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information series for HIV-positive people

HIV & hepatitis

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HIV & hepatitis

The viruses hepatitis B (HBV) and hepatitis C (HCV) can cause serious illness due to their effect on the liver. Many people with HIV are also infected with hepatitis B or hepatitis C, and this may have implications for their health and their treatment options. This booklet provides an introduction to hepatitis and is aimed at people with HIV who also have hepatitis B or C. It is not intended to replace discussion with your doctor but should help you think about questions you would like answered. A summary can be found at page 28. A glossary of terms used can be found at page 30.

contents

1 The liver

The liver is the largest internal organ in the human body and is situated in the upper right hand side of the abdomen (tummy), protected by the ribs. Although a healthy liver is important to everybody, it is especially important to people with HIV, as the liver plays an important part in processing anti-HIV medications and other drugs. Viral infections of the liver, such as hepatitis A, B and C can make you very ill, and may also impair the ability of the liver to process medicines, as can liver damage caused by drug and alcohol use.

The livers functions

The liver has three major functions:

- It stores and filters blood removing unwanted substances.
- It makes bile, which is released into the gut to help digest fat.
- It processes nutrients from food, releasing energy into the blood stream and storing vitamins and minerals.

What can go wrong

Hepatitis means inflammation of the liver and this is not uncommon in people with HIV. This booklet covers hepatitis caused by the viruses hepatitis A, B and C.
Heavy and sustained alcohol consumption can cause liver damage, leading to a

condition called cirrhosis, a permanently scarred and damaged liver which no longer works properly. Recreational drugs, such as ecstasy, heroin and cocaine, can also damage the liver.

Maintaining a healthy liver

There are some simple steps you can take to keep your liver healthy.

- If travelling overseas, particularly to a country with poor sanitation you should be aware that hepatitis A can be spread in shellfish, salads, raw vegetables, water and ice cubes.
- Using a condom will reduce the risk of contracting hepatitis B from anal, vaginal or oral sex and using a dental dam for oral-anal contact (rimming) will reduce the risk of contracting hepatitis A.
- If you inject drugs, do not share any injecting equipment because this is an effective way of transmitting infections including hepatitis B and C, as well as HIV.
- Drinking large amounts of alcohol can damage your liver, try give your body time to recover after an episode of heavy drinking. Similarly, be aware that some recreational drug use can damage your liver.
- Eating a low fat diet, including plenty of fresh fruit, vegetables and oily fish (like salmon or mackerel) will also help you maintain a healthy liver.

3 Vaccinations

Unlike HIV, vaccines are available against hepatitis A and hepatitis B. It is important that everybody who is HIV-positive receives these vaccinations, which are safe and effective and are available free of charge from sexual health or genitourinary medicine clinics (GUM) in the UK. Both vaccines are administered by a course of injections – two for hepatitis A and three for hepatitis B, over a number of months. For the vaccine to be effective it is necessary to have all the injections. Unfortunately, there is no vaccine against hepatitis C. Some people are naturally immune to hepatitis A and B and you will be checked for this prior to vaccination.

Hepatitis A

Hepatitis A can cause a short-term (or acute) illness which normally lasts ten to fourteen days. It has no long-term or chronic phase. Most people can expect to get better without any special treatment. Once you have had hepatitis A you cannot get it again.

The duration of hepatitis A illness can be longer in people with HIV. Infection with hepatitis A may mean that you have to stop taking anti-HIV or other medicines. This is because many medicines are broken down by the liver, and when the liver is inflamed by hepatitis A it is unable to process medicines effectively, increasing the risk of side-effects.

5 Hepatitis B

Hepatitis B is a viral infection that can cause serious or even fatal damage to the liver. Hepatitis B virus is also known as HBV.

The virus is most common in China, southeast Asia and sub-Saharan Africa where between 10-20% of the population may have been infected with hepatitis B. In western Europe and the US, between 0.1-0.2% of the population are infected with hepatitis B. However it is thought that as many as 30% of gay and bisexual men may have been infected.

The World Health Organisation estimates that 2 billion people have been infected with hepatitis B globally, and that more than 300 million people are chronic carriers of the virus.

