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

**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*

- **CBC**
  - Decreased and/or low normal MCV

- **Chemistry panel**
  - Decreased or low normal:
    - BUN
    - Albumin
    - Glucose
    - Cholesterol
  - Increased:
    - ALT, AST, GGT, ALKP (persistent elevation or ≥ 3x upper end of reference interval)
    - Total bilirubin*

- **CBC**
  - Decreased and/or low normal MCV

- **Urinalysis**
  - Ammonium biurate crystals
  - Bilirubin (feline)

**Use results to:**

- Assess liver function
- Identify occult liver disease
- Evaluate for vascular anomalies
- Monitor patients on hepatotoxic medication

2 or more of the above clinical indicators? Consider extrahepatic diseases where appropriate; perform pre- and postprandial bile acids*

**Normal**
- **Canine**
  - Preprandial: 0–14.9 µmol/L
  - Postprandial: 0–29.9 µmol/L
- **Feline**
  - Preprandial: 0–6.9 µmol/L
  - Postprandial: 0–14.9 µmol/L

**Mild elevation**
- **Canine**
  - Pre- or postprandial: 30.0–40.0 µmol/L
- **Feline**
  - Pre- or postprandial: 15.0–30.0 µmol/L

**Moderate to severe elevation**
- **Canine**
  - Pre- or postprandial: >40.0 µmol/L
- **Feline**
  - Pre- or postprandial: >30.0 µmol/L

**Rule out extrahepatic causes**
- Consider supportive care and reevaluate as appropriate

Continued suspicion of primary hepatobiliary disease?

Investigate for underlying hepatobiliary disease

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

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

The information contained herein is intended to provide general guidance only. As with any diagnosis or treatment, you should use clinical discretion with each patient based on a complete evaluation of the patient, including history, physical presentation, and complete laboratory data. With respect to any drug therapy or monitoring program, you should refer to product inserts for a complete description of dosages, indications, interactions, and cautions. Diagnosis and treatment decisions are the ultimate responsibility of the primary care veterinarian.

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