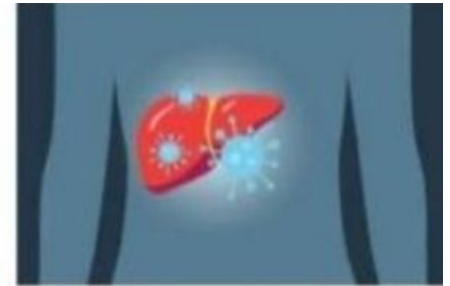


HEPATITIS



- The word is derived from the Greek words '*hepar*' meaning "liver" and '*itis*' meaning "inflammation".
- Hepatitis refers to an inflammatory condition of the liver. It's commonly caused by a viral infection, but there are other possible causes of hepatitis.
- These include autoimmune hepatitis and hepatitis that occurs as a secondary result of medications, drugs, toxins, and alcohol.
- Autoimmune hepatitis is a disease that occurs when the body makes antibodies against the liver tissue.

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- Some people have no symptoms whereas others develop yellow discoloration of the skin and whites of the eyes, poor appetite, vomiting, tiredness, abdominal pain, or diarrhea.
 - Hepatitis may be temporary (acute) or long term (chronic) depending on whether it lasts for less than or more than six months.
 - Acute hepatitis can sometimes resolve on its own, progress to chronic hepatitis, or rarely result in acute liver failure.
 - Over time the chronic form may progress to scarring (hard tissue) of the liver, liver failure, or liver cancer.

Causes:

- Causes of hepatitis can be divided into the following major categories: infectious, metabolic, ischemic, autoimmune, genetic, and other.
- Infectious agents include viruses, bacteria, and parasites.
- Toxins, drugs, alcohol, and non-alcoholic fatty liver disease are metabolic causes of liver injury and inflammation.
- Autoimmune and genetic causes of hepatitis involve genetic predispositions and tend to affect characteristic populations.
- The most common cause worldwide is viruses.

Signs and symptoms:

- **Acute hepatitis**
 - The initial prodromal phase (preceding symptoms) involves non-specific and flu-like symptoms common to many acute viral infections.
 - These include fatigue, nausea, vomiting, poor appetite, joint pain, and headaches.
 - Fever, when present, is most common in cases of hepatitis A and E. Late in this phase, people can experience liver-specific symptoms, including choluria (dark urine) and clay-colored stools.
 - Yellowing of the skin and whites of the eyes follow the prodrome after about 1–2 weeks and can last for up to 4 weeks.
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- The non-specific symptoms seen in the prodromal typically resolve by this time, but people will develop an enlarged liver and right upper abdominal pain or discomfort.
 - 10–20% of people will also experience an enlarged spleen, while some people will also experience a mild unintentional weight loss.
 - Cases of drug-induced hepatitis can manifest with systemic signs of an allergic reaction including rash, fever, serositis (inflammation of membranes lining certain organs), elevated eosinophils (a type of white blood cell), and suppression of bone marrow activity.

Type of Hepatitis

	A	B	C	D	E
Source of virus	Feces	Blood Blood derived Body fluids	Blood Blood derived Body fluids	Blood Blood derived Body fluids	Feces
Route of Transmission	Feco-oral	Percutaneous Permucosal	Percutaneous Permucosal	Percutaneous Permucosal	Feco-oral
Chronic Infection	No	Yes	Yes	Yes	No
Prevention	Pre Post Exposure Immunization	Pre Post Exposure Immunization Blood donor screening	Blood donor screening	Pre Post Exposure Immunization	Ensure Safe Drinking water

Hepatitis A

- Hepatitis A is caused by eating food and drinking water contaminated with a virus called HAV. It can also be caused by contact during sex.
 - While it can cause swelling and inflammation in the liver, it doesn't lead to chronic, or life long, disease.
 - Almost everyone who gets hepatitis A has a full recovery. There is a vaccine for hepatitis A that can be given to children or at-risk adults.
 - Practicing good hygiene and hand washing can also reduce your risk of contracting hepatitis A virus.
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Hepatitis B

- Hepatitis B is caused by the virus HBV. It is spread by contact with an infected person's blood, semen, or other body fluid. And, it is a **sexually transmitted disease** (STD). You can get hepatitis B by:
 - Having unprotected sex with an infected person.
 - Sharing drug needles (for illegal drugs like heroin and cocaine or legal drugs like vitamins and steroids).
 - Getting pricked with a needle that has infected blood on it (health care workers can get hepatitis B this way).
 - With hepatitis B, the liver also swells. Hepatitis B can be a serious infection that can cause liver damage, which may result in cancer.
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Hepatitis C

- Hepatitis C is caused by the virus HCV. It is spread the same way as hepatitis B, through contact with an infected person's blood, semen, or body fluid.
- Like hepatitis B, hepatitis C causes swelling of the liver and can cause liver damage that can lead to cancer.
- Most people who have hepatitis C develop a chronic infection. This may lead to a scarring of the liver, called **cirrhosis**.
- Blood banks test all donated blood for hepatitis C, greatly reducing the risk of getting the virus from blood transfusions or blood products.

