

# Common Liver Diseases

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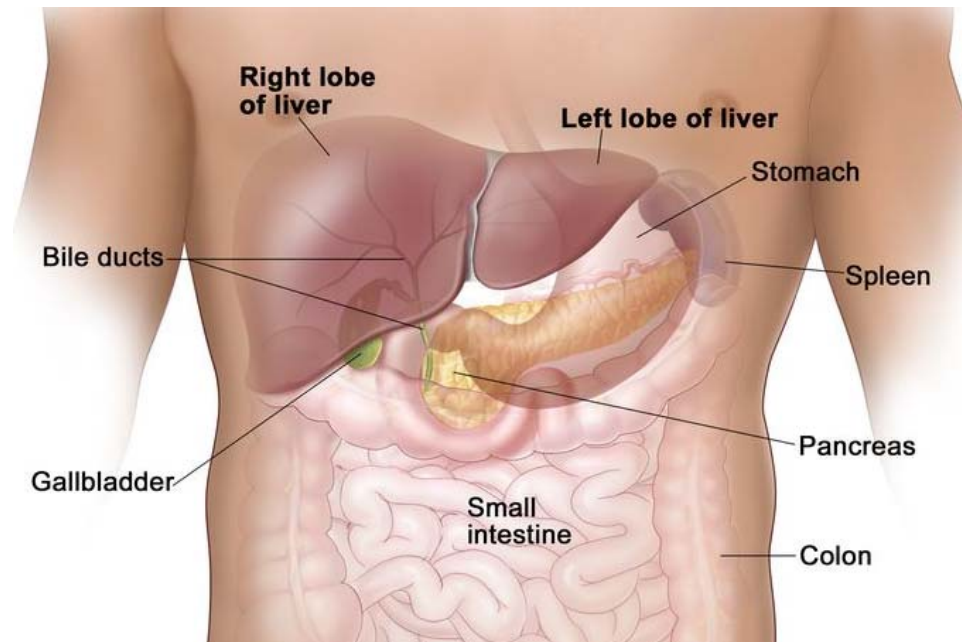
# Objectives

Liver Health

Common  
liver diseases

# Location of the Liver

- It is in the right, upper side of the abdominal cavity immediately beneath the diaphragm.
- Size about a football.
- It weighs about 3.3 pounds and holds approximately 13 percent of the body's blood supply.



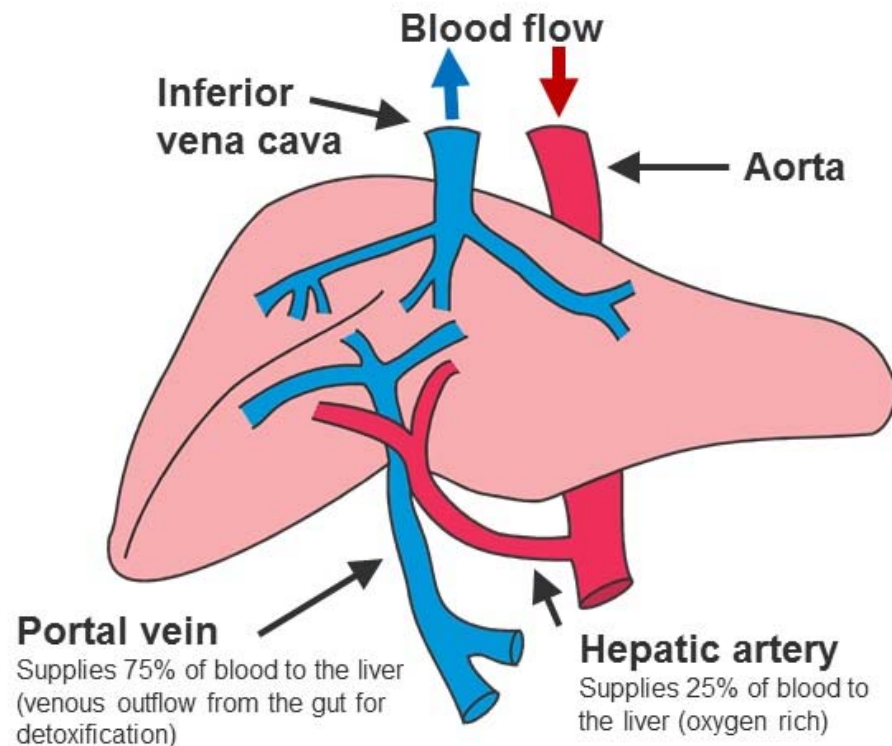
# Structure of the Liver

- It contains two major lobes, two smaller lobes, and multiple lobules.
  - The right lobe is the largest lobe of the liver.
    - **Caudate lobe** is the posterior section of the right lobe.
    - **Quadrate lobe** is the inferior section of the right lobe.
  - Left lobe.



