



Internal Medicine

Subject: Cirrhosis

Group no: C8

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هَذَا خَلَقَ اللَّهُ فَأَرْوِي مَاذَا خَلَقَ الَّذِينَ مِنْ دُونِهِ ۚ بَلِ الظَّالِمُونَ فِي ضَلَالٍ مُبِينٍ

Liver Cirrhosis

Definition

Cirrhosis is a **late stage of progressive hepatic fibrosis** characterized by:

- Distortion of hepatic architecture
- Formation of regenerative nodules

بالأردن مش كثير مفعول هالموضوع

In its advanced stages, cirrhosis is generally considered **irreversible**, with **liver transplantation** being the only definitive treatment option.

Etiologies and Classification

Common Causes

Nonalcoholic fatty liver disease (NAFLD)

Chronic viral hepatitis (Hepatitis B, C)

Alcoholic liver disease

Hemochromatosis

Less Common Causes

Autoimmune hepatitis

Primary and secondary biliary cirrhosis

Primary sclerosing cholangitis

Medications (e.g., methotrexate, isoniazid)

Wilson disease

Alpha-1 antitrypsin deficiency

Celiac disease

Idiopathic adulthood ductopenia

Granulomatous liver disease

Idiopathic portal fibrosis

Polycystic liver disease

Infections (e.g., brucellosis, syphilis, echinococcosis)

Right-sided heart failure

Hereditary hemorrhagic telangiectasia

Veno-occlusive disease

Clinical Manifestations

اغلب الأحيان بيجي asymptomatic او بيجي complications

Cirrhosis may present with **nonspecific symptoms** or **hepatic decompensation signs**:

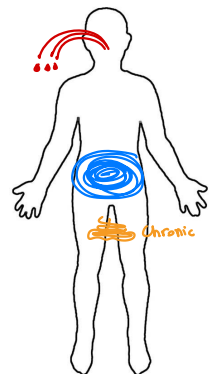
↳ with complications.

1. General Symptoms:

- Nonspecific: **Anorexia, weight loss, weakness, fatigue**
- Gastrointestinal: **Upper GI bleeding, abdominal distension (ascites), chronic diarrhea**
- Diarrhea may result from alterations in small bowel motility, bacterial overgrowth, increased intestinal permeability, and bile acid deficiency

2. Endocrine Manifestations:

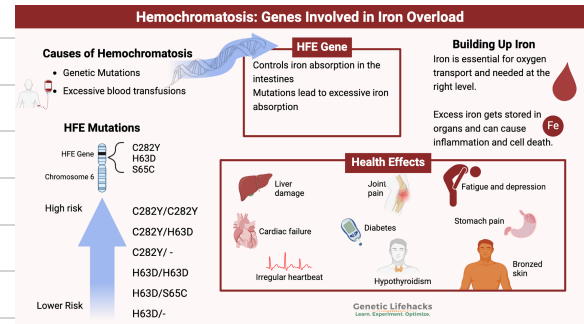
In Women	In Men
Chronic anovulation → Amenorrhea or irregular menstrual bleeding	Hypogonadism → Impotence, infertility , decreased libido, testicular atrophy
	Common in alcoholic cirrhosis & hemochromatosis



توضیحات

Common Causes

- ① **Nonalcoholic fatty liver disease (NAFLD)** → DM, Obesity, metabolic syndrom.
- ② **Chronic viral hepatitis (Hepatitis B, C)**
- ③ **Alcoholic liver disease**
- ④ **Hemochromatosis** → genetic, ↑ iron in liver, oxidative damage → cell death + fibrosis.



Less Common Causes

Autoimmune hepatitis

→ auto-immune disease, body attack small bile ducts → bile build-up → liver damage → fibrosis.

Primary and secondary → Chronic bile duct blockage due to gallstone or tumor stricture → bile accumulation → liver inflammation + fibrosis.

Primary sclerosing cholangitis

→ Linked to ulcerative colitis, inflammation + scarring in bile ducts → bile build-up → fibrosis.

Medications (e.g., methotrexate, isoniazid)

Wilson disease

→ genetic disorder, ↑ copper...

Alpha-1 antitrypsin deficiency

→ genetic disorder, accumulation of α1-AT protein in liver → cell damage + fibrosis.

