



Liver Cancer: Risk Factors and Prevention

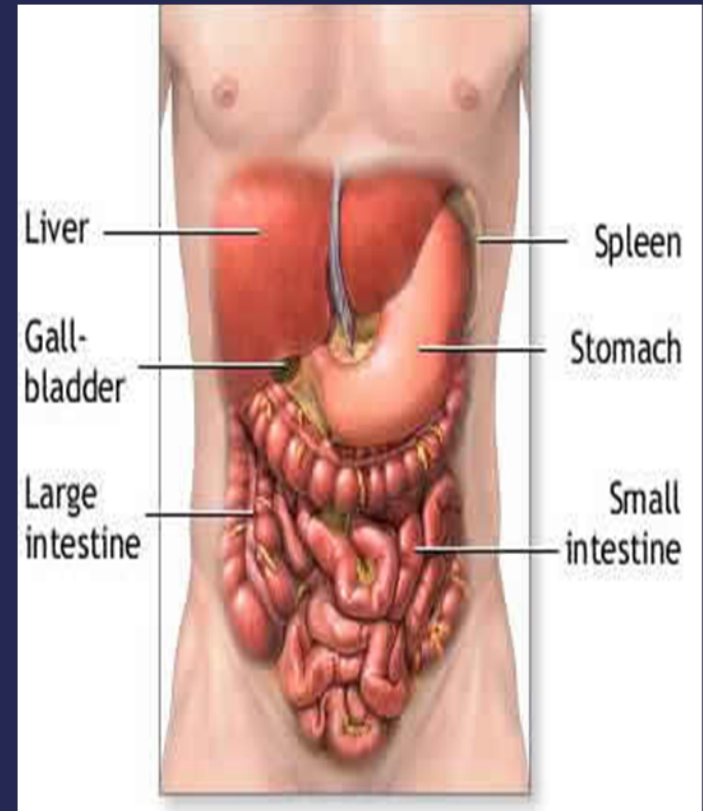
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The Liver

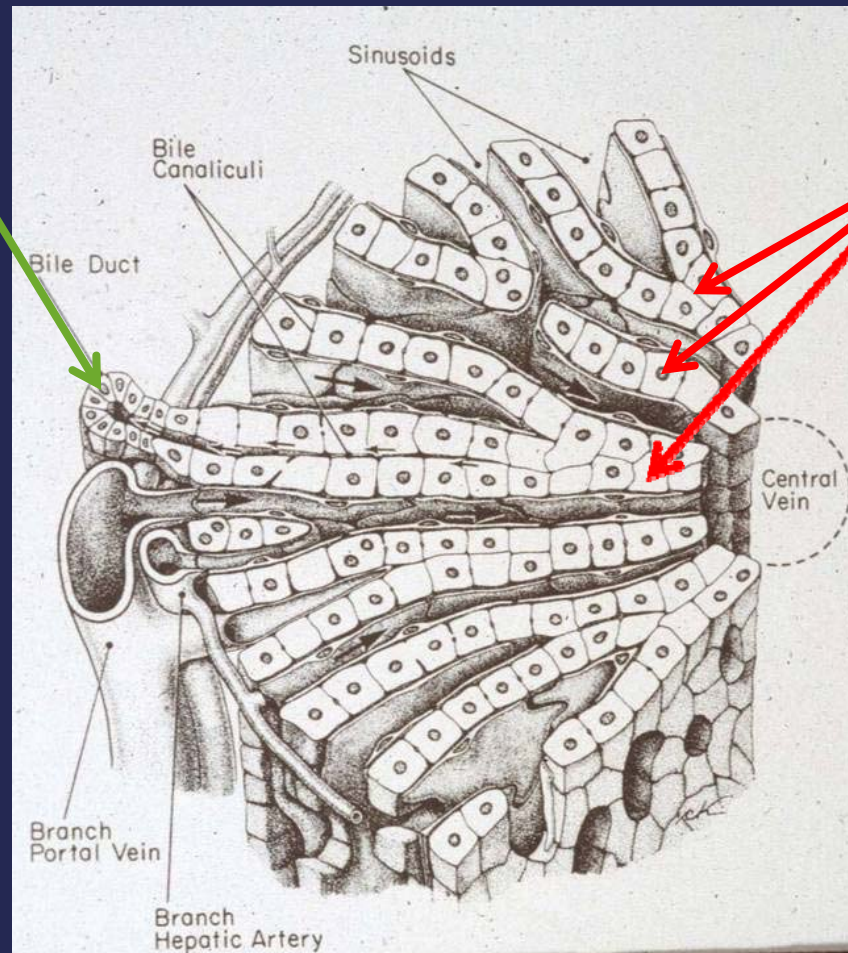
- The largest organ in the body
- The body's major factory:
 - Secretes many of the proteins circulating in blood
 - Clears toxins and medication
 - Produces bile
 - Helps maintain blood sugar
 - Filters, processes and stores nutrients absorbed through the digestive tract





