Serum Alkaline Phosphatase (ALP) Test

- Evaluates alkaline phosphatase levels, an enzyme linked to bile duct obstruction or liver disease.

Alkaline phosphatases (ALPs) represent a category of isoenzymes situated on the outer membrane of cells. These enzymes facilitate the hydrolysis of organic phosphate esters present in the extracellular environment. Zinc and magnesium serve as crucial cofactors for their activity. Despite the wide distribution across different tissues and the variability in their physiochemical characteristics, ALPs are categorized as true isoenzymes because they possess the common capability to catalyze the same biochemical reaction.[1] In liver cells, ALP is located in the cytosol and the canalicular membrane of hepatocytes. Its concentrations diminish in various organs, including the placenta, ileal mucosa, kidney, and bone. More than 80% of serum ALP is derived from the liver and bone, with lesser amounts coming from the intestine. While ALPs are found in multiple tissues throughout the body, their specific physiological roles are not yet fully understood.[2]

The primary clinical importance of assessing serum ALP levels lies in the diagnosis of cholestatic liver disease, as significant elevations in ALP are frequently seen in patients experiencing cholestasis. Typically, increases of four times or more above the normal upper limit can be detected in up to 75% of individuals with cholestasis, regardless of whether it is intrahepatic or extrahepatic.[3] The extent of elevation does not aid in differentiating between the two types of cholestasis. Comparable increases are also noted in cases of biliary obstruction caused by malignancies such as cholangiocarcinoma, pancreatic head adenocarcinoma, or ampullary adenocarcinoma, as well as conditions like choledocholithiasis, biliary stricture, sclerosing cholangitis, and intrahepatic cholestasis due to primary biliary cholangitis (PBC), drug-induced liver injury, chronic liver allograft rejection, infiltrative liver diseases (including sarcoidosis, amyloidosis, tuberculosis, and liver metastasis), and severe alcoholic hepatitis resulting in steatonecrosis.[4] Additionally, patients with AIDS may present with significantly elevated ALP levels, often due to cholangiopathy associated with opportunistic infections such as cytomegalovirus, cryptosporidiosis, or granulomatous liver involvement from tuberculosis.[5]

References

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