HEPATITIS C

An infection caused by the hepatitis C virus (HCV) that affects the liver and could be transmitted through sexual intercourse by blood or from infected

Diagnosis

Male & Female

About Hepatitis C

Hepatitis is a disease or inflammation of the liver (Pic. 1). Hepatitis C (HCV) infection is caused by the hepatitis C virus (Pic. 2) which is transmitted through blood to blood contact.

Hepatitis C is one of the most serious types of hepatitis. When a person is first infected with hepatitis C they may have short-term symptoms known as an acute infection. After the acute infection stage, most people do not get rid of the virus from their body. The virus stays in their body and may cause ongoing disease of the liver. This can cause long-term problems and is called chronic infection.

Acute hepatitis C usually goes undiagnosed because it rarely causes symptoms. When signs and symptoms are present, they may include jaundice, along with fatigue, nausea, fever and muscle aches. Chronic hepatitis C is usually asymptomatic for many years, until the virus damages the liver enough to cause the signs and symptoms of liver disease.

People who have chronic infection can pass the infection on to other people. A person remains infectious during both the acute phase and throughout chronic infection. They are not infectious if they have blood tests that indicate they have been able to clear the virus.

Hepatitis C is transmitted through infected blood entering the bloodstream of another person. This is often referred to as blood to blood contact. It is also
possible to spread hepatitis C through razors and other personal hygiene equipment (Pic. 3).

Having blood tests is the only way to tell if people are infected with the hepatitis C virus. Blood tests can also show if there is any damage to the liver. The first test is for antibodies, the second test looks for presence of the virus itself.

Sometimes people test positive for the antibody, but negative for the virus. This means that the virus has been in their blood but is now gone. This doesn’t mean that they are immune, because they can get infected again.

HCV induces chronic infection in 80% of infected persons. Approximately 95% of these clear with treatment. In rare cases, infection can clear without treatment. Those with chronic hepatitis C are advised to avoid medications toxic to the liver and alcohol. They should be vaccinated against hepatitis A and hepatitis B. There is no vaccine available yet because of the genetic diversity of HCV (RNA virus, high replication with a lot of genotypes and subtypes). There is also no effective post-exposure prophylaxis (immune globulin, antiviral agents) because passive immune prophylaxis against HCV using immune globulin containing detectable levels of anti-HCV has not been convincingly documented.

Use of acetaminophen is generally considered safe at reduced doses. Nonsteroidal anti-inflammatory drugs (NSAIDs) are not recommended in those with advanced liver disease due to an increased risk of bleeding. Ultrasound surveillance for hepatocellular carcinoma is recommended in those with accompanying cirrhosis. Coffee consumption has been associated with a slower rate of liver scarring in those infected with HCV.

Hepatitis C does not alter fertility itself, but chronic liver diseases can impair fertility because they interfere with the functioning of the pituitary gland, which produces some of the hormones needed for proper menstrual cycle and sperm production.

**Associated diseases**

**HIV**

Human immunodeficiency virus infection and acquired immune deficiency syndrome (HIV/AIDS) is a spectrum of conditions caused by infection with the human immunodeficiency virus (HIV). Patients who are HIV-positive are commonly co-infected with HCV due to shared routes of transmission: percutaneous exposure to blood, sexual intercourse, and from a mother to her infant. Infection with HCV can be asymptomatic, self-limiting, or progress to cirrhosis or cancer.
Biological changes caused by HIV, including systemic illnesses, stress, and weight loss, may affect the function of reproductive organs and result in infertility.

**Liver failure**

Liver failure or hepatic insufficiency is the inability of the liver to perform its normal synthetic and metabolic function as part of normal physiology. Chronic liver failure usually occurs in the context of cirrhosis, itself potentially the result of many possible causes, such as excessive alcohol intake, hepatitis B or C, and others.

Infertility in patients with liver failure may be overestimated. With current advances in assisted reproduction techniques (ART), as well as aggressive medical treatment of liver diseases, fertility in this population is maintained.

**Liver cancer**

Liver cancer, also known as hepatic cancer and primary hepatic cancer, is cancer that starts in the liver. However, only a minority of HCV-infected individuals develop cancer, suggesting a complex interplay between viral gene expression and host and environmental factors to promote hepatocyte transformation and carcinogenesis. Cancer, or more often cancer treatments, can interfere with some part of the process and affect your ability to have children. Most likely, it is important to talk about whether or not cancer treatment may increase the risk of, or cause, infertility.

**Complications**

**Cirrhosis**

If left untreated, hepatitis C may lead to scarring of liver (cirrhosis). This could develop up to >20 years after first infection. Cirrhosis is increasing in prevalence due to the epidemics of hepatitis C and obesity and the associated fatty liver.

Cirrhosis (Pic. 4) is often associated with hormonal imbalances that can interfere with sperm production. Pregnancy is rare in women with cirrhosis due to reduced fertility, but when it occurs, requires specialized management.

