

# Portal Hypertension



Surgery Team  
MED 433



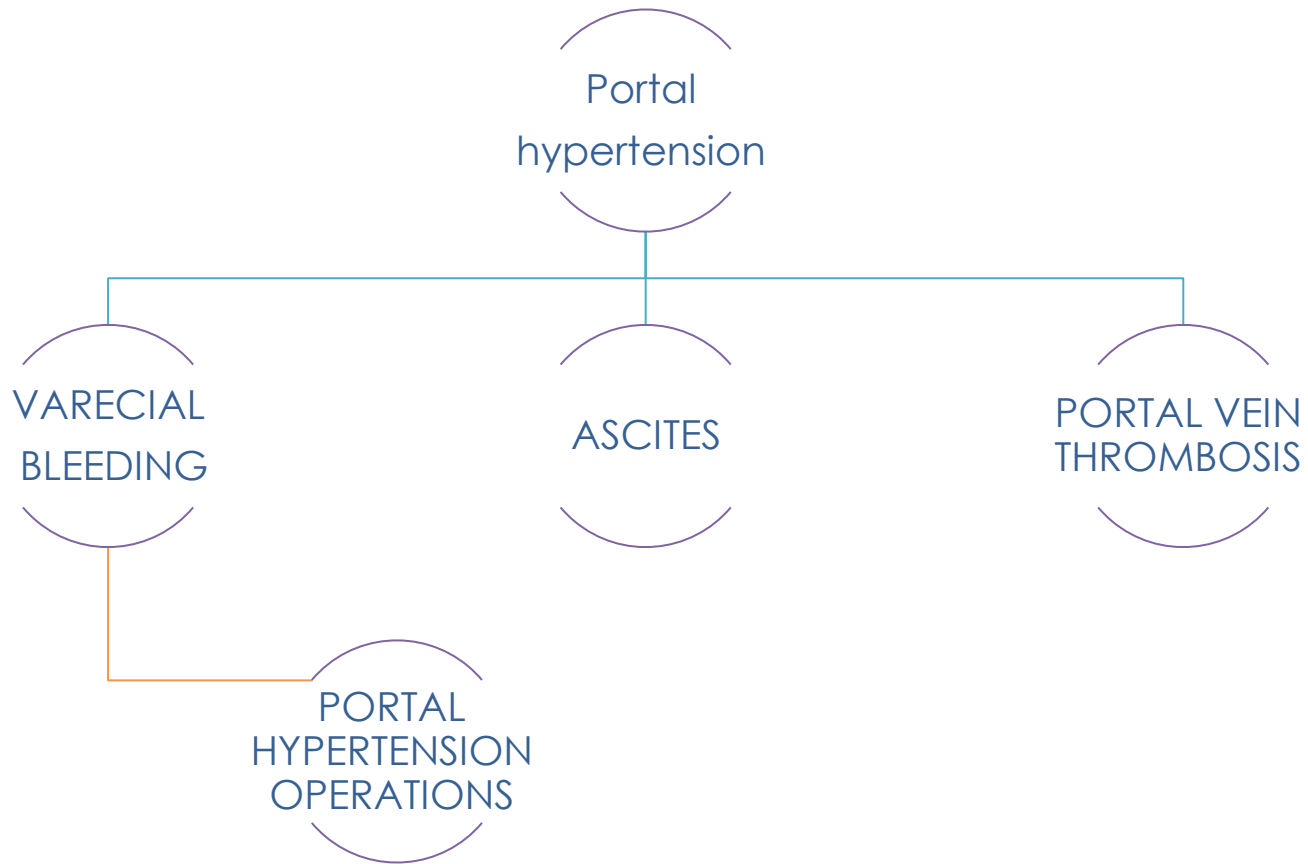
# Objectives :

- ✓ Effects of portal hypertension
- ✓ Clinical features
- ✓ Acute variceal bleeding
- ✓ Ascites

