Dept. of Animal Medicine,
Faculty of Vet. Med., Assiut University,
Head of Dept. Prof. Dr. I.S. Abdallah.

NERVOUS SIGNS AS CLINICAL MANIFESTAIONS OF SOME MINERAL DEFICIENCY IN FRIESIAN HEIFERS

(With 1 Table & 1 Fig.)

By

M.H. KARRAM; TH.S. ABDEL ALL; M.N. ISMAIL and A.A. AAMER

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الاعراض العصبية كظاهرة اكلينيكية لنقص بعض العناصر في عجلات الفريزيان

محمد كرام ، ثروت عبدالعال ، محمد اسماعيل ، أحمد عامر

تمت الدراسة على عدد ١٠ عجلات فريزيان في محطة بني مر عمرها حوالي ٩ شهور ظهرت عليها أعراض عصبية منها التهيج العصبي والتقلص العضلي وفقدان التوازن. وتم تحليل الدم وتقدير بعض مكونات السيرم حيث اتضح أن الحيوانات المصابة تعاني من نقص في عناصر الماغنسيوم، الكالسيوم، والفسفور غير العضوى مما أدى الى ظهور الأعراض العصبية . وعولجت الحيوانات المصابة بحقنها تحت الجلد بمحلول سلفات الماغنسيوم (١٠٪) والكالديما وقوالب الأملاح المعدنية (كولبورن) بمعدل قالب لكل ١٢ حيوان. وتلافيا لحدوث مثل هذه الظاهرة نصح باضافة العناصر سالفة الذكر الى العلائق التقليدية التي تقدم للحيوان..

SUMMARY

From 50 Friesian heifers (9 months) at Bani-Mour station 10 animals showed nervous manifestations which include hyperasesthesia, tetany and incoordination. Hypomagnesaemia was incriminated as the main cause for the previous clinical signs. Our suspecion was confirmed after blood analysis as hypomagnesaemia associated with hypocalcaemia was recorded. The diseased animals were treated by 10% magnesium sulphate and mineral salt administration. The haemogram of diseased animals was discussed before and after treatment. Application of the treatment revealed that abnormal clinical signs had disappeared as well as biood biochemical changes returned normal. The study also revealed that hypomagnesaemic tetany can be controled by feeding magnesium supplements to prevent the seasonal fall in serum magnesium levels.

INTRODUCTION

Mineral deficiency is nearly always a herd problem. BLAXTER and MCGIL (1956) give a complete clinical picture of magnesium deficiency in Ayrshire calves. The authors

observed no abnormalities untill serum magnesium had fallen to 0.7 mg%. STEVENSON and WILSON (1963) reported that acute hypomagnesaemia in calves is chracterised by sudden fall in plasma magnesium with hyperaeshesis followed by tetany, convulsions, and death.

The disease occur alaways in spring season specially when grass pastures top dressed with nitrogenous fertilizers, as it interfere with magnesium absorption (BLOOD and HENDERSON, 1974).

Some cases of hypocalcaemia are associated with abnormal levels of inorganic phosphate or magnesium, and such cases are often related to managemental factors (KENDALL, et al. 1965).

Hypomagnesaemic tetany is a highly fatal disease of all classes of ruminants. It is chracterised by hypomagnesaemia and hypocalcaemia and clinically by tonic and clonic muscular spasms, convulsions, and death due to respiratory failure. The disease is common in some areas, particularly where animals are housed during the winter and are inadequately fed. Cases may occur sporadically or a number of deaths may occur at one farm within a short period of time (BLOOD and HENDERSON, 1974).

ROSENBERGER, et al. (1979) declared that a fall in cattle blood serum magnesium below 1.5 mg% results in nervousness and excitability (latent tetany). The authors added that a severe fall in blood magnesium accompanied by hypocalcaemia, results in tonic clonic convulsions and inability to rise, with the animal laying on its side (clinical or stall tetany).

The aim of the present work was to study some mineral picture and haemogram of Friesian heifers under nervous manifestations, before and after treatment.