Hepatitis D

- Hepatitis D is caused by the virus HDV. You can only get hepatitis D if you are already infected with hepatitis B. It is spread through contact with infected blood, dirty needles that have HDV on them, and unprotected sex with a person infected with HDV.
- Hepatitis D causes swelling of the liver.

Hepatitis E

- Hepatitis E is caused by the virus HEV. You get hepatitis E by drinking water infected with the virus. It causes swelling of the liver, but no long-term damage. It can also be spread through sexual contact.

Pathophysiology:

- The specific mechanism varies and depends on the underlying cause of the hepatitis. Generally, there is an initial insult that causes liver injury and activation of an inflammatory response, which can become chronic, leading to progressive fibrosis and cirrhosis.
- The pathway by which hepatic viruses cause viral hepatitis is best understood in the case of hepatitis B and C.
- The viruses do not directly cause apoptosis (cell death). Rather, infection of liver cells activates the innate and adaptive arms of the immune system leading to an inflammatory response which causes cellular damage and death.

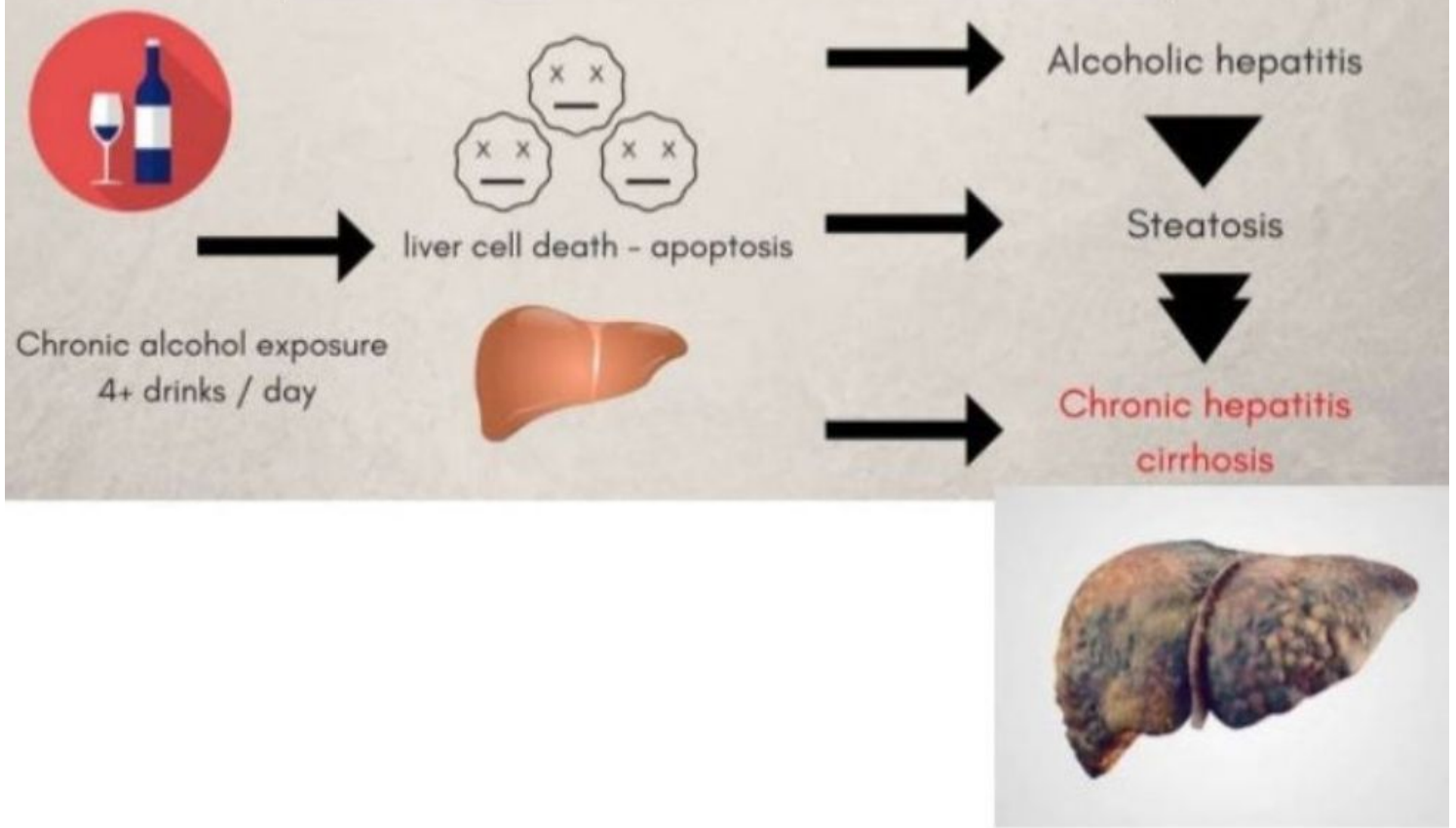
Prevention and Treatment:

