Serum Alkaline Phosphatase (ALP) elevation

Suggested scheme for evaluation of a high serum ALP

Consider:
- Pregnancy
- Age < 20 years\(^1\) (may be physiological)

Estimate Bilirubin, ALT, GGT

<table>
<thead>
<tr>
<th>Bilirubin</th>
<th>High</th>
<th>Normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALT</td>
<td>&gt; 80 U/L</td>
<td>&lt; 80 U/L</td>
</tr>
<tr>
<td>GGT</td>
<td>&lt; 90 U/L</td>
<td>&gt; 90 U/L</td>
</tr>
</tbody>
</table>

Isolated elevated ALP

ALP Isoenzymes

- ‘Placental’ (Regan isoenzyme)
- Predominant liver
- ‘THI’ Pattern (child)
- Predominant bone

Bone scan (if indicated)

Cholestatic liver disease:
- Extrahepatic obstruction
- Intrahepatic obstruction
- Hepatitis
- Alcoholic liver disease
- Primary biliary cirrhosis
- Sclerosing cholangitis
- Ascending cholangitis
- Post-operative cholestasis
- Gram negative bacteraemia

Drug toxicity
- Oestrogens
- Anabolic steroids
- Antipsychotic drugs
- Synthetic penicillins
- Erythromycin
- Gold
- Captopril

Mixed hepatocellular and cholestatic disease
- Chronic active hepatitis
- Space-occupying lesion\(^2\)
- Cirrhosis
- Drugs (see cholestatic list)

? Cholestatic liver disease?
- Two processes i.e.
  1. Liver enzyme induction\(^3\)
  2. Bone disease

Malignancy
- Bronchus, Ovary, Pancreas

Cholestatic liver disease (see above)

Transient Hyperphosphataemia of Infancy\(^4\)

Paget’s disease
- Malignancy\(^5\)
- Healing fractures
- Renal osteodystrophy
- Osteomalacia/Rickets\(^6\)
- Hyperparathyroidism
- Hyperthyroidism

1. Due to the skewed distribution of ALP, levels up to 400 IU/L are not uncommon during growth periods—higher levels have also been reported.
2. Malignancy (primary, secondary), abcess, cyst.
3. Alcohol, drugs (phenytoin, warfarin, benzodiazepines, tricyclics), obesity, diabetes mellitus, hypertriglyceridaemia.
4. Typically age < 5 years; very high ALP (> 700); may follow a viral illness. Benign and asymptomatic; high ALP persists for 8–12 weeks.
5. Prostate, breast, kidney, myeloma, lymphoma, etc.
6. Due to Vitamin D deficiency or resistance.