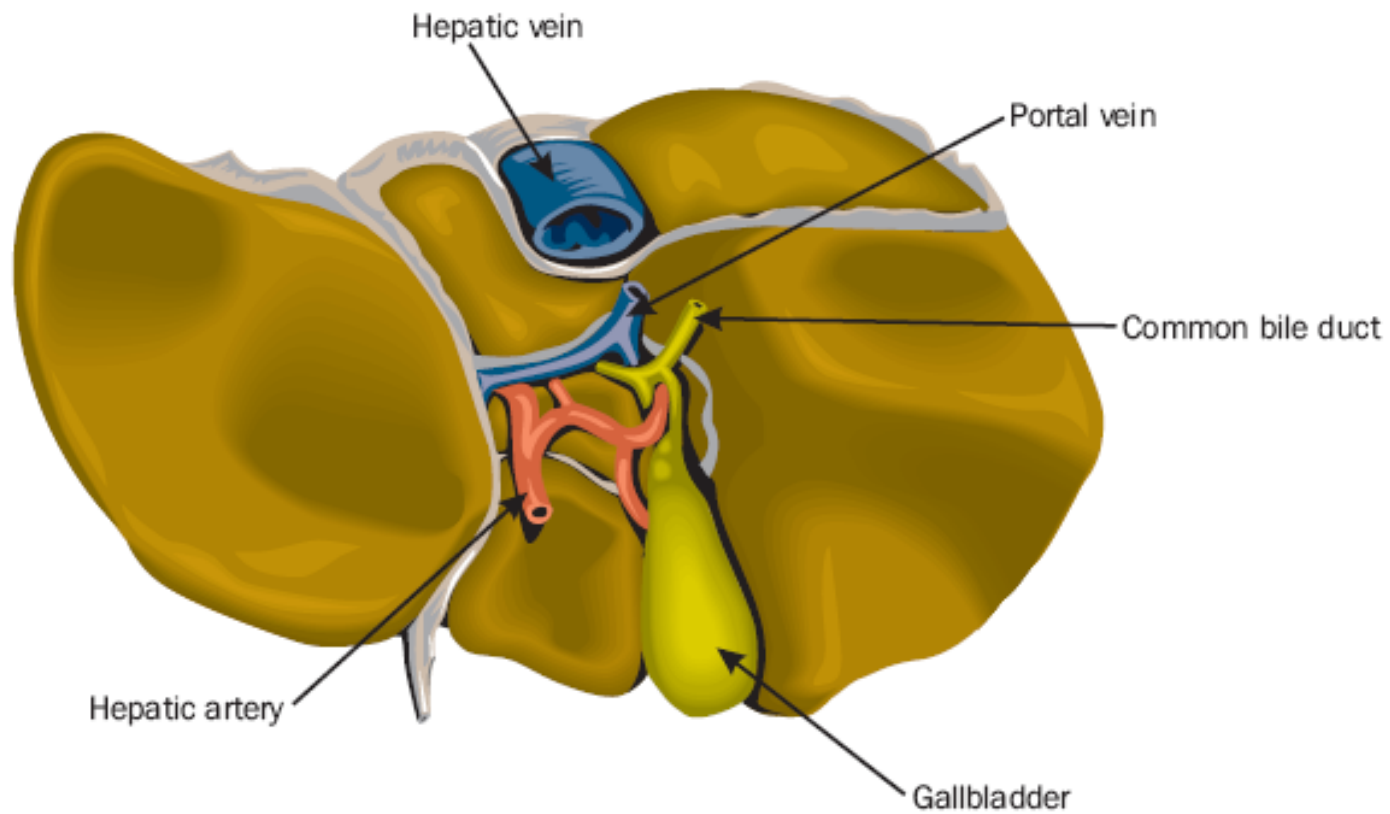
## Vascular Anatomy of the Liver

- The liver has a dual blood supply
- The venous outflow from the liver is via the hepatic vein into the vena cava



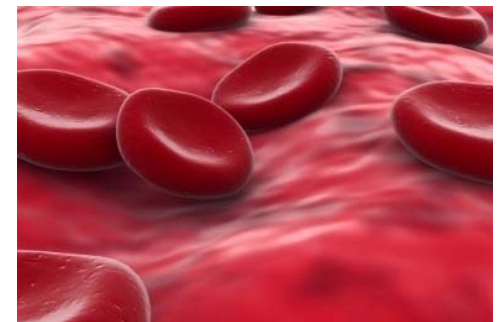
# UNDERSTAND THE LIVER

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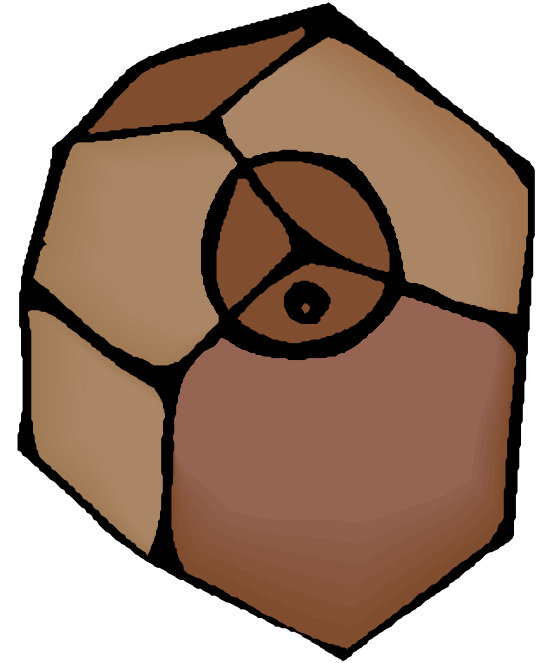


