ABC of hepatitis

DRUGS, CHEMICALS AND ALCOHOL CAN ALL INFLAME THAT WORKHORSE KNOWN AS THE LIVER, BUT VIRUSES ARE MAINLY TO BLAME. **MATT JOHNSON** REPORTS ON PATHOLOGY'S ROLE IN FINDING THE CULPRIT.

PHOTOGRAPHY: EAMON GALLAGHER

You and your liver share an unfair relationship; it knows an awful lot about you but chances are, if you're a non-medical type, you would have trouble tracing its outline on your abdomen with a finger.

In the age of excess, your liver knows what you eat, what you drink, what drugs you take and the condition and volume of your blood. You probably know it's a brownish organ, large and related to fois grae. But should your liver be unwell, don't be surprised if you become keenly aware of where it lives, what it does and how hard it normally works to keep you in blissful ignorance of its presence.

At about a kilogram and a half, your liver is your largest internal organ and also your largest gland. It fills the top right corner of the abdominal cavity, just under the diaphragm, and is so important to normal physiology that it receives one-quarter of all the blood pumped by the heart.

The liver is essential in the digestion and metabolism of carbohydrates, fats and proteins. It also controls blood sugar levels, removes worn out red and white blood cells, eliminates chemicals and drugs from your system, stores the vitamins and minerals you don't eat enough of (A, B12, D, E, K, iron and copper), and even acts as a blood reservoir in case of severe haemorrhage.

Interrupt one or more of these functions and you could quite soon be complaining of feeling unwell, as if you had a severe flu, but with abdominal pain, fatigue, anorexia, headache and a sudden onset of nausea when you smell food or, for smokers, cigarette smoke. The liver may also send out the signal particular to its own distress: jaundice, an unmistakable yellowing of the skin.

Present yourself to your GP complaining of some or all of the above and you may receive two things: a preliminary diagnosis of hepatitis and a referral to a pathology lab.

You need a pathologist because "hepatitis" is actually a relatively vague term that simply means inflammation of the liver, and before it can be treated effectively, the cause of that inflammation has to be identified.

Possible causes of hepatitis include chemicals (carbon tetrachloride), too much alcohol, parasites, bacteria, drugs (particularly antibiotics and certain tranquillisers), and mononucleosis (a flu-like illness). But by far the most common cause is infection by one of five viruses.

The five viruses are named A through to E: hepatitis A (HAV), hepatitis B (HBV), hepatitis C (HCV), hepatitis D (HDV) and hepatitis E (HEV), although 10 other viruses are under study, and hepatitis F and G have been provisionally classified. Each of the A to E viruses has slightly different symptoms, differing durations of infection and a wide range of long-term consequences. Viruses A, B and C are the most common.

The viruses respond to different types of treatment and can be transmitted via various means. To determine effective management, how the disease was transmitted and if others in your circle may be at risk, the pathologist's task is to identify which virus is causing the illness.

Testing for a hepatitis virus is a four-stage process involving biochemistry, immunoserology, histology and possibly even genetic testing. But because the virus can hide its presence (sometimes for months) it also involves other detective work.

For Dr Rob Baird, microbiologist, infectious disease physician and director of microbiology and infectious disease at Melbourne Pathology, the analysis involved in determining the viral strain of hepatitis is the "ultimate cross-discipline".

Because symptoms can vary significantly, and in many cases the sufferers show only mild symptoms, the first test conducted is not specifically for hepatitis, but is a blood test to simply measure how well the liver is working.

"The Liver Function Test (LFT) involves collecting blood and analysing it for rises in the levels of certain liver enzymes," Dr Baird says. "The results are usually returned within 24 hours. They cannot identify what type of hepatitis you may be suffering or the extent of the infection, but they will at least identify the liver as being affected."

If your LFT is abnormal, a second test aims to establish if viral hepatitis is the cause and what strain of virus is present. Serologic analysis of the blood sample

Hepatitis A

How is it spread?

After it has infected the liver, the virus is shed with the faeces. The disease is then spread via contaminated food, water or items such as cutlery – most likely due to hands not being washed. Contaminated shellfish are a common cause.

How do I avoid it?

Do what your mother told you: wash your hands after you go to the toilet and before you eat. Don't eat raw food in areas where the illness is common (Asia, Africa). Gamma globulin injections or a vaccine offer protection.

What are the symptoms?

There may be none but if there are they resemble the flu, with fever, fatigue, nausea, vomiting, abdominal pain, dark urine or light coloured stools. Jaundice may occur.

How will it be treated?

There is no specific treatment but the disease usually resolves on its own within two to 12 weeks. Rest and avoiding intimate contact and foods high in fat are recommended.

Will it have long-term effects?

Not usually.

Hepatitis B

How is it spread?

Hepatitis B is most often transmitted through contact with infected blood, other body fluids or contaminated needles. It is not spread by shaking hands, hugging or sharing food or drink. The virus is most common among people such as intravenous drug users and those who have unprotected sex with multiple partners.

