

OBSERVATIONS ON SOME METABOLIC AND NUTRITIONAL DISEASES ENCOUNTERED AMONG LIVESTOCK IN EGYPT

By

K.N. SOLIMAN, Y.L. AWAD, AND M. TALAAT FOUAD

*Veterinary Research Institute, Ministry of Agriculture, Dokki,
Cairo, Egypt, U.A.R.*

SUMMARY

Diseases due to nutritional deficiencies or metabolic disorders as observed by the authors or recorded in relevant literature are reviewed.

Symptoms, clinical and laboratory diagnosis as well as treatment of cases of Postparturient haemoglobinuria in Freizian cows and buffaloes are mentioned. Three cases of lactation tetany in buffaloes, and their successful treatment with calcium and magnesium therapy are reported. Lactation tetany in mares as well as post parturient paresis are discussed.

For deficiency diseases vitamin E deficiency in national and imported calves as well as symptoms observed in chickens are reported. Vitamin A and D deficiencies in poultry are discussed. Vitamin B deficiency was observed in chicks and turkeys. For trace elements-deficiencies, cobalt deficiency was diagnosed among sheep and a ewe treated with cobalt chloride orally for two weeks.

INTRODUCTION

Since the beginning of this century and with the vast advancement in the different fields of veterinary science more obscure syndromes have been studied and their etiological agents were identified. It was also recognized that a group of disorders or disease entities remained of obscure nature. The expanding development in the field of nutrition have unmasked the nature of many of these unknown diseases. At present it is known that life to be maintained needs more than the three primarily recognised elements proteins, fats and carbohydrates and that the animal body needs more than forty various elements. The present known scientific facts in the fields of nutrition, physiology, biochemistry proved beyond doubt the earlier statement of Lavoisier (*La vie est une fonction chimique*) that life is a chemical function. During the last forty years the revolutionary findings of the vitamins, the role played by different aminoacids and the essential needs for a number of minor elements have all dramatically changed the general concept of many animal obscure ailments.

Furthermore, it has been shown that the nutritional status of livestock has an apparent effect on its resistance to infectious agents. We do not intend to include that view in this work. The main purpose of the presented study is to focus attention on a number of definite nutritional deficiencies or metabolic disorders which were encountered by the authors among the livestock in Egypt. Relevant local literature on this subject is referred to. We hope on so doing, that we will be able to stimulate a reconstructive discussion or at least to provoke an interest in this subject particularly as our Republic is paying more attention to the side of animal production.

In dealing with this subject the disease will be mentioned under two main groups namely metabolic and deficiency disorders.

METABOLIC DISEASES

Postparturient haemoglobinuria

Postparturient haemoglobinuria is a metabolic disorder that appears in cattle and is characterised by haemoglobinuria, haemoglobinuria, icterus and hypophosphataemia. Postparturient haemoglobinuria was recorded by Penny (1956) when he reported on the three cases out of which one was fatal. Mullins and Ramsay (1959) described a post parturient haemoglobinuria case which he mentioned that it was associated with phosphorus deficiency and anaemia. These cases were confirmed to be a phosphorus deficiency when Madsen *et al* (1944) induced it experimentally. They put high producing dairy cows on a ration made up of Alfa and dried beet pulp. A high dietary intake of Ca may interfere with phosphorus absorption and lead to phosphorus deficiency when its level is marginal. Reinach and Low (1958) described high Ca dietary intake as an impediment to the absorption of phytate phosphorus in ruminants. As far as Egypt is concerned Soliman *et al* (1963) reported a hypophosphataemia syndrome that occurred on a dairy freizian farm at Albirka nearby Cairo Airodrome towards the middle of 1962. There were 327 heads of Freizian cattle in two groups out of these 12 died with similar symptoms mainly haemoglobinuria. The first case was met in a newly calved Freizian cow which died in 4 days in spite of full treatment of babesiosis. This case was followed by the death of 11 similar cows in the 26th of July 1962. The collective symptoms were signs of bloat accompanied with indigestion and severe drop in milk yield. Affected cows showed red urine, lied down and usually died after the first appearance of symptoms. The clinical appearance of the red urine led to the tentative diagnosis of babesiosis but the nonresponse to proper treatment of this disease added to the fact of the occurrence of the syndrome only in newly calved cows were the clue to the real nature of the condition as a hypophosphataemia. For the sake of

differential diagnosis a check was done by laboratory aids for other diseases that may cause similar symptoms as babesiasis, Cl. haemolyticum infections and salmonellosis. Investigations for these disease yielded negative results. Pregnant cows duely to calf were given acid sodium phosphate and bran along with bone meal was advised to be concluded in the ration. Blood samples analysis revealed haemoglobin value 6.6 gm/100 ml., total R.B.C. count 5.11 million/c.m.m. although the mean of the twelve random samples showed an apparent normal value yet in these cases there was a low inorganic phosphorous level being 2.1, 3.1 and 3.5 mg/100 ml. There was a history of keeping those animals on tibn only prior to the occurence of the symptoms which may account for the occurence of this syndrome. Moreover, the improvement of the case after the administration of bone meal and bran and the negative results of the previously mentioned group of disease as well as the analytical picture of the blood proves the fact that the case was a hypophosphat-aemia syndrome.