# Functions of the Liver

- The liver metabolizes carbohydrates, fats, and proteins.
- It removes drugs, alcohol, and hormones.
- The liver stores vitamins, minerals, and food molecules.
- It excretes **bile** (a greenish-yellow substance that contains waste products, cholesterol, and bile salts).
- The liver converts glucose into glycogen for storage.
- It regulates blood **coagulation** (clotting).
- The liver filters blood.



- ***Hepatocytes ( Liver Cells)*** are the primary cells in the liver that exchange substances with the blood filtering through the liver.

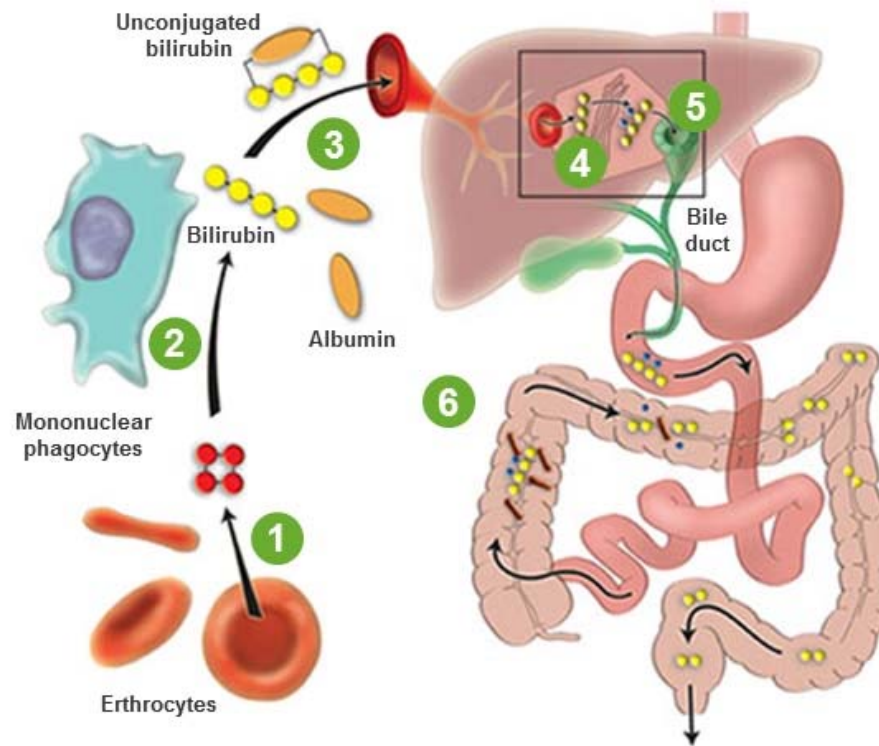


Liver Cell

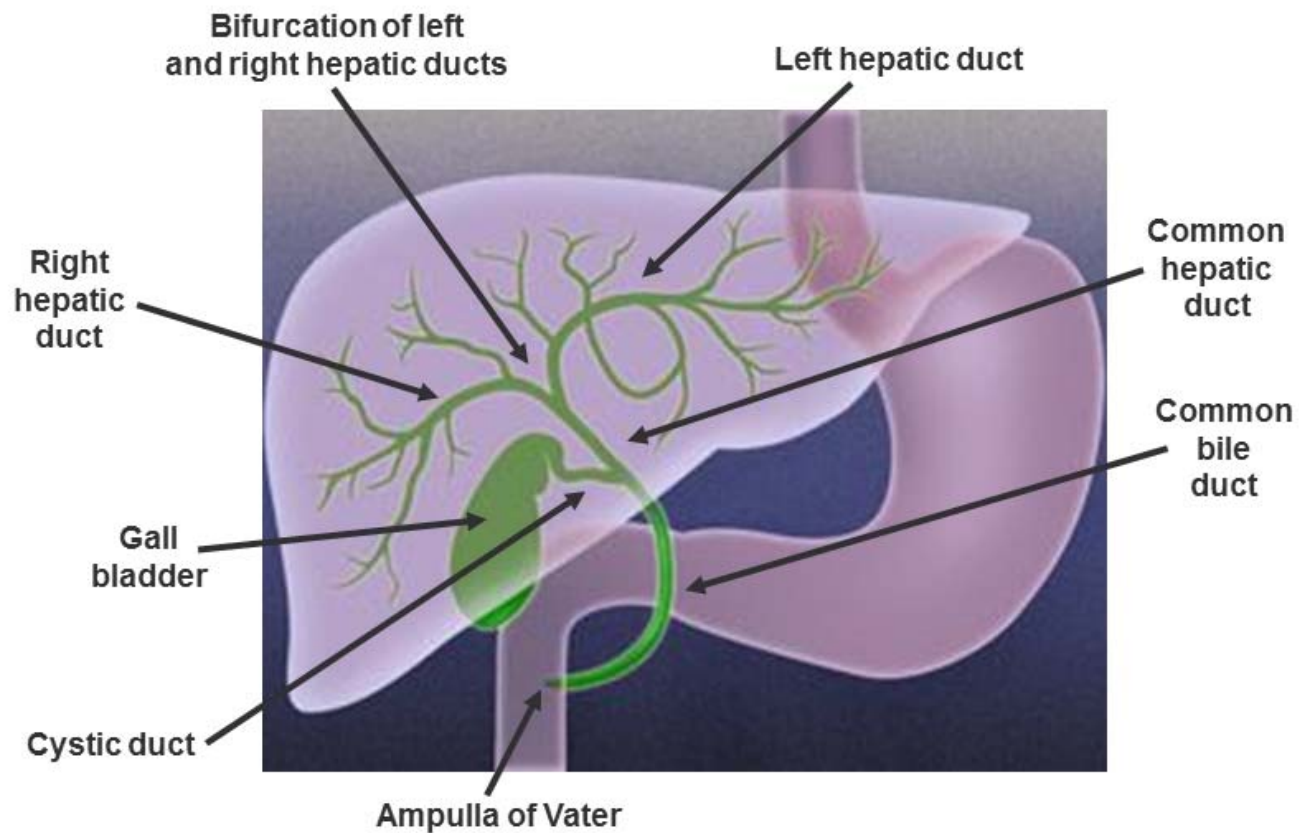


## Bilirubin Metabolism

1. Bilirubin comes from heme liberated from red blood cells
2. Heme is converted to bilirubin in mononuclear phagocytes
3. Insoluble (unconjugated) bilirubin is bound to albumin and taken up by hepatocytes
4. Bilirubin becomes soluble once conjugated (by UDP-glucuronyl transferase)
5. Conjugated bilirubin is excreted into bile and reaches the bowel where it is deconjugated by colonic bacteria and eliminated in feces



## Anatomy of the Biliary System





"Your liver has issues."

# Conditions that make the Liver Sick

- Genetics:
- Infection: **Viral**, Bacterial, Fungal, Parasitic.
- Autoimmune Liver Disease:
- Drugs:
- Toxins:
- Alcohol:  $\leq 2$  drinks per day. Gender, ethnicity, underlying liver conditions.
  - One standard drink: 11-14 gram of alcohol
