



## Jaundice - A Review

Westeous Dominic Pereira\*

First year BDS, Saveetha Dental College and Hospitals, Chennai, India.

\*Corresponding author's E-mail: [westeous@gmail.com](mailto:westeous@gmail.com)

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### ABSTRACT

Jaundice is a clinical manifestation of disorders of underlying bilirubin metabolism, hepatocellular dysfunction, or biliary obstruction. As clinical presentations of yellowing of eyes or skin can be somewhat nonspecific for the underlying etiology of disease, a stepwise approach to evaluation is necessary for accurate diagnosis and effective treatment plan. In this review, we discuss underlying mechanisms of cholestasis and jaundice as well as laboratory and imaging modalities needed to evaluate a patient presenting with hyperbilirubinemia. Jaundice occurs in settings of cholestasis or inability to effectively secrete bile as well as disorders of bilirubin metabolism and hepatocellular dysfunction. Clinical signs of jaundice occur when the serum bilirubin level exceeds 2.5 to 3 mg/dL. In all cases, evaluation begins with liver chemistry tests which include bilirubin (conjugated and unconjugated), alkaline phosphatase, alanine aminotransferase, aspartate aminotransferase, and total protein. In patients with hepatobiliary causes of jaundice, the alkaline phosphatase is usually elevated. In these cases, evaluation of hepatic synthetic function is crucial to the formulation of a treatment plan. When serologic evaluation is combined with hepatobiliary imaging, underlying mechanism of disease can often be elucidated. A stepwise approach to evaluation can be cost and time saving as well as a framework to improve patient outcomes. In this review, we will outline a diagnostic approach to jaundice, beginning with pathophysiology of cholestasis followed by hyperbilirubinemia and markers of synthetic dysfunction.

**Keywords:** Cholestasis, Jaundice, hepatobiliary, pathophysiology.

### INTRODUCTION

Jaundice, also known as icterus, is a yellowish or greenish pigmentation of the skin and whites of the eyes due to high bilirubin levels.<sup>1</sup> It is commonly associated with itchiness.<sup>3</sup> The faces may be pale and the urine dark.<sup>2</sup> Jaundice in babies occurs in over half in the first week following birth and in most is not a problem.<sup>3</sup> If bilirubin levels in babies are very high for too long a type of brain damage, known as kernicterus, may occur.<sup>5</sup>

Causes of jaundice vary from non-serious to potentially fatal.<sup>4</sup> Levels of bilirubin in blood are normally below 1.0 mg/dL (17 µmol/L) and levels over 2-3 mg/dL (34-51 µmol/L) typically results in jaundice. High bilirubin is divided into two types: unconjugated (indirect) and conjugated (direct).<sup>5</sup> Conjugated bilirubin can be confirmed by finding bilirubin in the urine. Other conditions that can cause yellowish skin but are not jaundice include carotenemia from eating large amounts of certain foods and medications like rifampin.<sup>6</sup>

#### What Is Jaundice?

It's a disease that turns your skin and the whites of your eyes yellow. Newborn babies often get it. But adults can, too.

#### Types of jaundice

##### Pre-hepatic jaundice

If an infection or medical condition makes the red blood cells break down sooner than usual, bilirubin levels rise.

This is known as pre-hepatic jaundice.

Conditions that may trigger this include malaria, sickle cell anaemia, thalassaemia, Gilbert's syndrome, hereditary spherocytosis and Crigler-Najjar syndrome.

##### Intra-hepatic jaundice

If the liver is damaged, it may be less able to process bilirubin. This causes what doctors call intra-hepatic jaundice. The liver damage may be a result of causes that include hepatitis, alcoholic liver disease, glandular fever, liver cancer, illegal drug use including ecstasy, and paracetamol over dose. Obesity and non-alcoholic fatty liver disease can be a cause of cirrhosis of the liver and jaundice.<sup>7</sup>

##### Post-hepatic jaundice

Post-hepatic forms of jaundice include the jaundices caused by failure of soluble bilirubin to reach the intestines after it has left the liver. These disorders are called obstructive jaundices. The most common cause of obstructive jaundice is the presence of gallstones in the ducts of the biliary system. Other causes have to do with birth defects and infections that damage the bile ducts; drugs; infections; cancers; and physical injury. Some drugs—and pregnancy on rare occasions—simply cause the bile in the ducts to stop flowing.