The Liver Under the Microscope

Cholangiocytes
"bile duct cells"



Hepatocytes
"Liver cells"

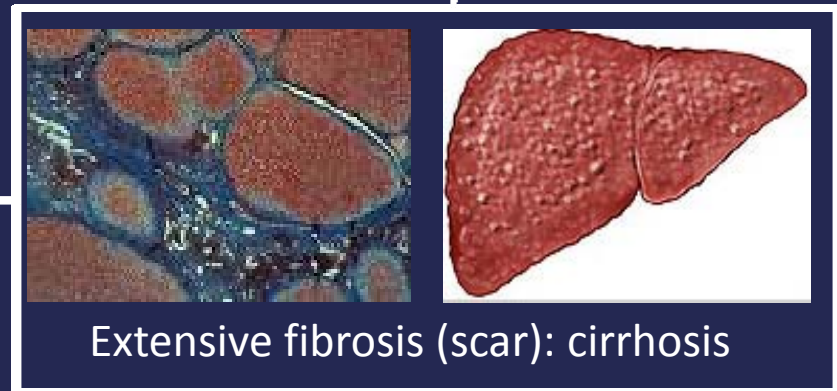
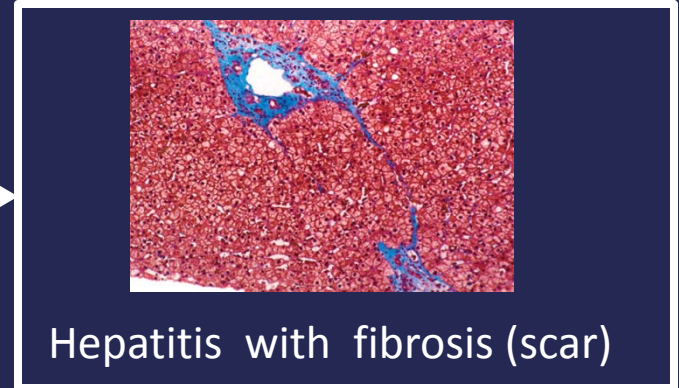
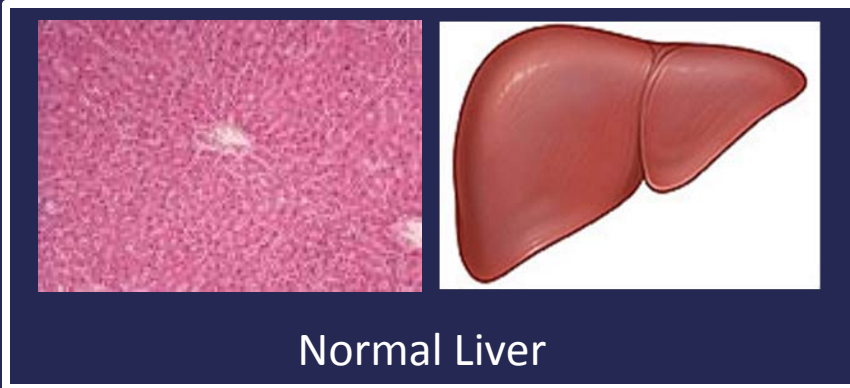


Types of cancer in the liver

Primary Liver Cancer “Cancer originates in the Liver”	Metastatic Cancer “Cancer spreads to the Liver”
~ 90% Hepatocellular Carcinoma (HCC, Hepatoma)	GI Cancers (Colon, pancreas, bile duct, esophagus, stomach, small intestine)
Cholangiocarcinoma	Lung cancer
Other (very rare)	Breast cancer
	Thyroid cancer
	Other



How does HCC develop ?





