BOWED LEGS IN STAGS

J.C. Wagner

INTRODUCTION

I would like to discuss two cases of bowed legs (showing lateral deviation) that I saw in the Ashburton County in February of 1983.

CASE 1

Background

The first case is a little sketchy and with my memory means that it it remains so to date. However it is a good reminder to us all that clear notes on our cases are useful, especially with people like Peter Wilson around.

A deer farmer in the Maronan county called me out to examine four fifteen-month-old stags that showed very mild bowing of the front legs which he had recently observed.

The four deer were in a group of 170, which were grazing a mature ryegrass clover paddock with supplementary hay feeding.

Clinical examination

The affected animals were in good condition and were growing well. Unfortunately the farmer was going away on holiday that day, and so the time for examination and treatment was short. Other than the bowed legs clinical examination revealed no abnormality. Blood samples were taken and the animals treated with the following:- Vitamin A, D & E, an anthelmintic drench which had copper, cobalt, zinc and selenium added and also a calcium injection. I suggested a move to a different pasture and the feeding of lucerne hay which was done.

Outcome

The problem ceased at this point with no new cases and the degree of bowed legs remained the same.

Laboratory Results

Calcium

Sample No.	Result	Units
1	2.35	mmol/L
2	2.47	mmol/L
3	2.31	mmol/L
4	2.16	mmol/L

Average 2.32

Reference Range

Lincoln A.H.C.	2.0-2.4 mmol/L
H. McAllum	1.63-2.79
P. Wilson	1.21-3.79

Inorganic Phosphate

Sample No.	Result	Units
1	2.55	mmol/L
2	2.44	mmol/L
3	2.37	mmol/L
4	2.16	mmol/L

Average 2.34

Reference Range

Lincoln A.H.C.	1.80-2.6 mmol/L
H. McAllum	2.03-2.6
P. Wilson	1.11-2.79

Conclusion

The laboratory results are within the accepted range for red deer of this age. The reference range however may need more assesment as it is very wide. No metabolic cause was found for this observed condition.

CASE 2

Background
This case involved only one stag in a group of sixteen aged 15 months. The degree of bowing was marked and had occured over a period of three weeks. The deer were on an established grass pasture and were being fed good quality meadow hay.

Clinical examination
The affected deer was bright, alert, eating and remained with the other stags which seemed unconcerned by its presence.

Investigation
With the co-operation of the Canterbury Venison Factory blood sampling was carried out and radiographs of the affected animal were taken.

Laboratory Results

Calcium

Sample No.	Affected line	Normal line	Units
1	2.19	2.04	mmol/l
2	2.33	1.95	
3	2.23	1.99	
4	2.02	2.13	
5	2.15	2.10	
6	2.26	1.73	
7	2.29	2.12	
8	1.98	1.98	
9	2.23	2.02	
10	2.30	1.92	
11	2.31		
Bowed legged deer	2.03		
	Average = 2.19	Average = 1.99	

Reference Range 2 - 2.4 mmol/L

Inorganic Phosphate & Alkaline Phosphatase
Normal line

Sample No.	Inorg. PO_4	Units	Alkaline Phos.	Units
1	2.21	mmol/l	238	IU/L at 25°C
2	2.29		60	
3	1.96			
4	2.29		96	
5	1.65		224	
6	2.32			
7	2.32		89	
8	2.30			
9	1.95			
10	1.91			
Average	2.12		141	
S.D.	0.22		74	

Affected line

Sample No.	Inorg. PO_4	Units	Alkaline Phos.	Units
1	1.96	mmol/l	63	IU/L at 25°C
2	2.45			
3	2.23		83	
4	2.04		191	
5	1.88		271	
6	2.55			
7	2.36			
8	2.13			
9	1.87			
10	2.73		142	
11	2.46			
12 (Bowed legged animal)	2.40		55	
Average	2.26		134	
S.D.	0.27		77	

Reference Range
Inorganic Phosphate 1.8 - 2.6 mmol/L
Alkaline Phosphatase 35 - 200 (Horse) IU/L at 25°C

