



Abu Dhabi Food Control Authority
Development Sector
Research & Development Division

Technical Report تقرير فني

Title العنوان	Symptoms of Nutritional Deficiency in Arabian Camels	
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Duration فترة المشروع	From: September 2010	To: November 2011

Background خلفية عن الموضوع

Although minerals and vitamins are needed in a very small percentage as dietary nutrients, they are very important in camel nutritional programs for proper animal function, such as bone, joint and ligament development, immune function, muscle contractions, and nervous system function, growth and reproductive performance. However deficiency of minerals and/or vitamins in the diet of the camels or any disturbances in the absorption from the body tissues, leads to the appearance of different clinical symptoms (Abdulwahhab 2003). The important minerals and vitamins for survival and growth of grazing animals are either manufactured in the rumen by the rumen microbes, in the body from the action of sunlight, or are stored in sufficient quantity in the liver or contained in adequate amounts in available feed (Abdulwahhab 2003). Although the body needs small quantities for the purpose of maintaining vital activities that occur in the body, requirements may be increased to meet the various immune and metabolic stresses imposed during hard exercise (Snow et al., 1992). Nutritional diseases have received little attention in camels compared with other livestock (Mohamed 2008) in regard to the prevalence, causes, epidemiology and clinical findings.

Problems التحديات

- Increased prevalence of nutritional deficiency diseases in camels in UAE.
- The clinical and epidemiological aspects of hypovitaminosis and mineral deficiencies in camels are not yet understood.

Objectives الأهداف

- To investigate different aspects of clinical findings of hypovitaminosis and mineral deficiencies in camels.

Methods طريقة العمل

A total of 15000 camels (1250 camel herds) in different districts of Abu Dhabi Emirate were examined clinically. Camel management and nutrition in each herd were recorded. The information pertaining to the camels examined during this study was also collected. This included breed, age, performance, lactation, pregnancy and any previous disease history, if any, etc. Blood and faeces samples were collected from diseased camels and examined at the Central Veterinary Hospital, Al Wathba and the Veterinary clinic Madinat Zayed, Emirate of Abu Dhabi, United Arab Emirates. The feeding regimen of the affected camels was variable but mostly ranging from high energy diet to roughage.

Results النتائج

In this study the deficiencies of vitamins (A, D, E, and Vit. B1) and minerals (selenium, calcium, Phosphorus, copper, iron and iodine) were the most common nutritional diseases of camels in UAE. Racing and young camels are highly susceptible to vitamin deficiency as compared to dairy camels. Carbohydrate rich feed,



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imbalanced rations, use of illegal medications or supplements and violent exercise and/or training are the most common risk factors for diseases associated with nutritional deficiency in camels.