Exceptions to the hepatitis → cirrhosis → cancer sequence

- Hepatitis B, where the virus can cause liver cells to become cancerous with or without cirrhosis
- Rarely, HCC can occur without hepatitis or cirrhosis



HCC usually occurs in a background of an abnormal liver

- Challenge: Often having to deal with a sick liver, in addition to the cancer
- Opportunity: Well defined population at risk that we can watch closely for the development of cancer



Causes of cirrhosis – Hepatitis C (HCV)

- Infection acquired by blood exposure: IV or intranasal drug use, blood transfusion before 1992
- Causes progressive scar of the liver in a some patients – particularly those who drink alcohol heavily
- Treatment of hepatitis C in pts at risk can prevent the development of cirrhosis and cancer



Causes of cirrhosis - Alcohol

- Safe alcohol intake ~ 7 drinks / week (one a day) in women, ~ 14 drinks per week (two a day) in men
- Treatment: alcohol abstinence in pts with liver disease due to alcohol can prevent worsening of liver disease



Causes of cirrhosis – Hepatitis B (HBV)

- In the US, usually a sexually transmitted disease or related to drug use
In Southeast Asia and Sub-Saharan Africa, often mother-to-child transmission
- Can cause progressive liver damage and cirrhosis, but can also cause liver cancer without cirrhosis
- Treatment of hepatitis B prevents worsening of liver disease and development of cancer



Causes of cirrhosis – Hereditary Hemochromatosis (HH)

- Genetic disease: inherited tendency to absorb excessive amount of iron through the intestine
- Iron deposition in organs can cause damage: to the liver (cirrhosis and liver cancer), the heart (heart failure), the pancreas (diabetes)
- Prevention by treating the excess iron



Causes of cirrhosis: non alcoholic fatty liver (NAFL)

- Associated with obesity and diabetes
- The great majority of patients with fatty liver do not have serious liver disease and do not develop liver cancer
- Heart disease is usually the main health problem associated with fatty liver
- Only a small minority of patients with fatty liver develop cirrhosis, this small group is at risk for liver cancer

