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## Hypocalcemic tetany in a pet lamb fed with cow milk

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## Υπασβεσταιμική νεύρωση σε κατοικίδιο αμνό διατρεφόμενο με γάλα αγελάδας

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**ABSTRACT.** A 30-days old pet lamb, that was fed with cow milk and pieces of bread was admitted to the Clinic of Farm Animals, because on the same morning it was found inappetent and depressed. A few minutes after admission it developed muscular tremors and convulsions. On clinicopathological evaluation serum calcium concentration was lower than normal. Treatment with calcium borogluconate was very effective in alleviating the signs. Hypocalcemic tetany can occur in young lambs fed with cow milk.

**Keywords:** Hypocalcemic tetany, lamb, cow milk, treatment, diagnosis

**ΠΕΡΙΛΗΨΗ.** Ένας κατοικίδιος αμνός ηλικίας 30 ημερών, που διατρέφονταν με αγελαδινό γάλα και κομμάτια ψωμιού προσκομίστηκε στην Κλινική Παραγωγικών Ζώων, επειδή το ίδιο πρωί παρουσίασε ανορεξία και κατάπτωση. Λίγα λεπτά μετά την προσκόμισή του παρουσίασε μυϊκό τρέμο και επιληπτικές κρίσεις. Η συγκέντρωση του ασβεστίου στον ορό ήταν χαμηλότερη από το φυσιολογικό. Η θεραπεία με βορογλυκονικό ασβέστιο ήταν πολύ αποτελεσματική. Η υπασβεσταιμική νεύρωση μπορεί να διαγνωσθεί σε νεαρούς αμνούς που διατρέφονται με γάλα αγελάδας.

**Λέξεις ευρετηρίασης:** Υπασβεσταιμική νεύρωση, αμνός, αγελαδινό γάλα, θεραπεία, διάγνωση

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## INTRODUCTION

In sheep, hypocalcemia or milk fever is more likely to occur in ewes at late gestation and early lactation periods. Hypocalcemia in ewes may cause reduced feed intake and flaccid paralysis; however, severe muscle tremors or tetany are also frequently observed (Oetzel and Goff, 1999; Brozos et al., 2011; Ermilio and Smith, 2011).

The occurrence of clinical hypocalcemia in ewes is usually sporadic and generally affects less than 5% of a flock, but occasionally it can occur as an outbreak (Sweeny and Cuddeford, 1987; Oetzel & Goff, 1999). To date hypocalcaemia has not been described in lambs that are not weaned.

## CASE DESCRIPTION

A thirty-days-old pet lamb of Chios breed was admitted to the Clinic of Farm Animals for examination, because according to its owner it was found on the same morning inappetent and depressed. The lamb was reared in a house yard in Thessaloniki and was fed with cow milk and pieces of bread.

The lamb had a body temperature of 38.1°C and 15 minutes after its admission it developed muscular tremors and tetanic convulsions. Tachycardia and panting were also observed. A blood sample was taken for estimation of total serum calcium, phosphate and magnesium levels. Hypocalcemic tetany was suspected, so parenteral calcium borogluconate 24% therapy was administered resulting in a rapid complete recovery within a few minutes after treatment. The laboratory findings denoted that the serum total calcium concentration was low 1.25 mmol/l, as reference values cited in the literature are 2.18-2.75 mmol/l (Roubies et al., 2006). Also, the serum phosphorus concentration (2.4 mmol/l) and serum magnesium concentration (1.027 mmol/l), were found within the normal limits cited in the literature (Roubies et al., 2006) (1.62-3.33 mmol/l for phosphorus and 0.94-1.31 mmol/l for magnesium), supporting the initial clinical diagnosis. After the treatment the lamb owner was consulted to feed his lamb with a milk replacer for lambs and to have

also access to good quality alfalfa hay. The lamb was re-examined after two months and found to be healthy, while according to the owner no more signs of hypocalcemia were noted.

## DISCUSSION

Hypocalcemia, an acute metabolic disease of adult sheep, is characterized by tetany, incoordination, paralysis and coma; it is caused by an inadequate supply of metabolisable calcium, particularly in the period from 6 weeks before to 10 weeks after lambing (Jensen and Swift, 1982; Radostits et al., 2010). In lambs hypocalcemia has been reported to date in non-suckling lambs older than 2 months old (Papasteriades, 1973). However, according to the authors' knowledge, this is the first report of clinical hypocalcemia in a pre-weaned lamb.

Hypocalcemia was diagnosed in the present case based on history (acute onset and progress, nutritional errors), clinical and serum biochemical findings, as well as to the rapid response to treatment with calcium borogluconate. Regarding the factors that predisposed to this condition were the increased calcium demands of the rapidly growing lamb (Underwood and Suttle, 2004) and that the calcium sources were poor. It is known that the cow milk calcium content is about 70 % lower compared to ewe milk. Also, the wheat bread contains increased amounts of phosphate and low calcium, a predisposing factor that aggravated the metabolic imbalance (Radostits et al., 2010; Pulina and Nudda, 2004).

It has been recorded that variation in dietary calcium intake results in a corresponding change in rate of absorption and distribution of calcium. Furthermore, increased levels of dietary phosphate, due to feeding of bread can also increase the incidence of hypocalcemia. The increased phosphate intake increases the serum level of phosphate which causes a decrease of serum calcium and has an inhibitory effect on renal enzymes that catalyze the production of 1,25-dihydroxycholecalciferol [1, 25-(OH) 2 D], eventually lowering intestinal calcium absorption (Radostits et al., 2010). Calcium homeostasis is

controlled by parathyroid hormone secreted by the parathyroid glands, calcitonin secreted by C cells of thyroid gland, and 1,25-dihydroxycholecalciferol (vitamin D) produced by kidney; vitamin D improves the efficiency of calcium absorption so that a higher proportion of dietary calcium is absorbed (Goff et al., 1991).

Prolonged overcast weather conditions, indoor housing, dark skin pigmentation, full fleece and genetic aetiology are factors that may further reduce endogenous vitamin D production in sheep (Van Saun, 2004; Thompson et al., 2007), therefore increase the incidence of hypocalcemia. In the present case all these factors do not seem to exist.

The inadequate level of calcium and vitamin D, as well as the high dietary level of phosphorus in

the lamb's diet may caused a state of hypocalcaemia that led to in-appetence (associated with gastrointestinal stasis), muscular tremors and tetanic convulsions. Calcium has a membrane stabilizing effect and hyperesthesia and tetany seen in hypocalcemia may be caused by a lack of nerve cell membrane stabilization and also increase impulse conduction or permit spontaneous impulse production in peripheral nerves and muscle fibers (Cockroft and Whiteley, 1999).

### CONCLUDING REMARKS

In conclusion, hypocalcemic tetany can be observed also in young lambs fed with cow milk and bread. ■

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