**Sources** : Slides, Raslan's Notebook, Principles & Practice of Surgery by: O. James Garden

**Color Index** : Slides & Raslan's | Textbook | Doctor's Notes | Extra Explanation

# Mind Map



# Portal hypertension

## INTRODUCTION

- (Defined as hydrostatic pressure  $>5$  mmHg) results initially from obstruction to portal venous outflow.
- Obstruction may occur at a **presinusoidal** (portal vein thrombosis, portal fibrosis, or infiltrative lesions), **sinusoidal** (cirrhosis), or **postsinusoidal** (veno-occlusive disease, Budd Chiari syndrome) level.
- **Cirrhosis is the most common cause of portal hypertension**; in these patients, elevated portal pressure results from both increased resistance to outflow through distorted hepatic sinusoids, and enhanced portal inflow due to splanchnic arteriolar vasodilation.

### CAUSES

Causes of Portal hypertension can be classified as:

- **Cirrhotic** (definition)
- **Non-cirrhotic**: most important non-cirrhotic causes are: **shistosomiasis** and splenic vein **thrombosis** (mainly caused by **hypercoagulable state** and pancreatitis)

### SYMPTOMS

- Asymptomatic: portal hypertension is asymptomatic until complications develop, where patients present according to the ongoing pathological process. These complications are in the form of:
  - **Gastroesophageal varices**
  - Ascites
  - Splenomegaly: can sometimes cause dull abdominal pain.
  - Underlying disease

# VARECIAL BLEEDING

- Approximately one-third of all patients with varices will develop variceal hemorrhage.
- A major cause of morbidity and mortality in patients with cirrhosis. Veins don't have much smooth muscles and as a result do not go into spasm once they bleed. With this lack of smooth muscle and engorgement of the esophageal veins with, varices tend to bleed profoundly, when they rupture.

## PREVENTION OF VARECIAL BLEED

### AASLD Recommendations:

These Recommendations are as follows:

1. No treatment is given to people who haven't developed Cirrhosis.
2. In patients who have compensated cirrhosis and small varices that have not bled but have criteria for increased risk of hemorrhage (Child B/C or presence of red wale marks on varices) → nonselective beta blockers.
3. In patients with medium/large varices that have not bled → nonselective beta blockers (propranolol or nadolol) is recommended or undergo EVL (Endoscopic variceal ligation).
4. In patients who receive beta-blockers → a follow-up EGD (esophagogastroduodenoscopy) is not necessary.
5. If a patient is treated with EVL, it should be repeated until the varices are obliterated. EGD should performed one to three months after obliteration and then every 6 to 12 months to check for variceal recurrence.



# TREATMENT OF ACTIVE VARICEAL BLEED

There are three primary goals of management **during the active bleeding episode**

## PRIMARY GOALS

### 1. **ABCs**, especially hemodynamic resuscitation

This is achieved by **two large bore peripheral lines**, where fluids or blood should be administered. In some cases, clotting factors/platelets might be needed due to the massive blood transfusion and exhausted clotting factors/platelets.

### 2. Prevention and treatment of complications

- **Prophylactic antibiotics**, preferably before endoscopy (although effectiveness has also been demonstrated when given after). Suggest **intravenous ceftriaxone** (1 g IV) or **Ciprofloxacin** (400 mg IV BID), About 20% of patients with variceal bleeding will have infection. Most commonly a UTI, but other more serious conditions like a respiratory infection or peritonitis may develop.

