Hille Fieten, DVM, PhD, ECVIM-CA internal medicine, MSc genetic epidemiology

European Specialist in Internal Medicine of Companion Animals, Faculty of Veterinary Medicine, Utrecht University
The Netherlands

h.fieten@uu.nl

INTERPRETATION OF HEPATIC PARAMETERS IN BLOOD

Indications for measurement of hepatic parameters in blood can be a suspicion of liver disease based on history and clinical signs or a routine screening, for example a "geriatric profile" or a pre-anesthetic blood check. There are different categories of laboratory parameters measured in blood which are being used in the diagnosis of hepatobiliary diseases. They are divided into enzyme activities in plasma, bile acid concentrations, serum proteins, bilirubin, blood coagulation tests, ammonia and ammonia tolerance tests, and a mixed rest group.

The measurement of enzyme activities in plasma is based on the idea that when there are changes in an organ (the liver or bile ducts) enzymes are released more than normally giving increased activity in the blood. Once in the circulation, the enzyme is being catabolized at a rate (half- life) which is specific for each enzyme. Liver enzyme activities that are most important in the dog and cat include alkaline phosphatase (AP), gamma glutamyl transpeptidase (gGT) and the transaminases alanine amino transferase (ALT) and aspartate amino transferase (AST). Enzymes indicate the degree of liver cell damage at the time of blood sampling, not the function of the liver that is left at that moment.

Bile acids in plasma are a very specific parameter to detect disorders of the liver and biliary tract. The concentration in plasma depends on a number of liver functions and on the intestinal absorption. Reduced hepatic functions such as clearance from the plasma (parenchymal disease or portosystemic collateral circulation), conjugation, biliary excretion and bile transport all may give increased bile acid levels. Unlike the enzymes, bile acids indicate the function rather than the actual cellular damage of the liver and bile system. Therefore they are often highly increased in animals with chronic disease with severely impaired liver functions such as congenital portosystemic shunts or cirrhosis, in which the enzymes often tend to be relatively low.

Ammonia is an important parameter when hepatic encephalopathy is suspected, as is the ammonia tolerance test (ATT). An ATT is performed in all cases in which the single basal fasting ammonia provides insufficient information.

In already diagnosed liver disease, liver function testing can give information regarding the severity of liver dysfunction. Hypoalbuminemia can be caused by chronic dysfunction of the liver. Albumin and most of the protein factors in coagulation are produced exclusively in the liver. The hypoalbuminemia almost never reaches the edema limit (about 15 g/l). The biologic half-time of albumin is 12 days. In diseases of the liver or bile ducts the blood coagulation may be abnormal usually as a result of DIC.

The interpretation of hepatic parameters will be discussed during the lecture and several aspects of interpretation in different patient groups will be discussed (ie. screening of healthy animals, diagnosing liver disease in clinically ill animal, therapy monitoring etc.).