

Benign tumours and cystic disease of the liver



BRITISH
LIVER
TRUST

Fighting liver disease

Benign tumours and cystic disease of the liver

The British Liver Trust works to:

- support people with all kinds of liver disease
- improve knowledge and understanding of the liver and related health issues
- encourage and fund research into new treatments
- lobby for better services.

All our publications are reviewed by medical specialists and people living with liver disease. Our website provides information on all forms of adult liver disease and our Helpline gives advice and support on general and medical enquiries. Call us on **0800 652 7330** or visit **www.britishlivertrust.org.uk**

Contents

The liver.....	3
How liver disease develops	4
What are cysts and tumours?.....	6
Benign liver tumours.....	6
Cystic diseases	9
Complementary and alternative medicines.....	21
Useful words	22
Who else can help?	24
Further information	25

The liver

Your liver is your body's 'factory' carrying out hundreds of jobs that are vital to life. It is very tough and able to continue to function when most of it is damaged. It can also repair itself – even renewing large sections.

Your liver has around 500 different functions.

Importantly it:

- fights infections and disease
- destroys and deals with poisons and drugs
- filters and cleans the blood
- controls the amount of cholesterol
- produces and maintains the balance of hormones
- produces chemicals – enzymes and other proteins – responsible for most of the chemical reactions in the body, for example, blood clotting and repairing tissue
- processes food once it has been digested
- produces bile to help break down food in the gut
- stores energy that can be used rapidly when the body needs it most
- stores sugars, vitamins and minerals, including iron
- repairs damage and renews itself.

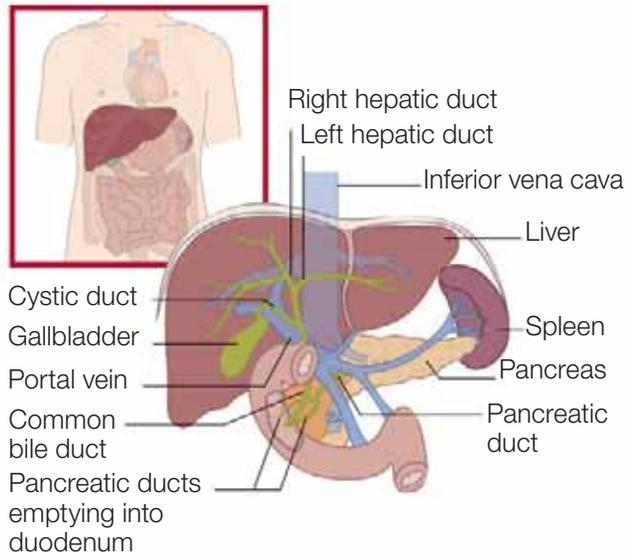
How liver disease develops

Liver damage develops over time. Any inflammation of the liver is known as hepatitis, whatever its cause. Sudden inflammation of the liver is known as acute hepatitis. Where inflammation of the liver lasts longer than six months the condition is known as chronic hepatitis.

Fibrosis is where scar tissue is formed in the inflamed liver. Fibrosis can take a variable time to develop. Although scar tissue is present the liver keeps on functioning quite well. Treating the cause of the inflammation may prevent the formation of further liver damage and may stop or reverse some or all of the scarring.

Cirrhosis is when inflammation and fibrosis has spread throughout the liver and disrupts the shape and function of the liver. Even at this stage, people can have no signs or symptoms of liver disease. When the working capacity of liver cells has been badly impaired and they are unable to repair or renew the liver, permanent damage occurs.

Cirrhosis can lead to liver failure or liver cancer. All the chemicals and waste products that the liver has to deal with build up in the body. The liver is now so damaged that the whole body becomes poisoned by the waste products and this stage is known as end stage liver disease. In the final stages of liver disease the building up of waste products may cause multiple organ failure and lead to death.



What are cysts and tumours?

There are various types of cysts and tumours in the liver, all of which are abnormal growths or structures.

A cyst is an abnormal, fluid-filled balloon or bubble-like structure (sac) that can grow in any part of your body. Liver cysts are mostly congenital, meaning that you have them from birth, or caused by contact with some form of parasite.

A solid tumour is an abnormal lump or swelling of tissue caused by an uncontrolled build-up of cells. Tumours can be benign or malignant – those that are benign do not spread or cause cancer, while malignant tumours are cancerous and may invade other parts of the body.

Most of the information is focused on cysts and how they can affect the liver and bile ducts. Bile ducts are tube-shaped structures that carry bile from the liver to the gallbladder and then to the small intestine for removal (excretion) from the body.