MATERIAL and METHODS

Materials:

The examined animals are living in a hygienic stable at Bani-Mour milking station. The ration was offered to animals in a rate of 5 kg concentrate mixture and 3 kg rice straw for each animal per day. It contains crude protein not less than 15%. Barseem was offered to animals twice daily. From total number of 50 Friesian heifers (9 months age), 10 animals showed nervous signs which included hyperaesthesia, incoordination, muscle tremors, and mild tetany specially at hind limbs with unsteady gait. The cases were diagnosed both clinically, and biochemically as hypomagnesaemia. Each diseased animal was treated by one injection of 100 ml Mg So4 10% S/C, and 10 ml AD_3E (Turlin) I/M for one week. Molassed cattle mineral was offered to animals

in blocks at a rate of 1 block per 12 heifers. Anticoagulated blood and serum samples were collected from each animal before and 72 hours after treatment (COLES, 1980).

Methods:

Test kits supplied by Bio Merieux/Bain/France were used to determine, blood serum Mg, Ca, inorganic phosphorus and glucose, according to methods of GINDLER (1971), GINDLER (1972), GOLDENBERG (1966), TRINDER (1969) respectively, Ca : P ratio as well as Ca : Mg ratio was calculated arithmatically. RBCs (X 10^6 MM^3), Hb (gm%), PCV% and WBCs (X 10^3 mm^3) were estimated by methods of SCHALM, et al. (1979).

Statistical analysis of the obtained data were carried out by the methods adopted after SNEDECOR and COCHRAN (1974).

RESULTS

The mean values of analysed parameters which included Mg (mg%), Ca (mg%), inorganic phosphorus (mg%), Ca/P ratio Ca:Mg ratio, Glucose (mg%), RBCs (X 10^6 mm^3), Hb (gm%), PCV% and WBCs (X 10^3 mm^3) are recorded in table (1) and figure (1).

DISCUSSION

Hypomagnesaemia is usually a herd problem. Tetany associated with depression of serum magnesium levels is a common occurence in ruminants. It is most likely to occur in calves being fattened for veal.

During our investigation on Friesian heifers at Bani Mour station, the examined animals showed nervous manifestations. The major clinical signs appeared on diseased heifers were hyperaesthesia, tetany and incoordination. We suspect that these signs may due mainly to hypomagnesaemia. Our suspecion was confirmed after blood analysis as the case is hypomagnesaemia associated with hypocalcaemia (table 1). This phenomena was recorded previously by BLOOD and HENDERSON (1974) and ROSENBERGER, et al. (1979). The authors claimed tht magnesium absorption depends on the ratio of calcium and magnesium ions in the intestine and on the electrical potential between the blood and gut contents.

Concerning inorganic phosphorus, decreased levels were observed in diseased animals. Our data on this respect agreed those of KENDALL, et al. (1965) and BLOOD and HENDERSON (1974). The authors stated that hypocalcaemia is associated with abnormal levels of inorganic phosphate or magnesium and such cases are often related to managemental factors. DOXEY (1971) stated that the serum level and ratio of Ca, Mg, and inorganic phosphate vary considerably from area to area and from farm

to farm and interpretation of findings must be assessed on both clinical and managemental consideration. Our results in this respect is in agreement with those of BLOOD and HENDERSON (1974) in that an increase in Ca : Mg ratio are indicative of Mg depletion. After Mg SO4 adminstration Mg level was increased (2.1 mg%) to reach nearly the normal breed level (2.2-2.7 mg%). The nervous signs gradually disappeared from diseased heifers and by 72 hours after treatment all heifers behaved normal.

The values of TRBCs, Hb, PCV, and TWBCs before and after treatment were fluctuated and did not appear to show any important diagnostic possibilities, as most changes were within the physiological limits for that breed.

The importance of this investigation is not only to show Mg importance for animal health, but also for diagnosis and control of hypomagnesemic tetany in farm animals.