Transmission

Hepatitis B is usually transmitted through contact with the saliva, blood, semen, and vaginal fluids of a person infected with hepatitis B. Transmission of hepatitis B from mother to infant causes the majority of hepatitis B infections worldwide, but the availability of hepatitis B vaccination has virtually eradicated mother-to-child transmission of hepatitis B in resource-rich countries. In western Europe, the US and Australia, hepatitis B infection occurs predominantly among gay and bisexual men, people who share drug-injecting equipment, people with haemophilia and health care workers. The virus is many times more infectious than HIV.

Symptoms of hepatitis B

When someone first becomes infected with hepatitis B, they may develop jaundice (yellowing of the skin), loss of appetite, pain in the abdomen, feel generally unwell, nausea, vomiting, muscle and joint aches or fever. These symptoms may be very severe or even fatal, though this is rare. The majority of people contracting hepatitis B have no symptoms and the infection is diagnosed by routine blood tests.

There are four stages of hepatitis B infection:

- Immune tolerance – hepatitis B replicates freely and there are no symptoms of hepatitis. This phase lasts for several weeks when adults become infected and for decades when infants are infected.
- Immune response - the immune system mounts an attack on hepatitis B infected liver cells and starts to clear the virus. It may last for as little as three weeks when adults are infected or it may persist for ten or more years in people with chronic infection. Symptoms of hepatitis may occur during this stage.
- Full viral clearance - the immune system has 'won the battle' and active viral replication stops. This is sometimes referred to as 'seroconversion' because the body begins to produce antibodies to a protein on the virus' surface called the hepatitis B 'e' antigen.

- Immunity to hepatitis B - there is a full antibody response to hepatitis B antigen and hepatitis B genetic material (DNA) usually disappears.

Blood tests can detect the presence of hepatitis B antigen and antibodies, which show that you have been exposed to the virus (antigens are foreign proteins or substances in the body and antibodies are produced by the immune system in response to an antigen).

If fragments of the virus itself, called hepatitis B surface antigen (HBsAg) are found in your blood for more than six months, you are a chronic carrier and are capable of infecting other people. If you have antibodies but no antigen after six months, you have cleared hepatitis B infection.

Some people are also 'e antigen positive,' which is a marker of increased viral replication, and an increased risk of transmission.

Once you have been diagnosed with chronic hepatitis B infection, regular monitoring of your liver is advised. Blood tests including a liver function test should be conducted at least every six to twelve months. A liver function test measures levels of particular proteins or enzymes in your blood to determine how well your liver is working. If you already have cirrhosis, a liver ultrasound scan may be conducted every six months to screen for signs of liver cancer. A

liver biopsy, when a small sample of liver tissue is extracted using a hollow needle, may also be performed to determine the extent of liver scarring.

Treatments for hepatitis B

The aim of treatment for hepatitis B is to reduce liver inflammation, lower levels of hepatitis B genetic material (DNA) and, ideally, to eradicate hepatitis B antigens and produce antibodies. There are currently two approved treatments for chronic hepatitis B in the European Union which are effective in about one-third of recipients who are monoinfected (only have one infection) with hepatitis B: alpha interferon and lamivudine (3TC, *Epivir*™). In addition, adefovir (*Preveon*™) will be licensed for the treatment of hepatitis B before Spring 2003.

Alpha interferon is usually given as an injection of five million units daily or 10 million units three times per week for at least four months. It generally leads to viral clearance in 20-40% of monoinfected recipients. Factors which have been associated with a poor response to alpha interferon are:

- Being male.
- Long duration of infection.
- HIV coinfection.
- High levels of hepatitis B DNA as well as other viral and host factors.

Key side-effects associated with alpha interferon include flu-like symptoms, aches and pains, depression, bone marrow suppression, and unwanted immune responses.

Lamivudine inhibits both HIV and hepatitis B and is an approved treatment for both viral infections. The dosage of lamivudine for the treatment of hepatitis B infection is 100mg taken orally once daily, whereas the dosage for treatment of HIV in combination with other antiretrovirals is one 150 mg tablet twice a day. Lamivudine should not be given as monotherapy in people with hepatitis B and HIV co-infection if HIV is above the limits of detection because the low dose could lead to 3TC resistance. As a treatment for hepatitis B, lamivudine results in viral clearance in about 20-30% of people after one year of treatment. The optimal length of lamivudine treatment for hepatitis B has not been established; studies have generally treated people for one to two years, but lifelong therapy may be required.