    - One drink of 40% Spirit
    - One glass of Wine
    - One 12 Oz of beer
- **Fatty Liver: Metabolic Dysfunction Associated Steatohepatitis (MASH).**

# Common Conditions that make the Liver Sick

- Alcohol-related liver disease
  - Chronic hepatitis B, C
  - MASH (Fatty Liver Disease)
  - Autoimmune hepatitis
  - Drugs, toxins (Supplements)
  - Combination of more than one cause
- 53.5%

## Other less common liver diseases

- Bile ducts damage (~5% to 10%)
  - Primary biliary cholangitis (PBC)
  - Primary sclerosing cholangitis (PSC)
  - Biliary atresia
- Inherited diseases
  - Cystic fibrosis
  - Alpha-1 antitrypsin deficiency
  - Hemochromatosis (~5% to 10% of cases)
  - Wilson disease
  - Glycogen storage disease

# Human Hepatitis Viruses

<b>Virus</b>	<b>Genome</b>	<b>Genome size (kb)</b>	<b>Envelope</b>	<b>Family / genus</b>
<b>HAV</b>	<b>RNA</b> positive sense, single stranded, linear	<b>7.5</b>	-	<b>Picornaviridae</b> <b>hepatovirus</b>
<b>HBV</b>	<b>DNA</b> partially double stranded, circular	<b>3.2</b>	+	<b>Hepadnaviridae</b>
<b>HCV</b>	<b>RNA</b> positive sense, single stranded, linear	<b>9.6</b>	+	<b>Flaviviridae</b> <b>hepacivirus</b>
<b>HDV</b>	<b>RNA</b> positive sense, single stranded, linear	<b>1.7</b>	+	<b>Unclassified</b> <b>(viroid), delta virus</b>
<b>HEV</b>	<b>RNA</b> positive sense, single stranded, linear	<b>7.5</b>	-	<b>Unclassified,</b> <b>togavirus and</b> <b>alpha virus-like</b>