This publication provides brief information on the most common benign tumours, specifically haemangiomas, focal nodular hyperplasia and adenomas. Cystic diseases, unlike benign tumours, can pose a serious health risk but are relatively rare in the UK.

Benign liver tumours

Benign liver tumours are common and usually without symptoms (asymptomatic). They tend to be found during imaging tests for unrelated conditions and, although most need no treatment,

it is important for doctors to tell these tumours apart from those that are malignant.

Haemangiomas

Haemangiomas are the most common of all benign solid tumours. Around 1% of people may have one of these tumours. Haemangiomas are made up of newly formed but abnormal blood vessels. They can vary in size but are usually less than 5cm (or a couple of inches) and usually remain so once grown.

Haemangiomas are usually picked up on ultrasound scanning. Further imaging techniques such as computed tomography (CT) and magnetic resonance imaging (MRI) or microbubble ultrasound may be required to confirm the diagnosis. A CT scan examines the density (thickness) of your body tissues. It obtains pictures, called tomograms, from different angles around your body using computer processing and can also show very detailed cross-sectioned images of your tissue and organs. With MRI a special tube scanner is used to provide a detailed view of your internal organs.

The majority of haemangiomas do not require long term monitoring or treatment. In rare cases where a tumour becomes overly large, embolisation (a type of treatment aimed at reducing the blood supply to the tumour) and surgery are most commonly used to reduce or remove it.

Focal nodule hyperplasia (FNH)

After haemangiomas, FNH is the most frequent of the benign solid liver tumours. It is commonly found in women aged between 15 and 50. The

typical tumour is a small mass or lump commonly measuring between 3cm to 5cm in diameter and is usually found singly. It is characterised by a pale-coloured central scar that in most cases can be seen in CT and MRI scans.

Some people experience pain in their abdomen (the 'tummy' or 'belly' area between the chest and pelvis) but most do not have clear symptoms. These tumours do not rupture or become malignant and do not need specific treatment.

Adenomas

Adenomas are tumours that can affect a number of organs and originate in your glands. Hepatic adenomas are very rare and are thought to be linked to exposure to certain hormones. On average, these tumours can measure between 8cm to 15cm. Of the benign tumours, they require the most clinical attention because it is possible for them to grow (and press against other organs or tissue), rupture and bleed. If this does happen it can cause severe abdominal pain.

The risk of rupture is increased in pregnancy, so that increased monitoring by ultrasound is advisable. Ultrasound scans involve sending sound waves into the body to create echoes that can be recorded and used to build a picture of the liver's condition.

In the extremely rare case that an adenoma does become malignant, surgical removal (resection) may be advised.

Cystic diseases

The overwhelming majority of cystic disease is caused by simple cysts. There are also inherited disorders that cause cysts, including polycystic liver disease, congenital hepatic fibrosis and Caroli's syndrome. Although rare in the UK, hydatid cysts are caused by a parasitic infection.

What is cystic disease?

The bile ducts in the liver are like the branches of a tree that come together just below the stomach. This is known as the biliary tree, sometimes called the biliary system or biliary tract. A side branch of the biliary tree leads to the gallbladder, the organ that stores bile. Gallbladder disease involving the biliary tree is more common than cystic disease.

Cysts affecting the biliary tree belong to a group of diseases caused by congenital bile duct abnormality and are usually inherited. These cysts can create problems by:

- placing pressure on surrounding organs and body tissue as they become enlarged
- causing inflammation of the bile ducts, known as cholangitis
- causing increased blood pressure in the portal vein, known as portal hypertension.

Simple liver cysts

Simple cysts arise from a malformation of your bile ducts. In rare cases, they can cause bile duct obstruction, secondary infection or may rupture. Some may require surgical drainage.

Simple cysts are not inherited and unrelated to polycystic liver disease (see page 11) in which many more cysts are present. They are estimated to affect between 1% and 2.5% of the population. They affect all ages, but occur more frequently in the population as age increases.

Simple cysts usually have no symptoms. Larger cysts may occasionally cause some dull pain and/or swelling in the upper right hand side of your abdomen, an area referred to as the 'right upper quadrant'. Jaundice (yellowing of the skin and whites of the eyes), which is often caused by bile duct obstruction, is rare.

To diagnose simple liver cysts medical staff may record your medical history and carry out a physical examination. An ultrasound or CT scan of your abdomen may also be carried out.