##### Hepatocellular

Hepatocellular (hepatic) jaundice can be caused by acute or chronic hepatitis, hepatotoxicity, cirrhosis, drug-



induced hepatitis and alcoholic liver disease. Cell necrosis reduces the liver's ability to metabolize and excrete bilirubin leading to a buildup of unconjugated bilirubin in the blood. Other causes include primary biliary cirrhosis leading to an increase in plasma conjugated bilirubin because there is impairment of excretion of conjugated bilirubin into the bile. The blood contains an abnormally raised amount of conjugated bilirubin and bile salts which are excreted in the urine. Jaundice seen in the newborn, known as neonatal jaundice, is common in newborn<sup>8</sup>

### Neonatal jaundice

Neonatal jaundice is usually harmless: this condition is often seen in infants around the second day after birth, lasting until day 8 in normal births, or to around day 14 in premature births. Typical causes for neonatal jaundice include normal physiologic jaundice, jaundice due to formula supplementation,<sup>9</sup> and hemolytic disorders that include hereditary spherocytosis, glucose-6-phosphate dehydrogenase deficiency, pyruvate kinase deficiency, ABO/Rh blood type auto antibodies, or infantile pyknotocytosis.

### Why Do Adults Get It?

Jaundice happens when there's too much bilirubin, a yellow-orange substance, in your blood. It's found in your red blood cells. When those cells die, the liver filters it from the bloodstream. But if something's wrong and your liver can't keep up, bilirubin builds up and can cause your skin to look yellow.

In jaundice, the skin and whites of the eyes look yellow. Jaundice occurs when there is too much bilirubin (a yellow pigment) in the blood—a condition called hyperbilirubinemia

Bilirubin is formed when haemoglobin (the part of red blood cells that carries oxygen) is broken down as part of the normal process of recycling old or damaged red blood cells. Bilirubin is carried in the bloodstream to the liver, where it binds with bile. Bilirubin is then moved through the bile ducts into the digestive tract, so that it can be eliminated from the body. Most bilirubin is eliminated in stool, but a small amount is eliminated in urine. If bilirubin cannot be moved through the liver and bile ducts quickly enough, it builds up in the blood and is deposited in the skin. The result is jaundice.

Many people with jaundice also have dark urine and light-coloured stool. These changes occur when a blockage or other problem prevents bilirubin from being eliminated in stool, causing more bilirubin to be eliminated in urine.

If bilirubin levels are high, substances formed when bile is broken down may accumulate, causing itching all over the body. But jaundice itself causes few other symptoms in adults. However, in new-borns with jaundice high bilirubin levels (hyperbilirubinemia) can cause a form of brain damage called kernicterus. Also, many disorders that cause jaundice cause other symptoms or serious

problems. These symptoms may include nausea, vomiting and abdominal pain, and small spiderlike blood vessels that are visible in the skin (spider angiomas). Men may have enlarged breasts, shrunken testes, and pubic hair that grows as it does in women.

### Causes of Jaundice

The most common causes of jaundice are Hepatitis Alcoholic liver disease A blockage of a bile duct by a gallstone (usually) or tumour A toxic reaction to a drug or medicinal herb.

### Hepatitis

Hepatitis is inflammation of the liver.<sup>10</sup> Some people have no symptoms whereas others develop yellow discoloration of the skin and whites of the eyes, poor appetite, vomiting, tiredness, abdominal pain, or diarrhea. Hepatitis may be temporary (acute) or long term (chronic) depending on whether it lasts for less than or more than six months.<sup>19</sup> Acute hepatitis can sometimes resolve on its own, progress to chronic hepatitis, or rarely result in acute liver failure.<sup>11</sup> Over time the chronic form may progress to scarring of the liver, liver failure, or liver cancer.

### Alcoholic liver disease

Drinking large amounts of alcohol over a long period of time damages the liver. The amount of alcohol and time required to cause damage varies, but typically, people must drink heavily for at least 8 to 10 years. Other drugs, toxins, and some herbal products can also damage the liver.

