

An Outbreak of Pre- and Post-Parturient Clinical Hypocalcemia in a Camel's Herd in Iran

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Abstract:

Background: Desert plants can't provide all the animals requirements for calcium and mineral deficiency in camels is mostly visible in dry seasons. The present study investigates hypocalcemia in pre-partum and post-parturient camels. **Methods:** In a camel herd 25 out of 96 pregnant animals showed clinical signs of hypocalcemia within a week post-parturition. Two camels had abortions and 9 animals that gave birth had died. Blood sample was collected and calcium and phosphorus concentration was measured using a commercial kit. **Results:** The

clinical and necropsy signs bore a resemblance of decline in blood calcium and the level of calcium and phosphorus had fallen below the normal range in all the tested blood. Most of the camels recovered after administration of injectable calcium and adding supplementary nutrition. **Conclusion:** Paying attention to minerals balance especially in last months of pregnancy and in recently parturiated camels is crucial.

Keywords: Calcium, Camel, Hypocalcemia, Phosphorus.

Introduction:

Camels which are resistant species to dehydration and heat, are adapted for living in arid lands and eating prickly desert resources (Lamuka *et al.*, 2017). Nevertheless, such desert plants can't provide all the animals nutritional requirements especially in pregnant camels. Minerals including calcium are essential and effective on metabolic profile of camels (Deeba *et al.*, 2020; Dereje *et al.*, 2016) The population of Iranian camels is 180000 which almost all of them are raised in traditional system and in desert areas where along with nutritional deficiencies (Mohammadpour *et al.*, 2020), they are exposed to wild animals attack which jeopardizes camels health by diseases such as rabies (Ahmed *et al.*, 2020; Esmaeili *et al.*, 2012). Mineral deficiency in camels is mostly visible in dry years in this country and the breeders don't have easy access to veterinary utilities. Moreover, in this system, camels rarely receive mineral rich supplementary feeds.

Several studies have shown decline in the level of calcium and phosphorus as the weather gets warmer and water availability reduces (Ahmed *et al.*, 2013; Aichouni *et al.*, 2011; Deeba *et al.*, 2020). In a study in 2007 in southern Darfur, the blood profile of camels was investigated in dry season. In this research the calcium level in dry season was 2.03 mmol/L while in green season it was 2.2 mmol/L. (Amin *et al.*, 2007). Inclusion of 0.5-0.6% calcium and 0.3-0.35% phosphorus to camel diet fulfills the animal's requirements (Deeba *et al.*, 2020). This paper

investigates an outbreak of hypocalcemia in pre-partum and parturied Kalekuhi camels which showed different stages of clinical signs of the disease during late winter and early spring in a farm located in a desert region between Tehran and Qom provinces. To our knowledge it is the first report of hypocalcemia occurrence in Iranian camels.

Materials and methods:

The animals: In a camel herd located between Tehran and Qom cities in which 300 Kalekuhi breed were kept, there were 96 pregnant camels. A total of 25 animals showed clinical signs such as depression, muscle tremors, stiffness of the limbs, and recumbency within 7-10 days post-parturition. Two camels aborted their fetuses after 7 days of recumbency and also during the disease course, and 9 ones died.

Collection of blood: Blood sample was collected from the 16 animals with clinical signs. A volume of 10 ml blood was poured in to the heparinized tubes and then centrifuged at 1800g for 20 minutes in the lab. Plasma was separated for the determination of calcium concentration.

Calcium and phosphorus determination: The total concentration of plasma calcium and phosphorus was measured by spectrophotometry using commercial kit (Pars Azmoon, Tehran, Iran) by an automated analyzer.

Results:

The observed clinical signs in involved animals were teeth grinding, profound depression, muscle tremors, increase in heart rate, stiffness of the limbs, ataxia and finally sternal recumbency which were indicated hypocalcemia in the animals. Sternal recumbency was visible within a week post-parturition. The level of calcium and phosphorus fell below the normal range in all the tested blood (the Table).

Calcium and phosphorous levels in the camels with clinical signs of hypocalcemia

The biochemical parameter	Normal range	The camels																Mean	Standard deviation
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
Calcium (mg/100ml)	8.4-12.4	2.2	1.5	2	1.8	1.5	2.1	1.3	1.3	2.3	1.4	1	1.4	2.5	1.7	2.3	1.7	1.75	0.439
Phosphorus (mg/100ml)	4.8-8.4	2.1	2.3	2.4	2.3	2.6	2.5	2.3	2.7	2.7	2.4	2.6	2.1	2.5	2.7	3	2.1	2.4	0.263

After administration of calcium magnesium phosphorus (Nasr Company, Iran) and improvement of nutritional status by addition of supplements, all the animals recovered except of 9 camels which died with sever stages of hypocalcemia.