Simple liver cysts generally do not require treatment unless they become large enough to cause pain.

To reduce their size, doctors can remove the fluid from the cyst. They do this by inserting a needle through the skin under X-ray guidance, and withdrawing (aspirating) the fluid. However, the fluid will usually refill the cyst. To help stop this, after the fluid has been taken out, doctors may inject a substance into the cyst to help stick the walls together. This substance is called a sclerosant. A similar technique involves removing part of the wall of the cyst, called laparoscopic de-roofing.

Therefore, after drainage a sclerosant (such as alcohol) may be injected into the cyst in an attempt to 'stick the walls together' and prevent the cyst from refilling with fluid. (This is the reason why

de-roofing is performed – to stop the cyst simply refilling with fluid).

As in endoscopy, laparoscopy uses a flexible fibre optic tube with a tiny camera and a light on the end (laparoscope). This is inserted into your abdomen through a small cut in your skin (keyhole). This procedure is performed under a general anaesthetic.

Polycystic liver disease (PLD)

Adult polycystic liver disease is an inherited disorder where many cysts of various sizes develop throughout your liver and is associated with congenital hepatic fibrosis (see page 13).

Both conditions have in common a growth of numerous abnormally shaped (malformed) bile ducts, known as ductal plate malformation. PLD may occur with polycystic kidney disease (PKD) or alone but is less common and milder than the kidney form.

The tendency to form multiple cysts is probably present at birth, but cysts usually do not become larger and cause problems until you are an adult. Cysts can be very small, perhaps no larger than a pinhead, but can grow up to 10cm. Similarly, your liver can remain its normal size or become heavily enlarged.

Your liver should continue to function effectively in PLD and the disease is not considered to shorten your life expectancy.

PLD becomes more common with age but is rare, affecting much less than 1% of the population.

Women tend to be more affected as the size and increase of cysts is thought to be linked to levels of oestrogen.

Polycystic liver disease is first noticed during puberty, with symptoms becoming more noticeable as you enter your thirties. Most people are diagnosed in their forties and fifties. PLD is often without clear symptoms, but swollen, painful abdomen and an enlarged and hardened liver (hepatomegaly) are usually associated with the condition. In many cases polycystic liver disease is discovered by accident or noticed during diagnosis of kidney disease. The majority of people with polycystic kidney disease will also have PLD.

Laboratory tests such as liver and renal function tests may be used to diagnose PLD. Liver function tests (LFTs) are used to indicate whether your liver is inflamed (hepatitis), damaged or not working properly. They measure levels of certain enzyme and protein substances in your blood that may alter when liver damage is present. Doctors will also use imaging tests such as ultrasound, CT or MRI scan and a special X-ray of the kidney (intravenous pyelogram).

Cysts rarely require treatment. If necessary, laparoscopic de-roofing can be helpful for reducing larger, uncomfortable cysts. In rare cases of severe PLD, where multiple cysts cause the liver to become massively enlarged and very painful (leading to other complications), a liver transplant may be required. This is usually only recommended if your quality of life has become very poor and other treatments are no longer helpful.

The course of your treatment may be influenced by the degree of any associated kidney disease you may have.

Congenital hepatic fibrosis (CHF)

Congenital hepatic fibrosis is an inherited disease that affects both your liver and your kidneys. CHF causes scarring and hardening of the liver, which makes it more difficult for the blood to flow through it. This causes a condition called portal hypertension, where there is increased pressure in the veins that carry blood to the liver. Bleeding oesophageal varices – small, protruding veins that line your gullet (oesophagus) – are an early sign of this condition.

If you have CHF your kidney function may also be affected. Some scientists believe that CHF and another condition called autosomal recessive polycystic kidney disease (ARPKD) are part of the same disorder.

Both CHF and ARPKD are very rare, affecting around one person in 20,000 and symptoms occur more in newborns and young children. Both sexes are equally affected.

Symptoms of CHF may be apparent from early childhood. These may include abdominal pain. Your kidneys and spleen may also be enlarged. Complications from portal hypertension may cause bleeding in the stomach, vomiting blood and blood in your faeces (from oesophageal varices). This condition is usually diagnosed in childhood, either because you have an enlarged liver or because of bleeding varices. In some people the diagnosis is not made until adult life. In addition to liver function tests, diagnosis is made by carrying out:

- an ultrasound scan of your liver and kidneys
- a CT scan of your abdomen
- an X-ray of blood vessels (angiography)
- an endoscopy to detect varices
- a liver biopsy.