- Vaccination
 - Treatment of hepatitis varies based on the form (acute versus chronic), severity of disease, and cause.
 - **Hepatitis A** generally does not progress to a chronic state and rarely requires hospitalization. Treatment is supportive and includes such measures as providing intravenous (IV) hydration and maintaining adequate nutrition.
 - **Hepatitis B** more severe acute cases, patients have been successfully treated with antiviral therapy similar to that used in cases of chronic hepatitis B, with nucleoside analogues such as lamivudine, entecavir or tenofovir. Injectable interferon alpha was the first therapy approved for chronic hepatitis B.
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- **Hepatitis C** In contrast to hepatitis A and B, progression to chronic hepatitis C is much more common.
 - The ultimate goal of hepatitis C treatment is prevention of hepatocellular carcinoma (HCC).
 - The best way to reduce the long-term risk of HCC is to achieve sustained virological response (SVR).
 - SVR is defined as an undetectable viral load at 12 weeks after treatment completion and indicates a cure.
 - Currently available treatments include indirect and direct acting antiviral drugs.
 - The indirect acting antivirals include pegylated interferon (PEG IFN) and ribavirin (RBV), which in combination have historically been the basis of therapy for HCV.
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- **Hepatitis D** is difficult to treat, and effective treatments are lacking. Interferon alpha has proven effective at inhibiting viral activity but only on a temporary basis.
 - **Hepatitis E** Similar to hepatitis A, treatment of hepatitis E is supportive and includes rest and ensuring adequate nutrition and hydration. Hospitalization may be required for particularly severe cases or for pregnant women.
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ALCOHOLIC LIVER DISEASE

