

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

**INVESTIGATION ON RICKETS PROBLEM OF FATTENING
CALVES AT QENA PROVINCE**
(With 2 Tables & 3 Figs.)

By
TH.S. ABD EL-ALL; M.N. ISMAIL; A.A. AMER
(Received at 28/11/1989)

دراسات عن مشكلة الكساح في عجول التسمين بمحافظة قنا

ثروت عبدالعال ، محمد إسماعيل ، أحمد عامر

شملت هذه الدراسة عدد ١٦ عجل من عجول التسمين بمحطة التسمين رقم ٢ بمحافظة قنا وظهرت عليها الأعراض الإكلينيكية للكساح على عدد ثمانية منها بينما أعتبرت الثمانية الأخرى كضوابط للتجربة . وقد تمت دراسة الأعراض الإكلينيكية في الحيوانات المريضة ومقارنتها بالسليمة بالإضافة إلى الصورة الدموية والبيوكيميائية . كما تم علاج الحيوانات المريضة باستخدام الأملاح المعدنية وحقن فيتامين أ د هـ في العضل بالإضافة إلى حقن خليط الكالسيوم والمغنسيوم في الوريد وتعريض الحيوانات للأشعة فوق بنفسجية ثم أخذ عينات بعد العلاج بشهر ثم شهرين وعمل قياس للمقارنات المختلفة .

SUMMARY

Signs of rickets on eight freisian calves under eight months old at Qena fattening station were observed. The clinical signs of rickets appeared in the form of stiffness, difficult in movement and rotation of the carpal joints.

Haemogram picture was studied. This included total erythrocytic & leucocytic count, haemoglobin concentration, packed cell volume. Mean corpuscular volume and mean corpuscular haemoglobin concentration were calculated.

Biochemical analysis of blood sera for calcium, inorganic phosphorus, magnesium, total protein, albumin, globulin and electrolytes were performed to confirm the diagnosis of rickets. Treatment of diseased animal have been carried out.

INTRODUCTION

Rickets is one of the most important diseases of young animals through which we can conclude some sort of disturbance in calcium, phosphorous and vit. D. metabolism (RADOSTITS and BLOOD (1985) and BONNIWELL, et al. 1982).

TH.S. ABD EL-ALL, et al.

Clinical signs of rickets are characterized by general unthriftiness, Loss of body weight, reduced food consumption, reluctance to move, abnormal bony structure associated with enlargement of epiphysis, bented shaft and finally associated with impaired reproductive performance (CALL, et al. 1986 and 1987).

Calcium and phosphorus are essential in mineralization of bone and teeth and deficiency of one them leads to their abnormal development. The effect of ca/p imbalance have been studied by CALL, et al. (1986); YOUSIF, et al. (1986) and HOWARD (1981).

In trial to study subclinical rickets ATTIA (1984) and EL-SHERIF and FAWZIA (1981) concluded that it can be diagnosed through biochemical analysis of blood serum. ATTIA (1984) added that the subclinical rickets have been developed when the ca/p ratio elevated above 2 without obvious clinical signs. But when the ca/p ratio was above 2 and associated with clear clinical signs this form is thus diagnosed as clinical rickets.

The aim of the present work is to confirm both the diagnosis and the role of treatment of diseased richitic calves conditions in alleviation and progress of the case.

MATERIAL and METHODS

A stock of 16 young freisian calves (under eight months) were housed indoors in Gena fattening station. Eight of them have been suffered from disturbance in movement, deformities in bony structure, stunted growth, unthriftiness, loss of body weight and reluctance of movement Fig. (1,2). Other eight calves have been proved to be healthy by both clinical and laboratory methods of examination and were considered as a control group for this study.