Nutritional Elements	Symptoms of Nutritional Deficiency
Vitamin A	<p>During the present study, three forms (congenital, postnatal and subclinical) of hypovitaminosis A were observed clinically in camels.</p> <p>Congenital form: Calves suffering from congenital deficiency of vitamin A are born blind or showing multiple congenital deformities likes hydrocephalus or anophthalmos.</p> <p>Postnatal form: The symptoms are characterized clinically by loss of appetite, reduction in the growth rate, true xerophthalmia, (with thickening and clouding of the cornea) and discharge of thin serous mucoid from the eyes.</p> <p>Subclinical form: Mainly in adult camels, characterized by night blindness and loss of reproductive function in both males and females.</p>
Vitamin D	<p>The appearance of one of the osteodystrophic diseases (Rickets and Osteomalacia) as well as loss of appetite and weakness.</p>
Vitamin E	<p>Two forms of the deficiency were observed.</p> <p>Acute form: The clinical form usually occurred in calves' is characterized by sudden death without showing any obvious symptoms.</p> <p>Subclinical form: Mainly in adult camels. This form is characterized by impaired fertility and a gradual reduction in muscular activity, especially in race camels.</p>
Vitamin B1	<p>The clinical findings showed variable signs including disorientation, aimless walking with a high stepping gait due to blindness, anorexia, opisthotonus or head retraction (star gazing), muscle tremor and convulsion followed by recumbency with paddling movement and death.</p> <p>During the present study, it was noticed that thiamine deficiency in camels usually occurs in sporadic cases.</p> <p>Vitamin B1 (Thiamine deficiency) is the disease of racing camels and higher rate of incidence occurred in camels with age range of 2-4 years.</p>
Selenium	<p>Poor racing performance, stiff gait, lethargy, anorexia, heart and respiratory disturbances and reduced fertility in adult camels are the main clinical findings selenium deficiency.</p>
Calcium & Phosphorus	<p>The results obtained in the present study indicate that the clinical symptoms of both deficiencies are usually appeared gradually, in the early stage of the disease, calves (one month-one year) shows stiff gait, difficult to move, increase in the size of the joints especially the fore limbs, lameness and sometimes arched back.</p> <p>Later on and as the condition become more progress, calves shows abnormal curvature of the shift of the long bones with an abnormal increase in the depth and width of the epiphyseal plates of particularly the long bones. General weakness, emaciation and appearance of abnormal appetite are the main signs that are observed in adult camels.</p>
Copper	<p>Clinical form: is usually a progress gradually and is mostly noticed in young calves (4-6 months) as characterized by ataxia and incoordination of the legs, particularly fore legs, during movement of the animal and softening of the bones specially the bones of the foot, followed by leg deformities and poor growth.</p> <p>Subclinical: While in adult camels, they are often infected with subclinical form. The higher incidence of subclinical form showed no clinical signs with blood copper levels below 60 ug/dl. However, some cases showed variable signs including general weakness, low milk production, anaemia, temporary infertility, the hair coat is rough and depigmentation.</p>



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Iodine	<p>In camels, both forms (clinical and subclinical) were diagnosed.</p> <p>Young camels are usually prone to the clinical form more than adult camels. In this form, calves are either born with goitre or the disease appears in calves 1-2 months old. The characteristic findings are birth of stillborn or weakness in newborn calves with gross palpable enlargement of the thyroid gland.</p> <p>Adult camels are usually showed subclinical form which manifested clinically by loss of libido in the male, failure to express estrus in the female, and high incidence of aborted, stillborn or weak calves.</p>
Iron	<p>During the present study, low serum iron (40 ug/100ml) was observed in association with ruminal lactic acidosis, hemorrhagic disease, sever mange, heavy tick infestation, diseases accompanied by fever and trypanosomiasis.</p>

Recommendations التوصيات

- The proper attention to camel nutrition by following a systematic regular program to use balanced food supplements containing all the vitamins and minerals is expected to prevent nutritional deficiencies.
- Provide green or dry ration rich in beta carotene and selenium, especially in the later stage of pregnancy.
- Regular oral doses of copper oxide (4 grams) should be providing pregnant camels between the fifth and eight month of pregnancy. Also, 4 grams of copper oxide should be given to Hiran after birth and repeated every two months.
- Dosing racing camels with Vitamin E and selenium supplement at least once per week.
- Provide balanced diets of phosphorus and calcium in the late stage of pregnancy and after delivery.
- Regular supplement of camel farms with mineral blocks.
- Carbohydrate rich feed, imbalanced ration, use of illegal medications or supplements and violent exercise and/or training are the most common risk factors for diseases associated with nutritional deficiency in camels.
- Early intravenous treatment with supplement of thiamine is considered as the most important method for the early diagnosis of the disease.
- Tincture of iodine should be applied on the flank skin of pregnant camels at least once every two weeks, especially during the last three months of pregnancy.

References المراجع

- Abdulwahhab, Yas. 2003. Camels: Diseases & Treatment. First Edition. Amrit Advertising, UAE, ISBN – 9948 – 03 – 059 – 1.
- Snow, D.; Billah, A.; Ridah, A. and Frigg, M. 1992. Plasma concentrations of some vitamins in camels. Proc. 1st Int. Camel Conf., pp. 335-338.
- Mohamed, H. 2008. Vitamin D Status in Camels (Camelus dromedarius). Research Journal of Biological Sciences 3 (4): 446-447.

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