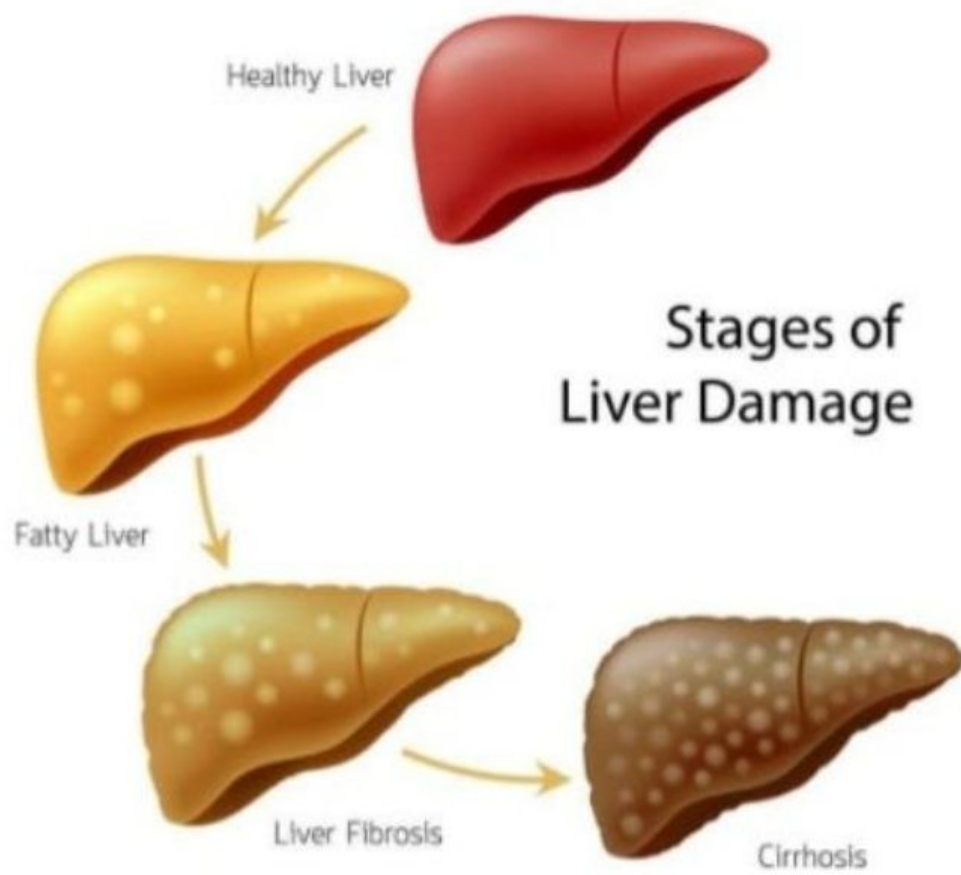


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- **Alcoholic liver disease** is a term that encompasses the liver manifestations of alcohol over consumption, including fatty liver, alcoholic hepatitis, and chronic hepatitis with liver fibrosis or cirrhosis.
 - It is the major cause of liver disease. Although steatosis (fatty liver) will develop in any individual who consumes a large quantity of alcoholic beverages over a long period of time, this process is transient and reversible. Of all chronic heavy drinkers, only 15–20% develops hepatitis or cirrhosis, which can occur concomitantly or in succession.

Early symptoms:

- Abdominal (tummy) pain
 - Loss of appetite
 - Fatigue
 - Diarrhea
 - Yellowing of the skin and whites of the eyes (jaundice)
 - Swelling in the legs, ankles and feet, due to a build-up of fluid (oedema)
 - Swelling in abdomen, due to a build-up of fluid known as ascites
 - A high temperature (fever) and shivering attacks
 - Very itchy skin
 - Hair loss
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- Unusually curved fingertips and nails (clubbed fingers)
 - Blotchy red palms
 - Significant weight loss
 - Weakness and muscle wasting
 - Confusion and memory problems, trouble sleeping (insomnia) and changes in your personality due to a build-up of toxins in the brain
 - Vomiting blood and black, tarry stools due to internal bleeding
 - A tendency to bleed and bruise more easily, such as frequent nosebleeds and bleeding gums
 - Increased sensitivity to alcohol and drugs (because the liver can't process them)
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Pathophysiology:

- **Fatty change**
 - Alcoholism causes development of large fatty globules (macro vesicular steatosis) throughout the liver and can begin to occur after a few days of heavy drinking.
 - Alcohol is metabolized by alcohol dehydrogenase (ADH) into acetaldehyde, then further metabolized by aldehyde dehydrogenase (ALDH) into acetic acid, which is finally oxidized into carbon dioxide (CO₂) and water (H₂O).
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- This process generates NADH, and increases the NADH/NAD⁺ ratio.
- A higher NADH concentration induces fatty acid synthesis while a decreased NAD level results in decreased fatty acid oxidation.
- Subsequently, the higher levels of fatty acids signal the liver cells to compound it to glycerol to form triglycerides.
- These triglycerides accumulate, resulting in fatty liver.

- **Alcoholic hepatitis**

- Alcoholic hepatitis is characterized by the inflammation of hepatocytes.
 - Between 10% and 35% of heavy drinkers develop alcoholic hepatitis.
 - While development of hepatitis is not directly related to the dose of alcohol, some people seem more prone to this reaction than others.
 - This is called alcoholic steato necrosis and the inflammation appears to predispose to liver fibrosis.
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- **Cirrhosis**

- Cirrhosis is a late stage of serious liver disease marked by inflammation (swelling), fibrosis (cellular hardening) and damaged membranes preventing detoxification of chemicals in the body, ending in scarring and necrosis (cell death).
 - Between 10% to 20% of heavy drinkers will develop cirrhosis of the liver. Acetaldehyde may be responsible for alcohol-induced fibrosis by stimulating collagen deposition by hepatic stellate cells.
 - The production of oxidants derived from NADPH oxidase and/or cytochrome P-450 2E1 and the formation of acetaldehyde-protein adducts damage the cell membrane.
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Prevention:

- Maintaining normal weight.
- Control obesity.
- Healthy diet.
- Avoid alcohol abuse.
- Avoid hepatotoxic drugs.
- Safe sex.

Treatment:

- Drugs: Sylimarin and sometimes corticosteroids.
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