Hepatitis B and HIV coinfection

Several studies have suggested that hepatitis B does not hasten or worsen HIV disease progression and severity. However, a recent US study which monitored over 5,000 gay men over sixteen years found that those with HIV who were also chronic

carriers of hepatitis B were eight times more likely to die of liver-related causes compared with men with HIV who did not have hepatitis B.

As in the case of anti-HIV therapy, combining two or more drugs to treat hepatitis B is generally regarded as more effective than the use of a single drug. However, two studies of the combination interferon alpha plus lamivudine failed to show the benefit of combination over single drug therapy. Combination therapy studies are continuing with the two approved treatments and a wide range of experimental drugs.

People with HIV and hepatitis B coinfection who are taking or considering lamivudine should be aware of the potential for 'hepatitis flares' when they stop lamivudine. One clinical trial found that around 20% of coinfected people who stopped the drug experienced a rebound in hepatitis B DNA, and a small minority (2-4%) had increased ALT and bilirubin levels (a sign of impaired liver function). People who are coinfected with HIV and hepatitis B should discuss this risk with their doctor before making changes to therapy.

Hepatitis B can develop resistance to lamivudine in about a third of people, but there is evidence that lamivudine-resistant hepatitis B remains sensitive to newer antiviral drugs such as adefovir, tenofovir, and lobucavir.

Combination therapy with adefovir and lamivudine is being investigated.

Tenofovir is also active against hepatitis B and some doctors think that an anti-HIV regimen that combines tenofovir and lamivudine may also be an effective treatment for hepatitis B. Studies to investigate this are currently recruiting. Another possible treatment is emtricitabine (FTC), which will be licensed in the UK in 2003 and could also be used with tenofovir.

HAART and hepatitis B

A flare of hepatitis B may be the consequence of immune recovery. As the immune system rebuilds due to the activity of anti-HIV drugs, it mounts improved immune responses to infectious agents such as hepatitis B. Some individuals may develop antigens to hepatitis B. This improved immune response may lead to active hepatitis. As a consequence, some experts believe that people with chronic hepatitis B infection who start anti-HIV treatment (often called highly active antiretroviral therapy, or HAART) should at the same time start treatment for hepatitis B infection, in order to reduce the risk that HAART will lead to hepatitis B-related liver damage.

A number of HIV antiretroviral drugs may cause increases in liver enzymes, and people with viral hepatitis face an

increased risk. Ritonavir, in particular, is associated with hepatic (liver) side-effects. However, other drugs can also trigger liver problems including indinavir, nevirapine, AZT, ddI, pentamidine, sulphur-based antibiotics, and ketoconazole.

Hepatitis B infection itself is a risk factor for the development of liver problems in people starting HAART.

Despite the risk of an acute episode of hepatitis and/or poor liver function results, evidence indicates that antiretroviral therapy may be used effectively in people with viral hepatitis.

Liver transplants for people with HIV

Evidence suggests that liver transplants can be successful in some people with HIV, and an increasing number of liver transplants are being conducted on people coinfected with HIV and hepatitis B or hepatitis C in the UK and US.

13 Hepatitis C

Hepatitis C virus (HCV) is more common in Europe and the USA than HIV infection. It is estimated that up to 500,000 people may be infected with hepatitis C in the UK alone. Coinfection with both hepatitis C and HIV is chiefly confined to injecting drug users and people with haemophilia and in the USA and Europe, it is thought that as many as 30% of people with HIV are also infected with hepatitis C. Increased rates of hepatitis C are also seen in gay men.

Hepatitis C was first identified in 1989. It is not related to hepatitis B virus, although it causes somewhat similar symptoms. Hepatitis C infects both the liver and the lymphatic system, and over time it may infect other organs too.

Transmission

Hepatitis C is transmitted by the virus entering the blood stream. The sharing of drug injecting equipment is the most common source of infection. Blood-to-blood hepatitis C transmission also occurred through blood products prior to the introduction of screening and sterilisation procedures in 1986.

Tattooing and piercing with unsterilised equipment can also be routes of hepatitis C transmission.

Hepatits C is sometimes detectable in body fluids other than blood at extremely low levels. This raises the possibility that hepatitis C may be transmitted without blood-to-blood contact. In most cases, levels of hepatitis C in other body fluids are too low to lead to transmission.