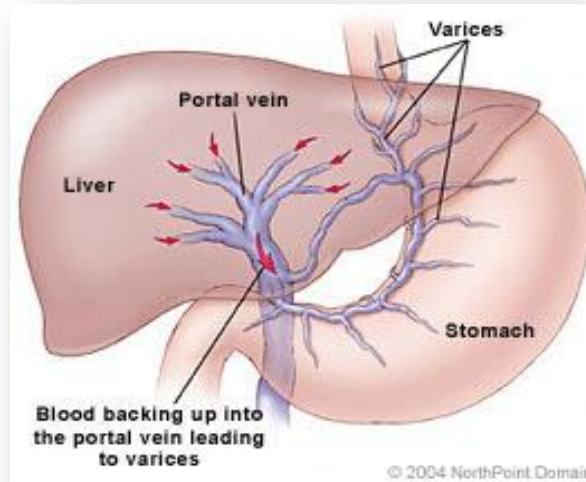
### 3. Arresting Variceal bleeding

- **Vasoactive substances**: Suggest **terlipressin** in countries where it is available and **somatostatin** or **octreotide** (50 mcg bolus followed by 50 mcg/hour by intravenous infusion) where terlipressin is unavailable.
- **Endoscopic treatment**: is the **treatment of choice**, where it can be **diagnostic** and also therapeutic. Endoscopic therapy can either be Endoscopic variceal ligation (EVL) or Endoscopic sclerotherapy.
- If the patient's bleeding is still not controlled, Surgery mostly in the form of **TIPS** (Transjugular intrahepatic portosystemic shunt) is usually performed.

# TREATMENT OF ACTIVE VARECIAL BLEED

## SALVAGE TREATMENT

- **TIPS (transjugular intrahepatic portosystemic shunt)** used primarily as a salvage therapy in patients **with recurrent variceal bleeding** despite an adequate trial of endoscopic and pharmacologic treatment (usually defined as two failed attempts of endoscopic treatment).
- The **best candidates for surgery** are patients with well **preserved liver function** who fail emergent endoscopic treatment and have no complications from the bleeding or endoscopy.
- The choice of surgery usually depends upon the availability, training, and expertise of the surgeon.
- Although a selective shunt has some physiologic advantages, it may significantly exacerbate marked ascites. Thus, a portacaval shunt would be preferable in patients with marked ascites.



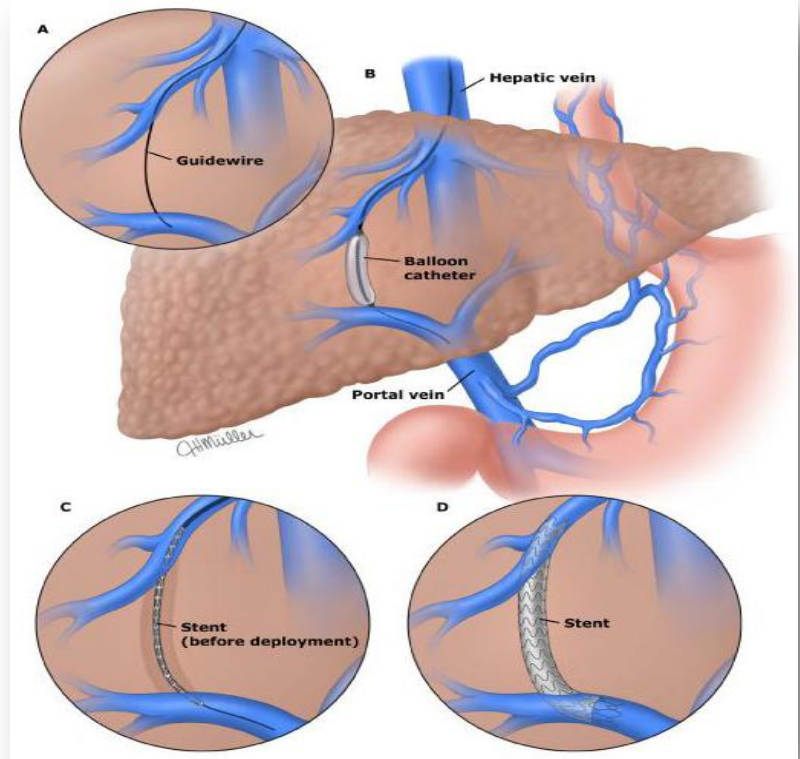
# PORTAL HYPERTENSION OPERATIONS

## Shunt Surgery

### Definition:

#### Transjugular intrahepatic portosystemic shunts (TIPS)

- Involve creation of a low-resistance channel between the hepatic vein and the intrahepatic portion of the portal vein (usually the right branch) using **angiographic techniques**. The tract is kept patent by **deployment of an expandable metal stent** across it, thereby allowing blood to return to the systemic circulation.
- Portosystemic shunts are classified as **nonselective**, **selective**, and **partial**, depending on how much hepatic portal flow is preserved.