Total Serum Vitamin B_{12}

Sample No. Normal line	Vit B_{12}	Units	Sample No. Affected line	Vit B_{12}	Units
1	235	pmol/l	1	225	pmol/l
2	235		2	270	
3	180		3	180	
4	115		4	235	
5	96		5	96	
6	160		6	145	
7	205		7	84	
8	225		8	145	
9	205		9	125	
10	110		10	130	
11			11	77	
			12 (Bowed legged deer)	105	
Average = 177			Average = 151		
S.D. 51			S.D. 60		

Range (sheep) Marginal 185 - 370 pmol/L
Adequate > 370

Serum Copper

Sample No. Normal line	Copper	Units	Sample No. Affected line	Copper	Units
1	7.8	umol/l	1	11.0	umol/l
2	7.1		2	10.2	
3	9.4		3	12.6	
4	8.6		4	6.0	
5	12.5		5	11.8	
6	9.4		6	7.8	
7	8.6		7	16.5	
8	7.8		8	13.3	
9	7.8		9	12.6	
10	11.8		10	11.8	
			11	14.9	
			12 (Bowed legged animal)	11.8	

Average = 9.1 Average = 11.7

Reference Range 11 - 20 umol/L Normal
4.5 - 8.0 umol/l Marginal

Liver Copper

Sample No.	Copper	Units
1	118	umol/kg
2	63	
3	79	
4 (Bowed legged animal)	192	

Average 113

Reference Range - Greater than 45 umol/kg

Liver Selenium

Sample No.	Selenium	Units
1	910	nmol/kg
2	580	
3	800	
4 (Bowed legged deer)	750	

Average 760

Reference Range 450 nmol/l

Hay Analysis

	Analyte	Result	Units
Copper	6		ppm
Molybdenum	0.07		ppm
Cobalt	0.16		ppm
Selenium	68		ppb
Sulphur	0.16		%
Phosphorous	0.19		%
Magnesium	0.18		%
Calcium	0.89		%

Comment
The copper level is considered boarderline for cattle and the phosphorous level is below the minimum 0.22% required for growing cattle. The Ca:P balance is 4:7 (Normal 1:2) suggesting a phosphorous deficiency.

HISTOPATHOLOGY OF THE BOWED LEGGED ANIMAL'S LIMBS.

Radiography

The radiograph supplied of the right limb showed some rarification of distal radius on the lateral side in close proximity to the ulnar epiphysis. There also appeared to be a widening of the radial epiphysis in this area, suggestive of an epiphyseal fracture.

Gross Pathology

There was much haemorrhage and oedema of the subcutaneous tissues over the lesion seen on the radiograph. The soft tissue changes in the left limb were not as marked. Both radii showed evidence of haemorrhage on the dorso lateral aspect of the radial epiphysis.

Histopathology

Both radii show clear evidence of the epiphyseal fractures seen grossly. The growth plate appears to have been split and cartilage is present on both sides of the fracture. The space formed by the separation of the epiphysis from the diaphysis is full of blood and fibrin. Little attempt at repair has been made suggesting that the lesion is fairly acute.

Comment

I feel that this is a case of trauma epiphysitis similar to that seen in foals.

SUMMARY OF RESULTS

Calcium (mmol/L)		Phosphate (mol/L)	
Normal line	1.99	Normal line	2.12
Affected line	2.19	Affected line	2.26
Bow legged	2.03	Bow legged	2.40
Case 1	2.32	Case 1	2.34

Alkaline Phosphate (IU/L at 25°C) (n=5)

		Range
Normal line	141	(60 - 224)
Affected line	135	(55 - 271)
Bow legged	105	

Serum B_{12} (pmol/L)

Normal line	177
Affected line	151
Bow legged	105

Serum Copper (umol/L)

Normal line	9.1
Affected line	11.7
Bow legged	11.8

Liver Copper (umol/kg)

Normal line (n=4)	113
Bow legged	192

Liver Selenium

Normal line (n=4)	760
Bow legged	750

DISCUSSION

The clinical pathology done on this case has failed to detect any underlying metabolic cause which might have predisposed the animals to such a condition. In fact the results seem in reverse to what one might expect! The tests for calcium and phosphate do not appear sensitive enough. The fractional clearance tests now available may have been useful as they measure increasing and decreasing calcium levels but only increasing phosphate levels.