### Bile duct obstruction

If the bile ducts are blocked, bilirubin can build up in the blood. Most blockages are caused by a gallstone, but some are caused by cancer (such as cancer in the pancreas or bile ducts) or rare liver disorders (such as primary biliary cholangitis or primary sclerosing cholangitis).<sup>12</sup>

### What Are Jaundice Treatments?

Treatment depends on the cause of the underlying condition leading to jaundice and any potential complications related to it. Once a diagnosis is made, treatment can then be directed to address that particular condition, and it may or may not require hospitalization.

Treatment may consist of expectant management (watchful waiting) at home with rest. Medical treatment with intravenous fluids, medications, antibiotics, or blood transfusions may be required. If a drug/toxin is the cause, these must be discontinued. In certain cases of new-born jaundice, exposing the baby to special coloured lights (phototherapy) or exchange blood transfusions may be required to decrease elevated bilirubin levels. Surgical treatment may be required.



**Self-Care at Home for Jaundice**

The objectives of home therapy include symptom relief and managing the medical condition causing the underlying jaundice. The various measures that may be undertaken include: Maintain adequate hydration by drinking fluids, and rest as needed. Take medications only as instructed and prescribed by a health care practitioner.

Avoid medications, herbs, or supplements which may cause detrimental side effects. Consult a health care practitioner for advice. Avoid drinking alcohol until the patient has discussed it with their healthcare professional. Certain dietary restrictions may be recommended by a health care practitioner. In certain cases of new-born jaundice, the parents or caregivers can place the baby next to a well it window a few times a day to decrease elevated bilirubin levels. In more severe cases, a health care practitioner may need to discharge the baby home from the hospital with home phototherapy. Provide adequate milk intake for the baby in cases of breastfeeding jaundice. If symptoms worsen or if any new symptoms arise, consult a health care practitioner.

**REFERENCES**

1. Goroll, Allan H. Primary care medicine: office evaluation and management of the adult patient (6th ed.) 2009, page 56, PMID 24369077, doi :10.1056/nejmra1208937.
2. Buttaro, Terry Mahan; Trybulski, JoAnn; Polgar-Bailey, Patricia; Sandberg-Cook, Joanne Primary Care: A Collaborative Practice (4 ed.), 2012, Elsevier Health Sciences. p. 690. doi :10.1148/radiol.14131410. ,PMID 24814176
3. Bassari, R; Koea, JB "Jaundice associated pruritis: a review of pathophysiology and treatment." (2<sup>nd</sup> edition) 2016, page 98, doi:10.1007/s11999-013-3132-2, PMC 3792262, PMID 23813184
4. Prof.), Roger Jones (2004). Oxford Textbook of Primary Medical Care. Oxford University Press. p. 758, volume 2, page 58 doi:10.1016/j.crad.2009.02.020. ,PMID 19664484
5. Winger, J; Michelfelder, A "Diagnostic approach to the patient with jaundice.". Primary care. (September 2011), doi:10.1136/bmj.e6603, PMID 23054045
6. Maisels, MJ (17 March 2015). "Managing the jaundiced newborn: a persistent challenge". CMAJ : Canadian Medical Association journal (Journal de l'Association medicale canadienne)., 187 (5): 335–43. doi:10.1503/cmaj.122117. PMC 4361106, MID 25384650.
7. Roche, SP; Kobos, R (15 January 2004), Jaundice in the adult patient." American family physician. 69 (2), 299–304, PMID 14765767.
8. Ferri, Fred F. (2014). Ferri's Clinical Advisor 2015: 5 Books in 1. Elsevier Health Sciences. p. 672. ISBN 9780323084307.
9. Roche SP, Kobos R; Jaundice in the adult patient. Am Fam Physician. 69(2), 2004 Jan 15 299-304. doi:10.1016/j.apmr.2014.01.033, PMID 24662810
10. Bernal W.; Wendon J. (2013), "Acute Liver Failure". New England Journal of Medicine. 369 (26), 2525–2534. doi:10.1056/nejmra1208937, PMID 24369077.
11. Dr. Chase's Family Physician, Farrier, Bee-keeper, and Second Receipt Book.; Being an Entirely New and Complete Treatise ... Chase publishing Company, 1873. p. 542. doi:10.1097/JSA.0b013e318297fa8d, PMID 24212370
12. Shinde, MN Chatterjea, Rana .Textbook of medical biochemistry (8th Ed.). New Delhi: Jaypee Brothers Medical Publications (P) Ltd. 2012 doi:10.4414/smw.2013.13825. PMID 23832373

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