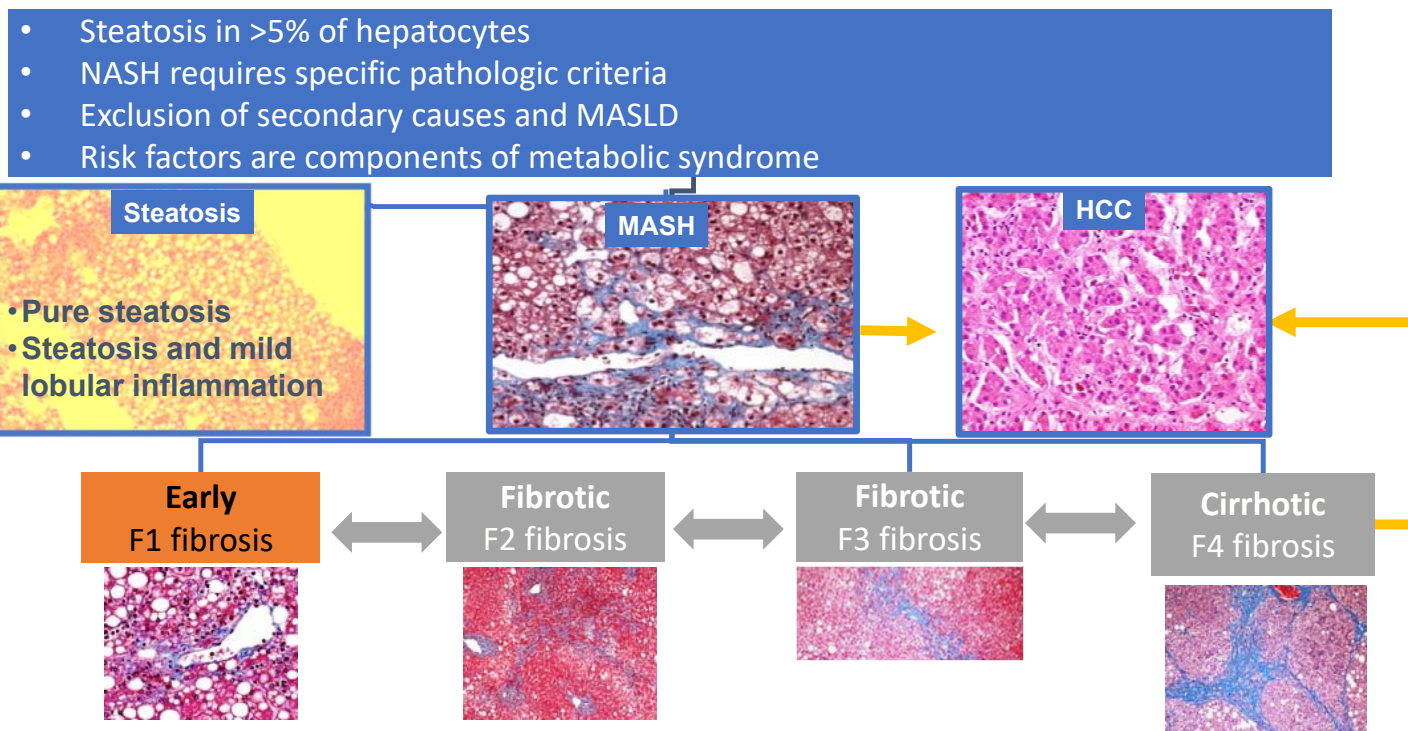
# MASH: The Impending Dust Storm or Tsunami