Celiac disease

→ Chronic inflammation in intestine → immune related liver damage → fibrosis.

Idiopathic adulthood ductopenia

Granulomatous liver disease

Idiopathic portal fibrosis

Polycystic liver disease

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Right-sided heart failure

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Veno-occlusive disease

Wilson's disease is a rare genetic disorder that affects the body's ability to metabolize copper. The following are some of the common symptoms of Wilson's disease:

Hepatic symptoms

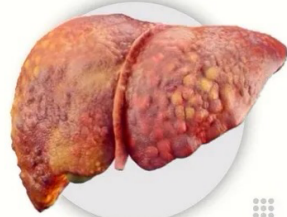
- Jaundice
- Anorexia
- Nausea and vomiting
- Liver pain

Neurological symptoms

- Dysarthria
- Dystonia
- Tremors
- Ataxia

Mental health symptoms

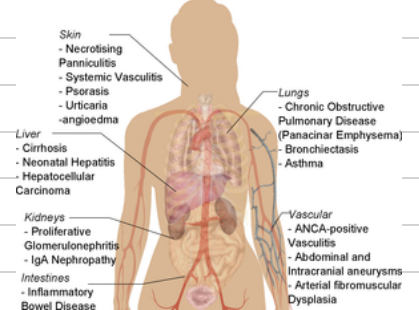
- Irritability
- Aggression
- Antisocial behaviour
- Anxiety



Ocular symptoms

- Sunflower cataract
- Kayser-Fleischer rings

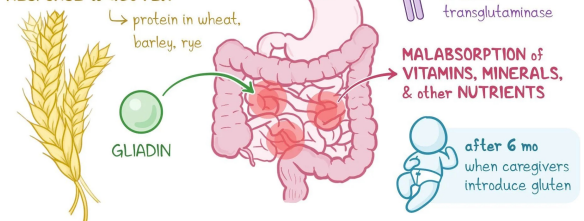
Alpha-1 Antitrypsin Deficiency



CELIAC DISEASE

a.k.a. CELIAC SPRUE / GLUTEN-SENSITIVE ENTEROPATHY

IMMUNE-MEDIATED RESPONSE to GLUTEN



Physical Signs.

System	Findings
General	Decreased blood pressure
Skin	Jaundice (serum bilirubin $>2-3$ mg/dL), spider angiomas (telangiectasias)
Head & Neck	Parotid gland enlargement, fetor hepaticus
Chest	Gynecomastia, spider angiomas
Abdomen	Splenomegaly, ascites, caput medusae, Cruveilhier-Baumgarten murmur
Genitourinary	Testicular atrophy due to hypogonadism (fertility)
Extremities	Palmar erythema, nail changes, clubbing, hypertrophic osteoarthropathy, Dupuytren's contracture, lower limb edema

Child-Pugh Score

A scoring system used to assess cirrhosis severity and prognosis:

Factor	Units	1	2	3
Serum bilirubin	$\mu\text{mol/L}$ mg/dL	<34 <2.0	34-51 2.0-3.0	>51 >3.0
Serum albumin	g/L g/dl	>35 >3.5	30-35 3.0-3.5	<30 <3.0
Prothrombin time	Seconds prolonged INR	<4 <1.7	4-6 1.7-2.3	>6 >2.3
Ascites		None	Easily controlled	Poorly controlled
Hepatic encephalopathy		None	Minimal	Advanced

Interpretation:

- Class A (5-6 points) → Well-compensated cirrhosis
- Class B (7-9 points) → Significant functional impairment
- Class C (10-15 points) → End-stage disease, poor prognosis

Radiologic Findings to confirm

Imaging Modality	Findings
Ultrasound	Shrunken, nodular liver; ascites; splenomegaly
CT Scan / MRI	Irregular liver surface, regenerative nodules, evidence of portal hypertension (varices, ascites)

Laboratory Findings

Parameter	Abnormalities in Cirrhosis
Bilirubin	Elevated
Aminotransferases (AST, ALT)	Abnormal levels
Alkaline phosphatase & GGT	Elevated
Prothrombin time (PT)/INR	Prolonged / Elevated (reflect the disease more accurately the function of liver)
Sodium (Na+), Albumin, Glucose	Low (hyponatremia, hypoalbuminemia, hypoglycemia)
Platelet count	Low (thrombocytopenia)

Terry nails



Patients with cirrhosis may have a finding known as Terry nails. In patients with Terry nails, the proximal two-thirds of the nail plate appears white, whereas the distal one-third is red. This finding is believed to be secondary to a low serum albumin. Terry nails may also be seen in patients with renal failure, diabetes, and heart failure.

