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Popular Article

Therapeutic Management of Tetanus in A Cat

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Introduction:

Tetanus is a neurological disorder caused by the toxin tetanospasmin, which is produced by the vegetative form of the Gram-negative, motile, spore-forming, anaerobic bacillus *Clostridium tetani*. Bacterial spores usually penetrate through a wound in the skin or mucosal membranes. Under anaerobic conditions, spores germinate to become the vegetative form of the bacterium which is capable of toxin production (1). From the infection site, tetanospasmin reaches local terminations of peripheral motor neurons, with retrograde axonal transport taking the toxin towards the central nervous system (CNS) where it interferes with the release of inhibitory neurotransmitters glycine and gamma aminobutyric acid (GABA) in the brainstem and spinal cord (2, 3). The consequence of this central disinhibition is sustained and uncontrolled skeletal muscle contraction. Autonomic Tetanus in cats is a serious, potentially fatal disease caused by the bacterium *Clostridium tetani*, which produces a neurotoxin that leads to muscle stiffness and spasms. While Cats are relatively resistant compared to other animals, they can still be affected, particularly after wounds or surgical sites become infected. signs may also be evident in more severely affected individuals.

In comparison to humans, horses, mice and guinea pigs, both dogs and cats are relatively resistant to the effects of the toxin, with cats in particular known to be more resistant than dogs (1, 4, 5).

In addition, disease onset is usually delayed in cats, and may take up to 3 weeks after infection, compared to within 5 to 10 days in dogs (range: 3–18 days) (1, 5).

Clinical Signs:

- An 8-month-old female orange and white cat (feline), of non-descript breed, weighing 1.5 kg was presented for examination on clinical examination, the cat was found to be dull and reluctant to move.

- The major clinical signs observed were generalized stiffness of all limbs, difficulty in mobility, Sawhorse stance, Hyperesthesia, Mild vocalization, Respiratory grunting sounds, Physiological parameters revealed Mucous membrane: Pale pink, Rectal temperature: 103.2°F, Peripheral lymph nodes: Palpable.
- Muscle stiffness of the face rigid upright stance with all four limbs are extended and locked.
- The ears are held erect, the lips are drawn back (risus sardonicus), and the forehead is wrinkled as a result of facial muscle spasms were observed in this case and also there were two intact female cats, seven neutered female cats, four intact male cats and 14 myalgia was reported in nine cats upon palpation of affected limb(s).
- Muscular fasciculations of the most severely affected limb(s) were also reported in three cats (6).
- Tail involvement was not detailed in most medical records. However, an erected tail was reported in three cats suffering from a generalized tetanus (two cats scored as grade I and one scored as grade II).
- In one case in which patellar reflex could still be elicited, an extreme hyperreflexia and a clonic response lasting 10–20 s were noticed (7).

1st day7th day14th day20th day

- **Day 1** — Tetanus Takes Hold: Severe Stiffness, Rigidity and Hyperesthesia
- **Day 7** — Still Fighting: Persistent Rigidity and Restricted Movement
- **Day 14** — Hope Returns: Alert, Responsive and Trying to Move
- **Day 20** — A Major Victory: Standing Again After Tetanus were observed.

Diagnosis: in the present case:

Abnormal biochemistry:

Parameters	Result
WBC ($10^9/L$)	22.35
LYM ($10^9/L$)	8.85
NEU ($10^9/L$)	14.927
EOS ($10^9/L$)	1.625
PLT ($10^3/\mu L$)	300
MCV (fL)	42.8
HCT (%)	23.9
Hb	7.5

Serum biochemistry:

Parameters	Result
ALT (IU/L)	55
ALP (IU/L)	43

Blood Smear Examination:

No haemoparasites were detected in the blood smear examination.