Courtesy of Dr. Steven Harris



# Let's Get the Terminology Correct: What is MASLD and NASH and MASH?



1. Younossi ZM. *Hepatology*. 2018;68(1):349-360;

3. Younossi ZM, et al. *Hepatology*. 2011;53(4):1874-1882;

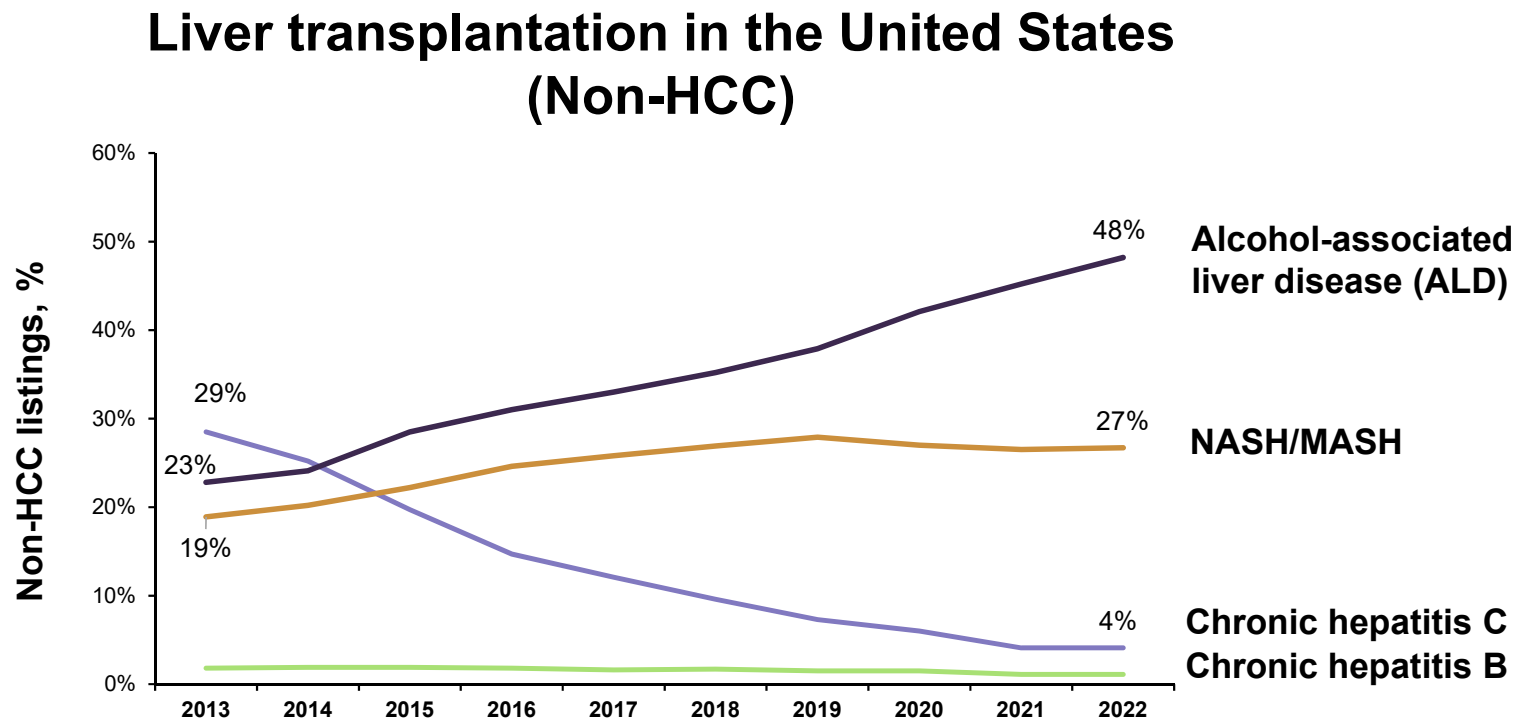
5. Anstee QM, et al. *Gastroenterology*. 2016;150(8):1728-1744;

2. Chalasani N, et al. *Hepatology*. 2018;67(1):328-35;

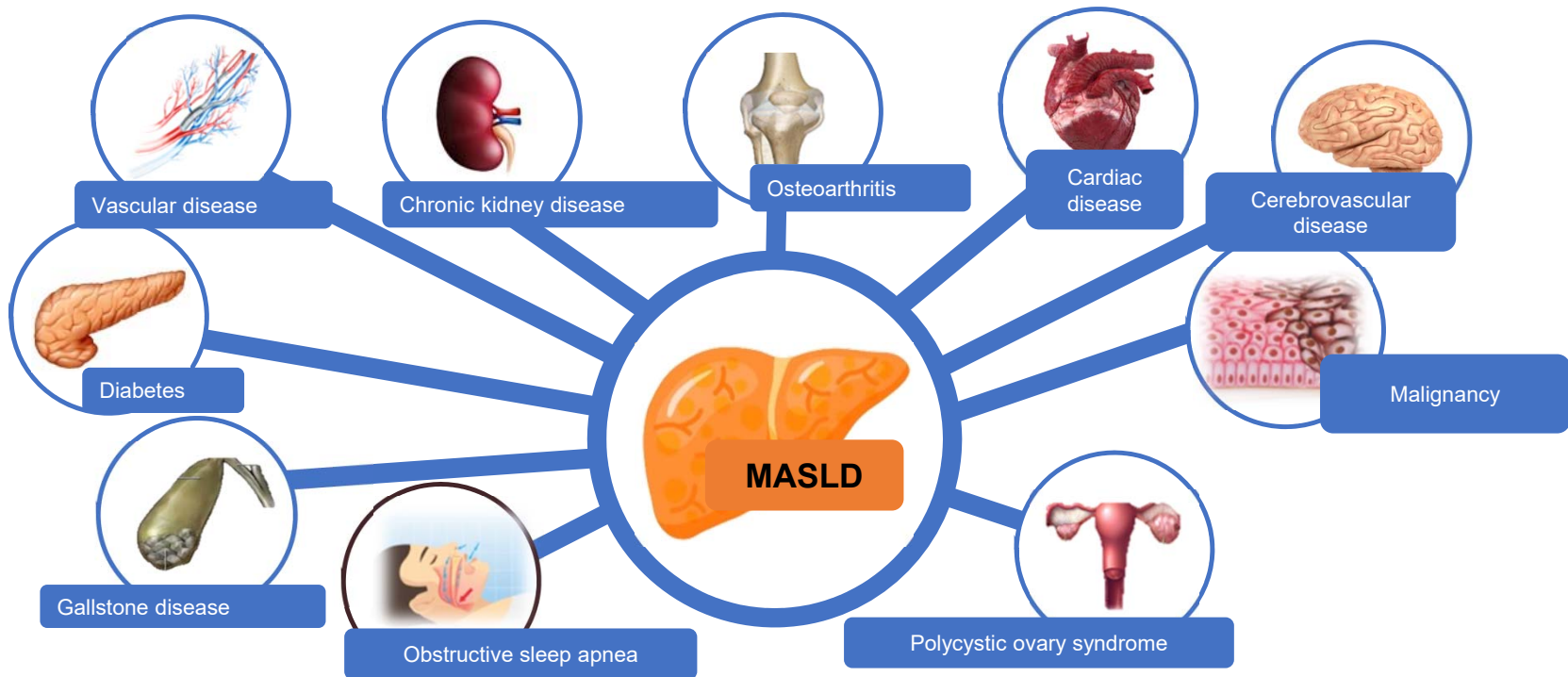
4. Younossi ZM, et al. *Hepatol Commun*. 2017;1(5):421-428;