The hay was being fed only as a supplement and although it was low in copper and phosphorus the blood and liver levels do not reflect this as their levels are within the accepted range.

The condition does not reappear every year in fact neither of the above two properties have had any further cases in

the last three years. This has made investigation of genetic predisposition for bowed legs difficult.

The diagnosis was traumatic epiphysitis of unknown origin.

I would like to thank Brian Cox of the Animal Health laboratory Lincoln, for his valuable assistance in this case.

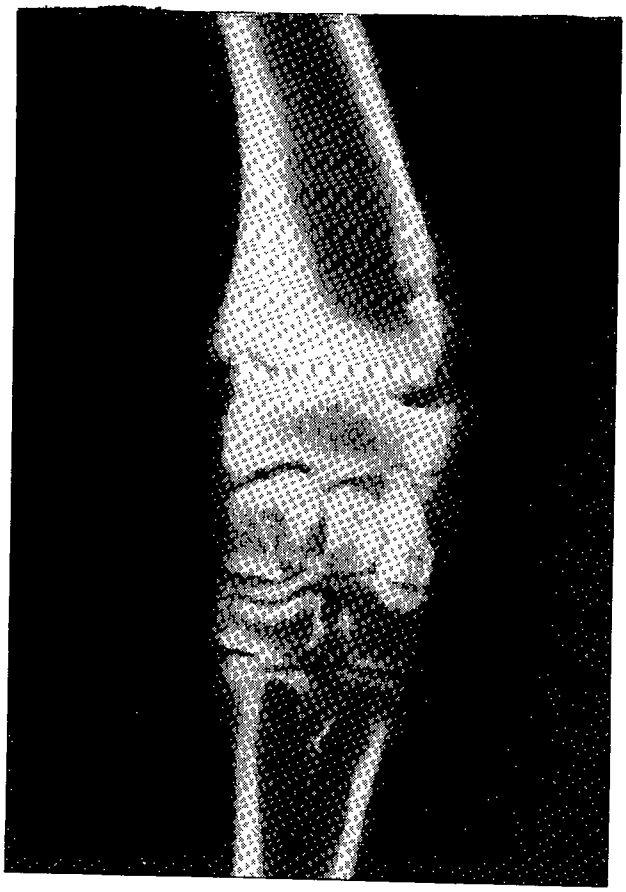

Figure 1

Left Radius, Carpus, Metacarpus

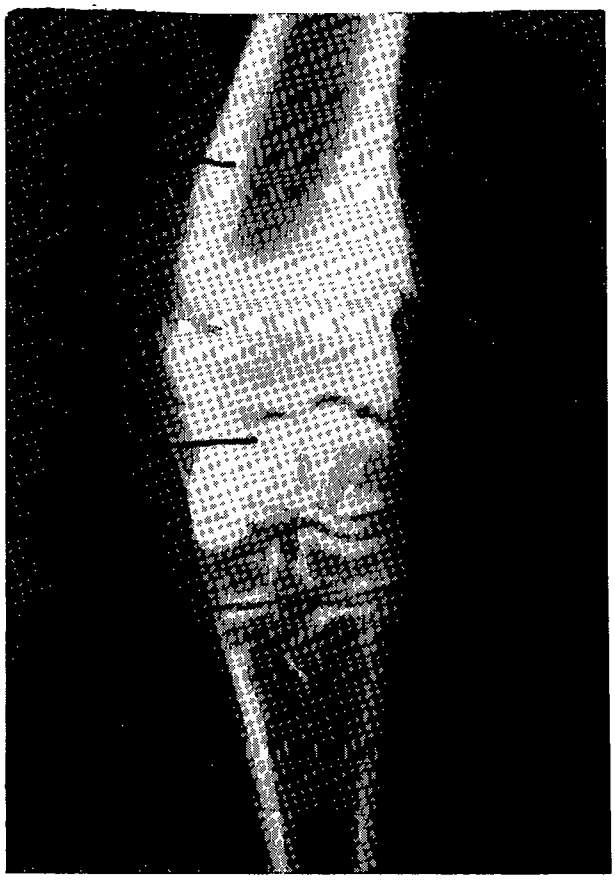

Figure 2

Right Radius, Carpus, Metacarpus