### A. Shunt Surgery

#### • Types of shunts:

1. **Nonselective**: those that decompress the entire portal tree, such as portacaval shunts.
2. **Selective**: those that compartmentalize the portal tree into a decompressed variceal system while maintaining sinusoidal perfusion via a hypertensive superior mesenteric-portal compartment, such as a distal splenorenal shunt.
3. **Partial**: those that incompletely decompress the entire portal tree and thereby also maintain some hepatic perfusion

### B. Nonshunt operations

Generally include either esophageal transection (in which the distal esophagus is transected and then stapled back together after varices have been ligated) or devascularization of the gastroesophageal junction (Sugiura procedure).



# VARECIAL BLEEDING TREATMENT

1

Maintain a hemoglobin level of approximately **8 g/dL**. A threshold above this may actually increase mortality.

2

Pharmacologic therapy (somatostatin or its analogue octreotide) should start as soon as bleeding is suspected and continue for 3-5 days after confirmation.

3

Short-term (maximum seven days) antibiotic prophylaxis should be instituted in any patient with cirrhosis and GI hemorrhage.

4

Upper endoscopy, performed within **12 hours**, should be used to make the diagnosis and to treat variceal hemorrhage either with endoscopic variceal ligation or sclerotherapy.

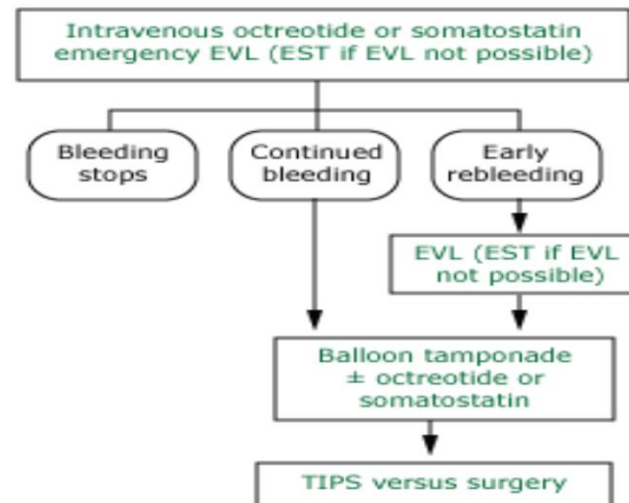
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TIPS is indicated in patients in whom hemorrhage from esophageal varices cannot be controlled or in whom bleeding recurs despite combined pharmacological and endoscopic therapy.

6

Balloon tamponade should be used as a temporizing measure (maximum 24 hours) in patients with uncontrollable bleeding for whom a more definitive therapy (eg, TIPS or endoscopic therapy) is planned.

## Management of acute variceal hemorrhage



# ASCITES

## INTRODUCTION

- Cirrhosis is the most common cause of ascites in the United States, accounting for approximately 85%.
- **Ascites is the most common complication of liver cirrhosis.**
- Fluid leaks from the surface of the liver and intestine.
- **Factors responsible:** portal hypertension, decreased ability of the blood vessels to retain fluid, fluid retention by the kidneys, and alterations in various hormones and chemicals that regulate body fluids.