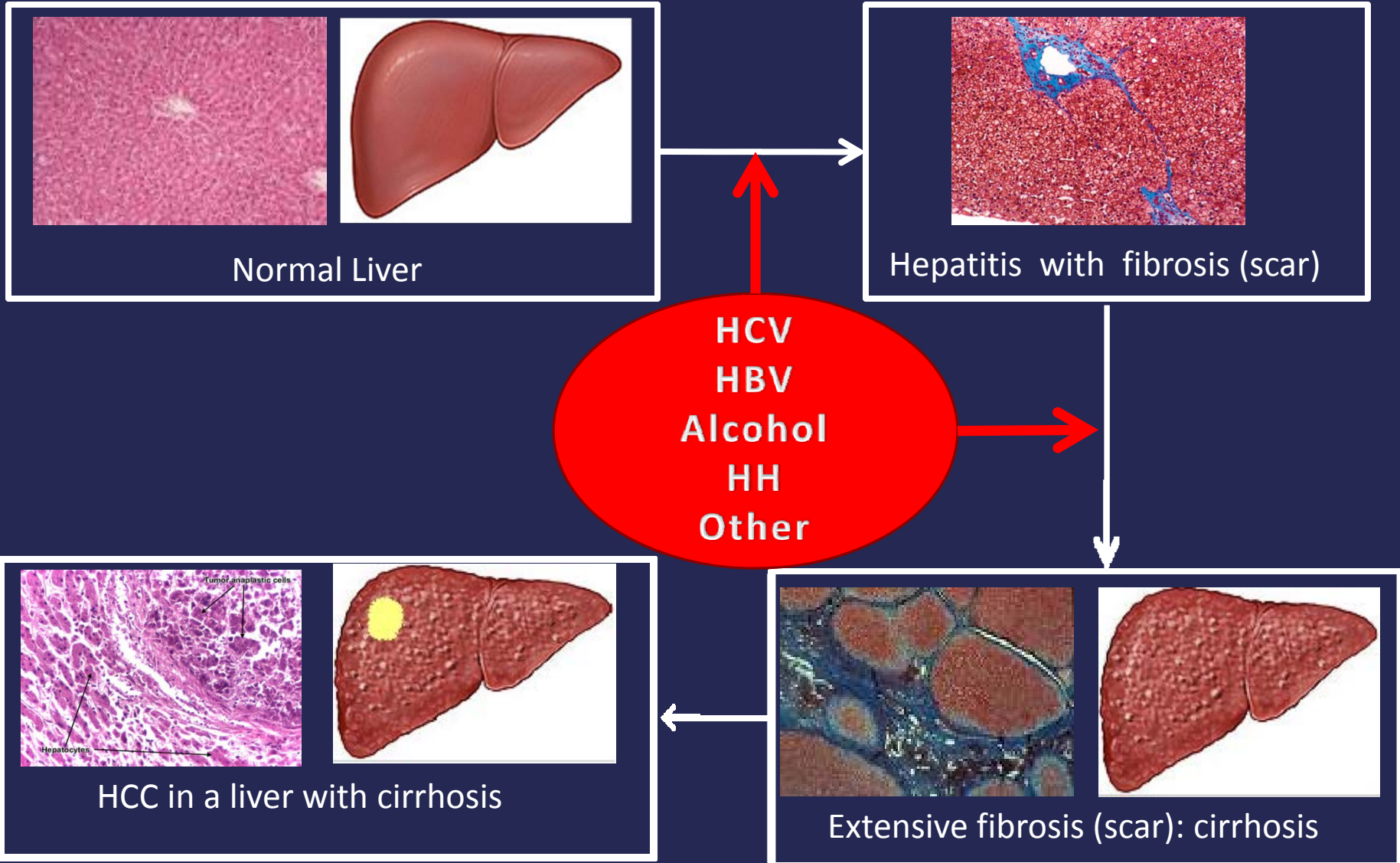


Uncommon causes of cirrhosis

- Autoimmune liver diseases: Autoimmune Hepatitis, Primary Biliary Cirrhosis, Primary Sclerosing Cholangitis
- Uncommon genetic diseases: alpha 1 antitrypsin deficiency, Wilson's disease



How does HCC develop ?





The importance of screening for HCC

- There are multiple treatment options for HCC, particularly for smaller tumors
- Early detection is key for curative treatments
- Early HCC usually does not produce any pain, or other symptoms
- Hence the importance of screening (“checkup”) for HCC in individuals at risk



Who is at risk for HCC ?

- Patients with cirrhosis of any cause
- Long standing hepatitis B infection (even without cirrhosis or scarring), particularly in patients born in Southeast Asia or Sub-Saharan Africa



How to detect HCC early

- Identify population at risk (cirrhosis, hepatitis B)
- Apply a safe screening test
- Apply a confirmatory test when the screening test is positive



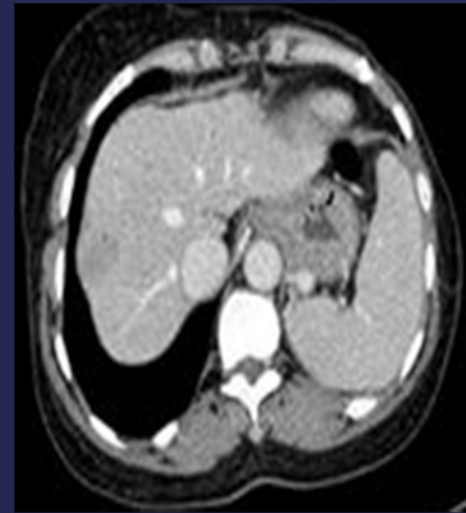
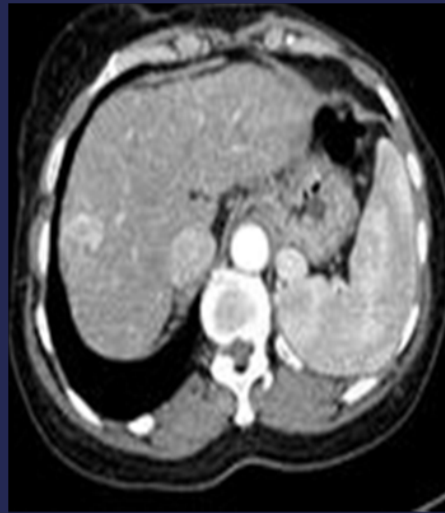
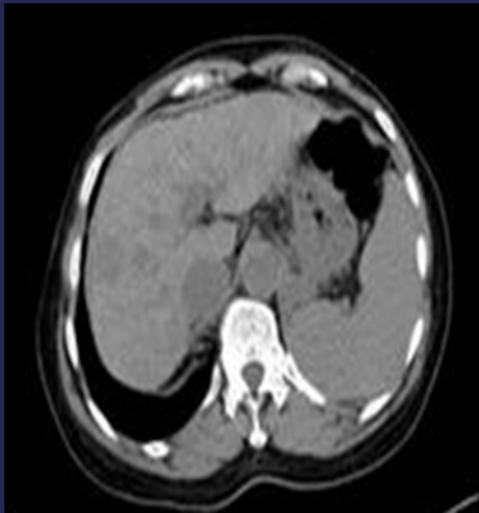
Screening tests

