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A CASE REPORT OF ECLAMPSY IN DOG

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ABSTRACT

Eclampsia known as puerperal tetany is an acute, life-threatening disease caused by low blood calcium levels (hypocalcemia) in dogs, during pregnancy and the first weeks of lactation after giving birth. Etiology is poor nutrition, hypoalbuminaemia, lactation, parathyroid glands disease. The purpose of this article is to explore the causes, various clinical aspects related to the progress of this disease and its treatment in the particular case.

Key words: eclampsy, hypocalcaemia, dog, therapy.

Introduction

Eclampsy is a life threatening condition in dogs and much rarely in cats caused by hypocalcemia. In dogs it is better described as puerperal tetany. Low calcium levels are typical. Sometimes it is misdiagnosed as `milk fever`. The low calcium levels a related to low free calcium in the blood serum. The condition normally develops in first 1–3 weeks post partum but it is described during pregnancy as well. The condition is triggered by calcium release with initial milk secretion and increasing needs of the puppies. The period between whelping and 40th day is crucial. Puppies normally do not develop signs of hypocalcemia, because the normal level in milk (Pathan M. M et al., 2011). The nursing animals are highly sensitive to changes in free calcium levels due to release in milk secretion (Moe S. 2008).

The metabolism of some nursing animals is not able to sustain high levels of calcium release in milk without affecting the blood levels. Animals with puerperal tetany show inability for fast calcium compensation in blood serum after release in milk. Small breeds with increased irritability are predisposed.

Material and Methods

The object of this study was a 5 years old female, jack Russel terrier, 6 kg body weight. Up to the presented information this is the first pregnancy of the bitch. The cycling period was normal – two times a year. The nutrition practice was poor – mostly homemade food with some mid class market food. Water was being supplied ad libitum.

At the time of hospitalization, a full anamnesis was taken and blood sample was collect from v. cephalica antebrachii using 22G catheter. The blood examination included complete blood count (CBC) supplied in SI units by Mindray BC-288 Vet automatic blood counting analyzer. Biochemical profile included total protein, albumin, blood sugar, bilirubin, cholesterol, aspartate amino transferase (ASAT), alanine amino transferase (ALAT), alkaline phosphatase (AP), gamma-glutamyl transferase (GGT), urea, creatinine, calcium and phosphorus on semiautomatic analyzer Mindray BA-88A using reagents by Giesse Diagnostics, Italy.

ECG examination was made using three lead EKG machine Mindray DECG-03A. Semi quantitative urinalysis was made with UroTest-10" (Vet Expert, Poland). The nutrition was corrected using "Trovet puppy" (Netherlads) in amount, recommended by manufacturer.

The correction therapy of the Ca levels was managed using Calcium gluconate 10 % (Sofarma, Bulgaria). The supporative therapy includet Natrium chloride 0.9 % (B. Braun, Germany), Glucose 5 % (B. Braun, Germany), Natrium chloride 0.9 % + Glucose 5 % (B.Braun, Germany), and other additives as Catosal (Bayer, Germany), Vit. AD3E (Vet Prom AG, Bulgaria), Introvit B-complex (Interchemie, Netherlands) extra label-doses adapted for average dog dose of B vitamins, Flawitol for puppies, tablets (Dermapharm, Poland).

Results

During last normal cycle the owners took decision to breed the animal. The male dog is of same breed but much larger in size. On the 8th February 2016 (63 days after) at night time first contractions have been noticed. Until next morning the bitch has not delivered a puppy and shown restless and vocalization. The owners brought her to nearest clinic. At 9 am the first puppy was born and 30 minutes after the second, and third which was of large size for the breed. The ultrasound scanning showed the presence of another one fetus. Because of the lack of medicine treatment, a C-section was made and the last puppy was exteriorized dead and of normal size. After four days the animal is back in the clinic because of bloody vaginal discharge. A blood sample shown low calcium levels have been noticed. Calcium therapy was made without information about dose and medicine used. On the 17th Feb the dog stopped to eat and on 18th Feb developed some nervous symptoms. The animal is being brought in clinic and calcium and buscolisin have been administered.