It is interesting to mention that Awad *et al*(1963) reported on two individual cases in buffaloes.

Lactation tetany

One of the major metabolic disorders in lactation tetany is characterized by hypomagnesaemia associated with hypocalcaemia although dietary magnesium intake is normal. Clinically there is tonic and clonic muscular spasms and convulsions and may in death. Morbidity rate varies from 2.0-12.0% in some herds. It is common in Northern Europe, England and New Zealand. It has been attributed to different factors out of which is hyperthyroidism or a high intake of potassium. In Egypt this disorder has been observed in two buffaloes at Sharkiah province which showed high irritability and nervous excitement which was suspected of rabies. The two cases were given magnesium sulphate, 16 ounces of magnesium sulphate and all the tonic spasms disappeared in the course of 12 hours. Animals were left with slight dizziness. The ounces of magnesium sulphate three times daily for three days completed the recovery of these two animals. From the normal data recorded from Egyptian farm animals Ayoub *et al* (1959) reported that while the magnesium level mean in male growing buffaloes is 3.2 ± 0.02 mg/ 100 ml of serum it is in the female nonpregnant nonlactating 2.93 ± 0.29 and 1.24 ± 0.38 in the pregnant buffaloes with the fact that more chance for lactation tetany to occur in our buffaloes is postulated.

A third case in a buffalo- calf was reported on clinical basis and responded to calcium and magnesium therapy, Awad (1956).

Parturient paresis

Although many cases of milk fever are on the practitioner's dairy yet few can be recorded in literature for the simple fact that they usually yield to calcium therapy and improvement of the calcium ion in the serum. These cases were found to be associated with endocrine and carbohydrate improper metabolism and good response is gained with glucose, vitamin D together with calcium gluconate injections. Cases of parturient paresis among imported foreign breeds in Egypt occurred on Sakha Governmental Farm and responded to borogluconate calcium therapy. Our buffalo cows are of a low calcium level as they get older with age. Ayoub *et al* (1960,1961) reported also that female buffaloes had a lower level than males and calcium \times phosphorous value for aged nonpregnant female buffaloes is lower than veals, male buffaloes and nonpregnant lactating ones. This brings the idea that as milk fever is the disease of high milk producers and a genetic factor may play a role the trend nowadays of improving our milking cows to be high milk producers may give the chance for milk fever cases to appear among our cows.

Lactation tetany in mares

A case of lactation tetany in a 7 years old mare was met with at Kafir EL-Hammam, Sharkiah province in the spring of 1945. Symptoms appeared suddenly on the 9th day after foaling. The collective symptoms observed were like those of tetanus with one exception that the membrana nictitans was not prolapsed, it was normal. On this basis and the response to sudden sounds, the case was diagnosed as lactation tetany. It was treated successfully with calcium gluconate injections.

DEFICIENCY DISEASES*White muscle disease*

Vitamin E plays a great role in maintainance of animal health and its deficiency is accompanied by death. More than 50% morbidity rate is observed in some cases. This deficiency has been recorded in Scotland, Scandinavia, Northern Europe, Kanada and North America. In Egypt, Soliman *et al* (1962) had recorded a vitamin E deficiency syndrome in 17 dead and emergency slaughtered young calves (1 Semental, and 16 suckling buffalo-calves) and 3 alive buffalo ones. This syndrome was met with in two main breeding farms, Almarg Farm near Cairo where the first Semental case was recorded and few odd other cases of buffalo calves. The majority of other affected suckling calves were encountered at Sakha Breeding Farm in 1961. All the cases occurring on this second Farm were seen and followed. The three alive cases were spotted clinically and treated with alphasatocopherol with the death of one and the recovery of the other two. On both Farms bucket feeding was practiced along with the addition of

20.c.c. of cod liver oil in the milk. The clinical symptoms, post mortem findings as well as the histological investigation are in agreement with other authorities in this subject. The success of treatment with alphatocopherol in the two calves leaves no doubt to the nature of the condition. Such a practice of daily addition of cod liver oil to milk feed should be stopped as this was the means by which the disease was experimentally induced by Kuttler *et al* (1958).