- Image of the liver: every 6 months
Ultrasound most commonly
 - Blood test: every 6 months
Alpha Fetoprotein (AFP): made by tumor cells
- . If AFP is elevated or US shows a tumor → MRI or CT to confirm



Diagnosis of HCC

- Unlike most other cancers, diagnosis of HCC does not always require a biopsy: The appearance on CT or MRI can be sufficient to make a confident diagnosis





Early HCC is curable!

- Limits:
 - No spread outside of the liver
 - No spread to the major blood vessels of the liver
 - Size limits



HCC Curative treatments

No spread outside the liver
No invasion of major liver vessels
Number and size of tumors within limits

Good liver function
Patient healthy enough for surgery

Surgical Resection

Impaired liver function
Patient healthy enough for surgery

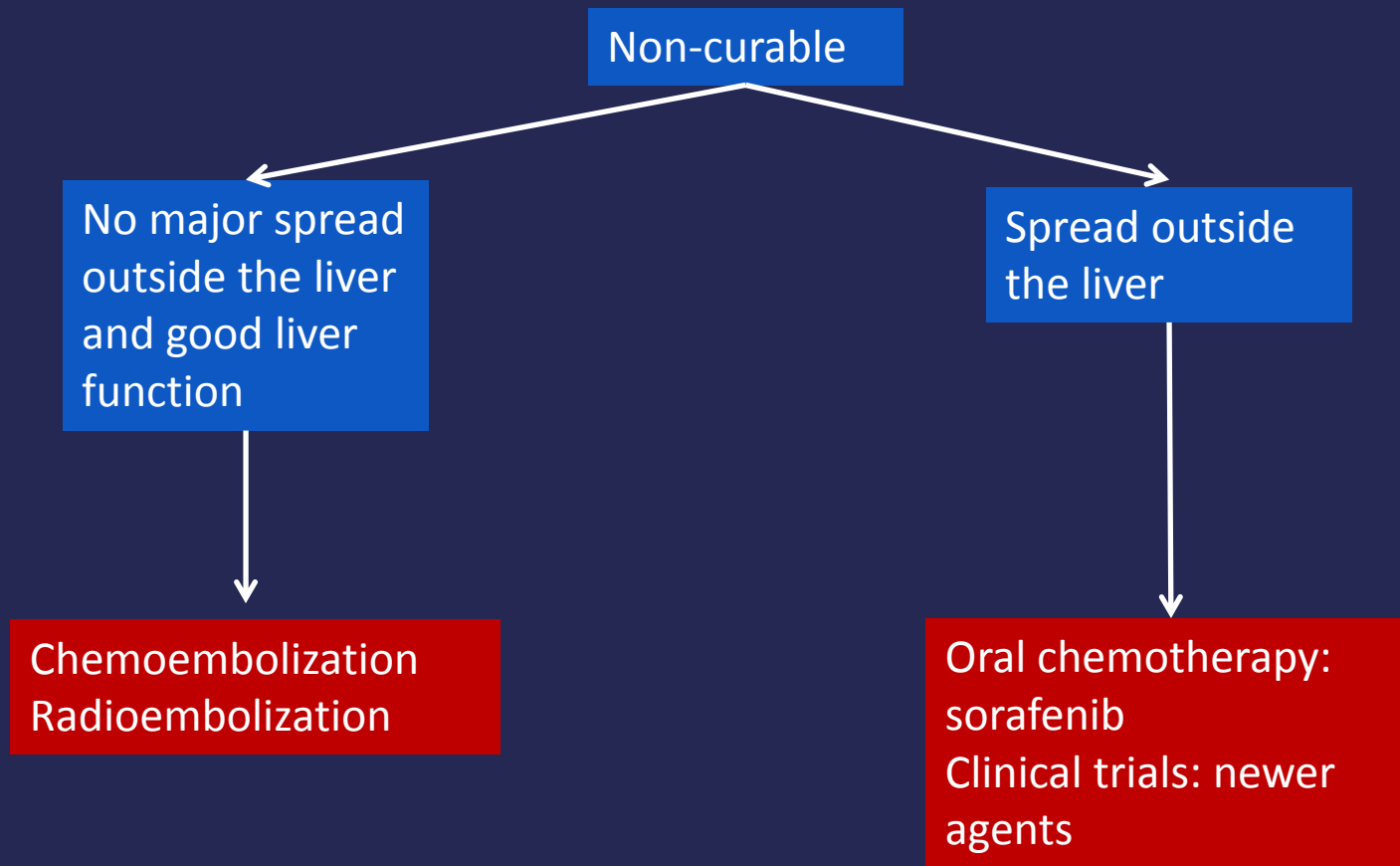
Liver Transplantation

Patient not healthy enough for major Surgery