The evidence so far suggests that although hepatitis C can be transmitted sexually, it is not easily passed on by this route. However, this is a controversial issue and opinion appears to be changing. Recently some HIV treatment centres have reported increasing numbers of gay men testing positive for hepatitis C. It is thought that people with HIV are more likely to pass on hepatitis C sexually, or contract it sexually. Sex which involves contact with blood is likely to pose a risk of hepatitis C infection. Sharing household items such as nail scissors, toothbrushes and razors, which may carry tiny amounts of blood, should be avoided. Mother-to-baby transmission of hepatitis C is thought to be uncommon although coinfection may increase the risk of both HIV and hepatitis C transmission. A high level of hepatitis C in the blood increases the likelihood that a woman will transmit hepatitis C to her child. A caesarean delivery can reduce the chance of a mother passing on hepatitis C to her baby.

Research into breast-feeding by hepatitis C-infected women has produced inconclusive results; some studies found that breast-

feeding increased the risk of infection while other studies did not. Consequently, current UK and US guidelines do not discourage breast-feeding, except when the skin is broken on the nipples or in cases of HIV coinfection.

Disease progression

A small proportion of people infected with hepatitis C manage to clear the infection. Approximately 85% of infected individuals go on to develop chronic or ongoing hepatitis C infection. Patterns of disease progression seem to vary considerably from person to person. Some individuals may never experience symptoms, others may begin to develop symptoms like fatigue or nausea ten to fifteen years after infection, and a significant minority develop serious liver disease. The varying severity of hepatitis C may reflect differences between hepatitis C strains, or differing genetic or immunological characteristics of the infected individual. Other factors such as being male, alcohol use, older age and co-infection with HIV may accelerate hepatitis C disease progression.

A large study has found that it takes, on average between 30 and 40 years to progress from infection with hepatitis C to liver cirrhosis in people monoinfected with hepatitis C.

Symptoms

Very few people with hepatitis C realise that there is anything wrong with them at the time they become infected. Less than 5% suffer acute hepatitis symptoms such as jaundice, diarrhoea and nausea.

However, over half of people who contract hepatitis C will develop some symptoms in the long-term. Most commonly, people with hepatitis C experience extreme tiredness prior to any evidence of liver disease. Other early symptoms include nausea, weight loss and intolerance to fatty food and alcohol.

People with hepatitis C may also show symptoms of depression, generally feel unwell, and have problems understanding and learning.

The two most serious forms of liver disease, cirrhosis (scarring of the liver tissue) and hepatocellular carcinoma (liver cancer), cause other symptoms discussed in detail below.

Cirrhosis

Cirrhosis is characterised by scarred liver tissue. Once cirrhosis has occurred it is irreversible, even if inflammation can be controlled.

Cirrhosis may lead to serious problems including jaundice, internal bleeding and swelling of the abdomen.

Liver cancer

Both chronic hepatitis B and hepatitis C significantly increase the likelihood of liver cancer.

Although lifestyle factors are generally under-researched in hepatitis C, heavy alcohol intake is definitely a contributory factor in the development of liver cancer, especially in patients with cirrhosis. The influence of other dietary and lifestyle factors have not yet been thoroughly researched, but it is thought that smoking cigarettes speeds up the rate of cirrhosis and increases the chance of developing liver cancer. Pegylated interferon has shown initial promise in trials against hepatitis C related cirrhosis in some people and has also been shown to reduce the risk of developing liver cancer.

Liver cancer is difficult to treat. Surgery is often the only option, involving removal of part of the liver. Chemotherapy has no proven benefit against liver cancer. Some small tumours can be cut out during surgery although the likelihood that a new tumour will develop within five years is high.

How does HIV affect hepatitis C?

HIV may affect hepatitis C infection by speeding up liver damage. As a result, coinfected people seem more likely to

develop liver disease than people with hepatitis C alone. Even coinfected people with high CD4 counts may be at greater risk of liver damage than HIV-negative people. Advanced HIV infection seems to be associated with more severe hepatitis C-related liver damage.

In the last five years, many studies have confirmed the link between HIV and hepatitis C coinfection and accelerated progression to cirrhosis, liver cancer and liver failure. Coinfection with HIV and hepatitis C has also been associated with high levels of hepatitis C in the blood.