Vitamin E deficiencies has also been encountered among growing chicks up to the broiler age with characteristic symptoms of encephalomalacia twitching and incoordination and ataxia are the main symptoms of deficiency. It is interesting here to point out that most symptoms are in the central nervous system.

Vitamin "A" deficiency

While small farmers rear few numbers of young chickens and pullets yet these as a group do not show peculiar deficiency symptoms. However, records of the Governmental farms due to their restricted diet and mode of life showed certain deficiencies as vitamin A based on post mortem findings. The goose skin structure of oesophagus of affected birds is a sure post mortem sign of this deficiency. Other accompanying symptoms as accumulation of caseous material in the eyes or in the cleft of the palate could be associated with other infectious poultry diseases like infectious sinusitis, air sac disease etc. The administration of vitamin A in addition to green fodder correct this disorder in short time.

Vitamin "D" deficiency

Cases of rickets were met with in young chicks as evidenced by bony deformities of limbs and existence of knobs in ribs in post mortem examination. Affected chicks showed apparent growth retardation when compared with normal mates of the same age. Similar cases were seen in young rabbits. In these instances there is usually at early stage the serum calcium level is not affected but the inorganic phosphorous is low. Cases in chicks and rabbits were diagnosed on Clinical and post mortem findings and vitamin D was advised to be added to rations. Usually it is a complex factor of antirachitogenic vitamin D factor from solar irradiation and calcium and phosphorous improper ratio in diet.

Vitamin "B" Deficiency

Riboflavin "B" deficiency : Although this vitamin is required in metabolism of all animals, yet it is not needed in the rations of cattle and sheep as it is bacterially synthesized in the rumen. It was observed in chicks and broilers which were noted to be walking on their hocks and their toes are curled inwards accompanied by diarrhoea. They responded evenly to riboflavin therapy.

Pantothenic acid deficiency: It is a dietary essential in rats, dogs, pigs, trukeys and other species. It is formed in the rumen of ccw and sheep. Intestinal synthesis have been found in rabbit and horse to meet body needs. Its deficiency was observed in young turkey chicks as observed by retarded growth and feather development, dermatitis and eyelids became granular and sticky. There was ulcer formation on the under surface of the skin of the toes. The condition responded readily to pantothenic acid treatment.

Cobalt deficiency

The necessity of cobalt in ruminant nutrition was made in early nineteenth thirties. A minute but steady supply enables microorganism inhabiting the rumen of sheep and cattle to produce vitamin B₁₂. Sheep suffering from cobalt deficiency loose appetite, become thin, anaemic and eventually starve to death. This deficiency is common in Australia, New Zealand, United Kingdom and North America. In Egypt a flock of sheep raised at Altahrir province showed symptoms of severe anaemia and diarrhoea although they were grazed on barseem. Parasitic infestation was excluded on both faecal and post mortem examination. Extensive diagnostic and differential work was done to exclude infectious diseases especially enterotoxaemia and all have proved negative. Post mortem findings were those of severe anaemia and emaciation, loss of flesh was great and on opening the chest cavity there was a large amount of pericardial fluid in every case. Abdominal organs appeared pale. Lymph glands were enlarged and oedematous. On clinical basis the case was diagnosed as cobalt deficiency. One mg of cobalt chloride is given to every animal for one month and top dressing of agriculture field with cobalt sulphate in the amount of 5 ounces per acre are recommended.

Awad (1956) reported on a case which appeared to be suffering from cobalt deficiency in a ewe and was successfully treated by the oral administration of 5 mg of cobalt chloride for a fortnight.

Deficiency due to unknown cause

Barakat *etal* (1960) reported that tail necrosis in buffaloes "Arrada" could be described as a deficiency disease since 53 cases of tail necrosis in buffaloes were resolved in about 21 to 30 days by oral administration of a mixture composed of 30 ml linseed oil emulsified with one hen's egg and administered orally. This manifestation of tail necrosis was induced experimentally in rats and this condition was cured properly with this emulsion.

It appears, thus, that metabolic and deficiency disorders of certain forms are in existence among our livestock in Egypt. Definitely, those concerned with this nutritional or metabolic group of diseases are

aware of these facts. The author's view that this side of the problem has to be further pursued to get more clearer and correct incidence of these deficiencies or metabolic disorders. One main important point we like to stress here is that the livestock owners mainly the farmers should be enlightened on these lines mainly through the Extension Service of The Ministry of Agriculture. Other means of educational programmes through wireless and television could be of great help in forwarding a proper and sound knowledge about nutrition and metabolic disorders.

