

CLINICAL MANIFESTATION AND MANAGEMENT OF JAUNDICE

Abstract

The Overview of Jaundice is provided in this chapter. Jaundice is a medical condition that is characterized by the yellowing of the skin and eyes due to the accumulation of bilirubin in the body. It is a common condition that affects individual of all ages and can be caused by a variety of factor including liver disease, haemolyticanaemia and certain medication. This chapter provides an overview of jaundice, including its causes, symptoms, diagnosis and treatment options. Additionally, it discusses the complications associated with jaundice and the important seeking medical attention if symptoms persist. Understanding the underlying causes of jaundice and the available treatment options can help individual manage this condition effectively and prevent further complication.

Keywords: Clinical Manifestation, Jaundice, medical, disease.

Authors

Mr. Vishant Pal

Demonstrator
(Biochemistry)
Department of Paramedical Sciences
Subharti Medica College
Swami Vivekanand Subharti University,
Meerut, India

Mr. Sobit

Demonstrator
(Microbiology)
Department of Paramedical Sciences
Subharti Medica College
Swami Vivekanand Subharti University,
Meerut, India

I. INTRODUCTION

Jaundice is a condition when there is an overabundance of bile pigments in the blood and biological tissues. This results in a yellow to orange and occasionally even greenish discoloration of the skin, eye whites, and mucous membranes. Jaundice can be difficult to see in artificial lighting and is best observed in daylight. The amount of coloration is determined by the blood bilirubin content, the pace at which it diffuses into the tissue, and the tissue's ability to absorb and bind bilirubin. At locations of inflammation and oedema (an abnormal buildup of fluid in the tissues), bilirubin enters the tissue fluids and is absorbed more quickly. The liver produces more bile than can be used, which is one of the most prevalent mechanisms generating jaundice. The elimination of bile pigments from the blood may be reduced or overproduced as a result of congenital abnormalities, liver disease, regurgitation (leakage of bilirubin extracted by the liver back into the bloodstream), or obstruction of the bile ducts. Because the liver has not fully developed, a healthy newborn may have jaundice. This kind of jaundice typically goes away within a few weeks if the liver starts to work normally. Neonatal jaundice is a frequent condition that affects between 50 and 60 percent of newborns born at full term and 80 percent of infants born prematurely.

Jaundice can result from a number of conditions, including haemolytic anaemia, circulatory system congestion, pneumonia, congenital liver abnormalities, poisoning by infectious agents or toxins, scarring of the liver tissue (cirrhosis), and obstructions or tumours in the liver, bile ducts, or pancreatic head.

The majority of the time, jaundice is a significant indicator of an underlying physical disorder, but outside of the neonatal era, the retention of bilirubin typically just results in temporary skin colouring while the underlying systemic issue is resolved. When cholestatic jaundice is severe or persistent, it might lead to further conditions that prevent bile salts from reaching the digestive system. Intestinal bleeding can happen as a result of the absence of bile salts because without them, the body cannot properly absorb the fat-soluble vitamin K. Without this vitamin, blood coagulation is compromised, which increases the likelihood of bleeding.

II. CAUSES

An underlying condition with aberrant bilirubin metabolism, liver malfunction, or biliary-tract blockage is indicated by the presence of jaundice. Jaundice is typically seen when bilirubin levels in the blood are higher than 3 mg/dl. Depending on the aspect of the physiological process the illness impacts, jaundice is divided into three groups.

These three groups are:

Category	Definition
Prehepatic/hemolytic	The disease first becomes apparent before liver metabolism occurs because of internal or environmental factors that lead to red blood cell rupture.
Hepatic/hepatocellular	Damage to parenchymal liver cells is the pathophysiology.
Post hepatic/cholestatic	The obstruction of the biliary tract and/or impaired bilirubin excretion lead to the disease, which develops following bilirubin conjugation in the liver.

- 1. Pre-Hepatic Causes:** RBCs and a greater breakdown rate are typically involved in pre-hepatic jaundice, however. An imbalance of bilirubin results when there is too many RBS, either because they die or are replaced by new RBS. The liver's inability to operate correctly is the main outcome.

Bilirubin continues to circulate in the bloodstream as a result, leading to jaundice. Pre-hepatic jaundice can have many causes, including parasite diseases (such as malaria) and sickle-cell anaemia.