Dupuytren's contracture



Nodular fibrosing lesions with bands radiating distally are features of Dupuytren's contracture. The ulnar side of the hand is affected, with the fourth and fifth fingers usually involved first.

التصنيف بصير حسب الـ score إلى A/B/C
لازم نعرفه

ما اهتمم فيه الدكتور بس اقروه

Initial manifestations of cirrhosis

Symptoms
Anorexia
Weight loss
Weakness
Fatigue
Muscle cramps
Easy bruising
Amenorrhea/oligomenorrhea/metrorrhagia (women)
Impotence (men)
Infertility
Decreased libido (men)
Jaundice*
Dark or "cola-colored" urine*
Pruritus*
Hematemesis/melena/hematochezia*
Abdominal distension*
Lower extremity edema*
Confusion or sleep disturbances*
Physical examination
Hepatomegaly
Splenomegaly
Spider angiomas/spider telangiectasias
Palmar erythema
Digital clubbing
Hypertrophic osteoarthropathy
Dupuytren's contracture
Muehrcke nails
Terry nails
Parotid gland enlargement (likely due to alcohol use and not cirrhosis per se)
Gynecomastia (men)
Loss of chest or axillary hair (men)
Testicular atrophy (men)
Caput medusa
Cruveilhier-Baumgarten murmur (venous hum heard best with the stethoscope over the epigastrium)
Jaundice*
Ascites (abdominal distension, shifting dullness, fluid wave)*
Asterix*
Fetor hepaticus*
Laboratory tests
Moderately elevated aminotransferases (often with an AST:ALT ratio >1)
Elevated alkaline phosphatase (2 to 3 times the ULN)
Elevated gamma-glutamyl transpeptidase
Thrombocytopenia
Leukopenia/neutropenia
Anemia
Low serum albumin*
Prolonged prothrombin time/elevated INR*
Hyperbilirubinemia*
Hyponatremia*
Elevated serum creatinine*
Imaging tests
Surface nodularity
Increased echogenicity (ultrasound)
Atrophy of the right lobe
Hypertrophy of the caudate or left lobes
Small, nodular liver*
Ascites*
Hepatocellular carcinoma*
Portal/splenic/superior mesenteric vein thrombosis*
Portosystemic collaterals*

Diagnosis

Step	Details
Initial Evaluation	Abdominal ultrasound to assess liver parenchyma and detect extrahepatic manifestations of cirrhosis.
Definitive Diagnosis	Liver biopsy (only required if clinical, laboratory, and imaging findings are inconclusive or if results would impact management).
Non-Invasive Methods	- Serologic tests: AST/Platelet Ratio, FibroTest/FibroSure. - Radiologic tests: Elastography, nuclear imaging studies, MRI

بطلنا كثير نستخدم ال biopsy هسا

Complications of Cirrhosis & Portal Hypertension

1. Ascites

• Definition: Pathological accumulation of fluid in the peritoneal cavity due to portal hypertension.

• **Diagnosis: Serum-Ascitic Albumin Gradient (SAAG)**

• SAAG ≥ 1.1 g/dL → Portal hypertension-related ascites (e.g., cirrhosis, heart failure)

• SAAG < 1.1 g/dL → Non-portal hypertension causes (e.g., infections, malignancy).

*Remember:- it's not only related to liver.

→ then I check the total protein in Ascitic fluid:
(≥ 2.5)
if it was high → Cardiac.
if it was Low → Hepatic.

Treatment → treat the underlying cause	Details
Sodium restriction	First-line dietary intervention.
Diuretics	Spironolactone ± Furosemide.
Large-volume paracentesis	For severe or refractory cases; albumin infusion recommended if $>5L$ removed.
Transjugular Intrahepatic Portosystemic Shunt (TIPS)	Considered for refractory ascites.