Post-mortem examinations: Necropsy findings of the 9 dead camels were included enlarged yellow liver, muscle necrosis of the limbs and distended bladder.

Treatment protocols: As the laboratory results showed the hypocalcemia and hypophosphatemia in the camels, 250 ml of Calcimaphor 40 (Nasr Company, Iran) was injected slowly into the jugular vein followed by 250 ml subcutaneous injection in sick animals. Moreover, 250 ml of the drug was injected subcutaneously to the healthy recently parturiated animals. The animals feed was enriched by adding 0.5% calcium and 0.3% phosphorus.

Discussion:

In the present study the clinical signs were close to milk fever disease in cattle. Moreover, the necropsy findings of the 9 dead camels included injuries such as fatty liver which indicated negative energy balance and muscle damage due to the ischemia resulted from prolonged recumbency. Distended bladder due to inability of the animals to urinate occurred following smooth muscle paralysis. Our laboratory results indicated that the herd suffer hypocalcemia so we treated the animals using Calcimaphor 40 which along with calcium, provided magnesium and phosphorus. After the treatment protocols, the camels which had shown primary stages of hypocalcemia and even two animals in sternal recumbency stage of the disease, gradually recovered. As our laboratory results showed in the table, hypocalcemia is associated with hypophosphatemia and treatment with calcium borogluconate will restore both conditions.

In the studied herd, the pregnant camels grazed in rough circumstance with roughage grasses such as Tamarix and Haloxylon so as they parturiated and produced milk, blood calcium declines in levels in which showed sever signs of milk fever in the animals. The level of calcium depends on the type of plants, season and soils of the area which camels are kept. In a study in Algeria in 2013 the serum calcium and phosphorus levels in summer were 2.07 mmol/l and 1.94 mmol/l respectively while in winter these levels rose to 2.47 mmol/l and 2.23 mmol/l respectively (Ahmed *et al.*, 2013).

Regarding the fact that 25 out of 96 pregnant and parturiated camels suffered hypocalcemia in the current study, and economic losses due to the death of 9 animals, paying attention to mineral deficiency in last months of pregnancy and in recently parturiated camels is crucial. In other

words, although camel is a resistance species among ruminants, inadequate minerals and malnutrition can affect health status and productivity of the animal especially in transitional period. In addition to calcium, magnesium and phosphorus are also essential in maintaining the levels of blood calcium in its normal range so other minerals imbalance should be considered in cases of hypocalcemic camels.

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شیوع هیپوکلسمی بالینی قبل و بعد از زایمان در یک گله شتر در ایران

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چکیده:

زمینه مطالعه: کلسیم نقش مهمی در توانایی انقباض عضلات صاف دارد و مقادیر بالایی از این ماده معدنی در اواخر آبستنی مورد نیاز است. گیاهان صحرائی قادر به فراهم آوردن تمام نیازهای حیوانات را برای کمبود کلسیم و مواد معدنی در شتر که بیشتر در فصول خشک قابل مشاهده است، نیستند. **هدف:**

مطالعه حاضر هیپوکلسمی را قبل و بعد از زایش شترهایی که مراحل مختلفی از علائم بالینی بیماری را نشان دادند بررسی می‌کند. **روش کار:** در یک گله شتر تعداد 25 نفر از 96 حیوان آبستن طی یک هفته علائم بالینی هیپوکلسمی را نشان دادند. دو شتر جنین خود را سقط کردند و 9 نفر بعد از زایمان تلف شدند. نمونه خون جمع آوری و غلظت کلسیم و فسفر با استفاده از آنالایزر خودکار Selectra Pro M اندازه گیری شد. **نتایج:** علائم بالینی و کالبدگشایی شباهت زیادی به کاهش کلسیم خون داشت و سطح کلسیم و فسفر در تمام خون‌های آزمایش شده به زیر حد نرمال کاهش یافته بود. **نتیجه گیری نهایی:** با توجه به حضور شترهایی که در مطالعه حاضر دچار هیپوکلسمی شده اند، توجه به تعادل مواد معدنی به ویژه در ماه‌های آخر آبستنی و در شترهای تازه زا بسیار مهم است.

- **کلمات کلیدی:** شتر، کلسیم، فسفر، هیپوکلسمی