

## 8 Summary

### **Study on the effect of an intramuscular injection of 10 million IU vitamin D<sub>3</sub> on the success of the treatment of hypocalcaemic parturient paresis.**

The objective of this field study, which was conducted between May 2003 and April 2004, was to investigate whether the administration of vitamin D<sub>3</sub> in the treatment of hypocalcaemic parturient paresis can achieve an improvement in therapy success. Of 200 cows which were presented with a history of parturient paresis, the diagnosis “hypocalcaemia” could be confirmed in 167 cows (83.5%). These animals were divided at random into two therapy groups. The patients in the control group received an intravenous calcium infusion and dexamethasone. The animals in the test group additionally received an intramuscular injection of 10 million IU vitamin D<sub>3</sub>. Prior to the first treatment, a blood sample was taken to measure calcium, phosphorus, magnesium, AST, CK, GLDH, β-hydroxy butyrate, cholesterol, total bilirubin and urea. A liver biopsy was also performed to establish the liver fat content. The two groups did not exhibit any statistically detectable differences in terms of specific case history, clinical examination or laboratory diagnostics. The cure rate of 96.41% (n=161) and relapse rate of only 17.37% (n=29) were in the upper bracket of treatment success quoted in literature. The two therapy groups did not exhibit any statistically detectable differences in terms of treatment success. The administration of the vitamin D<sub>3</sub> product consequently did not lead to any statistically detectable improvement in therapy success.

In this study, the disease occurred more frequently in autumn, with 50.30% (n=84) of the recorded cases occurring in the months September to November. The lowest frequency was in May, at 1.8% (n=3).

Case history revealed a relation between the animal’s age and the occurrence of parturient paresis. In this study, no first-calf heifers were affected, whereas the highest frequency of 35.93% (n=60) occurred in cows who were beginning their fourth lactation. As regards the time of occurrence of the disease, 93.41% (n=156) were within the first 24 hours of calving. 67.67% (n=113) of the treated cows had calved spontaneously, obstetric delivery had been performed in 29.34% cases (n=49). The body condition was above the optimum range (BCS = 3.25 to 3.5) in 83.23% of patients (n=139). No connection could be established between the case history data and therapy success.

When compiling the clinical findings, it was noticeable that the affected cows showed pronounced symptoms of the disease. "Recumbency", which is described as typical in hypocalcaemic parturient paresis, was manifest in 94.01% (n=157) of the cows. Sensory disorders were observed in 92.81% (n=155) of the cases. Hypothermia with body temperatures below 38°C occurred in 47.9% (n=80) of the patients. There was no evidence that the clinical findings had an influence on therapy success. Calcium and phosphorus concentrations exhibited a statistically detectable influence on the clinical picture. Whereas there was practically no change in the phosphorus concentration compared with previous studies, the mean calcium concentration of 1.07mmol/l was lower than the figures quoted in literature. As these comparative studies simultaneously reported less pronounced symptoms of the clinical picture, the differences in the clinical picture between these studies could therefore be attributed to the lower calcium level in this study. The extent of the clinical symptoms is therefore determined by the degree of hypocalcaemia.

Average phosphorus concentration in the cows with recurrent symptoms was 0.72mmol, compared with the average blood level of 1.01mmol/l measured in the patients which were cured with the first therapy, i.e. a difference of 28.71%. The reason for the lower phosphorus levels in the cows which were to undergo subsequent treatment is believed to be the delayed activation of the vitamin D<sub>3</sub> into its metabolically active form of 1.25-(OH)<sub>2</sub>-D<sub>3</sub> as described by HORST (1994). In parturient paresis, hypocalcaemia initially leads to a high level of PTH, which raises serum calcium concentration, accompanied by a concomitant reduction in phosphorus concentration. An increase in calcium and phosphorus concentrations occurs only after an adequate increase in 1.25-(OH)<sub>2</sub>-D<sub>3</sub>, the synthesis of which is activated by the PTH effect.

The muscular and liver damage of the patients influenced the cure rate, which implies increased activity of CK, AST and GLDH. The cows which could not be cured showed higher activity levels of these enzymes in the serum. Significantly higher GLDH levels were measured in those cows which could not be cured owing to liver damage. These high-level GLDH concentrations were accompanied by liver fat contents in the range of 12% to 22.5%. However, liver fat contents on that scale were also observed in physiological GLDH values. In this study, the liver fat content therefore did not show any statistically detectable influence on therapy success.