Next, as the liver is processing bilirubin, hepatic jaundice frequently occurs. Either the liver is inflamed or the liver cells aren't functioning properly. The way the liver works is impacted. The most common causes of prehepatic jaundice include:

- **Sickle-Cell Anaemia:** Typically, red blood cells are elongated and flexible. Some red blood cells with sickle cell anaemia resemble the sickles used to cut wheat. The disease's name is derived from these unusually shaped cells.
- **Spherocytosis:** Spherocytes, or erythrocytes (red blood cells) that are sphere-shaped rather than the typical bi-concave disc shape, are present in the blood in spherocytosis. All types of hemolytic anaemia, to some extent, contain spherocytes. Only spherocytes are present in autoimmune hemolytic anaemia and hereditary spherocytosis.
- **Thalassemia:** Your body produces less haemoglobin than usual as a result of the inherited blood disorder thalassemia. Due to the presence of haemoglobin, red blood cells might carry oxygen. You may have fatigue due to the anaemia that thalassemia causes.
- **Pyruvate Kinase Deficiency:** A uncommon genetic condition called pyruvate kinase deficiency causes your red blood cells to degrade more quickly than usual. It can result in haemolytic anaemia and present with signs like weakness, exhaustion, and an accelerated heartbeat.
- **Glucose-6-Phosphate Dehydrogenase Deficiency:** G6PD insufficiency is an inherited condition. It happens when the enzyme G6PD (glucose-6-phosphate dehydrogenase) isn't present in sufficient quantities in the body. This enzyme helps red blood cells function normally. A lack of this enzyme can lead to haemolytic anaemia. Red blood cells age faster than they are made when this happens.
- **Microangiopathic Haemolytic Anaemia:** Haemolytic anaemia (loss of red blood cells by destruction) is a condition that can be brought on by conditions in the small blood arteries, and one such condition is known as microangiopathic haemolytic anaemia (MAHA). Anaemia and schistocytes found on the blood film under a microscope help to identify it.

- 2. Hepatic Causes:** Bilirubin metabolism in the liver is abnormal, which results in hepatic jaundice. Significant hepatocyte damage brought on by viral, drug- or medication-induced, autoimmune, or, less frequently, transmissible genetic illnesses are the main causes of hepatic jaundice. A partial list of hepatic causes of jaundice includes the following:

- **Acute Hepatitis:** Inflammation of the liver is known as acute viral hepatitis, which is often inflammation brought on by infection with one of the five hepatitis viruses.

- Hepatitis A
 - Hepatitis B
 - Hepatitis C
 - Hepatitis D
 - Hepatitis E
 - **Chronic Hepatitis:** An inflammation of the liver is known as hepatitis. Liver inflammation lasts for at least six months in chronic hepatitis. This disorder may be moderate, producing only minor harm, or more significant, resulting in the death of numerous liver cells. In some situations, cirrhosis and liver failure result.
Chronic hepatitis from infection is most often caused by these viruses:
 - Hepatitis B and C
 - Hepatitis D
 - **Drug-Induced Hepatitis:** Hepatitis brought on by drugs is an inflammation and reddening of the liver brought on by an excessive number of certain drugs.
 - **Alcoholic Liver Disease:** Alcoholic liver disease is common, but can be prevented. There are 3 types. Many heavy drinkers progress through these 3 types over time:
 - **Irritable Liver:** The accumulation of fat within the liver cells results in fatty liver. It causes the liver to grow larger. It is the most typical liver condition brought on by alcohol.
 - **Alcoholic Liver Disease:** An acute liver inflammation is caused by alcoholic hepatitis. Liver cells die, and this is frequently followed by lifelong scarring.
 - **Alcoholic liver cirrhosis:** Normal liver tissue is destroyed in alcoholic cirrhosis. The functioning liver tissue is replaced by scar tissue.
 - **Gilbert's Syndrome:** Gilbert syndrome, pronounced "zheel-bayr," is a typical, risk-free liver disorder in which the liver fails to correctly handle bilirubin. Red blood cell lysis results in the production of bilirubin.
 - **Crigler-Najjar Syndrome, Type 1:** A uncommon genetic disorder called Crigler-Najjar syndrome develops when your liver is unable to break down bilirubin, a chemical produced by red blood cells. The skin of children who have this illness appears yellow due to jaundice. If neglected, these symptoms might be fatal or result in permanent brain damage.
- 3. Post Hepatic Causes (Obstructive Jaundice):** Obstructive jaundice, also known as post-hepatic jaundice, develops when the bile ducts or digestive tract are blocked, preventing the appropriate bilirubin drainage.
- **Causes of Post-Hepatic Jaundice** Some potential causes of post-hepatic jaundice are dependable source
 - **Biliary Channels** can get blocked by gallstones, which are hard deposits of calcium in the gallbladder. The growth and spread of cancerous cells in the pancreas, an organ that aids in the production of digestive fluids, is known as pancreatic cancer. The growth and spread of cancerous cells in your bile ducts is known as bile duct cancer.
 - **Biliary Atresia**, often known as pancreatitis, is an infection or inflammation of the pancreas. According to Trusted Source, a hereditary disease causes the bile ducts to be small or absent.
 - **Symptoms of Post-Hepatic Jaundice:** In addition to the yellowing of your eyes and skin, post-hepatic disease might cause other symptoms.
These symptoms may include:

- Feeling Sick
- Throwing Up
- Dark Urine or Pale Stool
- Abdominal Pain
- Diarrhea
- Abnormal Weight Loss
- Skin Itching
- Abdominal Swelling
- Fever

III. THE DIFFERENT COMPLICATIONS OF JAUNDICE IN NEWBORNS

Jaundice is likely to be present in newborns whose skin is yellow in colour. An excessive amount of bilirubin in neonates' and infants' blood is what causes the rather common illness. The liver excretes the yellow pigment bilirubin, which is present in red blood cells. The elimination of these substances in the urine and faeces helps to maintain appropriate levels. Acute bilirubin encephalopathy and kernicterus are the two primary consequences that result from untreated jaundice.

1. **Brain Damage:** When therapy is put off, a newborn may experience severe brain damage that causes other issues. One is cerebral palsy. It refers to a broad range of neurological conditions that interfere with the brain's capacity to communicate with the muscles. Other issues include hearing loss, difficulty learning, uncontrollable twitching or the inability to regulate certain body parts, delayed tooth growth, and a propensity to look up or back and forth.
2. **Risk Factors:** The majority of jaundice instances are not dangerous, but certain circumstances can increase a baby's risk of problems. Due to intestinal obstructions, a premature baby may have too much bilirubin, making it difficult for it to be effectively eliminated. It can happen to newborns who are bruised upon delivery, which breaks blood cells. If the mother and child have different blood types, an excessive number of blood cells may break down too quickly. Additionally, breast-feeding carries considerable danger.
3. **Acute Bilirubin Encephalopathy:** A disorder known as acute bilirubin encephalopathy arises when bilirubin penetrates the brain, where poisons block the cells and cause bilirubin toxicity. A infant runs the risk of sustaining brain damage if immediate care is not given. If a newborn with jaundice has problems waking up or seems especially exhausted, parents should pay attention. High-pitched crying or insufficient feeding or sucking behaviours in babies are possible. Fever, vomiting, and an encompassing of the back and neck are further warning signals.
4. **Further Symptoms of Kernicterus:** Seizures added to ongoing neck or spine bending are signs that the illness is getting worse. An exchange transfusion, a type of blood transfusion, is now being used as treatment. Blood is drawn from the umbilical cord, arms, or legs using a tube, and that blood is then replaced with donor blood that is in good health. This assists in bringing the baby's blood bilirubin levels back to normal.

5. **Initial Symptoms of Kernicterus:** A newborn will first exhibit all of the typical signs of jaundice in addition to others, which will warn parents of a potential kernicterus. Bilirubin may have impacted the brain if a newborn is acting unfocused, has trouble focusing on everything around him or her, and responds slowly. Damage is often indicated by loose and floppy muscles, and the newborn may bend his or her neck or spine. A sign could also be inadequate feeding, especially if it coexists with other symptoms.
6. **Kernicterus:** The central nervous system and brain could be gravely harmed by bilirubin, leading to a disorder called kernicterus. The best defense is early treatment because it is a relatively rare illness. By keeping an eye on the signs or progression of a baby's jaundice, it can be prevented. A physical examination and blood tests will be used to make an accurate diagnosis. If kernicterus is found, the newborn will exhibit particular behavior because the brain has been harmed.
7. **Symptoms of Jaundice:** Three to seven days after birth, when bilirubin levels are at their peak, parents should watch for any symptoms of jaundice. Particularly on the abdomen, arms, and legs as well as the whites of the eyes, a yellowish hue will intensify. Aside from that, you should be mindful of things like low-pitched weeping, lack of weight gain, and weariness. Typically lasting longer than three weeks, jaundice may or may not need treatment.
8. **Causes of Jaundice:** The buildup of bilirubin in the blood is the main cause of jaundice. Babies can be impacted by some underlying causes that can happen throughout pregnancy or right after birth. Hemorrhaging, or internal bleeding, sepsis, or a blood infection, an infection from a virus or bacteria, the outcome of the mother's and baby's blood not being compatible, a condition with the liver, a lack of enzymes, or broken red blood cells are a few examples.
9. **Phototherapy:** Phototherapy is a method of using light to treat jaundice. By adding oxygen, a process called photo-oxidation lowers the bilirubin levels in newborns. Because bilirubin can now dissolve in water, the liver can eliminate it more quickly. Light is directed at a baby's skin in two major ways: conventional phototherapy and fiberoptic phototherapy. Premature infants are treated using fiberoptic, but traditional treatment is typically tried first.
10. **What to Expect:** Make a list of topics to bring up with a doctor if parents are concerned about the degree of jaundice or additional symptoms their kid is exhibiting. He or she will inquire about the infant's ability to eat and whether it is breast milk or formula, as well as whether there have been any unusual bowel movements, how readily the infant wakes up, and whether the infant appears sick or has weak muscles. Changes in skin tone should be noticed, as should any spread to other body parts.