VIP

مهمم

شو يعني ascites ؟

Ascites = abnormal accumulation of fluid in the peritoneal cavity

و مهم نعرف انو مش شرط تكون بسبب ال liver disease

طب كيف بدنا نميز انو بسبب ال liver او لا؟

منحسب اشبي اسمه SAAG

عن طريق معادله

SAAG=serum albumin- ascitic fluid albumin

2. Spontaneous Bacterial Peritonitis (SBP)

• Definition: Infection of ascitic fluid without an evident intra-abdominal source.

• **Diagnosis: Ascitic fluid analysis**

• Neutrophil count ≥ 250 cells/ μL

• Positive culture (often Gram-negative bacteria)

لم الشرط ما يكون حدي Secondary cause مثل
Abscess, Perforation, Peritonitis

مثال Serum albumin = 3.5 g/dL

Ascitic albumin = 1.8 g/dL

SAAG=3.5-1.8=1.7

إذا كان أكثر او يساوي 1 معناته مشكلتنا بالغالب

cardiac or portal hypertension (liver)

إذا أقل من 1 بتكون infection/ malignancy/ etc

Treatment	Details
Empirical Antibiotics	IV Cefotaxime or other 3rd-generation cephalosporins.
Albumin Infusion	Reduces risk of hepatorenal syndrome.
Secondary Prophylaxis	Norfloxacin or Ciprofloxacin in high-risk patients.

3. Hepatic Encephalopathy (HE) *Decompensation*

• Definition: **Neuropsychiatric dysfunction** due to liver failure and ammonia accumulation.

• Clinical Grades:

Grade	Symptoms
Grade 1	Minimal changes, mild confusion, altered sleep.
Grade 2	Asterixis, lethargy, personality changes.
Grade 3	Marked confusion, incoherence, somnolence.
Grade 4	Coma, unresponsiveness.

Precipitating Factors	Examples
Infections	SBP, pneumonia, UTI
Electrolyte Imbalance	Hyponatremia, hypokalemia
GI Bleeding	Increased nitrogen load
Constipation	Ammonia absorption
Medications	Sedatives, narcotics

→ treat the underlying cause, symptoms

Treatment	Details
① Lactulose	First-line; decreases ammonia absorption.
② Rifaximin	Used in recurrent cases (reduces ammonia-producing bacteria).
Supportive care	Electrolyte correction, protein restriction (only in severe cases).

on the first attack → Lactulose

Second attack → Lactulose + Rifaximin

Stage	Features
Stage 0	• No encephalopathy
Stage 1	• Short attention span • Euphoria or depression • Asterixis may be present
Stage 2	• Lethargy or apathy • Disorientation • Asterixis usually present
Stage 3	• Somnolent, but responsive to verbal commands • Severe disorientation • Asterixis absent
Stage 4	• Coma

The "West Haven Criteria," from Reference 22.

4. Hepatorenal Syndrome (HRS)

• Definition: **Acute kidney injury (AKI)** in cirrhosis due to renal vasoconstriction.

• Diagnostic criteria:

1. Cirrhosis with ascites;
2. Serum creatinine > 133 $\mu\text{mol/L}$ (1.5 mg/dl);
3. No sustained improvement of serum creatinine (decrease to a level of 133 $\mu\text{mol/L}$ or less) after at least 2 days of diuretic withdrawal and volume expansion with albumin. The recommended dose of albumin is 1 g/kg of bodyweight per day to a maximum of 100 g/day;
4. **Absence of shock**;
5. No current or recent treatment with nephrotoxic drugs;
6. **Absence of parenchymal disease** as indicated by proteinuria >500 mg/day, microhematuria (>50 red blood cells per high power field) and/or abnormal renal ultrasonography.

• Types:

Type	Features
Type 1	Rapidly progressive renal failure (doubling of creatinine in <2 weeks).
Type 2	Slowly progressive renal impairment.

Treatment	Details
Vasoconstrictors	Midodrine + Octreotide ± Albumin. + good hydration
Liver Transplant	Definitive treatment.

5. Portopulmonary Hypertension (PPHTN)

• Definition: Pulmonary hypertension occurring in patients with portal hypertension.

• Diagnosis:

• **Echocardiogram**: Screening test of choice. (trans-thoracic)

• **Right heart catheterization**: Confirms elevated pulmonary arterial pressure (>25 mmHg).

Treatment	Details
Oxygen therapy	Supportive treatment.
Diuretics	Symptom relief in volume overload.
Vasodilators	Considered in severe cases.