Laboratory Investigation:

Blood Gas Analysis

Parameters	Result
pH	7.42
pCO ₂ (mmHg)	20.7
pO ₂ (mmHg)	106.5
Na ⁺ (mmol/L)	146
K ⁺ (mmol/L)	4.1
Ca ⁺⁺ (mmol/L)	1.28
Cl ⁻ (mmol/L)	121
Glu (mg/dL)	95
Lac (mmol/L)	1
cHCO ₃ ⁻ (mmol/L)	15.5

Diagnosis of feline tetanus is often difficult since cats are more likely to develop mild localised forms of the disease that lack the typical signs of generalised tetanus (8). However, in this case, the observed spasticity of a limb in an otherwise healthy animal and the evidence of recent trauma fulfilled the criteria for a presumptive diagnosis of localised tetanus (8). Confirmation was achieved by EMG analysis of the affected muscles, revealing characteristics of missing inhibition of the local motor neurons, as described previously (8). Tentative differential diagnoses including neuritis and myositis were excluded by NCV and muscle

biopsy. Ultimately, the isolation of *C. tetani* and/or the determination of antibody titres to tetanus toxin are warranted for a definite diagnosis (8), but were shown previously to be inadequate for the diagnosis of mild forms of localised tetanus.

Treatment and Therapeutic Management:



Considering the clinical signs and the history of a previous paw wound, the case was managed as generalized tetanus. Treatment was aimed at neutralizing circulating tetanus toxin, controlling muscle spasms, eliminating *Clostridium tetani*, and providing supportive care. The treatment protocol followed in the present case was compared with the therapeutic regimen reported in the reference (9) with respect to antimicrobial therapy, tetanus antitoxin administration, muscle-spasm control, analgesia, wound management, and supportive care.

- **Diazepam:** 2 mg/cat was administered intravenously (IV) and repeated at 10-minute intervals initially, as required, to control severe muscular rigidity and spasms. Once the spasms were controlled, diazepam 5 mg tablets were administered orally twice daily for continued muscle relaxation.
- **Tetanus immunoglobulin (Tetglob):** 250 IU/kg was administered subcutaneously (SC) as a single dose to provide passive antitoxin protection and neutralize circulating tetanus toxin.
- **Metronidazole:** 15 mg/kg body weight orally every 12 hours (BID) for 20 days was administered to control the anaerobic *Clostridium tetani* infection.
- **Mecosan OD capsules:** One capsule orally once daily was administered as supportive therapy for

30 days

- **Supportive nursing care:** The cat was maintained in a quiet, dark and low-stimulation environment, as external stimuli can trigger or worsen tetanic spasms. Adequate hydration, nutritional support, comfortable bedding and regular monitoring were provided.

Recovery:

The cat showed progressive improvement in muscle rigidity, mobility, appetite and overall activity during the treatment period. The frequency and severity of muscular spasms gradually decreased, followed by improvement in the ability to stand and move.

Complete clinical recovery was observed by the 20th day of treatment, indicating a favorable response to the combined antitoxin, antimicrobial, muscle-relaxant and supportive management. The case highlights the importance of early recognition, prompt administration of tetanus antitoxin, effective control of muscle spasms, antimicrobial therapy and intensive nursing care in the successful management of tetanus in cats.

Discussion:

Muscle tetany is painful and can cause life-threatening hyperthermia. Reported mortality rates in cats are between 8% and 50%. Equine serum immunoglobulin (tetanus antitoxin) is a valuable tool in the treatment of tetanus in cats along with muscle relaxants. When it occurs, history, clinical examination, characteristic clinical signs, and detailed anamnesis are fundamental to the presumptive diagnosis of the disease. Also, the appropriate clinical and therapeutic protocols, including intensive and drug management, and the performance of integrative therapies, such as physiotherapy and acupuncture, allow the good evolution of the clinical condition and the complete recovery of the animal. Even a tiny cut or puncture can become a serious health problem if ignored. Tetanus can occur when wounds are contaminated, so clean every wound promptly and consult your veterinarian when needed. Keep cats away from rusty, sharp, or contaminated objects.

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<https://www.frontiersin.org/articles/10.3389/fvets.2024.1425917/full#supplementary-material>

Pelvic limbs muscular fasciculations observed in a cat affected with 4 limbs multifocal tetanus. Signs were more severe on the pelvic limbs.

<https://www.frontiersin.org/articles/10.3389/fvets.2024.1425917/full#supplementary-material>

Hyperreflexia and clonic response elicited after patellar reflex testing in a cat affected with grade I generalized tetanus. Courtesy of Koen M. Santifort.

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