IV. HOW IS JAUNDICE DIAGNOSED?

When diagnosing jaundice, medical professionals look for indicators of liver illness like:

- The skin getting bruised.
- Spider angiomas are an abnormal grouping of blood vessels close to the skin's surface

- Redness on the palms and fingertips is referred to as palmar erythema.

Conjugated jaundice is indicated by a positive bilirubin result from a urine test, or urine analysis. The results of the urinalysis should be verified by serum testing. The complete blood count (CBC) and bilirubin levels will be part of the serum testing.

The size and tenderness of your liver will also be checked during an examination by your doctor. To further confirm the diagnosis, he or she may employ imaging techniques including liver biopsies and computer tomographic (CT) scanning (ultrasonography and CT scanning, respectively).

V. TREATMENT/MANAGEMENT

When it is feasible, treating the underlying hepatobiliary or hemorrhagic disorder is the best strategy to treat jaundice. Cholestasis-related pruritis can be treated, depending on its severity. For mild pruritis, warm baths or oatmeal baths may be comforting. Antihistamines may also be beneficial for pruritis. For patients with mild to severe pruritis, bile acid sequestrants such cholestyramine or colestipol are effective. Other less effective medications include phenobarbital, rifampin, naltrexone, sertraline, and others. The sole treatment for pruritis, if all other medical options fail, might be a liver transplant.

REFERENCE

- [1] <https://www.britannica.com/science/jaundice>
- [2] <https://en.wikipedia.org/wiki/Jaundice>
- [3] <https://fatty liverdisease.com/prehepatic-jaundice/>
- [4] <https://www.healthline.com/health/jaundice-types#post-hepatic-jaundice>
- [5] <https://www.mayoclinic.org/diseases-conditions/sickle-cell-anemia/symptoms-causes/syc-20355876>
- [6] <https://en.wikipedia.org/wiki/Spherocytosis>
- [7] <https://www.mayoclinic.org/diseases-conditions/thalassemia/symptoms-causes/syc-20354995?p=1>
- [8] <https://my.clevelandclinic.org/health/diseases/23419-pyruvate-kinase-deficiency>
- [9] <https://www.hopkinsmedicine.org/health/conditions-and-diseases/g6pd-glucose6phosphate-dehydrogenase-deficiency>
- [10] <https://www.merckmanuals.com/home/liver-and-gallbladder-disorders/hepatitis/overview-of-acute-viral-hepatitis>
- [11] <https://www.drugs.com/health-guide/chronic-hepatitis.html>
- [12] <https://www.hopkinsmedicine.org/health/conditions-and-diseases/hepatitis/drug-induced-hepatitis>
- [13] <https://www.hopkinsmedicine.org/health/conditions-and-diseases/alcohol-induced-liver-disease>
- [14] <https://www.mayoclinic.org/diseases-conditions/gilberts-syndrome/symptoms-causes/syc-20372811>
- [15] <https://my.clevelandclinic.org/health/diseases/22949-crigler-najjar-syndrome>
- [16] <https://healthprep.com/articles/blood-disorders/the-different-complications-of-jaundice-in-new-borns/>
- [17] <https://my.clevelandclinic.org/health/diseases/15367-adult-jaundice>