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ملاحظات حقلية على بعض أمراض النقص والاضطراب الغذائي كما شوهدت بين الحيوان الزراعى فى مصر

كامل نصر الله سليمان ، يوسف لبيب عوض و محمد طلعت فؤاد

المعامل البيطرية بالدقى

اتجه العلم الحديث الى التفكير فى البحث عن الأسباب والعوامل المختلفة التى تؤدى الى الأمراض التى يصعب تشخيصها ولم يعرف كنهها فى مجال الطب البيطرى ومن بين هذه المظاهر أمراض النقص الغذائى واضطراباته خاصة وما تقوم به أهم العناصر الغذائية كالفيتامينات والأحماض الأمينية فى حل كثير من المشاكل البيطرية .

ونحاول فى هذه العجالة استرجاع أمراض اضطرابات التمثيل الغذائى ونقصه كما ظهرت وشوهدت فى الجمهورية العربية المتحدة .

أولا - أمراض اضطرابات التمثيل الغذائى :

البول المدمم بعد الولادة : تصاب الماشية أحيانا بعد الولادة مباشرة بظاهرة مرضية تتميز بوجود بول مدمم مع أنيميا حادة وارتفاع نسبة الصبغة الصفراوية ونقص واضح فى عنصر الفوسفور غير العضوى فى الدم وقد ترجع أسباب هذه الحالة الى اضطرابات التمثيل الغذائى لعنصر الفوسفور ، أما نقصه المباشر أو زيادة نسبة الكالسيوم بالغذاء وقد لوحظ مثل هذه الظاهرة فى مزرعة أبقار فريزيان حلوب فى منطقة البركة بجوار مطار القاهرة الدولى فقد غذيت على التبن فقط مدة طويلة من الزمن أدت الى تفوق ١٢ رأس من ٣٢٧ وقد عولجت الحالة بحقن أملاح فوسفور الصوديوم الحمضية وتقديم الردة ومسحوق العظام وقد سجلت عام ١٩٦٣ حالتين شبيهتين فى الجاموس .

التصلب العظمى المصاحب الإدرار : تصاب الماشية بتشنجات عضلية واضحة وقد ظهرت مثل هذه الحالة فى جاموستين بمديرية الشرقية وقد عولجت باعطائها ١٢ أوقية سلفات الماغنسيوم ثلاث مرات يوميا ولمدة ثلاثة أيام .

حمض اللبن : وتظهر عادة فى الأبقار ذات الإدرار العالى ولعل قلة نسبة عنصرى الكالسيوم والفوسفور العضوى فى الجاموس المصرى الحامل يشير الى احتمال وقوع مثل هذه الحالات فى هذا النوع من الحيوان .

التشنج العظمى الإدرارى فى الأفراس : شوهدت هذه الظاهرة فى احدى الأفراس سن سبع سنوات بعد الولادة بتسعة أيام وعولجت بحقن جليكونات الكالسيوم .

ثانيا - أمراض النقص الغذائي :

نقص فيتامين (هـ) : وقد لوحظت هذه الحالات في ٢٠ عجلا مستوردا نفق منها ١٧ . ظهرت أعراض نقص الفيتامين بالتحوص الباثولوجية وعولجت ثلاثة منها بحقن فيتامين « هـ » .

ويظهر هذا النقص عادة في الكتاكيت كضعف عام في الأعصاب وعدم توازن في الحركات العضلية .

نقص فيتامين (أ) : يؤدي نقص هذا الفيتامين الى الكساح ولين العظام في الكتاكيت والأرانب الصغيرة لعدم تعرضها لأشعة الشمس لممدد كافية .

نقص فيتامين (ب) : لوحظ نقص الريبوفلافين في الكتاكيت المصابه باسهال مع التواءات في الأصابع .

وأما نقص حامض البانتوثينيك فقد أدى الى ضعف في النمو في الكتاكيت الرومية الصغيرة واصابة الجفون والجلد بالتهابات جلدية .

نقص الكوبالت : شوهدت أعراض تشابه نقص عنصر الكوبالت بين الأغنام في القطاع الشمالي من مديرية التحرير تميزت بوجود اسهال وأنيميا حادة وتضخم في الغدد الليمفاوية مع عدم ظهور أية أعراض تنم عن وجود طفيليات داخلية أو خارجية أو حمى معوية وعادة يرش على الأرض سلفات الكوبالت بمعدل ٥ أوقيات لكل فدان .

وقد عولجت واحدة من الماعز التي ظهرت عليها هذه الأعراض بمعدل ٥ ملليجرام من كلوريد الكوبالت يوميا لمدة أسبوعين .

أمراض النقص الغذائي لسبب مجهول : أشار الدكتور بركات وزملائه عام ١٩٦٠ بأن حالات « الأردة » بين الجاموس قد يرجع سببها الى نقص غذائي حيث أن ٥٣ جاموسة مصابة بهذا المرض أمكن علاجها بمزيج زيت بذرة الكتان والبيض لمدة ثلاثين يوما .