Two blood samples were obtained from each animals through Jugular vien pincture at once and after one and two months post-treatment. First blood samples (whole blood using anticoagulent) have been used in determination of haemogram picture including total erythrocytic count (T.R.B.Cs.-T/L); total leucocytic count (T.W.B.Cs.-G/L) and haemoglobin concentration (Hb-gm/L) using electronic cell counter (CX300) and Diluter (DC.210). Packed cell volume (PCV%) mean corpscular volumed (MCV-³u) and mean corpscular haemoglobin concentration (MCHC-%) have been estimated according to the method described by COLES (1986). Second blood samples (blood sera) were used for biochemical analysis. Blood serum total protein (gm/dl); albumin (gm/dl); calcium (mg/dl), inorganic phosphorus (mg/dl) and magnesium (mg/dl) were determined using test kits supplied from Biomerieux (Bains/France) and after the methods of WEICHELBAUM (1946); DRUPTF (1974); GINDLER and KING (1972); MORINL and PROX (1973) and GINDER and HETH (1971) respectively. Blood serum globulin and albumin/globulin (A/G) ratio were estimated mathematically.

RICKETS IN CALVES

The concentration of blood serum sodium and potassium levels were estimated using Flame-photometer (Corning 400) meanwhile blood serum chloride level was determined using chloride meter Model 925.

The diseased animals were treated using mineral mixture and injection of Cal-D-Mag (500 ml/day I/V) and turlin (AD₃E-10 ml/day I/M).

The treatment was extended to one week. Also the diseased calves were exposed to daily sunlight. second and third blood samples were taken 30 and 60 days post-examination.

Statistical analysis of the data were performed according to the method of KALTON (1967) using T-test.

RESULTS

Mean values of the haemogram picture and biochemical constituents of blood serum are illustrated in tables (1 & 2) and Figs. (1, 2 & 3).

DISCUSSION

The clinical signs which have been observed in clinically diseased calves are stiffness in gait, enlargement of the limb joint especially the forelegs and the enlargement of the costochondral Junctions. (Picture 1, 2). The large bone show abnormal curvature. Delayed eruption of teeth and presence of abnormalities in it as pitting, groves and pigmentation were evident. Animals also show anorexia, unthriftiness, difficulty in feeding and drooling of saliva. These clinical signs were in agreement with those previously observed by RADOSTITS and BLOOD (1985); COLES (1986) and UNDERWOOD (1979) in a similar conditions.

Regarding haemogram picture which included total erythrocytic count, haemoglobin concentration, packed cell volume, total leucocytic, mean corpuscular volume and mean corpuscular haemoglobin concentration which have been illustrated in table (1), there were non-significant variations in all studied parameters except a significant decrease in total erythrocytic count in diseased calves if compared with the healthy one. This can be attributed to anaemic condition resulting from anorexia and abnormalities in teeth. These results coincided with those previously obtained by EL-SHERIF and FAWZIA (1984) and ATTIA (1984) in lambs.

There is a non-significant variations in studied haemogram picture either in diseased calves or after application of treatment. The obtained values are within the normal levels previously mentioned by COLES (1986) DUNCAN and PRASSE (1986) and SCHALM (1979) in young calves.

The biochemical analysis of blood sera (Table 2, Fig. 3) declared that, there were highly significant decrease ($P/0.01$) in the levels of blood serum calcium, inorganic phosphorus, magnesium, total protein and albumin in rickets calves if compared with

the healthy ones. Hypoproteinaemia associated with hypoalbuminaemia in rickitic calves were evident. This can be attributed to the unthriftness of animal due to state of anoroxia or it may be due to the role played by inorganic phosphorus in intermediam protein metabolism YOUSIF, et al. (1986); ATTIA (1984); EL-SHERIF and FAWZIA (1981) and UDALL (1972).

An evident reduction in the level of blood serum calcium, phosphorus and magnesium in rickitic calves were found if compared with healthy ones. These coincided with the results previously obtained by NORDIN (1960) and UDALL (1972) which attributed this reduction to the decrease phosphorus in diet which may leads to withdrawal of both calcium and phosphorus from bone with an increased calcium excretion rate accompanied with consequent rarification of theses bones.

Blood serum electrolytes levels showed a significant decrease ($P/ < 0.05$) in rickitic calves if compared with the healthy ones. The obtained values came in agreement with those previously obtained by COLES (1986).

