

Clinically Important Plasma Enzymes

Amylase

Alkaline phosphatase

Acid phosphatase

Alanine aminotransferase (ALT)

Aspartate aminotransferase (AST)

Objectives:

- 1. To study the clinical significance of plasma amylase.**
- 2. To study the clinical significance of plasma alkaline phosphatase.**
- 3. To study the clinical significance of plasma acid phosphatase.**
- 4. To study the clinical significance of Alanine aminotransferase (ALT).**
- 5. To study the clinical significance of Aspartate aminotransferase (AST).**

AMYLASE

Normal value: 80-180 Somogyi Unit/dl
25-125 IU/L

It is Increased in:

1. Acute pancreatitis (usually increased > 1000 Somogyi Unit/dl)
2. Acute intra abdominal conditions : (usually moderate elevation)
 - A. perforated peptic ulcer
 - B. Small bowel obstruction
 - C. Acute peritonitis
 - D. Mesenteric thrombosis
 - E. Ruptured ectopic pregnancy
3. Pancreatic pseudocyst
4. Acute exacerbation of chronic pancreatitis
5. Mumps
6. Renal insufficiency
7. Pancreatic duct obstruction (Ca, stone, stricture)
8. Macroamylasaemia
9. Drugs (ex. Morphine)

It is Decreased in:

Pancreatic insufficiency

ALKALINE PHOSPHATASE

Several isoenzymes:

- 1. Bone (osteoblasts)**
- 2. Liver (biliary canaliculi)**
- 3. Intestine (epithelial lining)**
- 4. Kidneys (proximal tubules)**
- 5. Placenta**
- 6. Lactating breast**

Normal values: ADULTS: 3-13 King Armstrong Unit/dl

CHILDREN: 6-25 King Armstrong Unit/dl

Other unit: 39 – 117 IU/L

Physiological elevation:

- 1. Childhood**
- 2. Pregnancy**
- 3. Lactation**
- 4. After a meal containing fat**

Pathological elevation:

1. Osteoblastic bone disease:

- A. hyperparathyroidism
- B. Ricket's
- C. Osteomalacia
- D. Paget's disease
- E. Osteoblastic bone tumours:
(ex, osteogenic sarcoma " primary" and Ca prostate "secondary")

2. Cholestasis:

- A. Intrahepatic (slight)
- B. Extrahepatic (marked)

3. Hepatic disease:

- A. Hepatits
- B. Cirrhosis
- C. Infiltrative hepatic disease
- D. Hepatic space occupying lesions

4. Drugs:

- A. Androgens
- B. Anabolic steroids
- C. Azothioprine
- D. Paracetamol
- E. Halothane
- F. Aspirin
- G. Phenothiazines

Reduction:

- 1. Growth retardation in children**
- 2. Hypoparathyroidism**
- 3. Hypophosphatasia**
- 4. Kwashiorkor**
- 5. Scurvy**

ACID PHOSPHATASE

Several isoenzymes:

1. Prostate (highest concentration)
2. Bone (osteoclasts)
3. Liver
4. Spleen
5. Kidneys
6. Red blood cells
7. Platelets
8. pancreas

Normal values: Total: 4-11 IU/L

Prostatic: < 4 IU/L

Elevation:

1. Metastatic prostatic carcinoma
2. Malignant bone tumours
3. Hepatobiliary disease
4. Diseases of the RES
5. Gaucher's disease
6. Thromboembolism
7. Thrombocytopenia
8. Fever

ALANINE AMINOTRANSFERASE
(ALT)

Also called :

Serum Glutamate Pyruvate Transaminase
(SGPT)

Normal value: 10 – 40 IU/L

Organs:

Liver, Kidney, Heart, Muscle, Pancreas, Spleen, Lungs

ELEVATED IN:

- 1. Acute hepatitis**
- 2. Liver cirrhosis**
- 3. liver tumours**

ASPARTATE AMINOTRANSFERASE
(AST)

Also called :

Serum Glutamate Oxaloacetate Transaminase
(SGOT)

Normal value: 10 – 35 IU/L

Organs:

Heart, Liver, Muscle, Kidney, Pancreas, Spleen, Lungs

ELEVATED IN:

- 1. Acute MI**
- 2. Acute hepatitis**
- 3. Liver cirrhosis**
- 4. liver tumours**
- 5. Muscle injury**
- 6. Muscle disease**