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GAMMA GLUTAMYL TRANSFERASE (GGT) INFORMATION SHEET

PHYSIOLOGY

Gamma Glutamyl Transferase (GGT) in an enzyme which transfers a gamma- glutamyl group from peptides and other compounds to an acceptor. It is found in all cells of the body except myocytes with particularly high concentrations found in cells of the hepatobiliary system and the kidney. High levels are also found in the prostate, which may be responsible for the higher levels in male serum than female. GGT is cleared from the circulation by liver uptake and has a half-life in plasma about 4 days.

PATHOLOGY

Raised levels of GGT in the blood are a sensitive indicator of liver disease. Together with alkaline phosphatase (ALP) GGT is a marker of cholestasis. Any blockage to the flow of bile, inside or outside the liver, will lead to induction of these enzymes and increased levels in the blood. In these conditions GGT and ALP tend to be elevated to similar levels (ie a similar number of multiples of the upper reference limit). If the obstruction is within the liver parenchyma, there is usually little rise in the serum bilirubin as there is usually a sufficient amount of the biliary tree which is not blocked to allow normal bilirubin excretion. This is in contrast to extra-hepatic biliary obstruction where the serum bilirubin is usually elevated.

Serum levels of GGT are commonly elevated in patients with acute hepatitis although the rise in GGT is usually less than that of the transaminases and rarely exceeds a level of 5 times the upper reference limit.

GGT concentrations in serum may also be elevated in response to many drugs and toxins. The usual mechanism for this effect is induction of the enzyme leading to increased production and release into the circulation. Drugs which lead to increased GGT may also lead to an increase in ALP although this does not always occur. Alcohol is a potent inducer of GGT and the enzyme is commonly elevated in regular drinkers. Prescription medications which may lead to increased circulating GGT include dilantin, phenobarbitone, steroids (including the oral contraceptive pill), trimethoprim/sulphomethoxazole, erythromycin and flucloxacillin. Circulating levels may be reduced by cimetidine therapy. GGT levels will show a significant reduction one to two weeks after cessation of a causative agent.

GGT may also be released into the circulation from the kidneys and the prostate, eg in patients with renal infarct or prostate cancer. Myocardial infarction, cardiac failure, diabetes and pancreatitis can also increase serum GGT, although in these cases the source of GGT is the liver. GGT levels are higher in overweight and obese people and also responds more markedly to alcohol ingestion in this setting.

ELEVATED SERUM GGT

- Cholestasis: intrahepatic, extra-hepatic
- Hepatitis: any cause, levels usually less than transaminases and less than 300 U/L
- Drugs and other toxins: alcohol, anti-convulsants, steroids, other
- Other: myocardial infarction, congestive cardiac failure, pancreatitis, prostate cancer