**Mother-to-child transmission**

In developed countries transmission around the time of birth is now the leading cause of HCV infection. In the absence of virus in the mother's blood transmission seems to be rare. Factors associated with an increased rate of
infection include membrane rupture of longer than 6 hours before delivery and procedures exposing the infant to maternal blood. Cesarean sections are not recommended. Breastfeeding is considered safe if the nipples are not damaged. Infection around the time of birth in one child does not increase the risk in a subsequent pregnancy. All genotypes (complete heritable genetic identity) appear to have the same risk of transmission.

**Mortality**

An estimated 143 million people (2%) worldwide are infected with hepatitis C as of 2015. It occurs most commonly in Africa and Central and East Asia. About 167,000 deaths due to liver cancer and 326,000 deaths due to cirrhosis occurred in 2015 due to hepatitis C.

**Risk factors**

Testing for hepatitis C is recommended for people who may have undertaken high-risk activities such as:

- people who have been in prison
- people aged 40-60 (who may have been exposed many years ago without knowing it)
- people who have had a medical or dental procedure in the developing world
- anyone who has ever had an abnormal liver test
- immigrants from areas with a high prevalence of hepatitis C
- re-using or sharing drug injecting equipment including needles and syringes, spoons, mixing water and tourniquets
- sharing personal hygiene equipment, such as razors or toothbrushes with an infected person

Less common risks include sexual contact where blood is present, a blood transfusion prior to 1990, non-sterile medical and dental procedures, cosmetic procedures involving piercing of skin and mother to child transmission.

Hepatitis C is not transmitted by social contact or sharing items such as crockery, cutlery, shower and toilet facilities.

**Impact on fertility**

The liver regulates the balance of sex hormones, thyroid hormones, and other adrenal hormones. It transforms or removes any excess from the body. If the liver cannot do this properly, there is the risk of hormonal imbalances. Sexual libido depends upon a delicate balance of hormones. If this balance is upset by hepatitis C infection then both men and women can suffer loss of sexual desire.
The hepatitis C virus infection does not cause infertility in either sex - it does not affect a woman’s ovarian or uterine function, or a man’s sperm production or sperm characteristics.

Female fertility

Studies has shown no differences in fertilization rate and pregnancy rate in HCV patients. Many women with the virus are able to have a healthy baby. However, there is a small risk that the virus will be transmitted to a baby during pregnancy. HCV receptors are found not on the oocyte itself, but rather on granulosa cells surrounding the oocytes, and since HCV is an RNA virus, it cannot integrate into the host genome to potentially cause chromosomal instability like hepatitis B virus.

Male fertility

In the last decade, an infection of semen and sperm caused by viruses (viral infection) is the subject of intensive research. The research of viral infection of spermatozoa and its consequences for reproduction reached its peak with the beginning and development of methods of artificial reproduction. There are number of viruses known that they can infect the semen—the human immunodeficiency virus (HIV), human papilloma virus (HPV), hepatitis B virus (HBV), hepatitis C virus (HCV), and herpes simplex virus (HSV). The questions arises from these finding is whether the viral infection stays in semen fluid only or there is a possibility that viruses can be directly transported with human spermatozoa, and whether sperm infected with viruses is capable of transferring it into the egg during fertilization, that is true through vertical transmission.

Men can develop increased oestrogen levels that may affect sexual function, thus, it can alter sperm parameters, such as reduced motility, abnormal morphology, and lower sperm count. However, human sperm carrying the HCV C gene is able to achieve normal fertilization.

Prevention

Because hepatitis C is a blood-borne virus there are certain situations where transmission is more likely to occur. There are a number of precautions which will reduce the risk of transmission.

Personal hygiene
Never share razors or toothbrushes with others as hepatitis C can be transmitted through small breaks in the skin that may not be visible to the human eye, or may be caused by shaving or brushing your teeth.

**Sexual Intercourse**

Transmission of hepatitis C during sex is a very low risk. However safe sex is recommended particularly with casual partners or in circumstances where blood contact is more likely, such as during menstruation or when genital ulcers are present. Using condoms and water based lubricant when you have vaginal or anal sex is recommended.

**When dealing with blood**

There may be instances where a person comes into contact with blood. In this instance the following steps should be taken:

- Always use gloves when handling blood or body fluids. Supplies of clean gloves should be available in all households, childcare centres, schools and sporting venues.
- Cover cuts and wounds with waterproof adhesive dressing.
- Dispose of blood stained tissues, tampons, sanitary napkins and other dressings in a sealed plastic bag or an approved collection bin.
- Wipe up blood spills using gloves and newly opened hospital strength bleach (one part bleach to nine parts water)

**Symptoms**

Acute HCV infection is asymptomatic in most cases, and only 15% of cases are symptomatic with symptoms such as:

- yellow skin and eyeballs (jaundice; Pic. 5)
- dark orange or tea coloured urine
- nausea
- tiredness
- swollen and painful liver (right-hand side of abdomen)

Most people with acute hepatitis C go on to have chronic hepatitis C infection. Those who develop chronic infection are at risk of cirrhosis, hepatocellular carcinoma and liver failure. Those with chronic infection remain infectious to others.

**Therapies**
People with hepatitis C are advised to:

**Limit or avoid alcohol**

People with chronic hepatitis C should seriously think about not drinking alcohol at all. Alcohol can increase the injury to the liver.

