Alanine Aminotransferase (ALT)

Interpretive Summary

Description: Alanine Aminotransferase (ALT) is a cellular enzyme released in response to injury of liver cells. ALT can also increase mildly with muscular injury and gastrointestinal disease.

Decreased ALT

Common Causes

- Rarely clinically significant
- End stage liver disease

Related Findings

- End stage liver disease
  - Decreased albumin, ALP, glucose, cholesterol, BUN
  - Increased bilirubin

Increased ALT

Common Causes

- Inflammatory
  - Infectious causes
    - Bacterial cholangiohepatitis
    - Leptospirosis
    - Feline infectious peritonitis (FIP)
    - Histoplasmosis
    - Infectious canine hepatitis
  - Noninfectious causes
    - Chronic hepatitis
    - Cirrhosis
    - Pancreatitis
- Toxic
  - NSAIDS
  - Phenobarbital
  - Corticosteroids
  - Methimazole/carbimazole
- Liver hypoxia or hypoperfusion
  - Anemia
  - Congestive heart failure
  - Shock
- Metabolic disorders
  - Hyperthyroidism (cats)
  - Hepatic lipidosis (cats)
  - Cushing’s disease
  - Diabetes mellitus/diabetic ketoacidosis
- Neoplasia
- Trauma
Uncommon Causes

- Portosystemic shunts (usually mild elevations if any)
- Toxic
  - Mushroom
  - Sago palm
  - Aflatoxin
  - Ragwort (horses)
  - Xylitol
  - Tetracycline
  - Idiosyncratic drug reactions
- Inherited
  - Copper storage disease (certain dog breeds, but particularly severe in Bedlington Terriers)
  - Lysosomal storage disorders
- Severe skeletal myopathy, usually mild to moderate increases
- Nutritional hepatopathies
- Gastroenteritis

Related Findings

- Inflammatory
  - Increased AST, ALP, GGT, total bilirubin
  - Decreased albumin, cholesterol, glucose, BUN in severe cases
  - Increased bile acids and ammonia
  - Positive titers or PCR for leptospirosis, feline coronavirus (FIP), histoplasmosis
  - Positive bacterial or fungal culture of liver/bile
  - Histopathology/cytology findings consistent with inflammatory hepatic diseases
  - Increased Spec cPL® or Spec fPL® with pancreatitis
- Metabolic
  - Hyperthyroidism
    - Increased T4, free T4, free T4 by equilibrium dialysis
  - Hepatic Lipidosis
    - Increased ALP
    - GGT usually normal unless concurrent inflammatory disease is present
    - Enlarged liver on radiographs, hyperechoic liver on ultrasound
    - Cytology/histopathology consistent with hepatic lipidosis
  - Cushing’s Disease
    - Increased ALP
    - Decreased urine specific gravity
    - Stress leukogram: increased neutrophils and monocytes, decreased lymphocytes and/or eosinophils
    - Adrenal function tests consistent with Cushing’s disease
  - Diabetes Mellitus
    - Increased serum glucose and glucosuria
    - Increased fructosamine
    - Ketonuria (in severe cases)
- Neoplasia
  - Enlarged/irregular liver on radiographs and/or ultrasound
  - Cytology/histopathology findings consistent with neoplasia

Additional Information

Physiology

- ALT is a hepatocellular enzyme
Another name for ALT is serum glutamic-pyruvic transaminase (SGPT)

The enzyme is almost exclusively found within hepatocytes, so serum increases are highly specific for hepatocellular injury in dogs and cats (there is only a minor contribution from skeletal muscle and red blood cells).

The magnitude of increase may relate to severity of liver damage but does not predict reversibility.

The serum half life is 2-3 days for dogs; reductions occur over 1-2 weeks with cessation of hepatic damage.

The hepatocellular level of ALT in horses is very low, hence ALT is of limited value in this species.

References


Last updated 11/1/2013