The plan of treatment using cal-D-Mag, AD₃E and mineral mixture-gave a good results in correcting both haemogram and biochemical constituents but the treatment can not give any progress or alleviation of bony changes.

Finally the studied parameters confirm the diagnosis of rickets and showed the role of treatment in producing alleviation in blood constituents of diseased calves to the normal physiological levels.

REFERENCES

- Attia, H. (1984): Studies on clinical and subclinical rickets in Lambs and its treatment M.V.Sc. Thesis, Fac. Vet. Med., Zagazig Univ.
- Bonniwell, M.A.; Smith, B.S.W.; Spence, J.A. Wright, H. and Ferguson, D.A.M. (1980): Rickets associated with Vit. D. deficiency. Vet. Record 122, 386-388.
- Call, J.W.; Butcher, J.E.; Shupe, J.L.; Lamb, R.C. and Boman, R.L. (1987): Clinical effect of low dietary phosphorus concentrations in feed. given to lactating dairy cows. Am. J. Vet. Res. 48 (1): 133-136.
- Call, J.W.; Butcher, J.E.; Shupe, J.L.; Bluke, J.T. and Olson, A.E. (1986): Dietary phosphorus for beef cows. Am. J. Vet. Res. 48 (2): 475-481.
- Coles, E.H. (1986): Veterinary clinical pathology. 4th Ed. W.B. Saunders company, philadelphia, London, Toronto.
- Druptf, F. (1974): Colorimetric determination of serum albumin using bromocresol green. Pharm. Biol. 2: 777.
- Duncan, J.R. and Prasse, K.W. (1986): Veterinary laboratory Medicine. 2nd Ed. Iowa state Univ. Press, Ames, Iowa.
- El-Sherif, M.M.T. and Fawzia, F. (1981): Metabolic profile tests as a diagnostic aid for subclinical rickets in Lambs. Zagazig Vet. J. 3: 103-109.

RICKETS IN CALVES

- Ginder, E. and Heth, D. (1971): Determination of magnesium in serum and urine. *Clin. Chem.* 17: 662.
- Gindler, E.M. and King, J.D. (1972): Rapid colourmetric determination of calcium in biological fluid with thymol blue. *Am. J. Clin. Path.*, 58: 376-382.
- Howard, J.L. (1981): Current veterinary therapy. Food animal practice. W.B. SAUNDERS company philadelphia, London, Toronto.
- Kalton, G. (1967): Introduction to statistical ideas for scientists. 2nd Ed. Acad. Press, London.
- Morinal, L. and Prox, J. (1973): New and rapid procedure for serum phosphorus using O-phenylendiamine as reductant. *Clin. Chem. Acta*, 46: 113-117.
- Nordin, B.E.C. (1960): Osteodystrophic diseases of sheep. *Nutr. Soc.* 10: 129.
- Radostits, O.M. and Blood, D.C. (1985): Herd health. Text Book of Health and production mangement of agricultural animals. W.B. Saunders company philadelphia, London.
- Udall, R.M. (1972): Advances in veterinary Science. P. 29.
- Underwood, (1979): Trace elements in man and animal nutrition 3rd Ed. A cademic Press, New York.
- Schalm, O.W. (1979): Veterinary haematology. 3rd Ed. Lee and Febriger, Philadelphia, U.S.A.
- Weichselbaum, T.E. (1946): Estimation of total protein. *Am. J. Clin. Path.*, 16: 40-45.
- Yousif, M.A.; El-Attar, H.M.; Abdel-Raouf, M. and El-Magawry, S. (1986): Clinical and subclinical rickets in goats in relation to some blood parameters. *Assiut Vet. J.* 17 (33): 89-95.