On the next day a thorough examination was made and affected heart activity was diagnosed. The heart sounds were accentuated and tachycardia of 185 to 196 bpm was count. Respiratory rate was increased without any abnormal findings. Body temperature was normal 38.2–38.9 ºC during whole period af management in the clinic. The mobility of the animal was affected and she was not moving normally. Generally, the animal was dull and did not respond to vocal commands of her owner.

A bloody discharge was present during examination for around a week time and disappeared after that.

Blood sampling showed the following results: hypocalcemia total calcium 1,14 mmol/l, ionized calcium 0,82 mmol/l, increased AP – 508 U/L (for the whole 12-day examination period average 526 U/L), increased hematologic parameters – MCV 72.9 fl, MCH 26.3 (for the whole period MCV – average 73.9 fl and MCH – average 26.14 pg) and low increase in the levels of chlorine – 103.1 mmol/l. The levels of potassium (4.63 mmol/l), Sodium (145 mmol/l), Phosphprus (0.98 mmol/l), Magnesium (0.67 mmol/l) and the levels of the rest of biochemical analytes – total protein, albumin, glucose, bilirubin, cholesterol, ASAT, ALAT, GGT, urea, creatinine were normal. The changes in the levels of calcium and phosphorus are represented on table 1.

Table 1: Daily changes in blood levels of total calcium and phosphorus before calcium therapy.

Date / ***Parameter***	***18.02***	***19.02***	***20.02***	***21.02***	***22.02***	***23.02***	***24.02***	***25.02***	***26.02***	***27.02***	***28.02***	***29.02***
Ca, mmol/l	1.14	2.18	1.88	2.53	2.31	2.25	2.96	2.48	2.02	2.27	2.69	2.65
P, mmol/l	0.98	1.32	0.91	1.26	1.11	1.13	1.52	1.01	1.12	0.79	2.22	2.03

At the time of first visit at clinic the owner has been advised to discontinue ad libitum feeding of the puppies and to feed them adapted milk using a bottle and rubber teat. The nursing by the

mother to be only 5 minutes a day and to stop in 10 days period. To avoid overdose calcium a daily blood sample was checked for the level and the daily dose was adapted according to the result. After the morning treatment with 10% calcium gluconate (0.5–1.0 ml/kg) the blood level of calcium was normal for the next 12 hours. On the following morning the levels were lower (Table 1). The explanation of this fact we find in the massive milk release. We accepted the levels of high than 2.2 mmol/l but not higher than 2.9 mmol/l. The exact treatment plan was the following:

- Day 1: 5 % glucose solution – 180 ml, IV, for 2 hours; 10 % calcium gluconate – 6 ml, slow fractions for 60 minutes; Catosal – 3 ml, IV; Introvit B-complex – 0.5 ml, SC; Vit. АД3Е – 0.1 ml, SC.
- Day 2: equal volume of 5 % glucose and NaCl 0.9 %, total volume – 180 ml, IV, for 2 hours; 10 % calcium gluconate – 3 ml, slow fractions for 60 minutes; Catosal – 2 ml, IV.
- Day 3 to Day 7: IV infusion of glucose and sodium chloride – same dose and route as previous days; 10 % calcium gluconate – 5 ml slow fractions for 60 minutes; daily Catosal – 2 ml, IV and Introvit B-complex – 0.5 ml, SC.
- Day 8: equal volume of 5 % glucose and NaCl 0.9 %, total volume – 180 ml, IV, for 2 hours; 10 % calcium gluconate – 3 ml, slow fractions for 60 minutes; Vit. АД3Е – 0.1 ml, SC.
- Day 9: 5 % glucose – 180 ml, IV slow for 2 hours; 10 % calcium gluconate – 5 ml, slow fractions for 60 mins; Catosal – 2 ml, IV; Introvit B-complex – 0.5 ml, SC;
- Day 10 to Day 12: 0.9 % Sodium chloride 180 ml, slow IV infusion for 2 hours; 10 % calcium gluconate – 5 ml, slow IV fractions for 60 min.

After almost every infusion the dog urinated spontaneously with normal urine – gravity of 1.020 and pH 6.5 negative for glucose, bilirubin, urobilinogen, protein, ketones, blood and leucocytes. Normal amount of crystals were also noticed.

During initial examination and continuous calcium therapy we made ECG monitoring. On the ECG records there were no any abnormalities in cardiac function – pulse rate of 120 to 145 bpm, normal voltage and elements. The Q-T segment was shorter due to calcium injection. Its level was 0.17–0.18 s.

