ACT (activated clotting time) tubes are invaluable for point of care screening for coagulopathies, or monitoring patients for the acute effects of disease (e.g. trauma) or drugs (e.g. heparin) on the clotting system. Anecdotal reports however, suggest that ACT may be affected by inflammatory disease, which previously has not been factored into the interpretation of results.

To test this hypothesis, the Ontario Veterinary College (OVC) intensive care unit selected a group of 102 dogs, comprising 87 patients presented to the OVC ICU and referred for laboratory work-up, and 15 controls, none of which was known to have had access to rodenticides or evidence of a coagulopathy, for a prospective observational study. In addition to the ACT, other tests conducted were: prothrombin time (PT), activated partial thromboplastin time (aPTT), anti-thrombin (AT), platelet count, neutrophil count, and C reactive protein (CRP).

The results of three tests commonly employed to evaluate coagulation - ACT, aPTT, and AT - were found to be correlated with the absolute neutrophil count and CRP concentrations, indicators of inflammation in the dog. The correlation was strongest for ACT and CRP (r= 0.66, p< 0.0001). One parameter (AT) was negatively correlated. CRP, as an indicator of inflammation, had previously been found to be better correlated with aPTT than it was with the absolute neutrophil count. Therefore, it was of interest to find that the ACT was also more closely correlated with the CRP than to the neutrophil count, suggesting that ACT may be a useful indicator of inflammation in the dog.

When the patients were subdivided into four groups according to ACT time - Group 1 (80-100secs, normal), Group 2 (70-100secs), Group 3 (105-140secs), and Group 4 (> 140secs) - it was shown that both aPTT and ACT were able to discriminate between each of the groups, i.e. aPTT and CRP increased incrementally as ACT increased. This was not the case with neutrophil count however, which, for each of the ACT groups, was higher than the control, but did not differ between groups.

Evidence for a strong link between coagulation and inflammation has been accumulating for some time now, and the mechanisms are beginning to be understood. The findings of this study are therefore not novel; however, they do provide useful, practical information which will assist in the interpretation of tests previously only considered to be assessing the coagulation cascade. The extension of ACT associated with inflammation is presently unexplained.
In summary:

- a persistently elevated ACT, in the absence of an overt coagulopathy, should raise suspicion of underlying inflammatory disease warranting further investigation.
- ACT is likely to be a more sensitive and specific indicator of inflammation than the absolute neutrophil count.
- consideration should be given to the interpretation of ACTs from animals with suspected coagulation defects and concomitant inflammation.

**Addendum:** the method used for measuring ACT is that of Bateman and Mathews (1999), previously published in J. Vet. Emerg. Crit. Care. 9:79-82, the salient features of which are:

2ml of blood are injected by vacuum flow into an ACT vacutainer previously warmed in the sampler’s axilla. Timing begins on injection. The tube is gently mixed by inversion to ensure adequate mixing with the silaceous earth contents, and is then replaced in the axilla. The tube is subsequently inspected at 60secs and every 10 seconds after that for clot formation, after which it is immediately replaced in the axilla.

The normal canine range for MAX-ACT™ (Helena Laboratories) tubes is 55-80 seconds (See et al., 2009), slightly different from the BD ACT tubes used in the OVC study which are no longer available. Gribbles Veterinary can supply practitioners with MAX-ACT tubes, and copies of the references listed, upon request - just call your local laboratory or speak to your Gribbles Veterinary business development manager.

**Keith McSporran**

**References**


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**Autumn Cow Panel - back by popular demand**

Actively promote end of lactation status checks to your dairy clients using the Gribbles Veterinary Autumn Cow Panels (ACPs), and maximize the effectiveness of on-farm mineral management strategies.

Tissue sampling in the autumn or at drying off provides an opportunity to ensure trace elements and magnesium concentrations are appropriate heading into winter, and assess any effects of sporodesmin on the liver.

Options for sample collection include collecting liver biopsies and/or blood samples on-farm, or getting liver samples collected at the slaughter plant.

For more information on our heavily discounted Autumn Cow Panels, contact your local Gribbles Veterinary laboratory, your business development manager or refer to the ACP flyer available on our website.
Testing sire bulls for bovine viral diarrhoea (BVD)

Introduction of a bull persistently infected (PI) with BVD virus to a herd of cows risks infertility, embryonic loss and perpetuation of infection within the herd. PCR testing of all bulls well before sales ensures that only non-PI bulls are sold, and acts as a surveillance test on the farm as well. Test every bull by collecting serum samples and requesting the pooled PCR test ($7.35 per sample excl. GST). For urgent results, ELISA testing ($12.95 per sample excl. GST) offers significantly reduced turnaround times compared to PCR testing; BVD Antigen ELISA results are typically reported on the same day that the serum samples are received by the testing laboratory, compared to a turnaround time of up to 5 working days for BVD PCR testing.

Blood manganese in dogs with porto-systemic shunts

The essential trace element manganese is potentially toxic in high concentrations, and its absorption is usually strictly controlled by an efficient hepatic first pass effect. In liver failure however, the concentration of manganese in the systemic circulation can increase and lead to serious neurotoxicity. In fact, the neurotoxicity associated with manganism is thought to offer a better explanation for the syndrome of hepatic encephalopathy than high blood levels of ammonia, which has been the traditional view.

A recent study was designed to test the hypothesis that dogs with porto-systemic shunts would have impaired ability to eliminate manganese, resulting in increased concentrations in the peripheral blood. A group of 18 dogs with porto-systemic shunts (PSS) was compared with 40 control dogs - 26 of which had non-hepatic illness, and 14 of which were considered healthy. 13 of the 18 dogs with PSS were found to have blood manganese concentrations exceeding those of dogs in the control group, and the median concentration of manganese for the PSS group was shown to be more than double that of the controls.

The standard test for PSS in dogs is the post-prandial total bile acids test. In most animals this is both sensitive and specific, given the appropriate presentation and supporting data; which, in a young animal, could include: CNS signs, microcytosis of red cells, hypoalbuminaemia, and low urea. Where it fails is in Maltese terriers, which may have intrinsically high total bile acids. In this breed, a whole blood manganese concentration of > 1,100 nmol/L would be highly suspicious for PSS when associated with the appropriate clinical and supportive laboratory findings. Gribbles Veterinary can analyse EDTA blood samples for manganese for $25.00 per sample (excl. GST).


Contact us

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Last but not least, please feel free to contact your local Business Development Manager:

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Breaking news

- Gribbles Veterinary is proud to sponsor the following CPD opportunity on Wednesday 18 May 2011: ‘Soft Tissue Sarcoma Surgery in Dogs’, presented by Jon Bray (IVABS). This seminar, part of the Auckland branch of the NZVA annual programme, will be held at the New Zealand Dental Association Rooms in Ellerslie and is open to veterinarians from around the country.

- With the imminent launch of the New Zealand Kennel Club 'Accredited Breeders Scheme', Gribbles Veterinary is launching the NZKC Thyroid Panel ($155.00 excl. GST), which includes Gribbles Veterinary’s exclusive TSH, TgAA and free T4 by equilibrium dialysis tests. Gribbles Veterinary is also the exclusive New Zealand provider of many of the genetic tests required under the scheme, through our strategic partnership with Genetic Technologies.