

Eclampsia in Horses, Dogs, and Cats: Causes, Symptoms, Diagnosis, and Treatment

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Horse:

Common names: Hypocalcaemic Tetany, Transport Tetany, Lactation Tetany, Transient Tetany

Dog & Cat:

Common names: Puerperal Hypocalcaemia, Periparturient Hypocalcaemia, Puerperal Tetany

Occurrence

- ✚ **Horses:** Eclampsia is a rare condition in horses, usually occurring after prolonged physical exertion or transportation (transport tetany) and in lactating mares (lactation tetany). It typically manifests around the 10th day after foaling or 1-2 days after weaning. Mild cases post-transport often recover spontaneously.
- ✚ **Dogs:** This is an acute, life-threatening condition occurring 2-4 weeks after whelping, rarely during late gestation. It predominantly affects small breeds with large litters.
- ✚ **Cats:** Though uncommon, it can occur during early lactation.

Etiology and Pathogenesis

Eclampsia is linked to acute depletion of serum ionized calcium, and sometimes altered magnesium and phosphate levels.

Horses:

- High milk production and lush pasture grazing are predisposing factors.

- Prolonged physical activity (e.g., endurance rides) can lead to calcium loss through sweat, increased calcium binding during hypochloremic alkalosis, and stress-induced high corticosteroid levels, which inhibit vitamin D activity, reducing calcium absorption and mobilization.
- Stress and lack of calcium intake contribute to transport tetany.
- Hypocalcemic tetany may be triggered by blister beetle ingestion (Cantharidin poisoning).

Dogs and Cats:

Likely caused by calcium loss in milk and inadequate dietary calcium intake. Tetany occurs due to spontaneous repetitive firing of motor nerve fibers, as membrane-bound calcium loss increases nerve membrane permeability, requiring less stimulus to depolarize.

Clinical Manifestations

The severity of symptoms correlates with serum ionized calcium levels. Increased excitability may be the sole symptom in mild cases.

Horses:

- Severely affected horses sweat excessively, struggle with limb tetany and incoordination, exhibit a stiff gait, and have elevated tails.
- Rapid, violent respiration and wide nostril dilation produce a distinct chest thumping sound due to spasmodic diaphragm contraction.
- Muscular fibrillation, particularly in the masseter and shoulder regions, and trismus are evident without nictitating membrane prolapse.
- Temperature may be normal or slightly elevated; pulse rate becomes rapid and irregular in later stages.
- The horse may attempt to eat and drink but fails. Stomach tube passage is impossible.
- Within 24 hours, the animal may go down, develop continuous tetanic convulsions, and die within 48 hours. The case fatality rate exceeds 60%.
- Hypocalcemia is constant (serum levels 4-6 mg/dl, normal 11-14 mg/dl), and response to calcium salt treatment is excellent.
- Clinical signs correlate with hypocalcemia severity:
- Ca levels > 8 mg/dl: Only excitability is noted.
- Ca levels up to 5 mg/dl: Tetanic spasms occur.

- Ca levels < 5 mg/dl: Recumbency and stupor follow.
- Hypomagnesemia (around 1 mg/dl, normal 1.8-2.5 mg/dl) is observed post-transport.

Dogs and Cats:

- Early signs include panting and restlessness, followed by tremors, twitching, tetany, muscle spasms, gait changes, seizures, and severe hyperthermia. Prolonged seizures may cause cerebral edema.
- Behavioral changes like aggression, whining, salivation, pacing, hypersensitivity to stimuli, and disorientation are frequent.
- Tachycardia, hyperthermia, polyuria, polydipsia, and vomiting may occur. The bitch is generally healthy, and the neonates thrive.

Diagnosis

Diagnosis is based on clinical signs, history, and treatment response. Definitive diagnosis requires low serum ionized calcium levels; however, measuring total serum calcium (<6 mg/dl) is typically acceptable. Prolonged QT intervals and ventricular premature contractions on ECG are also indicative.

Differential Diagnoses**Horse:**

- Tetanus: Prolapse of the third eyelid, hypersensitivity to sound.
- Endotoxemia: Hypothermia.
- Colic: Abdominal pain signs, sham drinking.
- Exertional rhabdomyolysis or other muscle disorders: Elevated serum muscle enzymes (CPK, GOT).
- Laminitis: Immobility rather than restlessness, feet held together.
- Botulism: No fever, progressive paralysis of limb, jaw, and throat muscles, sternal recumbency.

Dog and Cat:**Seizure causes:**

- Hypoglycemia: Blood glucose profile.
- Toxicoses: Hypothermia.
- Primary neurologic disorders:

Epilepsy:

Recurrent periodic tonic-clonic convulsions of short duration (1-2 minutes).

Irritability and hyperthermia causes:

- **Metritis:** Thickened, indurated uterus, frequent or prolonged estrual bleeding.
- **Mastitis:** Mammary gland swelling/inflammation, discoloration, and abscessation.

Treatment

Horse:

- Mildly affected horses may recover without specific treatment.
- Slow intravenous injection (as in milk fever), preferably diluted 1:4 in saline or dextrose, results in rapid recovery. Voiding a large volume of urine is an early recovery sign.
- If no improvement occurs after the initial infusion, a second dose may be given 15-30 minutes later. Some horses need daily treatment for 4-5 days to recover from hypocalcemic tetany. Incorporating magnesium into the solution may help if tetany is associated with physical exertion.

Dog and Cat:

- Slow IV administration of 10% calcium gluconate (0.5-1.5 ml/kg over 3-5 minutes; usual dose 5-20 ml) usually results in rapid improvement within 15 minutes. Muscle relaxation should be immediate.
- Alternatively, 27% calcium chloride at a dosage of 0.22-0.66 ml/kg/hr IV.
- Once stable, the dose of calcium gluconate may be diluted in normal saline and given subcutaneously, three times a day, to control clinical signs (calcium chloride should not be given subcutaneously). Alternatively, 5-15 mg of elemental calcium/kg/hr can be continued IV.
- If the bitch remains unresponsive after hypocalcemia correction, treat for cerebral edema, hyperthermia, and hypoglycemia if present.
- Post-crisis, 25-50 mg of elemental calcium/kg/day is given orally for the remainder of lactation. The calcium dose is based on the product's elemental calcium content (e.g., calcium carbonate tablets contain 260-600 mg elemental calcium/tablet).
- Vitamin D supplementation is used if serum calcium remains low. The dosage of 1,25-dihydroxyvitamin D₃ (calcitriol) is 0.03-0.06 µg/kg/day; it reaches maximal effect in 1-4 days. Iatrogenic hypercalcemia is a common complication, resolving in 2-14 days.

- Corticosteroids are contraindicated as they lower serum calcium and may interfere with intestinal calcium transport and increase urinary calcium loss.

Prevention

- Puppies or kittens should not nurse for 12-24 hours. During this time, they should be fed a milk substitute or other appropriate diet. If mature enough, they should be weaned. If tetany recurs in the same lactation, the litter should be weaned.
- Owners should be warned that this condition is likely to recur in future pregnancies.
- Preventive measures for puerperal hypocalcemia in bitches include:
 - Feeding a high-quality, nutritionally balanced diet during pregnancy and lactation.
 - Providing food and water ad libitum during lactation.
 - Early lactation supplemental feeding of puppies with milk replacer and solid food after 3-4 weeks of age.
 - Oral calcium supplementation during gestation is not indicated and may cause postpartum hypocalcemia.
 - Calcium administration during peak milk production may be helpful in bitches with previous puerperal hypocalcemia episodes.