6. EASL-EASD-EASO CPG NAFLD. *J Hepatol*. 2016;64:1388-402.

# Consequences of MASH: Liver Transplantation



# Not to Forget MASH is a Part of a Multisystem Disorder



Angulo P, et al. *Gastroenterology*. 2015;149:389–397;  
Ekstedt M, et al. *Hepatology*. 2006;44:865–873;  
Rafiq N, et al. *Clin Gastroenterol Hepatol*. 2009;7:234–238;

Söderberg C, et al. *Hepatology*. 2010;51:595–602;  
Dam-Larsen S, et al. *Scand J Gastroenterol*. 2009;44:1236–1243;  
Hicks SB et al. *J Hepatol* 2019;71:1229-1236.



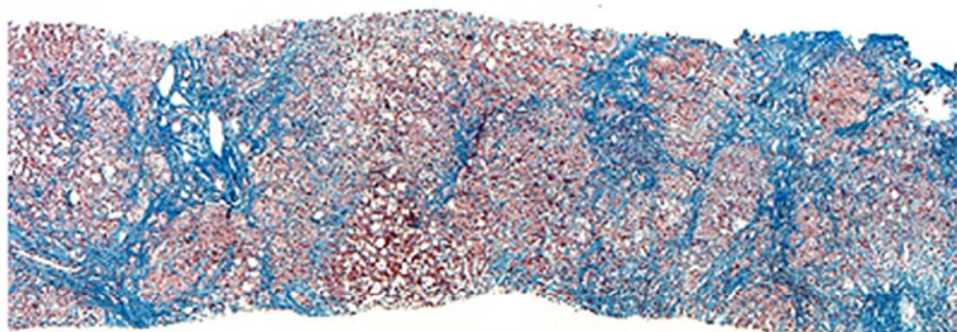
**Healthy**



**Cirrhosis**

## Cirrhosis on needle biopsy

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Needle biopsy of the liver (40x) of a 61-year-old female with obesity, diabetes, and hyperlipidemia referred for evaluation of chronically elevated serum aminotransferases. Trichrome stain demonstrates bridging fibrosis (blue staining), periportal inflammatory infiltrates and marked steatosis. These findings are consistent with cirrhosis secondary to NASH.

*Courtesy of Jeremy Ditelberg, MD.*

# Cirrhosis: The End of the Road

- The problem:
  - Liver disease tend to developed indolently, it starts out with no symptoms or signs and unsuspected until complications develop.
  - It is often diagnosed incidentally.
  - Most usually when complications show up.
    - Ascites: fluid accumulate in the abdomen
    - Lower leg edema
    - Bleeding from stomach
    - Yellow jaundice
    - Mental confusion
    - Liver cancer

# Ascites, Sarcopenia, Spider Nevi



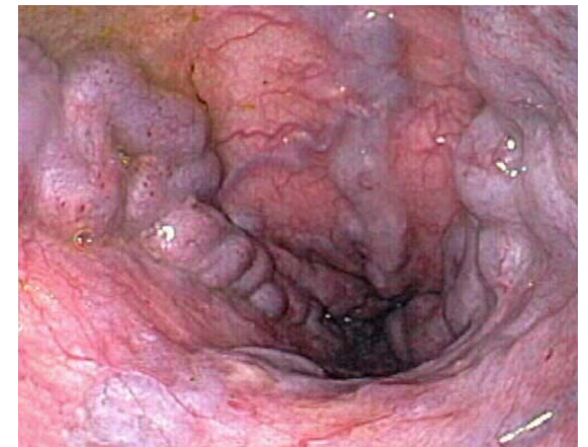
# Varices Increase in Diameter Progressively