### Treatment

- Dietary sodium restriction is a central component, 2000 mg / day
- Patients should be instructed to avoid NSAIDs, which causes sodium retention and affect renal function.
- Fluid restriction is equivocal and not strongly recommended
- Diuretic therapy, a single morning oral doses of spironolactone and furosemide, beginning with 100 mg and 40 mg
- Serial therapeutic paracentesis and TIPS are usually reserved for patients with refractory ascites.
- Peritoneovenous shunts (LeVeen or Denver) or surgical portosystemic shunts have very limited indications

### complication

S

- **Spontaneous bacterial peritonitis:** (SBP) is an infection of preexisting ascitic fluid without evidence for an intra-abdominal secondary source such as a perforated viscus .
- **The diagnosis is established by:**
  1. positive ascitic fluid **bacterial culture**, and/or
  2. elevated ascitic fluid absolute **polymorphonuclear leukocyte (PMN)** count ( $\geq 250$  cells/mm<sup>3</sup>)

# PORTAL VEIN THROMBOSIS

## CAUSES

- Can be picked up Ultrasound with Doppler flow studies, CT scanning, and magnetic resonance angiography (MRA) UGD should be performed to establish whether varices are present or not.
- In cases of detected acute thrombosis (e.g. pancreatitis) Anticoagulation therapy should be given for at least three months starting with low molecular weight heparin and shifting to oral anticoagulation as soon as the patient's condition has stabilized.
- Anticoagulation should be continued long-term in patients with acute portal vein thrombosis who have a permanent thrombotic risk factor that is not correctable.

## BLEEDING FROM PORTAL VEIN THROMBOSIS

- Gastric fundal varices: endoscopic variceal obturation using tissue adhesives such as cyanoacrylate is preferred, where available. Otherwise, endoscopic variceal ligation is an option.
- Splenectomy is curative for cases of splenic vein thrombosis and gastric varices formation.
- TIPS should be considered in patients with hemorrhage from fundal varices that cannot be controlled or in cirrhosis when bleeding recurs despite combined pharmacological and endoscopic therapy.

When we say portal hypertension we mean the portal system not necessarily the portal vein. Splenic vein thrombosis causes portal hypertension although the portal vein pressure may be in the normal range but the splenic vein pressure is increased.

## Liver Resection

Benign lesions	Malignant lesions
<p><b><u>Adenoma</u></b></p> <ul style="list-style-type: none"><li>• The most common benign liver lesion that can be resected.</li><li>• Has an Estrogen receptors, so it gets bigger in pregnancy and with oral contraceptives.</li><li>• <b>Why it should be resected?</b><ol style="list-style-type: none"><li>1. Could transfer to HCC</li><li>2. High risk of rupture.</li></ol></li></ul>	<p><b><u>HCC</u></b></p> <p>Here we <b>don't resect if there is cirrhosis</b>, because those patients are cirrhotic and can't tolerate the surgery.</p> <p><b><u>Cholangiocarcinoma</u></b> : cancer of the epithelial cells of the biliary ducts.</p> <p><b><u>Secondary liver tumors (metastases)</u></b> : One of the indications for surgery in liver malignancies is colorectal cancer metastasis . It will increase 5 years survival in 60% of the patients</p>

The most common liver tumors are secondary (metastatic) tumors.

# Summary

- Portal hypertension is defined as hydrostatic pressure  $>5$  mmHg
- The obstruction of the venous flow may occur at a presinusoidal , sinusoidal or postsinusoidal.
- Cirrhosis is the most common cause of portal hypertension.
- Patients with portal hypertension usually symptomatic unless there is a complication like : Gastroesophageal varices, ascites or splenomegaly.
- The first step in the management of patients with variceal bleeding is to assess ABC and resuscitates him with IV fluid.
- The most common malignant tumors in the liver are secondary tumors (metastases).
- Hepatocellular carcinoma usually affect cirrhotic patients and surgery is not indicated for these patients to resect the tumor.





# MCQs

1-The most common malignant tumors in the liver are :

- A- Hepatocellular carcinomas
- B- Adenomas
- C- Metastases
- D- Cholangiocarcinoma

2- A patient known to have hepatitis C for 20 years, came with hematemesis, what is the first step in the management of this patient :

- A- Give him octreotide
- B- Endoscopic variceal ligation
- C- Give him IV fluid.
- D- Do endoscopy.

3- Before endoscopy, which Prophylactic antibiotic we give :

- A-Ceftriaxone
- B-ampicillin
- C- Gentamicin
- D-imipenem

Answers : 1-C 2-C 3-A

# Thank You..

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