Radiofrequency Ablation

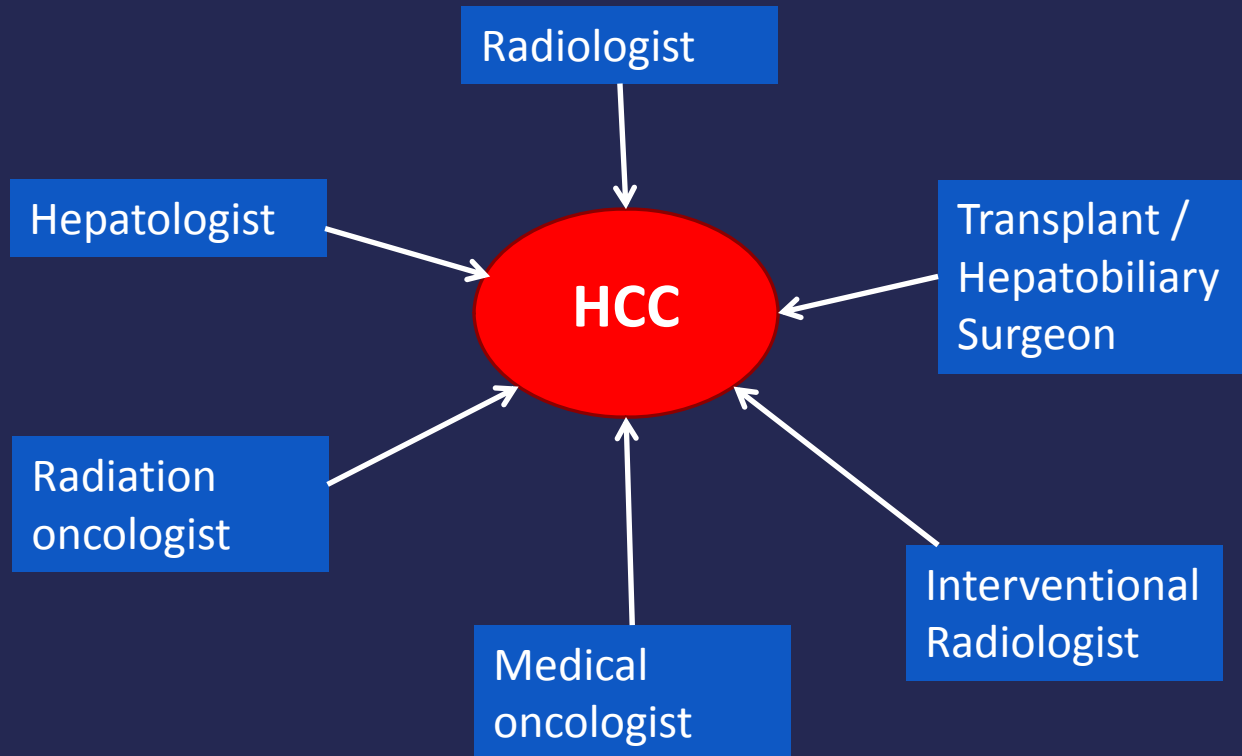


Treatments for advanced HCC can prolong life





A multi-specialty team is essential in diagnosing and treating patients with HCC





Penn's Multidisciplinary Liver Tumor Clinic – Every Friday morning

- Patients referred for evaluation of liver tumor
- Films reviewed with all specialists present
- Patients scheduled for multiple consultations from different specialists in the same clinic visit, addressing all aspects of diagnosis and treatment options
- Treatment plan is formulated and implemented



Summary

- HCC most often occurs in the context of a cirrhotic liver
- Early detection by screening at risk population is crucial
- HCC is curable when detected early
- Effective treatments are available even in non curable HCC
- A multidisciplinary team approach provides efficient evaluation and treatment of HCC