Some studies have however found that having HIV as well as hepatitis C did not speed up the amount of time it took to develop liver disease. It can also be difficult to measure exactly how long people have been infected with hepatitis C. This can lead to false estimates of the speed of hepatitis C disease progression.

The effect of hepatitis C on HIV prognosis

In countries where antiretroviral therapy is widely available, liver disease is now a major cause of hospital admission and death among HIV-infected people.

However, this is a direct consequence of liver problems and recent large studies suggest that hepatitis C did not significantly alter the chances of dying,

developing AIDS or responding poorly to HAART.

Diagnosis and monitoring

A blood test for the presence of antibodies to hepatitis C can tell you whether or not you have been exposed to the virus.

A test is also available to measure your hepatitis C viral load (PCR). A viral load test can indicate whether you are one of the small percentage of people who clear hepatitis C from the body naturally. Given that viral eradication is one of the goals of anti-hepatitis C treatment, viral load testing is also used to monitor the effectiveness of treatments. Unlike HIV viral load testing, hepatitis C viral load is not an indicator of when to commence treatment, but it does indicate how long treatment should last for. People with high viral load (above 2 million copies) may require a longer period of treatment.

Liver function tests (LFTs) may give an indication of whether hepatitis C has damaged your liver, but these are much less useful for hepatitis C than for hepatitis B, since some people have quite normal liver function tests even though they have suffered significant liver damage.

If the degree of liver damage is unclear, it may be necessary to have a liver biopsy, in which a small sample of liver tissue is extracted via a needle, to look for signs of

liver injury. A liver biopsy is a more complex procedure for people with haemophilia, and you may need to receive extra Factor VIII or Factor IX before and after the biopsy. A few people with haemophilia may not be able to have a biopsy because of very low clotting factor levels.

A liver biopsy will help to determine what sort of treatment may be needed, and how long it should last. Liver biopsy is the only way to determine accurately whether a person with hepatitis C has liver damage, because other markers of liver damage may be normal.

HIV infection can make the diagnosis of hepatitis C and its symptoms more difficult. Hepatitis C infection may not show up on antibody tests in a minority of HIV-infected people, and levels of liver enzymes may not reveal the full extent of liver disease.

HAART in coinfected individuals

Highly active antiretroviral therapy (HAART) is safe and effective in people co-infected with HIV and hepatitis C, although the risk of liver toxicity due to anti-HIV drugs is greater. Consequently, choice of anti-HIV drugs may be influenced by liver impairment or disease, and careful monitoring of liver function is

recommended when hepatitis C-infected people start HAART.

The decision to commence HAART in co-infected people is based on HIV viral load and CD4 count, as it is for people infected with HIV alone.

People with hepatitis C who take HAART may be at greater risk of metabolic disorders such as insulin resistance and diabetes than people with HIV alone, but may be at lower risk of increased cholesterol.

Among the total HIV-infected population, about 3-4% of individuals develop acute liver disease within two years of starting HAART.

In addition to hepatitis C co-infection and alcohol intake, several other factors have been linked to liver toxicity among people starting HAART:

- Injecting drug use.
- Age over 35.
- Hepatitis B co-infection.
- High levels of liver enzymes when treatment is started.
- Protease inhibitor therapy – ritonavir has been shown to increase the risk of liver toxicity.
- CD4 increase, and HIV viral suppression.

Who should receive HCV treatment?

There is huge variation in response to anti-hepatitis C treatments due to a variety of factors.

People less likely to respond well to treatment include:

- Symptomatic people with fibrosis of the liver.
- People with hepatitis C viral load greater than two million copies.
- People with CD4 counts below 500.
- People with the most aggressive variety of hepatitis C virus – type 1b.

People with fewer symptoms and with lower hepatitis C viral loads tend to be better responders, but they may have a lower risk of disease progression in any case (for example, people with type 2 hepatitis C probably have a lower risk of liver cancer than people infected with other sub-types).

Current practice is only to initiate treatment if liver function tests are consistently abnormal. If liver function is relatively normal, current practice is to defer treatment.

Aims of hepatitis C treatment

The main goals of hepatitis C treatment, according to disease stage, are:

- Sustained undetectable hepatitis C viral load (below 100 copies) six months after

completing a course of treatment, thought to indicate clearance of infection.
- Undetectable hepatitis C viral load within three months of starting treatment. This is strongly predictive of achieving long-term clearance of hepatitis C.
- Sustained normalisation of ALT (liver enzyme) levels.
- Improvement and disappearance of liver inflammation.
- Prevention of progression to cirrhosis and liver cancer.

