hours, maximum 12 million U/day) has been relegated to second-line status due to its propensity to increase spasticity in tetanus patients.

In patients unable to tolerate metronidazole or penicillin, second- or third-generation cephalosporins or tetracyclines have been used successfully. Treatment should continue for 10 to 14 days.

Once the patient is in the ICU setting, adjunctive therapies include surgical debridement of the wound, the use of antispasmodics, analgesics, and sedatives, and intensive airway management if required.

Full recovery can take up to six weeks. Common complications include nosocomial infections, pulmonary emboli, abnormal heart rhythms, and decubiti. Permanent neurological sequelae, often



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Nothing supports this goal more than **Insights in Images**, where urgent care practitioners can share the details of actual cases, as well as their expertise in resolving those cases. After all, in the words of UCAOA Executive Director Lou Ellen Horwitz, everyday clinical practice is where “the rubber meets the road.”

Physicians, physician assistants, and nurse practitioners are invited to submit cases, including x-rays, EKGs, or photographic displays relating to an interesting case encountered in the urgent care environment. Submissions should follow the format presented on the preceding pages.

If you have an interesting case to share, please e-mail the relevant images and clinical information to editor@jucm.com. We will credit all whose submissions are accepted for publication.

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Tetanus Prophylaxis and Wound Management

Vaccination history	Clean, minor wounds		All other wounds*	
	Td [†]	TIG	Td [†]	TIG
Unknown or < 3 doses	Yes	No	Yes	Yes
≥3 doses	Only if last dose >10 yrs	No	Only if last dose >5 yrs	No

*Such as, but not limited to, wounds contaminated with dirt, feces, soil, and saliva; puncture wounds; avulsions; any wounds resulting from missiles, crushing, burns, and frostbite.

[†]If patient is <7 years of age, give DTaP. If patient is between 7 and 10 years of age, or ≥65 years, give Td. Otherwise (i.e., between 11 and 64 years of age) give Tdap.

Source: Adapted from VPD Surveillance Manual, 4th Edition, 2008. Tetanus: Chapter 16. Available at: www.cdc.gov/vaccines/pubs/surv-manual/default.htm.

seen in neonatal tetanus survivors, are less common in children and adults.

Immunization

In addition to thorough cleansing and debridement of a potentially infected wound, post-exposure immunization for tetanus is critical for prevention and treatment. The nature of the wound and the patient's immunization history dictate the recommended uses of tetanus toxoid (Td, Tdap, DT, DTaP) and TIG.

Patients who received their primary vaccination series but who have not received a tetanus booster within 10 years should receive a toxoid booster dose. If the wound is considered high-risk (e.g., contaminated with dirt, feces, or saliva, or deep or necrotic wounds), a toxoid booster should be given if the patient has not been boosted within five years.

Patients with unknown or uncertain vaccination history should receive both tetanus toxoid and TIG (250 U IM at a site distant from the toxoid administration) unless the wound is minor and clean, due to the fact that the toxoid alone (in the absence of previous immunization) will not be sufficient to produce a protective antibody response.

TIG (3000 units to 6000 units IM) should be administered as soon as possible to any patient exhibiting symptoms of or suspected of having tetanus.

Specific Recommendations:⁴

A primary series consists of a minimum of three doses

of tetanus and diphtheria containing vaccine.

For infants <6 weeks of age, TIG (250 U IM) without toxoid is indicated for "dirty" wounds.

For infants and children >6 weeks up to 7-years-old, DTaP is recommended.

For persons 7- through 9-years-old, and those >65-years-old, Td is given.

For persons age 10 through 64 years, Tdap is preferred; if the patient has previously received Tdap, however, then Td is given.

HIV positive patients should receive TIG regardless of previous immunizations.

Summary

As urgent care providers, we are many times on the front line of wound management, and *all* wounds present a potential risk for tetanus. An understanding of the signs and symptoms of tetanus, the importance of a good immunization history, and the role of vaccination in the prevention and treatment of this potentially lethal infection will help us keep our patients protected. ■

References

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How to submit a case report to JUCM

If you've encountered an interesting case in your urgent care center, let us share it with your colleagues. Typically, case reports published in JUCM run between 1,200 and 1,800 words and include basic information on presentation, history, remarkable findings on examination, and disposition of the case, as well as more general information on appropriate treatment for similar cases. Images—x-rays, EKGs, or photos—are helpful where appropriate, as well. Send your case report, or any questions you may have about our submission process, to editor@jucm.com.