

Jaundice (Hyperbilirubinemia): Causes, Symptoms and Treatment

Jaundice is the **yellow discoloration** of the skin, sclerae (whites of the eyes), and mucous membranes due to **elevated serum bilirubin** levels. Clinically visible jaundice typically occurs when **total serum bilirubin >2–2.5 mg/dL** (34–43 $\mu\text{mol/L}$).

Bilirubin Metabolism Overview

- **Bilirubin** is a yellow pigment derived from the breakdown of **heme** in red blood cells.
- **Unconjugated (indirect) bilirubin** is insoluble in water and bound to albumin for transport to the **liver**, where it is:
 - **Taken up by hepatocytes**
 - **Conjugated** with glucuronic acid (becomes water-soluble)
 - **Excreted into bile** ? reaches intestine ? converted to **urobilinogen** and **stercobilin** (gives stool its brown color)
- Some urobilinogen is reabsorbed and excreted in **urine**.

Types of Hyperbilirubinemia

1. **Pre-hepatic (Hemolytic) Jaundice**
 - Caused by **increased RBC breakdown**
 - Excess **unconjugated bilirubin**
 - Common causes:
 - Hemolytic anemias (e.g., sickle cell disease, thalassemia, malaria)
 - Autoimmune hemolysis
2. **Hepatic (Hepatocellular) Jaundice**
 - Due to **hepatocyte dysfunction** (impaired uptake, conjugation, or excretion)
 - Mixed conjugated and unconjugated hyperbilirubinemia
 - Causes:
 - **Viral hepatitis, drug-induced liver injury** (e.g., isoniazid, acetaminophen), **alcoholic hepatitis, cirrhosis, hepatoma**
3. **Post-hepatic (Obstructive/Cholestatic) Jaundice**
 - Impaired **bile flow** due to obstruction
 - Predominantly **conjugated bilirubin**
 - Causes:
 - **Gallstones, bile duct strictures, pancreatic cancer, cholangiocarcinoma, primary sclerosing cholangitis**

Common Causes of Jaundice

Category	Common Causes
Infectious	Viral hepatitis (A, B, C), Malaria, Leptospirosis, Typhoid, CMV
Hematologic	Hemolytic anemias (SCD, G6PD), autoimmune hemolysis, malaria

Category Hepatic

Obstructive

Neoplastic Congenital

Common Causes

Alcoholic liver disease, Drug-induced liver injury, Cirrhosis

Biliary atresia (infants), Gallstones, Pancreatic tumor

Hepatocellular carcinoma, Cholangiocarcinoma
Gilbert's syndrome, Crigler-Najjar, Dubin-Johnson, Rotor

Clinical Features of Jaundice

History

- **Fatigue, nausea, anorexia, RUQ pain**
- **Dark urine, pale stools, pruritus** (obstructive pattern)
- **Smoking aversion** may point to hepatitis
- Drug use, alcohol history, transfusion, and travel history

Physical Examination

- **Scleral icterus, skin jaundice**
- **Hepatomegaly, splenomegaly** (e.g., in hemolytic anemia)
- **Stigmata of chronic liver disease:** spider angiomas, gynecomastia, ascites
- **Lymphadenopathy** (e.g., lymphoma, viral infection)
- **Asterixis, confusion ? hepatic encephalopathy**

Investigations

Basic Labs

- **CBC with Reticulocyte Count** – Elevated in hemolysis
- **Peripheral smear** – Sickle cells, schistocytes
- **Liver Function Tests (LFTs):**
 - **ALT/AST:** Hepatocellular damage
 - **ALP/GGT:** Cholestasis or obstruction
 - **Total and Direct Bilirubin**
 - **Albumin** – ? in chronic liver disease
 - **PT/INR** – Liver synthetic function

Urinalysis

- **Bilirubin present** – conjugated hyperbilirubinemia
- **Urobilinogen** – Absent in obstructive jaundice

Serologic Tests

- **HBsAg, Anti-HCV, Anti-HAV IgM, EBV/CMV serologies**

- **TORCH panel** in neonates

Imaging

- **Abdominal Ultrasound** – First-line in obstructive jaundice
- **CT/MRI/MRCP** – For detailed liver and biliary tract evaluation

Specialized Tests

- **Alpha-fetoprotein (AFP)** – Elevated in hepatocellular carcinoma
- **Liver biopsy** – Chronic hepatitis, cirrhosis, tumor
- **Paracentesis** – Ascitic fluid analysis if ascites present

Management Principles

? **Jaundice is a symptom, not a disease. Management targets the underlying cause.**

Cause	Management
Hemolytic anemia	Treat underlying hemolysis, transfusions if necessary
Viral hepatitis	Supportive care, antivirals (e.g., HBV, HCV), avoid hepatotoxins
Drug-induced liver injury	Discontinue offending drug (e.g., isoniazid, acetaminophen), consider N-acetylcysteine
Obstructive jaundice	ERCP or surgery to relieve obstruction
Cirrhosis with complications	Diuretics, paracentesis, liver transplant evaluation
Neonatal jaundice	Phototherapy or exchange transfusion (if severe)
Unknown cause	Admit for further workup

Nursing Considerations (NCLEX Focus)

- Monitor **I&O**, **skin integrity**, and **neuro status** (risk of encephalopathy)
- Teach patient to avoid **alcohol and hepatotoxic meds**
- Encourage **nutritional support** – high-calorie, moderate-protein, low-sodium diet (if cirrhotic)
- Ensure **infection prevention** in immunocompromised or liver failure patients
- Educate on **medication adherence** and **follow-up labs**

Key High-Yield Pearls

- ? **Dark urine + pale stool + pruritus** ? think **obstructive jaundice**
- ? **ALT > AST** ? **viral hepatitis**; **AST > ALT** ? **alcoholic hepatitis**
- ? **Hemolysis signs + isolated unconjugated bilirubin** ? **pre-hepatic jaundice**
- ? Always screen for **viral hepatitis** in liver disease

- ? Sudden jaundice + abdominal mass ? consider **malignancy**