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Generalized Tetanus with Opisthotonos

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Title: Generalized Tetanus with Opisthotonos

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Introduction:

Tetanus is a rare clinical entity in the United States, with fewer than 40 cases per year¹.

Opisthotonos is a classic physical examination finding of generalized tetanus that should be rapidly identified and understood by emergency physicians.

Case Report:

A 26-year-old female with a past medical history of IV drug use presented with opisthotonos (Figure 1), *risus sardonicus*, trismus and an infected hip wound containing maggots (Figure 2). Paramedics had found her unresponsive in a local homeless encampment. She was obtunded, with initial vital signs of heart rate 129 beats/minute, blood pressure 50/36 mmHg, respiratory rate 20 breaths/minute, and oxygen saturation 74% on non-rebreather. Initial labs were notable for point of care glucose 48 mg/dL, white blood cell count $21.3 \times 1000/\text{mm}^3$, potassium 6.8 mmol/L, bicarbonate 15 mmol/L, anion gap 30 mmol/L, lactate 21 mmol/L, venous blood gas pH 6.84, pCO₂ 93 mmHg. She was empirically treated with dextrose, sodium bicarbonate, IV fluids, vasopressors, antibiotics, and tetanus immune globulin due to clinical concern for tetanus. She required a cricothyrotomy after oral intubation was unsuccessful due to refractory trismus despite two doses of midazolam 5 mg IV and rocuronium 80 mg IV. Collateral history obtained from her mother revealed that the patient had no history of neuromuscular disorders and was ambulatory at baseline. She expired due to overwhelming sepsis 12 hours after arrival despite maximal medical therapy. Blood cultures did not grow *Clostridium* species at 90 days, and wound cultures were not performed.

Discussion:

The pathophysiology of generalized tetanus involves the colonization of a wound by *Clostridium tetani*, an anaerobic spore-forming gram-positive rod found in soil and feces. *C. tetani* produces tetanospasmin, a potent neurotoxin that inhibits the release glycine and GABA, leading to muscle spasm². Nerves of the face and neck are affected first due to their short axon length followed by the trunk and extremities. Sustained facial muscle contraction is known as *risus sardonicus* or “sardonic grin” and is often the earliest sign of acute tetanus. Severe truncal

hyperextension and spasticity known as opisthotonos is a nearly universal late finding that occurs due to the difference in the relative strength of the strong extensor muscles of the axial spine compared to the weak flexor muscles of the abdomen³. The explanation for the patient's sustained tetany despite weight-appropriate dosing of a neuromuscular blocking agent is unknown; however, it is possible that upregulation of post-synaptic acetylcholine receptors and poor perfusion secondary to hypotension and critical illness played a role⁴.

The differential diagnosis for patients who present with opisthotonos includes strychnine poisoning, traumatic brain injury, cerebral palsy, dystonic medication reaction, drowning, and maple syrup urine disease.

The diagnosis of tetanus is made clinically in the setting of rigidity, trismus, or opisthotonos with a wound and history of inadequate immunization. Wound cultures are negative greater than 50% of the time. Treatment involves aggressive supportive care, muscle relaxation, human tetanus immune globulin, Tdap administration, antibiotics, and chemical paralysis in severe cases⁵. Prevention via vaccination is necessary to maintain tetanus as a rare clinical entity.

Citations:

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Figure 1: Opisthotonos



Figure 2: Infected wound, presumed *Clostridium tetani* source



Declaration of interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:

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