

Successful management of postpartum eclampsia in a queen

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Abstract

A four-year-old domestic short hair queen was presented with a history of sudden onset of ataxia, shivering and severe panting for four hours. The cat queened three weeks ago with a litter size of seven. Based on the history, clinical signs and laboratory investigation, the condition was diagnosed as postpartum eclampsia. The objective of this study was to diagnose and manage lactational hypocalcemic queen properly. Treatment of the queen with intravenous calcium gluconate and dextrose resulted in resolution of clinical signs. Thus, this study may aid field veterinarians in managing such cases effectively.

Keywords: Calcium gluconate, Dextrose, Eclampsia, Hypocalcemia, Queen

Highlights

- Eclampsia is an acute life-threatening condition caused by low serum calcium levels.
- There is less documentation of the incidence of hypocalcemia in queen compared to bitch.
- Supplementation of dietary calcium and vitamin D helps in preventing recurrence after treatment.

Eclampsia, caused by low serum calcium levels, is an acute life-threatening condition commonly noticed in bitch and rarely reported in queen. It is related to low free or ionic serum calcium. The condition mostly occurs in the first one to three weeks postpartum, especially in animals with large litter size and high lactation demand (Wallace and Davidson, 1995; Dimitrov *et al.*, 2016) and is rare in late pregnancy (Pathan *et al.*, 2011; Mosallanejad, 2012). The possible causes of postpartum eclampsia are low calcium mobilization for fetal skeletal mineralization, large litter size, excessive drainage of calcium through milk, imbalanced diet/poor nutrition during periparturient period and disease of the parathyroid glands (Pathan *et al.*, 2011; Priyanka *et al.*, 2011). The imbalance between the rates of inflow and outflow of calcium from the extracellular fluid due to increased excretion in the milk appears to be a significant factor in pathogenesis (Pathan *et al.*, 2011). The main indications are ataxia, hyper-excitability and shivering during the postpartum period. Unlike canine eclampsia, case reports of postpartum hypocalcemia in queens are meagre. This report presents a case of postpartum eclampsia in a queen and its successful management.

A four-year-old female domestic short hair cat weighing 3.0 kg was presented with a history of sudden onset of ataxia, hyper-excitability, shivering and severe panting (Fig. 1) since last four hours. The cat queened

three weeks ago with a litter size of seven. According to the owner, the queen became reluctant to nurse the kittens. The vital parameters such as rectal temperature, respiratory rate and heart rate were 105°F (Fig. 2), 62 breaths/minute and 200 beats/minute, respectively. Venous blood collected from the cephalic vein was analysed in an automated analyser. The hematological parameters were normal, but alterations were observed in the serum biochemistry, especially calcium 7.8 mg/dL (reference range: 9-11 mg/dL, Bjerkaas, 1974) and blood glucose 66 mg/dL (reference range: 77-118 mg/dL, Bentinck-Smith, 1971).

Based on history, clinical signs, and biochemical alterations (hypocalcemia and hypoglycemia), the condition was diagnosed as postpartum eclampsia. The queen was treated with calcium gluconate @ 1.5 mL/kg and 25% dextrose @ 5 mL/kg body weight intravenously. Biochemical analysis of serum 30 minutes post-treatment revealed calcium and glucose levels as 11.2 mg/dL and 116 mg/dL, respectively. The treatment resulted in excellent resolution of clinical signs, and the queen began to eat shortly after the treatment (Fig. 3). Calcium and vitamin D syrup were prescribed orally, and the queen was discharged. The owner was advised of weaning practice with commercial milk replacers.

Documentation regarding the incidence of hypocalcemia in queens, compared to bitches, is limited.