Among people with coinfection and CD4 counts above 200, the aim of hepatitis C treatment should be hepatitis C eradication. However, the treatment strategy is slightly different for individuals with advanced HIV. Among this group of people, the aims include:
- Fostering tolerance of anti-HIV drugs.
- Reducing liver damage and hepatitis C viral load.
- Normalising liver function.
- Reducing the risk of liver failure and death.
- Improving quality of life.

Treatment for hepatitis C

Before treatment for hepatitis C is started, it is important to have a hepatitis C viral genotype test. The genotype of hepatitis C you are infected with can predict your response to treatment. There are at least

six types of hepatitis C genotype, and type 1 is the most common in the UK. Unfortunately, type 1 responds least well to the currently available treatments for hepatitis C.

Treatment for hepatitis C is not life-long. It consists of 24 week or 48 week courses of treatment. Currently three antiviral treatments are approved for hepatitis C: interferon alpha or interferon alpha plus ribavirin, or a new form of interferon called pegylated interferon alpha plus ribavirin.

Pegylated interferon is removed more slowly from the body. This makes it a more effective form of the drug and allows for once weekly dosing.

Ribavirin is not active against hepatitis C when taken alone. The combination ribavirin/interferon alpha produces a superior sustained response rate among individuals previously untreated, and among those who have had poor responses to interferon alone.

The British HIV Association (BHIVA) recommends that a decision to provide treatment for hepatitis C should be made after tests including a liver biopsy and hepatitis C genotype have been performed. The infection considered the greatest risk to a person's health should be treated first. Hepatitis C should be treated first if a person's HIV is stable and does not require treatment whereas HIV should be treated prior to hepatitis C if a person's CD4 count

is low or a person is assessed to be at risk of HIV progression. When hepatitis C therapy is provided, a combination of pegylated interferon and ribavirin should be used.

Which infection to treat first

As discussed above, when you should start treatment for HIV or hepatitis C depends on the stage of the infection. If tests show both diseases should be treated, doctors will usually start treating HIV first as this is likely to be the more rapid and life-threatening of the two diseases. Secondly, treating HIV before your CD4 count falls below 200 is associated with a better response to hepatitis C treatment. If hepatitis flares up, HAART may need to be suspended to treat the hepatitis C infection.

Hepatitis C may be treated first if, for example, a person has rapidly progressing or severe liver disease and a CD4 count above 350.

Close monitoring of people taking both HAART and anti-hepatitis C drugs is advised to look for signs of liver toxicity. There are also potential drug interactions between the NRTIs (particularly AZT) and ribavirin which increase the risk of the serious, but very rare, metabolic disorder called lactic acidosis. People taking ribavirin plus anti-HIV drugs (especially AZT) may also be a greater risk of the blood disorder known as anaemia.

Side-effects of hepatitis C treatment

Side-effects may be very severe, though they tend to modify and in some cases lessen as treatment goes on. They include high fevers, joint pain, weight loss, nausea and emotional and psychological disturbances.

The major side-effect of alpha interferon is severe depression, and many people take anti-depressants to combat this.

Other major side-effects of alpha interferon are neutropenia (low white blood cell count) and thrombocytopenia (low platelet count). Pancreatitis is a rare life-threatening condition which can occur in response to treatment with ddI, and less commonly d4T. People taking interferon/ribavirin plus ddI/d4T may be at increased risk of pancreatitis. Fat loss associated with d4T and other nucleoside analogues may also be worse in people with hepatitis C coinfection.

Use of complementary therapies

Many people with hepatitis have chosen to use alternative and complementary therapies to reduce symptoms. Chinese herbal medicine in particular is used quite widely in the UK. Milk thistle is also used by some people with liver disease. However, there is no clinical evidence that these treatments are effective. What's more, the

popular complementary therapy Kava-kava has caused liver failure in some people and is going to be banned from sale in the UK.

Diet and nutrition

Dietary adjustments and other changes in lifestyle are important. Reducing alcohol consumption or eliminating it entirely is beneficial. Avoidance of trans-fatty acids (look for the words 'hydrogenated vegetable oil' on labels to spot these) and animal fats may also be helpful, though some doctors advise that this may be less important in people who do not have symptoms.