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Table (1)

Some biochemical and haematological values in hypomagnesaemic heifers

Constituents	Before treatment	After treatment
Magnesium (mg %)	1.80± 0.89	2.10± 0.47*
Calcium (mg %)	7.70± 0.73	12.90± 2.51*
Ca : Mg ratio	5.37 : 1.00	6.00 : 1.00
Inorgnic phosphorous (mg %)	8.30± 1.43	11.30± 2.24*
Ca : P ratio	0.93 : 1.00	1.2 : 1.00
Glucose (mg %)	86.59±14.55	89.68±14.84
RBCs (x 10^6/mm^3)	8.30± 1.21	7.00± 1.32
Hb. (gm %)	13.74± 1.33	9.73± 1.30*
PCV (%)	37.20± 1.81	35.52± 1.80
WBCs (x 10^3/mm^3)	12.91± 3.82	13.30± 2.21

* = Non significant (P/__ 0.05).

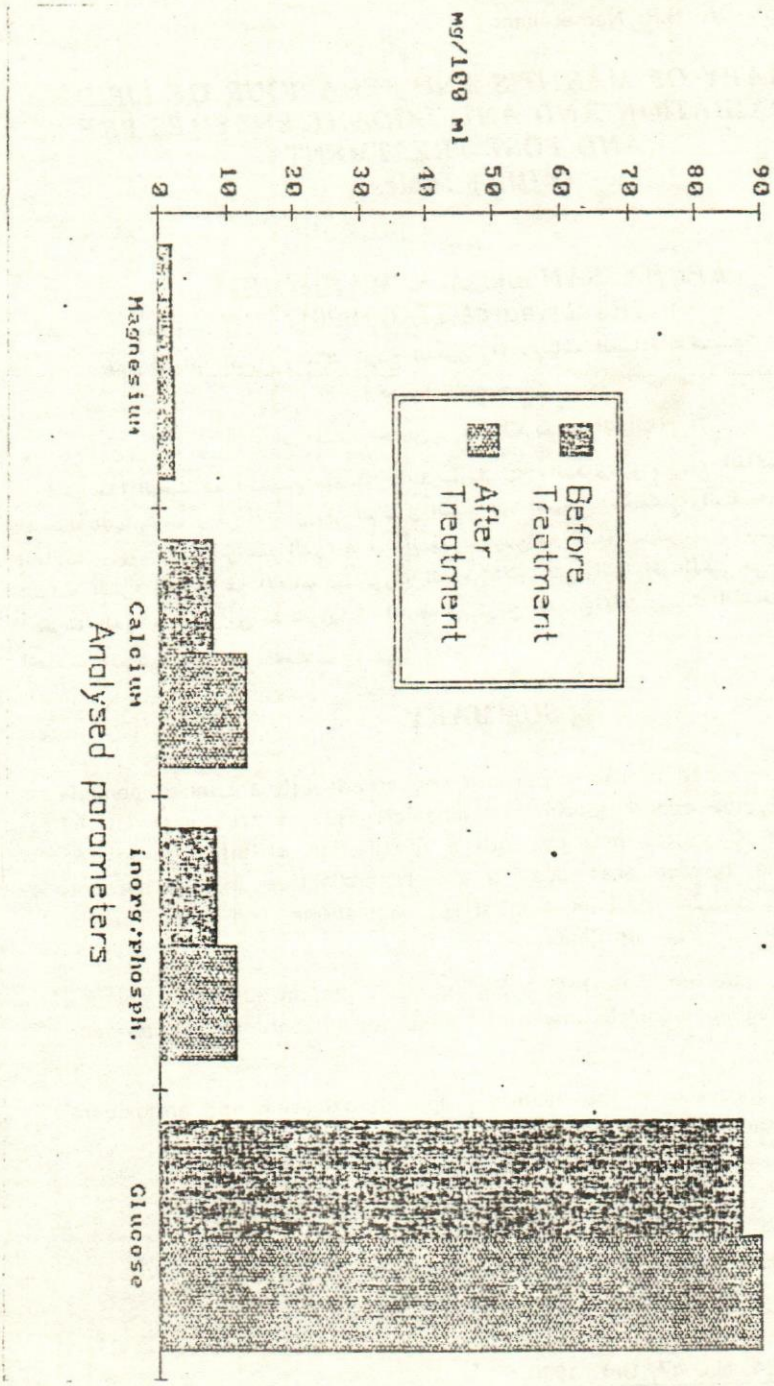

Fig (1): Biochemical parameters in hypomagnesemic heifers