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News

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URINE BILE ACIDS TESTING

URINE BILE ACIDS

Studies of urine bile acids in people have shown them to be a sensitive test for liver dysfunction.

Advantages of Urine Bile Acids

There are several advantages of urine bile acids over serum bile acids measurement:

- no requirement for fasting.
- avoids shortcomings of randomly collected serum samples and spurious results caused by spontaneous gall bladder contraction, incomplete or delayed gastric emptying, and slow intestinal transit time.
- provides a time-averaged sample that dampens acute changes in serum bile acids concentration that can occur due to physiologic variables affecting the enterohepatic circulation.
- no need for multiple venipunctures.
- less costly to perform.

Recent studies have evaluated urine bile acids testing in dogs and cats with liver disease. Serum and urine bile acids concentrations were compared in 126 dogs and 79 cats. Of the dogs, 102 had liver disease diagnosed at biopsy, 9 had other diseases, and 15 were healthy. Of the cats, 54 had liver disease, 17 had other diseases, and 8 were healthy. The highest serum bile acids concentration from either fasting, post-prandial, or randomly taken samples was compared to the urine bile acids concentration, collected within 24 hours of the serum. Urine bile acids concentrations were reported as a ratio to urine creatinine to eliminate changes due to differences in urine flow and urine concentration.

Results:

- **for dogs**, the sensitivity and specificity of urine bile acids for diagnosis of liver dysfunction were 61% and 100%, respectively, whereas serum bile acids had a sensitivity of 78% and specificity of 67%.
- **for cats**, the sensitivity and specificity of urine bile acids were 85% and 88%, respectively, whereas serum bile acids had a sensitivity of 87%, and the same specificity of 88%.
- patients with porto-systemic shunts (PSS) tended to have lower urine bile acids: creatinine ratios than patients with hepatocellular disease.

Conclusions

- the sensitivity and specificity of urine bile acids measurement were similar to those of serum bile acids, but the urine bile acids test was more specific for canine liver dysfunction than was serum bile acids testing.
- a pattern of results showing very high serum bile acids but only slightly increased urine bile acids may be indicative of a shunting disease such as PSS or MVD.
- while bile acids testing can identify animals with hepatic dysfunction, it may fail to recognize animals with hepatic disease in the absence of hepatic dysfunction.

To Measure Urine Bile Acids, 1mL of urine is required. *Test Code 85645.*

A randomly collected urine sample is acceptable, but blood contamination should be avoided.

URINE BILE ACIDS TESTING (CONT'D)

SERUM BILE ACIDS

As serum bile acids testing is now often used as a screening test rather than for confirming hepatic dysfunction in ill patients, questions have arisen about the interpretation of results.

Results from fasting and post-prandial bile acids can vary or give spurious values due to:

- common presence of microvascular dysplasia (MVD). Bile acids can be intermittently high in these dogs, although they often are clinically normal. Certain breeds, such as Cairn Terriers and toy breeds, are predisposed to MVD.
- not all bile acids are stored in the gall bladder. Only ~60-80% of resting bile acids are in the gall bladder at any given time. Some bile acids are continuously released into the small intestine.
- gall bladder has periodic, small spontaneous contractions.
- incomplete post-prandial gall bladder contraction.
- variation in timing of peak bile acids concentration after feeding. Most dogs show maximum bile acids 2-4 hours post-prandially, although some dogs peak at 6-8 hours.
- delayed gastric emptying.
- differences in intestinal transit time.

These physiologic variations in the enterohepatic cycle explain why fasting bile acids sometimes can be higher than post-prandial bile acids. Such differences

can be quite large, and fasting bile acids 100 $\mu\text{mol/L}$ more than post-prandial concentrations can be seen.

Hepatic dysfunction is considered to be present when resting or post-prandial bile acids are greater than 25 $\mu\text{mol/L}$ (dog) and 20 $\mu\text{mol/L}$ (cat).

Animals with vascular shunts but normal hepatocytes tend to have lower and often normal fasting bile acids than do animals with hepatocellular disease.

Monitoring Serum Bile Acids in Patients with Liver Disease:

- interpretation of changes in bile acids can be difficult.
- modest reduction in serum bile acids concentrations cannot be used to conclude there is improvement in liver function or reduction in liver disease.
- animals with chronic liver disease develop acquired vascular shunts that do not close, even if liver disease resolves. Thus, post-prandial bile acids likely will always be increased, despite improvement in liver function.
- ursodiol (Actigal™) cross-reacts with the bile acids test and so use of this drug can falsely elevate bile acids concentration. As ursodiol will saturate the bile acids pool with chronic use, discontinuing it for a short time will not eliminate its effects on bile acids.

References: Trainor et al., *J Vet Int Med* 17: 145-153, 2003; Center, *Proc. N Am Vet Conf* 2003; pp. 413-415.

LAB TIPS

Sample Requirement for Cortisol Testing

Antech Diagnostics has determined that EDTA plasma (LTT) can falsely increase cortisol concentrations by as much as 30%. Serum is the specimen of choice for cortisol testing. *LTTs are not acceptable samples for cortisol testing.*

Rabies Export Testing Update

An increased volume of rabies testing is resulting in longer turnaround times from the Rabies Diagnostic Laboratory at Kansas State University.

FAVN (Fluorescent Antibody Virus Neutralization)

This test is required for pets being exported to Hawaii and many other countries, including all of Europe. This test can take 4-6 weeks for completion of the assay and processing of paperwork. *Test Code S17108.*

RFFIT (Rapid Fluorescent Focus Inhibition Test)

This test is required by Australia, New Zealand, and some other countries. This test also is used to assess rabies virus vaccine titers, in special circumstances. It can take 2-4 weeks to complete the testing. *Test Code S16685.*

Samples submitted for rabies testing for export purposes **must** be accompanied by a completed FAVN or RFFIT form, which are available from Antech Diagnostics. The pet's microchip ID number **must** be written on the FAVN or RFFIT form. Please contact Client Services if you require these forms or have questions regarding rabies testing.

Blood Lead Testing

For blood lead measurement, the test requires a LTT that must be at least ½ full.