**Maintain a healthy well-balanced diet**

Obesity speeds hepatitis C liver injury, speeds alcoholic liver injury and can cause cirrhosis in the absence of other insults. Obesity is best prevented. Once it is present and the patient has developed cirrhosis, the fat tends to disappear from the liver and patients regularly spontaneously lose weight. At this late stage it may be too late for further weight reduction to be beneficial to the liver.

**Get adequate rest**

There are steps that can take to get a good night’s rest, including go to bed at the same time and get up at the same time; no pets, TVs, work, or gadgets in bedroom; keep the room cools use soft fabrics for PJs, sheets and blankets; skip naps; and avoid exercise, large meals or alcohol within 2-3 hours of bedtime.

**Conventional medicine**

Hepatitis C is treated using antiviral drugs. Several medications or combinations can lead to cure in about 10 weeks in the majority of infected patients. Liver transplantation is used in advanced stages where cirrhosis occurs. Antiviral therapy for the treatment of hepatitis C virus infection is also used before and after liver transplantation to reduce reoccurrence of hepatitis C.

The ultimate goal of hepatitis C treatment is to reduce the occurrence of end-stage liver disease and its complications including decompensated cirrhosis, liver transplantation, and HCC. Treatment success is assessed by sustained virologic response (SVR), defined undetectable HCV RNA in blood several months after completing a course of treatment.

Treatment during the first six months is more effective than once hepatitis C has become chronic. In those with chronic hepatitis B,
treatment for hepatitis C results in reactivation of hepatitis B in about 25%.

**Pharmacotherapy**

**Antiviral medication**

Treatment with antiviral medication is recommended in all people with proven chronic hepatitis C who are not at high risk of dying from other causes. People with the highest complication risk should be treated first, with the risk of complications based on the degree of liver scarring. The initial recommended treatment depends on the type of hepatitis C virus and whether or not a person has cirrhosis.

Direct-acting antiviral agents (DAAs) represent a revolution in HCV drug discovery. DAAs were developed to reduce adverse events, and improve adherence to therapy among HCV patients.

**Surgical therapy**

**Liver transplantation**

Cirrhosis due to hepatitis C is a common reason for liver transplantation though the virus usually (80–90% of cases) recurs afterwards. Infection of the graft leads to 10–30% of people developing cirrhosis within five years. Treatment with pegylated interferon and ribavirin post-transplant decreases the risk of recurrence to 70%.

**Assisted reproduction**

Infertility treatment, when there is a possibility of infection with hepatitis of the couples or one of them, is causing concern. Since, transmission of the infection to the baby, laboratory technicians, medical staff, and contamination of gametes/embryos is possible. The management of infertility associated with the hepatitis infection is a very important and controversial topic, by performing diagnostic tests before starting treatment of infertility can reduce or eliminate potential risks.

If one partner is infected, he/she is referred for treatment with one of the modern drug regimens for 8 to 12 weeks before fertility treatment. If viral load does not drop to an undetectable level then a protocol exists for infected men to test semen for the virus and use the frozen sperm for in vitro fertilization (IVF) and intracytoplasmic sperm injection (ICSI) to minimize transmission to mother and baby.
Accordingly, proper initial detection of hepatitis in fertility clinics should be done and protocol and techniques for virus removal should be performed. Moreover, before embryo and gamete cryopreservation (preservation by freezing) or donation of hepatitis status should be determined and suggested protocol of sperm washing technique. In addition, storage of sample in the nitrogen vapor instead of the liquid state and double-sealing technique for cryocontainers in order to avoid potential cross-infection should be performed.

Find more about related issues

Therapies

Egg donation
Process by which a woman donates eggs for purposes of assisted reproduction or biomedical research.
Learn more at: [www.fertilitypedia.org/edu/therapies/egg-donation](http://www.fertilitypedia.org/edu/therapies/egg-donation)

ICSI
A micromanipulative fertilization technique in which a single sperm is injected directly into an egg.
Learn more at: [www.fertilitypedia.org/edu/therapies/icsi](http://www.fertilitypedia.org/edu/therapies/icsi)

Sperm donation
The procedure in which a man (sperm donor) provides his sperm for fertility treatment.
Learn more at: [www.fertilitypedia.org/edu/therapies/sperm-donation](http://www.fertilitypedia.org/edu/therapies/sperm-donation)

Standard IVF
A process in which an egg is fertilised by sperm outside the body: in vitro. Own or donated gametes may be used.
Learn more at: [www.fertilitypedia.org/edu/therapies/standard-ivf](http://www.fertilitypedia.org/edu/therapies/standard-ivf)

Gallery
In humans, it is located in the right upper quadrant of the abdomen, below the diaphragm. Its other roles in metabolism include the regulation of glycogen storage, decomposition of red blood cells and the production of hormones.

The Components of the Digestive System

Digitally colorized micrograph of hepatitis C presence.

The difference between normal and cirrhotic liver.

A yellowish or greenish pigmentation of the skin and whites of the eyes due to high bilirubin levels. It is commonly associated with itchiness. The feces may be pale and the urine dark.

**Sources**
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