CHF differs from cirrhosis because your liver cells remain able to function. There is no specific treatment for the condition but many people require re-routing of blood from the intestines. This is known as a 'shunt' operation and is carried out to prevent more intestinal bleeding. A metal or plastic tube (stent) is used to join two veins in order to change the direction of blood flow. It is usually done by a radiologist with the help of ultrasound or other imaging equipment to guide them. This procedure will mean at least a day or two in hospital.

Bleeding oesophageal varices can be treated during endoscopy. This is a procedure in which a long, flexible fibre optic tube with a tiny camera on the end (endoscope) is passed into your gullet after you have been sedated.

The bleeding is often treated using a technique called banding, often carried out as day surgery. Banding is where a vein is sucked into a small chamber attached at the end of the endoscope and a small band is placed around its base (ligation).

Complications from bleeding varices are life-threatening and early diagnosis is important. When these procedures are effective, without other complications, the prognosis for people with CHF is usually good.

Choledochal cysts

There are different types of choledochal cysts. They are categorised by their size and where they are found. They affect the main trunk of the biliary tree, known as the common bile duct, causing it to become unusually enlarged. This is called cystic dilatation and probably occurs at time of birth. It leads to an abnormal junction between the common bile duct and the pancreatic duct (anomalous pancreatobiliary junction, or APBJ).

Usually by the age of two or three, but sometimes not until you have reached adulthood, the duct may form a cyst. This prevents the bile from reaching the intestine. Bile backs up into the liver, causing you to become jaundiced. Inflammation and weakening of the bile duct walls will follow.

In childhood this may lead to pancreatitis (inflammation of the pancreas), cholangitis and liver damage. The most worrying complication may be cholangiocarcinoma, a rare type of cancer that develops in cells lining the bile ducts in the liver.

Choledochal cysts are extremely rare. The condition affects females more than males and occurs more commonly in Southeast Asia, with more than 30% of reported cases occurring in Japan. The majority of choledochal cysts are seen in childhood, although some people may not show symptoms until they are adults.

Symptoms are jaundice, caused by the reduced amount of bile draining from the abnormal bile duct, and abdominal pains. Pain may be increased if the

bile building up in the liver becomes infected. In some cases the cyst can be felt by the doctor when examining your abdomen.

The diagnosis of choledochal cysts is not difficult once the condition is suspected. Cysts can be confirmed by using imaging equipment such as ultrasound, MRI or magnetic resonance cholangiopancreatography (MRCP), endoscopic retrograde cholangio-pancreatography (ERCP) and CT.

MRI and MRCP studies are able to provide images of the cyst with more precise anatomic detail. MRCP is a specialised scan that is performed in the MRI machine that provides a picture of your biliary and pancreatic ducts. In this scan, the fluid in your biliary ducts appears brighter while the surrounding organs and tissues will appear darker.

During an ERCP, the endoscope is passed into the duodenum and contrast medium is injected back up into the bile ducts. This can be visualised with X-ray screening allowing the gastroenterologist to see the outline of your biliary tree.

ERCP is an endoscopic procedure which, although invasive, is valuable in examining both your biliary and your pancreatic structures. It can identify problems with the biliary tree, cystic duct obstruction, gallstones, narrowings and tumours.

If the condition is not correctly diagnosed the blockage of bile may result in scarring (fibrosis) of your liver. Extensive scarring may lead to cirrhosis. If you are diagnosed as an adult, inflammation and damage to the bile ducts may have been occurring for many years.

Choledochal cysts are treated by surgical removal of the abnormal segment of the bile duct and reconstruction of the biliary tree so that bile travels back into the intestine. Leaving the diseased cyst in place is considered to increase the risk of developing cholangiocarcinoma.

Caroli's syndrome

Caroli's disease and Caroli's syndrome are biliary tree disorders in which small cysts alternate with narrowed segments of the bile ducts. These abnormalities may be present throughout the liver, or limited to a small area. They are more common in adults and more likely to occur in women.

Caroli's disease, which occurs in the main bile ducts, is less common than Caroli's syndrome although both are very rare. In Caroli's syndrome the small bile ducts are also malformed and congenital hepatic fibrosis occurs.

Caroli's syndrome is generally inherited, whereas Caroli's disease is not. As with congenital hepatic fibrosis, Caroli's syndrome is often associated with autosomal recessive polycystic kidney disease (ARPKD).

