Preventing and Managing Tetanus

Tetanus

- Tetanus is caused by *Clostridium tetani*, which is a spore-forming, Gram-negative obligate anaerobic bacteria.
- The bacteria are ubiquitous in the environment, including soil and animal feces.
- Under anaerobic conditions the bacterial spores germinate and release two toxins, tetanolysin and tetanospasmin.

Epidemiology of Tetanus:

- Since inclusion of tetanus toxoid-containing vaccines (TTCV) were included in routine childhood immunizations in 1947, **cases of tetanus have decreased by 95%** and related deaths have decreased by 99%.
- Since the mid-90s, there have been an **average of 40 cases/year** in the US.
- Between 2009 and 2023 there have been:
    - 402 cases with 37 deaths
    - 56 cases in children with 0 deaths
    - Although **86.8% of wounds were tetanus-prone** only **28.6% received TTCV** when indicated and only **2.3% received tetanus immune globulin (TIG)** when indicated
- In a recent report of 4 pediatric cases of tetanus, **all were unvaccinated**.

Clinical presentation:

Incubation:

- Mean 8 days (range 3-21 days)
- Dependent on inoculation size and distance of the wound from the central nervous system (CNS)

4 Clinical Types:

- Generalized: >80% of cases
- Localized: muscle spasms confined around the site of inoculation
- Cephalic: trismus and CNS palsies
- Neonatal: umbilical site infection, feeding difficulty and facial spasms

Clinical Symptoms:

- Trismus (75--98%)
- Dysphagia (83%)
- Muscle spasms
- Muscle rigidity
- Reflex spasms (70%)
- Laryngospasm and respiratory muscle spasms
- Autonomic instability (HTN, tachycardia)

Diagnosis:

Tetanus is a clinical diagnosis

- Consistent clinical presentation without an alternative diagnosis
- There are no cultures or serologic tests available

Wound Management:

- **Tetanus prone wounds:** dirty/contaminated, puncture, animal bites, crush injuries, burns or frostbite
- **Clean minor wound;**
    - Vaccinate with a TTCV if not up to date on vaccines or it has > 10 years since last TTCV.
- **Tetanus prone wound:**
    - If the person has not received the primary series of the tetanus diphtheria vaccine, provide TIG and TTCV.
    - If the person has received the primary vaccine series but is either not up to date or it has been > 5 years since the last TTCV, vaccinate with a TTCV.

Management of Tetanus:

- TIG 500 IU IM (bind up circulating toxin)
- Metronidazole for 7-10 days
- Wound debridement
- Airway management
- Control muscle spasms: often with benzodiazepines
- Manage dysautonomia: often with IV magnesium sulfate
- Vaccination

The information contained herein should not be used as a substitute for a physician's independent judgement as to appropriate medical care and treatment. There may be variations in treatment that are recommended based on individual facts and circumstances.

References

1. https://www.cdc.gov/tetanus/index.html
2. Hughes MM, Amin AB, Rubis AB. Tetanus Surveillance — United States, 2009–2023. MMWR Surveill Summ 2026;75(No. SS-1):1–11.
3. Campbell KL, Amin AB, Goswitz J, et al. *Notes from the Field*: Tetanus in Four Children — Idaho, Minnesota, Missouri, and Wisconsin, 2024. MMWR Morb Mortal Wkly Rep 2026;75:192–193.
4. Nolt D, O'Leary ST, Aucott SW. Risks of Infectious Diseases in Newborns Exposed to Alternative Perinatal Practices. Pediatrics. 2022 Feb 1;149(2):e2021055554.
5. Sudarshan R, et al. Lancet Infect Dis. 2025 Nov;25(11):e645-e657
6. Ergönül Ö, et al. Lancet. 2026 Feb 14;407(10529):716-727