Bile acids algorithm

Use results to:



Assess liver function



Identify occult liver disease



Evaluate for vascular anomalies



Monitor patients on hepatotoxic medication

Clinical signs and diagnostic findings consistent with hepatobiliary disease

Clinical signs

Breed predilection

Poor growth in young animal

Poor recovery from anesthesia/sedation

Neurologic signs

History of hepatotoxic medication

Weight loss

Anorexia/vomiting/diarrhea

Ascites Icterus*

CRC

Decreased and/or low normal MCV

Chemistry panel

Decreased or low normal:

- BUN
- Albumin
- Glucose
- Cholesterol

Urinalysis

Ammonium biurate crystals Bilirubin (feline)

Increased:

- ALT, AST, GGT, ALKP (persistent elevation or ≥ 3x upper end of reference interval)
- Total bilirubin*

2 or more of the above clinical indicators?

Consider extrahepatic diseases where appropriate; perform pre- and postprandial bile acids*

*If patient is icteric or if bilirubin is increased, rule out prehepatic causes and proceed without bile acids testing (see reverse side).

Normal

Canine

Preprandial: 0–14.9 µmol/L Postprandial: 0–29.9 µmol/L

Feline

Preprandial: $0-6.9 \, \mu \text{mol/L}$ Postprandial: $0-14.9 \, \mu \text{mol/L}$

Does not rule out the presence of

hepatobiliary disease

Mild elevation

Canine

Pre- or postprandial: 30.0–40.0 µmol/L

Feline

Pre- or postprandial: 15.0–30.0 μmol/L

Can be seen with both extrahepatic and hepatobiliary disease

Moderate to severe elevation

Canine

Pre- or postprandial: $>40.0 \mu mol/L$

Feline

Pre- or postprandial: >30.0 µmol/L

Consistent with hepatic dysfunction and/or cholestatic liver disease

Rule out extrahepatic causes

Consider supportive care and reevaluate as appropriate

Continued suspicion of primary hepatobiliary disease?

Investigate for underlying hepatobiliary disease

See reverse side for steps to identify/rule out possible causes of increased bile acids





Increased bile acids and/or hepatic enzymes?

Evaluate for extrahepatic diseases



Possible causes

- Pancreatitis
- Gastrointestinal disease
- Endocrine
- Hyperadrenocorticism
- Hyperthyroidism
- Diabetes mellitus
- Extrahepatic neoplasia
- Hypoperfusion (congestive heart failure, shock)
- Trauma
- Drug induced (ALKP/GGT)
 - steroids, phenobarbital
- Muscular disease (ALT/AST)
- Osteolytic disease/bone (ALKP)



Consider performing

- Spec cPL® Test/Spec fPL® Test
- Diagnostic imaging
- · Endocrine testing

Investigate underlying hepatobiliary disease



Possible causes

- Inflammation (chronic hepatitis, cholangiohepatitis)
- Infection (leptospirosis, bacterial cholangiohepatitis)
- Toxicity (NSAID, phenobarbital, sago palm)
- Vascular anomaly (portosystemic shunt, microvascular dysplasia)
- Neoplasia (primary or metastatic)
- Cholestatic liver disease
- Lipidosis
- Vacuolar hepatopathy
- Cirrhosis
- · Biliary disease
- Mucocele
- Cholelith
- Biliary neoplasia
- Cholecystitis
- Breed-related increase (Maltese)



Consider performing

- Coagulation profile (PT/aPTT)
- Ammonia
- · Diagnostic imaging
- Cytology
- Biopsy
 - Special testing as indicated (liver copper concentrations, liver culture)
- Infectious disease testing

