

THE USE OF ACUTE PHASE PROTEINS AND OTHER CLINICAL LABORATORY INDICES FOR THE DETECTION OF CATTLE WITH ACUTE DISEASE

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Consumer confidence in food products is of enormous importance to the meat industry. Of particular concern is the ability to detect diseased animals prior to entering the food chain as these animals may be carrying pathogens of zoonotic significance or pathogens adversely affecting product quality. A study was undertaken to investigate the ability of clinical laboratory data to differentiate between cattle with acute and chronic inflammatory processes, and included 31 and 50 cases respectively. Results for 29 clinical biochemical and haematological parameters were obtained. Univariable analysis was performed to ascertain which parameters were significantly associated with disease status. A multivariable logistic regression model was then constructed using all variables significant at $P < 0.1$. In the final model, only Serum Amyloid A was significant. This finding suggested that a single animal side test may be capable of differentiating between acute and chronic disease.

BACKGROUND

Currently, the approach to meat inspection in the United Kingdom is subjective, and recent public scares have highlighted inadequacies of the system (Veterinary Record, 1997). There are several groups examining the possibility of objective, animal-side tests being carried out immediately prior to slaughter to identify those animals whose meat may pose a risk to the consumer. This study was designed to ascertain whether assays for biochemical and haematological tests were able to differentiate between cattle with acute or chronic inflammatory processes.

Eighty-one cattle which presented to the University of Glasgow Veterinary School were included in the study, and, on the basis of post mortem findings, 31 and 50 cases respectively were classified as having acute or chronic inflammatory processes. Results of 29 biochemical and haematological parameters were obtained for each animal. Univariable analysis was performed using two-sample tests, and all those variables which were significant at $P < 0.1$ were used in stepwise multivariable logistic regression analysis.

RESULTS

Step-wise logistic regression analysis revealed that serum amyloid-A (SAA) alone was sufficient to differentiate between the acute and chronic groups. Inclusion of further variables to the logistic regression model resulted in the model becoming unstable due to insufficient overlap of the distributions of the acute and chronic cases. Assessment of the model which included only serum amyloid-A revealed that the model had a sensitivity of 97% and a specificity of 100% at the biologically interpretable probability cut point of 0.5.

DISCUSSION

This study has resulted in the identification of laboratory tests which may be used to differentiate between cattle which have acute or chronic inflammatory processes. Serum amyloid-A was the parameter which best classified cattle cases which had presented to GUVS referral hospital into appropriate groups. This finding suggested that a single animal-side test may be capable of differentiating between cattle with acute or chronic inflammatory processes. Serum Amyloid A is one of the main acute phase proteins which has been recently identified in cattle, and techniques for its quantitative measurement have been described (Horadagoda et al., 1993). In conclusion, provision of a rapid, economic, animal-side test for SAA which may be carried out pre-slaughter to differentiate between cattle with acute or chronic inflammatory conditions would ensure improved safety and quality of meat entering the food chain, and be of enormous importance in world trade.

BIBLIOGRAPHY

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