Table (1)
Haemogram picture of examined calves pre and post treatment

Condition	Animal	T.R.B.Cs P/L	P.C.V. %	Hb gm%	M.C.V. μ	M.C.H.C. %	T.W.B.Cs G/L
Rickets	8	6.83 \pm 1.09*	32.1 \pm 1.6	11.98 \pm 1.01	48.1 \pm 8.7	37.4 \pm 4.1	13.0 \pm 1.5
Healthy	8	7.54 \pm 0.44	34.1 \pm 2.6	13.79 \pm 0.86	45.4 \pm 3.5	40.5 \pm 4.2	12.95 \pm 0.90
Rickets	8	6.23 \pm 1.09	29.0 \pm 4.12	13.06 \pm 1.7	47.75 \pm 8.79	45.67 \pm 7.72	17.18 \pm 6.13
Healthy (post 30Ds)	8	6.97 \pm 1.16	30.63 \pm 3.09	17.13 \pm 2.16	44.58 \pm 6.97	56.96 \pm 12.39	16.21 \pm 3.94
Rickets	8	5.88 \pm 0.66	28.0 \pm 1.00	14.0 \pm 1.8	47.62 \pm 5.80	60.66 \pm 6.0	16.80 \pm 3.05
Healthy (post 60 Ds)	8	6.00 \pm 1.00	28.6 \pm 3.00	15.10 \pm 2.0	47.67 \pm 6.66	52.8 \pm 5.12	14.00 \pm 2.84

Table (2): Mean values of blood serum of examined calves pre and post treatment

Condition	Total protein gm%	Albumin gm%	Globulin gm%	I/G Ratio	Calcium mg%	Phosphorus mg%	Magnesium mg%	Sodium mmol/L	Potassium mmol/L	Chloride mmol/L
Rickets	5.76±0.50	3.01±0.16	2.75±0.7	1.23±0.8	7.28±1.14	5.53±0.3	1.94±0.3	136.4±5.4	5.3±0.4	108±7.15
Healed	7.9 ±0.62	5.01±0.5	2.88±0.5	1.8 ±0.5	10.43±0.93	8.05±0.4	2.66±0.39	144.3±5.47	6.16±0.36	124±6.8
Rickets	5.78±1.74	2.91±0.94	2.86±1.0	1.05±0.4	8.02±1.23	6.74±0.3	2.89±0.29	132.9±5.7	5.5 ±0.98	110.8±5.94
Healed (Post 3DBs)	8.26±1.26	5.2 ±0.76	3.06±0.74	1.76±0.4	10.73±1.29	10.43±1.24	3.29±0.64	156.6±12.39	6.84±0.52	131.1±25.30
Rickets	7.58±0.78	4.44±0.3	3.09±0.6	0.98±0.5	9.6 ±1.14	8.7 ±0.5	3.0 ±0.4	120 ±6.8	5.0 ±0.6	112.1±6
Healed (Post 6DBs)	8.36±1.38	5.1 ±0.66	3.28±0.9	1.8 ±0.5	10.0 ±0.56	8.9 ±6.2	3.10±0.5	140.6±4.9	5.8 ±0.5	125.9±5.0

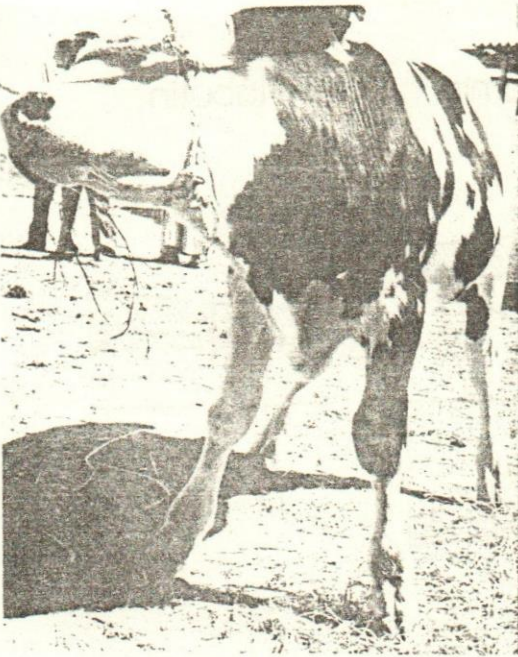


Fig. (1 & 2):

Showing clinical signs of rickets in examined Cattle.

