

Bilirubin

hemoglobin albumin-serum venipuncture

Definition

Bilirubin is a product that results from the breakdown of hemoglobin. Total and direct bilirubin are usually measured to screen for or to monitor liver or gallbladder problems.

Alternative Names

Total bilirubin; Unconjugated bilirubin; Indirect bilirubin; Conjugated bilirubin; Direct bilirubin

Why the Bilirubin is Performed

This test is useful in determining if a patient has liver disease or a blocked bile duct.

Bilirubin metabolism begins with the breakdown of red blood cells. Red blood cells contain hemoglobin, which is broken down to heme and globin. Heme is converted to bilirubin, which is then carried by albumin in the blood to the liver.

In the liver, most of the bilirubin is chemically attached to another molecule before it is released in the bile. This "conjugated" (attached) bilirubin is called direct bilirubin; unconjugated bilirubin is called indirect bilirubin. Total serum bilirubin equals direct bilirubin plus indirect bilirubin.

Conjugated bilirubin is released into the bile by the liver and stored in the gallbladder, or transferred directly to the small intestines.

Bilirubin is further broken down by bacteria in the intestines, and those breakdown products contribute to the color of the feces. A small percentage of these breakdown compounds are taken in again by the body, and eventually appear in the urine.

How the Bilirubin is Performed

Blood is drawn from a vein (venipuncture) or capillary. The laboratory technician spins the blood in a centrifuge to separate the serum (liquid part) from the cells. The bilirubin test is done on the serum.

How to Prepare for the Bilirubin

Fast for at least 4 hours before the test. Your health care provider may instruct you to stop taking drugs that affect the test.

Drugs that can increase bilirubin measurements include allopurinol, anabolic steroids, some antibiotics, antimalaria medications, azathioprine, chlorpropamide, cholinergics, codeine, diuretics, epinephrine, meperidine, methotrexate, methyl dopa, MAO inhibitors, morphine, nicotinic acid, oral contraceptives, phenothiazines, quinidine, rifampin, salicylates, steroids, sulfonamides, and theophylline.

Drugs that can decrease bilirubin measurements include barbiturates, caffeine, penicillin, and high-dose salicylates.

Considerations

Factors that interfere with bilirubin testing are:

- Hemolysis (breakdown) of blood will falsely increase bilirubin levels
- Lipids in the blood will falsely decrease bilirubin levels
- **Bilirubin** is light-sensitive; it breaks down in light

Normal Results

- Direct bilirubin: 0 to 0.3 mg/dL
- Total bilirubin: 0.3 to 1.9 mg/dL

Note: mg/dL = milligrams per deciliter

Normal values may vary slightly from laboratory to laboratory.

What Abnormal Results Mean

Jaundice is the discoloration of skin and the sclera of the eye, which occurs when bilirubin accumulates in the blood at a level greater than approximately 2.5 mg/dL. Jaundice occurs because red blood cells are being broken down too fast for the liver to process. This might happen due to liver disease or bile duct blockage.

If the bile ducts are blocked, direct bilirubin will build up, escape from the liver, and end up in the blood. If the levels are high enough, some of it will appear in the urine. Only direct bilirubin appears in the urine. Increased direct bilirubin usually means that the biliary (liver secretion) ducts are obstructed.

Increased indirect or total bilirubin may indicate:

- Crigler-Najjar syndrome
- Erythroblastosis fetalis
- Gilbert's disease
- Healing of a large hematoma (bleeding under the skin)

- Hemolytic anemia
- Hemolytic disease of the newborn
- Physiological jaundice (normal in newborns)
- Sickle cell anemia
- Transfusion reaction
- Pernicious anemia

Increased direct bilirubin may indicate:

- Bile duct obstruction
- Cirrhosis
- Dubin-Johnson syndrome (very rare)
- Hepatitis
- Intrahepatic cholestasis (buildup of bile in the liver) of many causes

Additional conditions under which the test may be performed:

- Biliary stricture
- Cholangiocarcinoma
- Cholangitis
- Choledocholithiasis
- Hemolytic anemia due to G6PD deficiency
- Hepatic Encephalopathy
- Idiopathic aplastic anemia
- Idiopathic autoimmune hemolytic anemia
- Immune hemolytic anemia (including drug-induced immune hemolytic anemia)
- Secondary aplastic anemia
- Thrombotic thrombocytopenic purpura
- Wilson's disease