

Acute Phase Proteins response in Cattle with Digital Inflammation: A pilot study.

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Acute phase proteins (APP) are a group of proteins including serum amyloid A(SAA), haptoglobin, and fibrinogen, which are synthesized by the liver as part of the acute phase response. This response is mediated by pro inflammatory cytokines including interleukins, and is characterised by fever, pain, leukocytosis, and protein catabolism. The acute phase response can be triggered by a variety of insults including bacterial, viral and parasitic infections, physical and chemical trauma.

In cattle changes in concentrations of SAA and haptoglobin have been shown to be potentially useful markers of inflammation in two common inflammatory conditions in dairy cattle; mastitis and uterine infections. In another common condition, lameness the acute phase response has not been investigated. This study was designed to determine if an acute phase response could be detected in cattle that were clinically lame due to inflammatory conditions of the foot. Serum levels of haptoglobin and SAA and plasma levels of fibrinogen were measured in 33 lame and 26 sound cattle. Lesions causing lameness included white line disease, digital dermatitis, solar ulcer, and foul in the foot. Fibrinogen values ranged from 0.40-8.60 g/L in non lame cows and 1.60-10.30 g/L in lame cows. Haptoglobin ranges were 0.10 –1.08 g/L in non lame cows and 0.11 – 3.60 g/L in lame cows. SAA ranges in non lame cows were 3.60-11.00 mg/L and in lame cows 9.40-965.65 mg/L. Mean levels of fibrinogen and SAA were significantly different between lame and non lame cows $p < 0.001$, while values for haptoglobin were not $p = 0.102$.

Comparison of fibrinogen and haptoglobin for the detection of lameness in cows using ROC analysis revealed a sensitivity of 81.8% and a specificity of 97.1 % for fibrinogen with a sensitivity of 23.5% and specificity of 97% for haptoglobin. Thus indicating that while both assays are specific, haptoglobin is less sensitive with fewer lame cows having increased levels. Conversely both tests have similar low sensitivity (22%) and high specificity (85.7% and 86.5% respectively) for differentiating between acute and chronic (<2 weeks duration) foot problems. Both haptoglobin and SAA were increased in specific conditions i.e. foul in the foot, while fibrinogen was affected by all conditions evaluated.

Conclusion: This pilot study suggests that increased levels of plasma fibrinogen are better indicators of lameness than serum haptoglobin in cows.