

Gamma Glutamyl Transferase (GGT)

Interpretive Summary

Description: Gamma Glutamyl Transferase (GGT) is a marker of cholestatic liver disease.

Decreased GGT

Common Causes

- Not clinically significant

Increased GGT

Common Causes

- Cholestasis, either intrahepatic or extrahepatic
 - Impaired bile flow due to:
 - Necrosis
 - Hepatocellular swelling
 - Hepatic lipidosis (cats)
 - Cushing's disease or glucocorticoid administration
 - Diabetes mellitus
 - Gall bladder mucocoele/stones
 - Neoplastic
 - Inflammatory
 - Cholangiohepatitis/cholecystitis
 - Pancreatitis
- Drug therapy
 - Barbiturate anticonvulsants
- Primary hepatocellular injury in horses may cause mild increases (<4X)

Uncommon Causes

- Artifact
 - Hemolysis - variable effect on GGT values depending on methodology
- Toxic
 - Ragwort (horses)
 - Alsike clover (horses)
 - Mycotoxin
- Colostral intake and absorption

Related Findings

- Cholestasis
 - Increases ALT, AST, ALP, bilirubin
 - Abdominal radiographs may show:
 - Enlarged liver
 - Gall stones or calcification of gall bladder (rare)
 - Abdominal ultrasound may show:
 - Enlarged, hyperechoic liver
 - Abnormal gall bladder
 - Enlarged
 - Mucocoele

- Stones in the gall bladder
 - Histopathology/cytology findings consistent with cholestatic liver disease
 - Hepatic lipidosis (cats)
 - ALP:GGT ratio increased compared to other liver diseases in cats
 - GGT often normal unless concurrent inflammatory disease
 - Cushing's disease
 - 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
 - Pancreatitis
 - Increased amylase and lipase
 - Increased Spec cPL® or Spec fPL®
 - Hyperthyroidism
 - Increased T4, free T4, free T4 by equilibrium dialysis
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Additional Information

Physiology

- GGT is involved in glutathione metabolism and is mainly associated with the microsomal membranes of biliary epithelium, renal tubular epithelial cells, and pancreatic acinar cells.
- The activity of serum GGT parallels the activity of serum ALP in dogs, but has higher specificity and lower sensitivity for detection of hepatobiliary disease.
- In cats GGT often elevates more than ALP in liver diseases other than lipidosis, where GGT elevation is uncommon.
- Compared to ALP, GGT is less affected by secondary hepatic disease and enzyme-inducing drugs.
- GGT is more useful than ALP in detecting cholestatic or biliary disease in horses due to the narrow GGT reference interval and the variability of ALP activity in this species. The GGT half-life in horses is about 3 days.
- Considering ALP and GGT together increases the predictive value for hepatic disease.

References

- Latimer KS, Mahaffey EA, Prasse KW, eds. *Duncan and Prasse's Veterinary Laboratory Medicine: Clinical Pathology*, 4th ed. Ames, IA: Blackwell; 2003.
- Stockham SL, Scott MA. *Fundamentals of Veterinary Clinical Pathology*, 2nd ed. Ames, IA: Blackwell; 2008.
- Willard MD, Tvedten H, eds. *Small Animal Clinical Diagnosis by Laboratory Methods*, 4th ed. St. Louis, MO: Saunders; 2004.

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