After the final examination we took the decision to release the animal because of its good status and successful therapy. The food was changed and vitamin/mineral tablets was assigned for two weeks – „Flawitol puppies“ (55.28 mg calcium). Control blood sampling after 3 days shown increased levels of MCV-73,7 fl, MCH-26,5 pg, AP-368 U/L, and norma levels of the rest of the analytes – calcium 2.55 mmol/l, ionized calcium – 1.4 mmol/l and phosphorus – 1.17 mmol/l. The nervous system activity and response was also normal at the time of the control examination.

Disscussion

The eclampsy is a condition connected to hypocalcaemia due to different predisposing factors.

In most of the cases the dog owners are not clear with the nutritive needs of their pets. Homemade diets are one of the paramount predisposing factors. They include mostly meet overwhelming the fact that they contain high protein. Such a diets affect negatively the Ca:P ratio, because the level of the digestible calcium amount in meat is less than that of phosphorus. In ideal case the ratio must be 1.2:1. Lots of available ingredients in homemade diets (liver for example) contain ratio of Ca:P

= 1:15 which cause a high disbalance in animal`s metabolism (Simpson, J. W. et al. 1993).The poor nutrition and calcium release with milk are the two main factors in our case.

The diet low in protein and increased release of albumin can also cause low calcium levels. This condition is typical for some kidney diseases, disrupted protein synthesis, and protein release in digestive system. In our patient such a conditions were not described, which brought us to exclude those conditions as predisposing problem (Mellanby R. J. et al. 2005).

Parathyroid problems can also affect the eclampsy in dogs and cats but those condtions are extremely rare (Pathan M. M et al., 2011).

In the period of increased milk production during day 10 and 30 post partum the animals abilty to sustain the calcium levels is stressed. This stress is increased in the next weeks because of the increased needs of the puppies for milk. The milk secretion is of higher priority and reduction in serum calcium levels is the consequence. The ionized calcium is responsible for neural symptoms and muscle dysfunction (cramps). Due to lack of information for any other predisposing factor we can conclude the lactation causes low calcium levels. Although only a few – the newborns were of larger size for the breed so they needed mor milk than average newborn – figure 1. The bitch had normal milk secretion. The puppies removal and their early weaning is milestone in successful treatment of such a case.

Figure 1:

Imbalance between loss of extracellular calcium and absorption by the organism connected to increased milk secretion is a key mechanism in puerperal tetany in bitches. A heavy hypocacaemia nd sometimes hypophosphoraemia coincides with peak lactation in animals with eclampsy as a result of disturbed ratio between excretion/absorption in extracellular calcium pool (Ettinger, 1983).

Intensive loss of membrane bound calcium leads to increased ion permeability of the membranes. This effect leads to lowering of action potential and clinically manifested neuro-muscular tetany and cramps.

Calcium supplementation or foods rich in calcium can affect negatively the parathyroid hormones. The result of the latter is decreased ability of the organism for calcium deposition in the bones, and absorption by the intestines. When the body is of high calcium need as in lactation there is no possibility to adapt quickly to the increased needs. When the calcium is released in the milk it serum levels decrease (Pathan M. M et al., 2011).

The eclampsy therapy normally starts with slow IV infusion of calcium under supervision of vet. In average cases volume 5- 10 ml 10% calcium gluconate daily is enough for dog with body mass of 5–10 kg the calcium must be administered slowly to avoid ventricular fibrilations and cardiac arrest. In eclampsy patients the conscious loss for only a few minutes can increase body temperature to 41–42 ºC such hypertherima affects the brain. Cold water in shower or in pool is a choice in such a cases. After a few minutes in cramps the glycogen in liver and muscles is finished and the animas are exhausted. Low blood sugar levels can also trigger the tetany and cramps in some patients. IV administration of 5 % glucose is indicated in those patients. In cases of sever tremor – sedation and barbiturates are the correct approach.

Conclusions

Corection in diet with correct Ca: P ratio or premium class food according to animals condition is the only prophylaxy.

Administration of 10 % calcium gluconate is an easy approach in practical treatment in eclampsy cases.

Early weaning of the puppies is an important supportive element in the whole eclampsy therapy.

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