

## 7 Summary

### **Evaluation of the acute-phase-proteins haptoglobin and fibrinogen in calves with pneumonia**

Respiratory tract disease causes great financial losses in the cattle industry. The objective of this study was to evaluate the ability of the two acute-phase-proteins haptoglobin and fibrinogen to determine severity of inflammation, to control treatment success and to predict course of disease in calves with pneumonia.

Calves with respiratory tract disease (n=147) and healthy calves (n=43) were examined on five days (day 0, 1, 2, 3, 7). The calves were 2 to 6 weeks old. Clinical parameters such as body temperature, respiration rate and a clinical score were determined. Blood samples to analyse the proteins were collected. Ultrasound was used to determine the extent of lung inflammation.

After first examination the diseased calves were divided into three different treatment groups (group 1: florfenicol [20mg/kg, 2x in 48h], group 2: oxytetracycline [5mg/kg, 3x every 24h] and group 3: florfenicol [20mg/kg, 2x in 48h] and flunixin-meglumin [2,2mg/kg, 1x on first treatment day]).

Fibrinogen was analysed by a coagulation method modified by Clauss (1959) and haptoglobin by measuring the peroxidase activity of the haemoglobin-haptoglobin-complex.

The protein concentrations differed significantly ( $p < 0,01$ ) between diseased and healthy calves. On the first day the diseased calves had an average haptoglobin concentration of 0,324 (95% C.I.: 0,266 – 0,394) mg/ml and on the second day a concentration of 0,347 (95% C.I.: 0,291 – 0,412) mg/ml. On day seven the haptoglobin concentration declined to 0,063 (95% C.I.: 0,043- 0,094) mg/ml in the diseased group. The healthy calves had an average haptoglobin concentration of 0,061 (95% C.I.: 0,033 – 0,114) mg/ml on the first day and of 0,042 (95% C.I.: 0,021-0,086) mg/ml on the second day. The concentration of fibrinogen was  $526,1 \pm 159,6$  mg/dl on first day in the diseased group and  $547,6 \pm 145,2$  mg/dl on second day. On day seven the fibrinogen concentration declined to  $431,1 \pm 118,3$  mg/dl in the diseased calves. The healthy calves showed an average fibrinogen concentration of  $360 \pm 106$  mg/dl on day one and of  $368 \pm 122$  mg/dl on day two.

As expected all clinical parameters differed significantly between the diseased and healthy calves on day one. The clinical score was significantly higher in the diseased group than in the healthy group on all days. Only limited differences were found between the two groups with sonographic examination.

There were significant correlations between haptoglobin and fibrinogen concentrations. The protein concentrations also correlated significantly with the clinical parameters on the respective days.

After treatment the protein concentrations declined. Significant differences in the concentration of acute-phase-proteins were found between the three treatment groups on day seven, but they had no effect on the clinical outcome. The clinical score on the first day proved to be the best prognostic indicator for treatment success or for course of disease. The acute-phase-proteins showed only limited potential to predict the clinical outcome.

Over all, the results indicate, that haptoglobin and fibrinogen concentrations in healthy calves are different from those in calves with inflammatory, non-treated disease. Significant correlations between haptoglobin and fibrinogen and between the acute-phase-proteins and clinical parameters were found.

Further research is required to investigate the diagnostic and prognostic value of haptoglobin and fibrinogen. Special interest should be set on correlation between acute-phase-proteins and lung lesions as well as verification of treatment effect.