Data Interpretation: LFTs

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Liver Function Tests

- Albumin
- AST (aspartate transferase)
- ALT (alanine transferase)
- ALP (alkaline phosphatase)
- GGT (gamma glutamyltransferase)
- Bilirubin
- Prothrombin time/INR
# Liver Function Tests

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
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<tbody>
<tr>
<td>Albumin</td>
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<tr>
<td>AST</td>
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<td>ALT</td>
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<td>ALP</td>
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<td>Bilirubin</td>
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<td>Prothrombin time/INR</td>
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# Liver Function Tests

<table>
<thead>
<tr>
<th>Test</th>
<th>Description</th>
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</table>
| Albumin    | - Synthetic function  
- Chronic assessment (half-life 20 days)                                      |
| AST        | - Hepatocyte damage                                                        |
| ALT        | - Hepatocyte damage  
- More sensitive than AST                                                   |
| ALP        | - Increased in cholestatic disease                                          |
| GGT        | - Produced in bile tract  
- Induced by alcohol                                                           |
| Bilirubin  | - Red cell breakdown  
- increased red cell breakdown or decreased biliary excretion               |
| Prothrombin time/INR | - Vit K dependent clotting factors                                      |
### Sources - extrahepatic

<table>
<thead>
<tr>
<th>Test</th>
<th>Extra-hepatic source</th>
</tr>
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<tbody>
<tr>
<td>Bilirubin</td>
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<tr>
<td>AST</td>
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<td>ALT</td>
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## Sources - extrahepatic

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</table>
| Bilirubin | - Red blood cells  
- Haemolysis  
- Intra-abdominal bleed |
| AST   | - Muscle (skeletal/cardiac)  
- RBCs |
| ALT   | - Muscle (skeletal/cardiac)  
- Kidneys |
| ALP   | - Bone  
- Kidneys  
- Placenta (first trimester) |
Bilirubin

• Unconjugated
  • Present in blood
  • Not soluble in water

• Conjugated
  • Conjugated in liver
  • Excreted via bile into small intestine
  • Converted to urobilinogen (excreted in urine) and stercobilin (excreted in faeces)
General principles of derangement

• Pre-hepatic
  • ↑ unconjugated bilirubin
  • Other LFTs largely normal

• Hepatic
  • ↑ AST/ALT

• Post-hepatic (obstructive)
  • ↑ ALP/GGT
Jaundice

- Yellowing - caused by bilirubin
- Pre-hepatic
- Hepatic
- Post-hepatic
Jaundice - causes

• Pre-hepatic
  • Haemolysis
  • Ineffective red cell production (Vit B12 deficiency)

• Hepatic
  • Hepatitis
  • Cirrhosis
  • Tumours
  • Drugs
  • Gilbert’s

• Post-hepatic
  • Gallstones
  • Biliary stricture
  • Ca – cholangiocarcinoma, head of pancreas
  • Cholangitis
Hepatitis- Acute

• Early ↑↑ ALT / AST
• Followed by ↑ bilirubin
• Can be some mild ↑ ALP

• Causes:
  • Viral hepatitis
  • EBV
  • CMV
  • Drugs/toxins
Hepatitis – Chronic/Cirrhosis

• ↑ ALT / AST
• Other LFTs may be normal
• Could be ↓ albumin, ↑ PT/INR, ↓ cholesterol
Cholestasis (obstructive)

• ↑↑ ALP
• ↑ GGT/bilirubin
• May be some mild ↑ ALT/AST
Alcoholic hepatitis

• ↑ AST/GGT
  • Less ALP and bilirubin increase

• Acute:
  • 10x ↑ in AST and GGT

• Chronic
  • ↑ ALT, bilirubin, ALP
  • ↓ albumin
  • May be ↑ MCV

• Other Sx:
  • Nausea, hepatomegaly, ankle oedema, ascites
<table>
<thead>
<tr>
<th>Test</th>
<th>Hepatitis</th>
<th>Obstruction</th>
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<tbody>
<tr>
<td>ALT</td>
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<tr>
<td>AST</td>
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<td>ALP</td>
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<tr>
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<tr>
<td>Bilirubin</td>
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<td>Urine bilirubin</td>
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<tr>
<td>Disorder</td>
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<td>Conjugated</td>
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<tr>
<td>Pre-hepatic (unconjugated)</td>
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<td>↔</td>
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<td>Jaundice</td>
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<tr>
<td>Non-haemolytic (unconjugated)</td>
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<td>↔</td>
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<tr>
<td>Bone Disease</td>
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