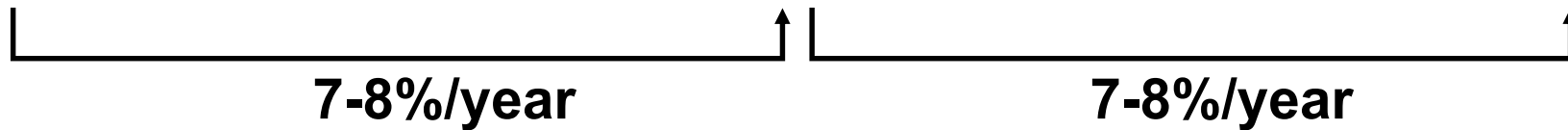
**No varices**



**Small varices**  
Lower risk of bleeding



**Large varices**  
Higher risk of bleeding





# 56 y/o man with HCV and Large HCC



Pre-treatment

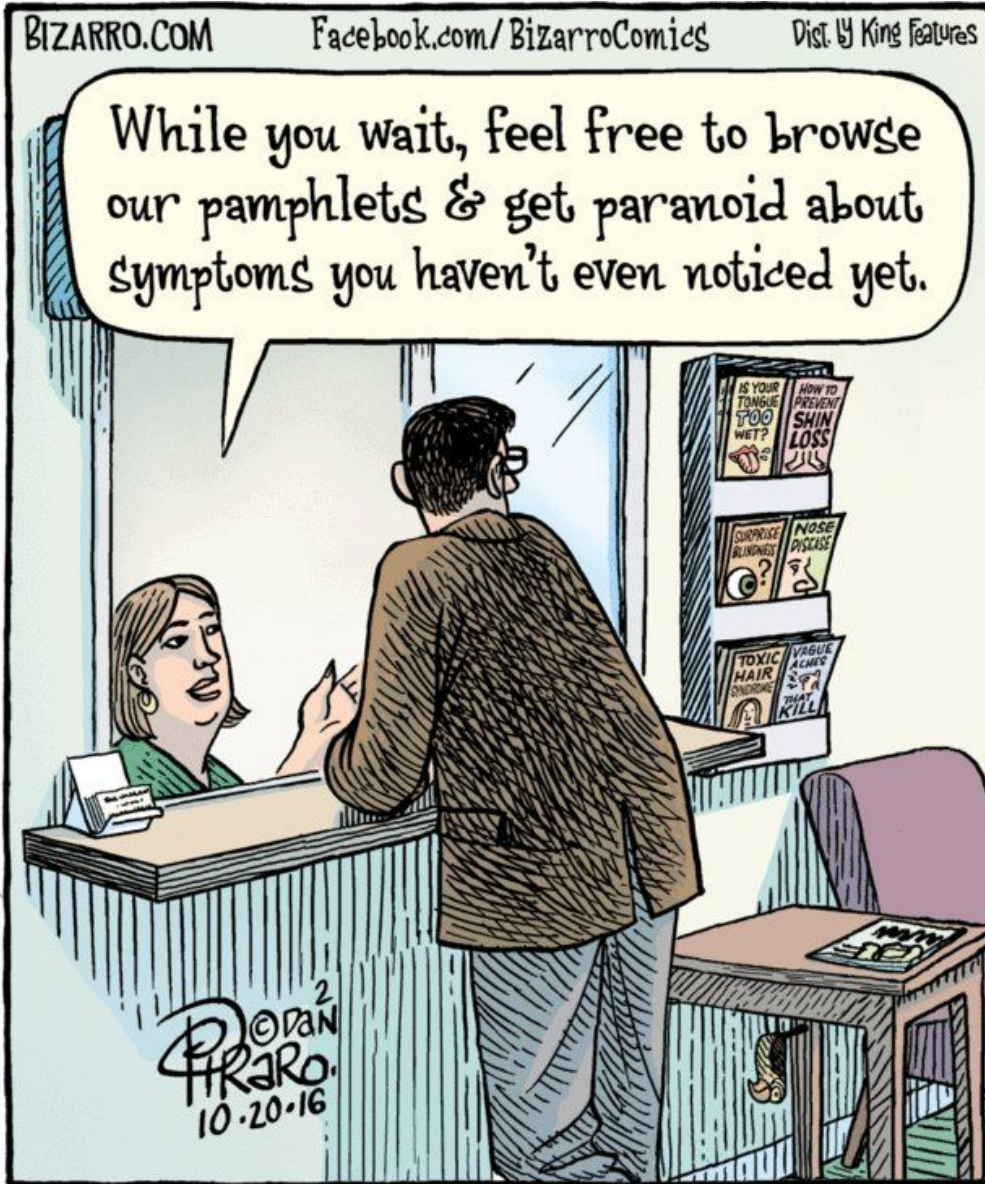


1 mo after Y-90 #1



1 mo after Y-90 #2  
4 mo after Y-90 #1

While you wait, feel free to browse our pamphlets & get paranoid about symptoms you haven't even noticed yet.





"Do you solemnly swear to listen to my advice?"



"...and that's how you handle liver!"

Questions?