People with Caroli's disease and Caroli's syndrome may have cholangitis, portal hypertension and, as with people who have choledochal cysts, are at much higher risk of developing cholangiocarcinoma.

The symptoms are usually abdominal pain and, very rarely, jaundice. Complications from portal hypertension may cause vomiting of blood

(haematemesis) and blood in your faeces (maelena). Bleeding comes from burst or ruptured varices. If the bile becomes infected, you may develop fever, abdominal pain and, rarely, jaundice. This complication can first appear in childhood or may not occur until middle age.

Doctors will be looking for bile duct abnormalities and evidence of fibrosis. LFTs, imaging and liver biopsy may all be used in diagnosis.

Radiologists will scan the bile ducts using ultrasound, CT and MRCP. ERCP and another invasive technique called percutaneous transhepatic cholangiography (PTC) may also be used. With PTC, a thin needle is passed through your skin and through the liver into a bile duct. A dye is injected so that the biliary tree becomes outlined on X-ray. This picture will show any narrowing or blockages.

If severe cholangitis is suspected, a liver biopsy may also be carried out. During a liver biopsy a fine hollow needle is passed through the skin into the liver and a small sample of liver tissue is withdrawn for study. This is usually done after a local anaesthetic has been given and is usually carried out as day surgery.

Treatment may be required if you have recurrent or severe cholangitis. This can involve reconstructive surgery to improve the flow of bile. If you have developed gallstones, these may be removed by an ERCP procedure.

A medication made from naturally occurring bile acids called ursodeoxycholic acid (URSO) may

also be given to sooth any complications arising from gallstones.

Hydatid cysts

This type of disease is a parasitic infestation by a tapeworm known as 'echinococcus granulosus'. This parasite, which lives mainly in dogs, enters your body as larvae. This is likely to happen when you handle an infested animal or eat food or drink water contaminated by its faeces. The larvae travel in the bloodstream and lodge in organs to form cysts. The liver is most commonly affected (70% of hydatid cysts form there), followed by the lungs, brain and bones.

The cysts become larger and in some cases form a mass. This can take decades, and not all cysts are active. Growing cysts can cause damage to your body tissues either directly or by affecting the flow of blood. They can also rupture or leak, possibly leading to allergic reaction and shock (anaphylaxis). If the rupture affects biliary ducts, cholangitis may follow. More seriously, secondary infection can occur if this happens in your lungs. A ruptured cyst will also cause the disease to spread further in your body.

Hydatid cysts are very rare in the UK and are more likely to be contracted abroad where there has been contact with sheep dogs and other animals. These areas are more commonly southern Europe, the Middle East, Australia, New Zealand and South America.

A related parasite, echinococcus multilocularis, is found in the northern hemisphere. It lives in wild

foxes and is passed on through contact with rodents. It enters the human body in the same way as *Echinococcus granulosus* but the cyst behaves more like a cancerous tumour.

Both parasites can cause severe liver disease but are very rare. They are estimated to affect only one person in 100,000 in the UK.

Symptoms may be at first general and can be non-specific. They are generally caused by pressure from the size of the cysts. Possible symptoms may include:

- abdominal pain and/or swelling and tenderness
- coughing
- skin rashes
- itching (pruritus)
- jaundice

Because the parasite grows slowly in your body it is rarely diagnosed during childhood or adolescence unless your brain is affected. Diagnosis of hydatid disease is usually reached by blood tests and imaging tests.

Liver function tests are used, together with a test mainly in immunology to detect the presence of antigens or antibodies, known as the enzyme-linked immunosorbent assay (ELISA). Antigens are invading or foreign proteins, and antibodies are the proteins your body produces to defend against them.

CT and ultrasound scans are most commonly used to show single or multiple cysts. MRI scans may be used to provide greater detail to help doctors decide whether cysts are active, inactive

or something in between (transitional). ERCP may be used to show cysts in the bile ducts.

Drugs are usually used first in the treatment of hydatid disease to help prevent any spread of the disease although surgery is still required in many cases. The first line drug treatments are albendazole and mebendazole. These drugs are given in oral form and work by being absorbed through the cyst's membrane to affect its growth. You will have to take these drugs for three months. Another drug, praziquantel, can be given over 14 days and is now sometimes used in combination with albendazole and mebendazole.

Between a third and half of cysts treated with drugs may grow smaller or disappear.

If surgery is required, the aim is usually to remove the cyst completely. This can be complicated, particularly where there has been secondary infection from the cyst, and in certain cases may carry significant risk of mortality.