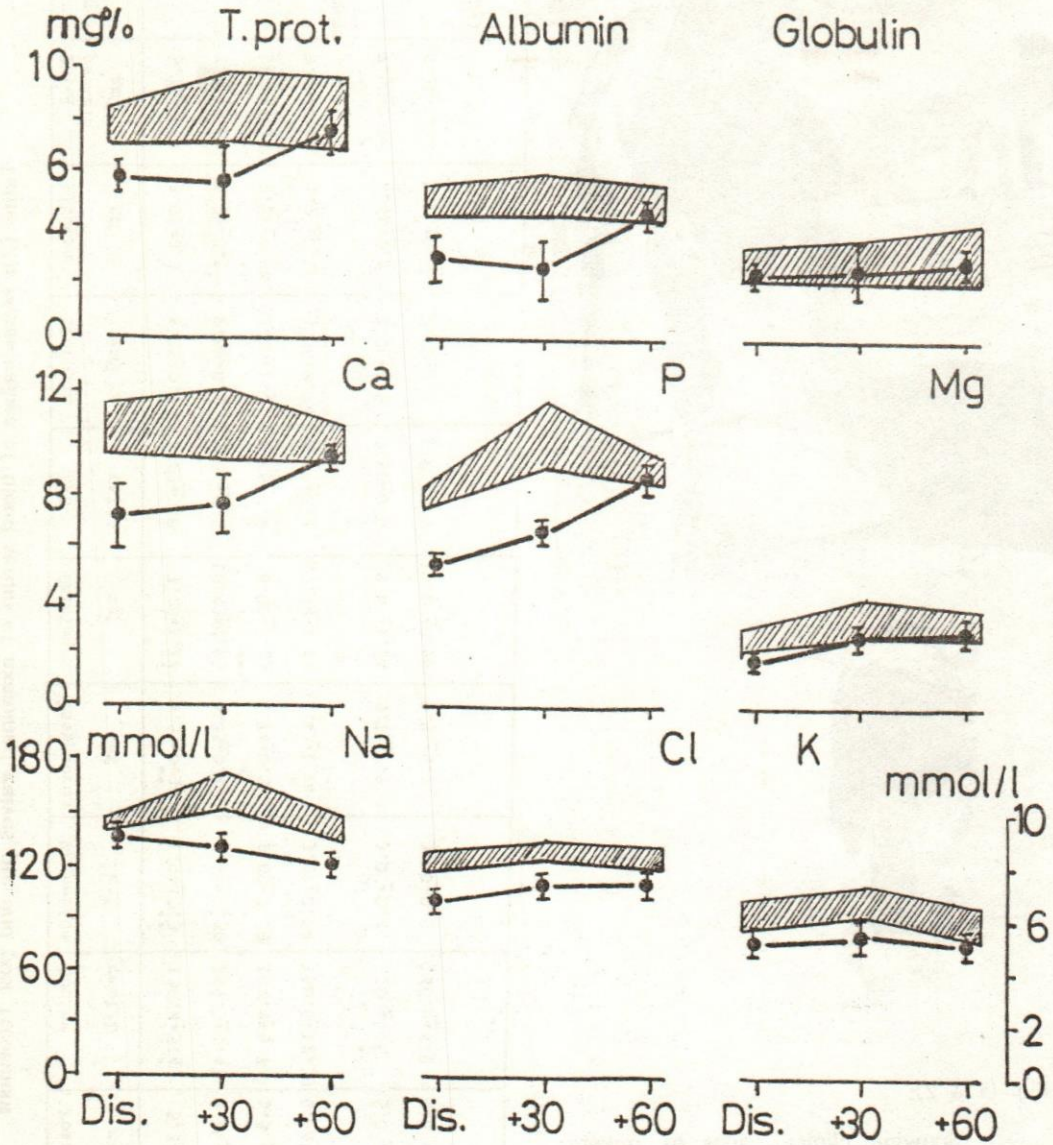


Fig.3. Mean values of studied blood serum parameters. \square $\bar{x} \pm SD$ Healthy calves
 \bullet $\bar{x} \pm SD$ Diseased calves .