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Eclampsia in a queen



Fig. 1. Cat presented with severe panting, shivering and recumbency



Fig. 2. Picture showing the body temperature of the cat prior to treatment



Fig. 3. The cat began to eat again shortly after the treatment

Low blood calcium is the result of reduction in extracellular calcium ion. Depletion of ionised calcium is responsible for the development of neuronal signs and muscular dysfunction due to the intensive loss of membrane-bound calcium followed by increased ion permeability (Dimitrov *et al.*, 2016). An ionised calcium level is considered a better indicator of extracellular calcium concentration than total calcium level (Biddle and Macintire, 2000). However, total serum calcium concentration can also be used for diagnosis of hypocalcemia if estimation of ionised calcium is not possible (Aroch *et al.*, 1999). The present study confirmed hypocalcemia through the measurement of total serum calcium concentration.

Severe muscle contractions can result in a significant rise in body temperature. The increased body temperature associated with hypocalcaemia does not necessitate the use of additional antipyretic medications. Typically, fever improves with the treatment of hypocalcaemia (Hall, 2015). In the present case, the queen's body temperature was initially measured as 105°F. After the first treatment, the patient's body temperature decreased to 101.3°F.

Rapid administration of calcium can potentially result in bradycardia. It is imperative to monitor the heart rate to prevent bradycardia and arrhythmia. In case of an arrhythmia, calcium therapy should be discontinued at once until the heart rhythm returns to normal. In our study, continuous monitoring was carried out throughout the treatment process.

Mayer (1968) emphasized that eclampsia develops due to calcium and vitamin D deficiency during gestation and breastfeeding. Nesvadba (1971) stated that overfeeding with animal proteins such as egg and meat may cause impairment of calcium metabolism and hypocalcemia. Vitamin D supplements increase the absorption of calcium from the intestines. Vitamin D supplementation administered at a dose of 0.03-0.06 mcg/kg to dogs with eclampsia may play a role in preventing hypocalcemia (Hall, 2015). Phytate compounds are also recommended as a supportive treatment for hypocalcemia, as they bind to ionized calcium and render it biologically inactive (Resnick, 1964). Providing a balanced diet with an optimal calcium: phosphorus ratio during gestation, supplementing kittens with milk replacers as soon as possible to reduce the milk demand from the dam and

weaning the kittens as early as possible will also prevent the relapse of this condition (Pathan *et al.*, 2011). As the demand for milk increases, the likelihood of eclampsia also increases. Lactating queens are highly sensitive to changes in free calcium levels due to depletion in milk secretion (Moe, 2008). Some lactating queens are unable to maintain increased calcium demand without affecting their blood levels (Pathan *et al.*, 2011; Dimitrov *et al.*, 2016). For queens who will continue breastfeeding after hypocalcemia, the use of oral calcium preparations at a dose of 25-50 mg/kg 3-4 times a day has been recommended. If the kittens are large enough, they should be weaned. Kitten should not be allowed to suckle for 24 hours after an eclampsia attack to prevent relapse (Wikström, 1974). In this case, the kittens were prevented from sucking.

In the presented case report, postpartum hypocalcemia was diagnosed in our patient. Weaning was advised for the patient whose general condition improved after treatment, and the patient's diet regimen was changed. A proprietary formula containing calcium, vitamin D and phytate-containing cereals (soybean, legume) was proposed. Postpartum feeding is important in queen to avoid possible cases of lactational hypocalcemia and serious complications. During the last 3 weeks of gestation, the use of a balanced diet with adequate calories and calcium should be recommended. As there is a lack of research on eclampsia in queens, further improved study and analysis can be done to better understand about the occurrences and treatment of the same. Further understanding the genetic factors contributing to eclampsia in cats may help identify predisposed cats and enable selective breeding practices to reduce the incidence of the condition. Rapid testing kits or devices that monitor blood calcium levels, among other improvements in diagnostic techniques, could make it practicable to identify eclampsia in cats more quickly and accurately.

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Author's contributions: RMG: Design or conduct of the study; RMG, RK: Collection, analysis and interpretation of data; RK, SP: Writing (review and editing); SP: Supervision; RMG, RK, SP: Approval and decision to submit the manuscript for publication.

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