Complementary and alternative medicines

Many complementary and alternative medicines are available that may ease the symptoms of liver disease. But certain medications used in non-liver related disease can damage the liver. At present, healthcare professionals are not clear on the role and place of some therapies in managing liver disease. More research needs to be done on the use of these therapies. You may wish to discuss the use of these therapies with your doctor.

Useful words

Antibody – a specific immunoglobulin (protein) produced by the body as part of a defence reaction against an invading substance (antigen).

Antigen – an invading organism (such a virus). When recognised by the body as foreign, the body's immune defence will react to the antigen by producing antibodies.

Autosomal – refers to genes that are not found on the sex chromosomes.

Benign – a mild condition or disease that is not life-threatening. The term is usually applied to tumours.

Bile – a yellow-green fluid produced by your liver to aid digestion. It contains chemicals as well as waste products and plays a central role in helping the body digest fat.

Biliary – anything to do with bile or the bile ducts.

Cell – the most basic and smallest functioning unit or 'building block' of living things. Your body is made up of cells, each with its own unique functions and features. Within the outer skin (membrane) of each cell is a central compartment known as the cell 'nucleus' that contains your genetic material.

Cirrhosis – where inflammation and fibrosis have spread to disrupt the shape and function of the liver. Even with no signs or symptoms of liver disease, the working capacity of liver cells has been badly impaired and they are unable to repair the liver. This is permanent cell damage and can lead to liver failure or liver cancer.

Fibrosis – where scar tissue is formed in an inflamed liver. Fibrosis can take a variable time to develop and, even with scar tissue present, the liver keeps on functioning quite well. However, continued building up of scar tissue may lead to cirrhosis.

Hepatic – anything relating to the liver.

Hepatitis – any inflammation of the liver is known as hepatitis, whether its cause is viral or not. A sudden inflammation of the liver is known as acute hepatitis. Where inflammation of the liver lasts longer than six months the condition is known as chronic hepatitis.

Inferior vena cava – the large vein that carries blood back to the heart from the lower part of the body.

Inflammation – the first response of the immune system to infection, commonly characterised by heat, swelling, pain and tenderness.

Jaundice – a condition in which the whites of the eyes go yellow and in more severe cases the skin also turns yellow. This is caused by a rise of bilirubin plasma (containing yellow pigment) which is normally disposed of by the liver.

Malignant – a tendency to become progressively worse. In tumours, this describes a disease that will spread and destroy healthy tissue.

Oesophagus – the gullet. This important part of the digestive system is a tube through which food and liquid travels from the mouth to the stomach.

Portal hypertension – increased blood pressure in the portal vein, which carries blood from the bowel and the spleen to the liver. Portal hypertension is characterised by impaired or reversed blood flow, an enlarged spleen, and protruding (dilated) veins in the oesophagus and stomach.

Stent – a small, thin wire-mesh or plastic tube used when treating obstructions in the bile ducts. Where there is a narrowing (stricture) in the bile duct the doctor will insert a stent to open up the duct to keep it from collapsing.

Varices – dilated (expanded) and protruding veins that run along the wall under the lining of the upper part of the stomach and lower end of the gullet. If they rupture or break they will bleed heavily.

Who else can help?

www.arpkdchf.org

The ARPKD/CHF Alliance is a US charity dedicated to improving the lives of those affected by ARPKD (autosomal recessive polycystic kidney disease) and CHF (congenital hepatic fibrosis). Browsers will find the Alliance website a useful source of patient information and other resources.

Further information

The British Liver Trust publishes a large range of leaflets about the liver and liver problems written for the general public.

Leaflets that you may find particularly helpful include:

- *Cirrhosis of the liver*
- *Diet and liver disease*
- *Liver cancer*
- *Liver disease tests explained*
- *Liver transplantation*
- *Life after liver transplant*

Contact us for more information:

Tel: 0800 652 7330

Email: info@britishlivertrust.org.uk

Web: www.britishlivertrust.org.uk

This leaflet is for information only. Professional, medical or other advice should be obtained before acting on anything contained in the leaflet as no responsibility can be accepted by the British Liver Trust as a result of action taken or not taken because of the contents.

Special thanks

Dr Ashley Brown, Consultant Hepatologist,
Imperial College Healthcare NHS Trust

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British Liver Trust

2 Southampton Road
Ringwood, BH24 1HY

Tel: 0800 652 7330 **Fax:** 01425 481335

Email: info@britishlivertrust.org.uk

Web: www.britishlivertrust.org.uk