Liver Function Tests

James talks to Dr Ken Liu about the assessment of abnormal liver function tests (LFTs).

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**About Dr Ken Liu**

Dr Ken Liu is currently the liver transplant fellow at Royal Prince Alfred Hospital. Ken completed his internship, residency and Basic Physician Training at Royal Prince Alfred Hospital. He also completed 2 years of advanced training in Gastroenterology at Concord Hospital.

**Liver Function Tests**

*With Dr Ken Liu, Liver Transplant Fellow at Royal Prince Alfred Hospital, New South Wales, Australia*

**An approach to abnormal Liver Function Tests (LFTs)**

Junior doctors commonly order LFTs and are often the first to interpret them. It is important that JMOs have a sensible approach to interpreting them when they are abnormal.

1. **When should LFTs be ordered?**

- Inpatients usually have LFTs results available, it is a common test ordered in the Emergency Department
- If someone is sick enough to be admitted to hospital, they should probably have LFTs at least once during their admission
- Any patient with liver or biliary disease should have LFTs performed
- If a new medication is being started, especially one known to affect the liver, a baseline set of LFTs can be helpful
- In terms of frequency
  - If someone has a set of normal LFTs and a disease that does not affect the liver, it is wasteful to do LFTs more than once a week, or even to do regular LFTs
  - If someone has cirrhosis, liver failure or other diseases affecting the liver they need daily LFTs
2. What is your approach to an abnormal set of LFTs?

- History and the course of the admission is very important as the tests cannot be interpreted in isolation
  - As an example, someone with heart failure or sepsis can develop deranged LFTs
- A medication history is important
  - Ask about over the counter substances and herbal medications
- The time course
  - Have the LFTs be deranged acutely or is it a chronic problem?
- The severity
  - How many times above the upper limit of normal are the tests?
- Does the patient have underlying liver disease?
  - Ask about alcohol
  - Known cirrhosis and have they ever presented with jaundice, dark urine, ascites or encephalopathy
  - What does the examination show?
    - Peripheral stigmata of liver disease
      - Palmar erythema
      - Spider naevi
      - Signs of decompensation such as ascites or encephalopathy.
    - Is the patient jaundiced?
    - Vital signs – hypotension can cause a transaminitis
    - Signs of right heart failure

3. Is the classification of abnormal LFTs into cholestatic and hepatocellular patterns helpful?

- The traditional hepatocellular vs cholestatic pictures of LFTs are useful and should be in the back of your mind when you are looking at LFT results, but in reality things do not always fit neatly into those boxes
  - Hepatocellular – raised AST and ALT
    - There are not very many causes of transaminitis where the AST is higher than the ALT, classically alcohol can do it (though the numbers are rarely high) the other cause is ischaemia
4. What is your next steps for investigation if the LFTs are abnormal?

- If it's predominantly cholestatic and you have suspicion that it's a biliary problem, then your next step is an abdominal ultrasound to assess the bile ducts
  - If you suspicion is strong and the ultrasound is not conclusive, the next step after that is an Magnetic Resonance Cholangiopancreatography (MRCP)
  - A CT cholangiogram can be useful if MRCP is not readily available - it is limited in that you cannot order it if the bilirubin is too high
- If it is a predominantly hepatitic picture you can do tests looking for viral hepatitis, and start doing tests to look for some of the rarer causes like autoimmune hepatitis, primary biliary sclerosis etc
- If you ask for a liver consult, you should have at least thought about the possible causes. A list of the patients medications, especially new ones, can be helpful and an ultrasound should be ordered (even if it's not exactly a cholestatic picture)
- The next step is a liver screen. A panel of tests looking for diseases that can cause liver derangement and cirrhosis. The tests you order out of this set will depend on this clinical history
  - **Viral hepatitis serology**
    - Hep B surface antigen
    - Hep B surface antibody
    - Hep B core antibody
    - Hepatitis C antibody
    - If it is acute order in addition
      - Hep A IgM
      - EBV serology
      - CMV serology
  - **Metabolic**
    - Iron studies
    - Ceruloplasmin
  - **Autoimmune**
    - ANA
    - Anti-smooth muscle
    - Anti-liver kidney microsomal type 1
    - Anti-mitochondrial
    - ANCA
Liver function tests are something of a misnomer in that they are measures of liver damage. Coagulation, albumin and to an extent bilirubin are the real measures of liver function. If you are going to order LFTs, you should order coagulation studies at least as well. This can be important in cirrhosis, when someone has few functioning hepatocytes and they are not releasing AST/ALT and the LFTs can look normal but their INR is high because they actually have poor liver function.

In hospital the most common situation is for the LFT derangement to be multifactorial. Medications make up a large majority of causes and of them antibiotics are a big component. Paracetamol, especially in older people who don’t tolerate the usual 4g/day, is also a common cause. Sepsis and hypotension can also cause LFT derangement. Right heart failure is another common treatable cause.

If you are going to call for a consult, have a think about the problem yourself. Again, the history is very important, especially medications. Don’t be so rigid in your interpretation of LFTs in terms of cholestatic, biliary, mixed, etc. – any pattern can be seen with any cause.

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