Experimental treatments

Interferon-tau is another new form of interferon currently under investigation which, like pegylated interferon, may have greater effectiveness against hepatitis C in co-infected individuals. However this has yet to be proved.

Summary

- The liver plays an important part in processing anti-HIV drugs and other medicines.
- Viral infections like hepatitis A, B and C can make you very ill and impair the ability of the body to process medicines.
- Vaccinations against hepatitis A and B are available– there is no vaccine for hepatitis C.
- People with HIV are recommended to be vaccinated against hepatitis A and B.
- Hepatitis A can make you ill in the short-term but does not have longer-term health consequences.
- Hepatitis B can make you ill in both the short and long term.
- Treatments are available for hepatitis B and some anti-HIV drugs also work against hepatitis B.
- Anti-HIV drugs can be used effectively in people coinfected with hepatitis B, but may cause short-term hepatitis B 'flares.'
- Hepatitis C can make people ill in the longer-term and many people with HIV are also coinfected with hepatitis C.
- It can take many years for hepatitis C to cause damage to the liver and drinking alcohol, smoking and taking some recreational drugs can speed this up and make the damage worse.

- People with HIV also experience faster hepatitis C related liver damage.
- Hepatitis C does not appear to make HIV worse or mean that HAART works less well.
- Treatments are available for hepatitis C and treatment decisions should be made on an individual basis.
- When people with HIV receive treatment for hepatitis C it is recommended that they receive a combination of ribavirin and pegylated interferon.

Glossary

acute A recently developed condition.

anaemia A shortage or change in the function of red blood cells. These carry oxygen to the cells of the body.

antibody Protein substance produced by the immune system in response to foreign organism.

antigen Something the immune system can recognize as 'foreign' and attack.

antiretroviral A substance that acts against retroviruses such as HIV.

antiviral A drug that acts against viruses.

biopsy A small sample of tissue that can be examined for signs of disease.

CD4 A molecule on the surface of some cells onto which HIV can bind. The CD4 cell count roughly reflects the state of the immune system.

cholesterol A waxy substance, mostly made by the body and used to produce steroid hormones.

chronic A long-term condition.

clinical trial A research study involving participants, usually to find out how well a new drug or treatment works in people and how safe it is.

diabetes A condition characterised by raised concentration of sugar in the blood, due to problems with the production or action of insulin.

genotype The genetic make-up of an organism.

HAART Highly Active Antiretroviral Therapy, a term used to describe anti-HIV combination therapy with three or more drugs.

haemophilia An inherited condition, characterised by an inability to clot blood and to bleed profusely from even minor cuts and injuries.

hepatic To do with the liver.

hepatitis Inflammation of the liver.

insulin A hormone produced by the pancreas that tends to lower blood sugar levels.

jaundice A yellowing of the skin and whites of the eyes associated with liver or gall bladder problems.

liver The organ involved in digestion of food and excretion of waste products from the body.

liver function tests (LFTs) Tests evaluating the function of the liver.

metabolism The mechanisms which sustain life, turning sugar and fat into energy.

nausea Feeling sick.

NRTI Nucleoside analogue reverse transcriptase inhibitor, the family of antiretrovirals which includes AZT, ddI, 3TC, d4T, ddC and abacavir.

protease inhibitor Family of antiretrovirals which target the protease enzyme.

seroconversion The time when a person's antibody status changes from negative to positive.

neutropenia A shortage of neutrophils, immune cells in the blood which can attack bacteria and fungul infections.

pancreas A glandular organ situated behind the stomach that secretes insulin and digestive enzymes.

pancreatitis A condition of the pancreas causing severe abdominal pain, shock and collapse, which can be fatal.

strain A variant characterised by a specific genotype.

toxicity The extent or ways in which a drug is poisonous to the body.

transaminase An enzyme that can be measured in a blood sample that indicates the health of the liver.

tumour Uncontrolled new tissue growth, in which cells multiply rapidly.

undetectable viral load A level of viral load that is too low to be picked up by the particular viral load test being used.

vaccine A substance that contains antigenic components from an infectious organism. By stimulating an immune response (but not disease), it protects from subsequent infection by that organism.

viral load Measurement of the amount of virus in a sample.

virus A microscopic germ which reproduces within the living cells of an organism it infects.

Notes

Notes

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