Diagnostic criteria

Clinical portal hypertension with or without significant chronic liver disease

mPAP >25 mmHg

PAWP <15 mmHg

PVR >2-3 wood units

mPAP = Mean pulmonary artery pressure, PAWP = Pulmonary artery wedge pressure, PVR = Pulmonary vascular resistance

6. Hepatopulmonary Syndrome (HPS)

- Definition: Hypoxemia in patients with liver disease and portal hypertension due to intrapulmonary vascular dilatation.
- Diagnostic Criteria:

Liver disease

$PA-a,O_2 \geq 15 \text{ mmHg}$

Positive CEE (Contrast enhanced echo)

$PA-a,O_2$: alveolar-arterial oxygen tension difference; CEE: contrast-enhanced echocardiography. #: abbreviated formula: $PA,O_2 - Pa,O_2 = FI,O_2 (P_{atm} - PH_2O) - Pa,CO_2 / RER - Pa,O_2$, where PA,O_2 is alveolar oxygen tension, Pa,O_2 arterial oxygen tension, FI,O_2 inspiratory oxygen fraction, P_{atm} atmospheric pressure, PH_2O water vapour partial pressure and RER exchange respiratory ratio (assumed to be 0.8)

+ Triad :-

1. intra pulmonary vascular dilation
2. Liver disease
3. Arterial hypoxemia.

- Increased alveolar-arterial (A-a) gradient
- Platypnea-Orthodeoxia (worsening hypoxia when upright)

Diagnosis	Findings
$PaO_2 < 70 \text{ mmHg}$	Arterial blood gas analysis
Normal CXR & PFTs	No parenchymal lung disease
Contrast-Enhanced Echocardiogram	Detects intrapulmonary shunting (microbubble study)
Technetium-labeled Macroaggregated Albumin Scan	Confirms pulmonary vascular dilatation
Pulmonary Angiography	Definitive test in some cases

Treatment	Details
Oxygen Therapy	Symptomatic relief.
Liver Transplant	Definitive treatment.

7. Hepatic Hydrothorax

- Definition: Pleural effusion in cirrhosis patients (usually right-sided) due to diaphragmatic defects.
- Diagnosis:
- Thoracentesis (to rule out infection/malignancy).
- Chest imaging (CXR, ultrasound, CT scan).

Treatment	Details
Sodium restriction + Diuretics	First-line management.
Therapeutic thoracentesis	If symptomatic, avoid frequent procedures to prevent complications.
TIPS procedure	For refractory cases.

what to avoid?

Chest tubes

يفضل نتعامل مع ال diuretics بكون احسن

1. A 54-year-old man with cirrhosis presents with abdominal distension. SAAG = 1.7 g/dL and ascitic fluid protein = 1.0 g/dL. What is the most likely cause of his ascites?
 - A. Malignancy
 - B. Nephrotic syndrome
 - C. Heart failure
 - D. Portal hypertension due to cirrhosis
 - E. Tuberculosis
2. Which finding BEST reflects acute deterioration of liver function?
 - A. Low albumin
 - B. Elevated ALP
 - C. Elevated AST/ALT
 - D. Prolonged PT/INR
 - E. Elevated GGT
3. A patient with ascites develops fever and abdominal pain. Paracentesis shows neutrophils = 320 cells/ μ L. What is the next step?
 - A. Start IV cefotaxime
 - B. Start diuretics
 - C. Perform TIPS
 - D. Give lactulose
 - E. Repeat paracentesis in 48 hours only
4. In cirrhosis, which lab abnormality is expected?
 - A. High sodium
 - B. Low albumin
 - C. Low bilirubin
 - D. High glucose
 - E. High platelets
5. A pregnant woman in her 3rd trimester presents with fulminant hepatitis. Most likely cause?
 - A. HAV
 - B. HBV
 - C. HCV
 - D. HDV
 - E. HEV
6. Which marker appears FIRST in acute HBV infection?
 - A. Anti-HBs
 - B. Anti-HBc IgG
 - C. HBeAg
 - D. HBsAg
 - E. HBV DNA
7. A newborn of an HBV-positive mother should receive:
 - A. Vaccine only
 - B. HBIG only
 - C. HBIG + Vaccine
 - D. Tenofovir
 - E. Nothing

Answers

- D
D
A
B
E
D
C