How do I avoid it?

There is an effective vaccine and it is now part of the childhood immunisation schedule. Do not share needles or personal items such as toothbrushes, razors, razor blades or nail files and clippers. Practise safe sex.

What are the symptoms?

Most children and about half of adults who get hepatitis B never feel sick. The others will complain of fever, vomiting, fatigue, flu-like symptoms and loss of appetite.

How will it be treated?

Those with symptoms need rest, fluids and to avoid fatty foods, alcohol and certain medications.

Will it have long-term effects?

Between 80 and 90 per cent of adults who develop acute hepatitis B recover, leaving between 10 and 20 per cent who become chronically infected. Of the chronic patients, most will be asymptomatic carriers, but all are at risk of cirrhosis and liver cancer and ultimately dying from liver failure.

Hepatitis C

How is it spread?

Mostly by blood-to-blood contact. Shared needles, unsafe sex, poorly sterilised acupuncture or tattooing needles and shared razors can be responsible. Estimates of infection rates among Australian intravenous drug users are as high as 90 per cent.

How do I avoid it?

There is no vaccine and the only way to avoid infection is to reduce your exposure to the risk factors.

What are the symptoms?

Acute hepatitis C is very mild and often not diagnosed.

How will it be treated?

Hepatitis C is aggressively treated, firstly in an attempt to eradicate the virus and then to prevent serious chronic effects of the disease. Treatment with synthetic anti-viral drugs is expensive, usually often requires repeated courses and is not always effective. Sufferers are advised to avoid alcohol permanently.

Will it have long-term effects?

About 20 per cent of people with acute hepatitis C fully recover and are felt to clear the virus, leaving 80 per cent to develop some form of chronic condition. On average, it takes 10 years before chronic hepatitis is apparent or diagnosed. Of those with chronic hepatitis, 11 per cent of cases will be severe. However, 25 per cent of patients with chronic hepatitis will develop cirrhosis after 20 years and, of these, 5 per cent will develop liver cancer.

What worries Dr Baird is the growth in both hepatitis B and C. Worldwide it is estimated that there are more than 350 million hepatitis B carriers – five per cent of the world's population.

Dr Rob Baird, Microbiologist, Infectious Disease Physician and Director of Microbiology and Infectious Disease at Melbourne Pathology

looks for the body's immune response, searching for the antigens and antibodies that are specific to hepatitis A, B or C. It's an accurate test and sounds simple, but Dr Baird says there are 10 different antibody profiles for HBV alone and some can take several months to develop.

Things get a little more complex if hepatitis C is suspected. HCV generates two antibodies and requires two tests. Says Dr Baird: "The first test is very sensitive so it picks up a few false positives, but the second is very specific. We use the first test to narrow down the number of more expensive and complex second tests we need to do."

If the first test is positive and the second is negative, Dr Baird and his colleagues need to collect another blood sample and move to an even more complex level of testing. Unlike bacteria, viruses do not have metabolic or reproductive ability of their own. To grow and replicate they have to invade a host cell and hijack its metabolic machinery to reproduce and then infect other cells.

Unlike the LFT, where pathologists look for evidence of the damage being caused by the virus, or with the immunoserology test, where they chase the signs of the body's immune response to the virus, the molecular biologist actually goes hunting for the virus itself.

The aim is to look for nucleic acids specific to hepatitis C. The test also allows doctors to find out how severe the infection is and what the likelihood of long-term consequences is.

It identifies which drugs will be most effective and, because the drug therapy can cost more than $10,000 a year, the test is a government requirement before treatment can start.

If after all this blood testing the cause of the hepatitis still isn't clear, a liver biopsy will be performed and the tiny sample of liver tissue extracted by a needle will be split several ways and sent to a pathologist for microscopic examination.

The type of damage inflicted by the various hepatitis viruses can be quite specific, and biopsies remain one of the most accurate ways of determining the progression of the disease.

What worries Dr Baird is the growth in both hepatitis B and C. Worldwide it is estimated that there are more than 350 million hepatitis B carriers – five per cent of the world's population. It is also estimated that 10 million to 30 million people become infected each year even though there is an effective vaccine. It is easy to understand Dr Baird's frustration at routinely diagnosing a disease that could, technically at least, be eradicated.

Worse still, there are about 200 million people who have the hepatitis C virus. For every person infected with HIV each year, there are more than four infected with hepatitis C.

In industrialised countries, this infection may only account for 20 per cent of acute hepatitis cases but it is the cause of a staggering 70 per cent of cases of chronic hepatitis, 60 per cent of liver cancers and 30 per cent of liver transplants.

Over the next two decades, chronic hepatitis C is predicted to become a major burden on the health system as patients now unaware they even have the virus progress to end-stage liver disease and liver cancer.

At present there is no vaccine and no completely effective treatment. Dr Baird's advice is to lower your risk factors and get tested if you think you may have been exposed.

GPs NOTE: This article is available for patients at http://pathway.rcpa.edu.au