

Review on Jaundice

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ABSTRACT

Jaundice is a complex disease. Jaundice is actually the high bilirubin level in the body. Yellowing of skin, mucous membranes and skin are common presentations of jaundice. Jaundice has various variants including pre-hepatic jaundice (due to hemolysis of red blood cells), hepatic jaundice (due to defect in capture, conjugation and excretion of bilirubin by liver) and post hepatic jaundice (due to the obstruction of extra hepatobiliary system). The causes of various variants of Jaundice is either acquired or congenital. High plasma bilirubin level can cause various manifestations involving satiety, gastrointestinal bleeding, diarrhea, anemia, edema, weight-loss and can be fatal because it can cause psychosis, lethargy, seizures, coma or even death. High bilirubin level can help in the diagnosis of Jaundice. Differential diagnosis of various variants of Jaundice can be carried out on the basis of bilirubin level (conjugated and unconjugated), ultrasonography and other radiological techniques. The proper management of Jaundice is high water intake and low fat diet. The primary effective treatment for pre-hepatic jaundice and neonatal physiological jaundice is phototherapy. Infusion of immunoglobulins is also used for treatment of pre-hepatic jaundice. Proper nutrition, steroids and immunosuppressant are used for treatment of hepatic jaundice. The treatment for post hepatic jaundice is decompression and surgery.

Keywords: Jaundice , Hemolysis.

I. INTRODUCTION

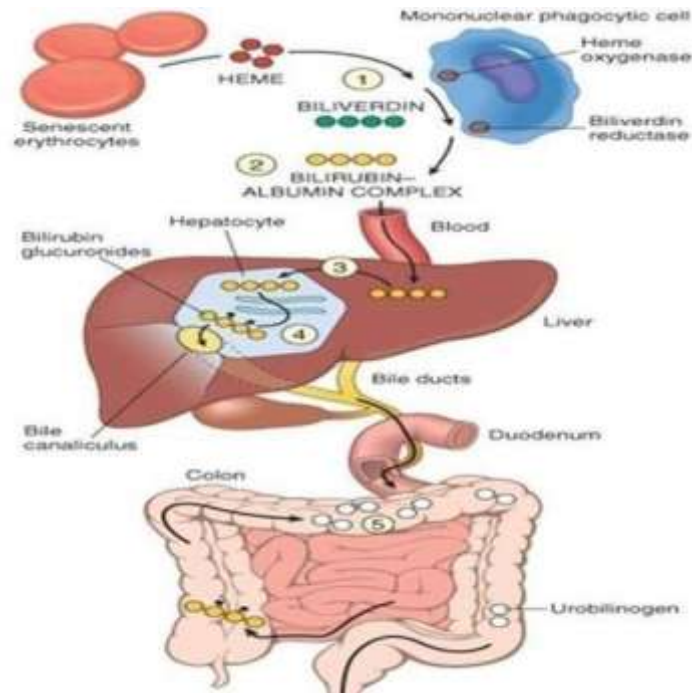
Jaundice is defined as a yellowing of skin, mucous membrane and sclera due to the deposition of yellow- orange le pigment in bilirubin.(1) The bilirubin is an endogenously synthesized pigment that can be toxic specially in newborn children.(2) The bilirubin in unconjugated form has a typical spectrographical peak at 450 mm.(3) The word Jaundice is actually a derivative of French word

jaune which means 'yellow.(1) jaundice indicates the hyper bilirubinemia and that excessive level of bilirubin may be in conjugated or unconjugated form. The clinical presentations of jaundice upper when bilirubin level exceeds 34.2μ mol/L or 2 mg/dL.(4)

The substrate for the production of bilirubin is heme group. The heme is catabolized at alpha carbon bridge by an enzyme heme oxygenase and results in the liberation of iron, carbon monoxide and biliverdin. The biliverdin is further acted upon by biliverdin reductase to form bilirubin.(5) 80 % of bilirubin is derived from the heme group of haemoglobin. This haemoglobin comes from the destruction of red blood cells in the reticuloendothelium of liver, spleen and bone marrow. The remaining 20% of bilirubin comes from multiple sources like myoglobin, cytochromes etc.(1 , 6) 3.8 mg/kg or approximately 250-300 mg bilirubin is produced daily in normal adults. The amount of bilirubin production in neonates is much higher than adults.(7)

The bilirubin produced is then transported to the liver in the bound form with plasma albumin. The dissociation constant for first albumin binding site is $K_d=7 \times 10^7 M^{-1}$

1.(8)Conjugation of bilirubin takes place in the liver by UDP-glucuronyltransferase and this conjugation is essential for water solubility and Elimination. (1, 6)The activity of UDP-glucuronyltransferase is influenced by age, gender, thyroid hormones and microsomal enzyme inducing agents, such As phenobarbital, rifampicin etc. (9,10) Conjugated bilirubin is excreted into the bile. The bile is then passed to the duodenum via biliary system. Inside The intestine some bilirubin is metabolized by the intestinal flora into urobilinogens and then reabsorbed. These urobilinogens are then removed by the Kidney and excreted via urinary system.(1,6)



The production and metabolism of bilirubin is shown in Figure (11)

SYMPTOMS OF JAUNDICE:-

Following are the major jaundice symptoms:

- | | |
|------------------------|-------------------------------------------------------------|
| 1. Extreme weakness | 5. Nausea |
| 2. Headache and fever | 6. Yellow discoloration of the eyes, tongue, skin And urine |
| 3. Loss of appetite | 7. Dull pain in the liver region |
| 4. Severe constipation | 8. Vomiting |
| | 9. Itchiness.(12) |



Types:

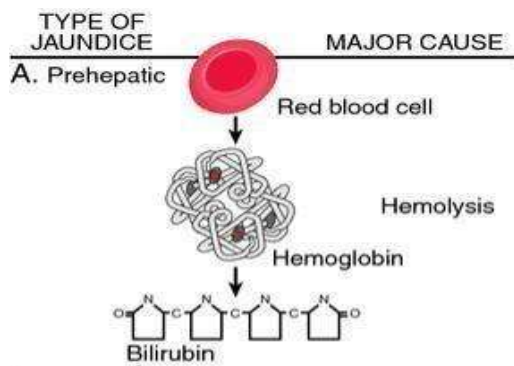
On the basis of causes Jaundice can be classified into three types.(4)

1. Pre-hepatic Jaundice
2. Hepatic Jaundice
3. Post hepatic Jaundice

1. Pre-hepatic jaundice:-

Pre hepatic jaundice is such type of jaundice which is caused due to hemolysis therefore it is also known as hemolytic jaundice. The major cause of Enhanced hemolysis is defective plasma membrane of red blood cells. This vulnerable cell membrane cannot bear the shear

stress and hence ruptures Resulting in hemolysis thus causing the increased serum bilirubin level.(13,14)



Etiology:

The pre hepatic jaundice is mainly caused due to hemolysis. The causes of pre- hepatic/hemolytic jaundice are classified into two groups:

1. Congenital Causes: (15,16)

Congenital causes of hepatic jaundice involve following

1. Spherocytosis
2. Elliptocytosis
3. Congenital LCAT deficiency
4. Thalassemia
5. Sickle cellanemia
6. Stomatocytosis
7. Acanthocytosis
8. Echinocytes
9. GSH synthase deficiency
10. Pyruvate kinase deficiency
12. G6PD deficiency
13. Erythroblastosis fetalis

Acquired causes of pre-hepatic jaundice involve following:

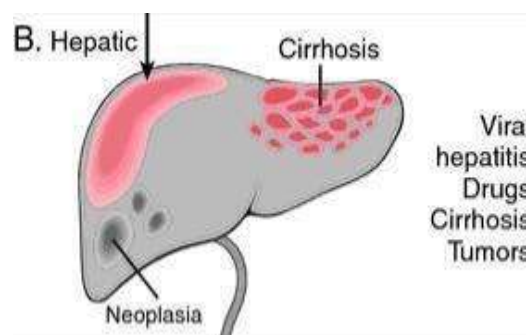
1. Resorption of extensive hematomas
2. Auto immune hemolysis
3. Transfusion reactions
4. Trauma
5. Microangiopathy
6. Hemolytic uremic syndrome
7. Long distance runners
8. Disseminated intravascular clot
9. Infections e.g. malaria, etc.
10. Toxins e.g. snake venoms, etc.
11. Chemicals e.g. nitrites, aniline dyes ,etc.
12. Paroxysmal nightly hemoglobinuria
13. Thrombotic thrombocytopenic purpura
14. Hypophosphatemia
15. Vitamin B12 deficiency
16. Folic acid deficiency

Clinical presentations:

Patients with hemolytic jaundice are presented with Anemia, Yellowing of sclera, dark yellow- brown colored urine, yellowish skin and high bilirubin Levels.(17)

2. Hepatic jaundice:-

Hepatic jaundice is a type of jaundice in which the basic Defect lies within the liver mainly in the hepatocytes. The Liver captures bilirubin from plasma proteins mainly Albumin, then after conjugation excretes in the bile via Biliary system. Any pathology of the liver leading to Defect in capture, conjugation and excretion can cause Hepatic jaundice. Main enzyme of conjugation is UDP- Glucronyltransferase. This is commonly immature at Birth and its under-activity can cause so called Neonatal Physiological Jaundice. Further this enzyme can be Defective due to the genetic mutation of the UTG1A gen On chromosome 2. This gene encodes for UDP- Glucronyltransferase and thus the defective conjugating Enzyme leads to the hepatic jaundice. (18,19) Any defect in The hepatic excretory mechanism of bilirubin can also Cause hepatic jaundice. The excretory mechanisms Involve hepatocytes bile acid-independent secretion, Hepatocytic bile acid-dependent secretion and bile Ductular secretion. Any defect in the above mentioned Excretory mechanisms can lead to the accumulation of Bilirubin in blood causing hepatic jaundice.(20, 21)



Etiology:

Hepatic jaundice is caused due to the defect in capture, conjugation and excretion of bilirubin by liver.(22 ,23) Hepatic causes of the jaundice can be Classified in to two types:

• Congenital causes:

Congenital causes of hepatic jaundice are following (23 ,24)

1. Wilson’s Disease

2. Rotor's Syndrome
3. Haemochromatosis
4. CriglerNajar syndrome
5. Gilbert's syndrome
6. Dubin-Johnson's syndrome

• **Acquired causes:**

Acquired causes of hepatic jaundice are following(23,24)

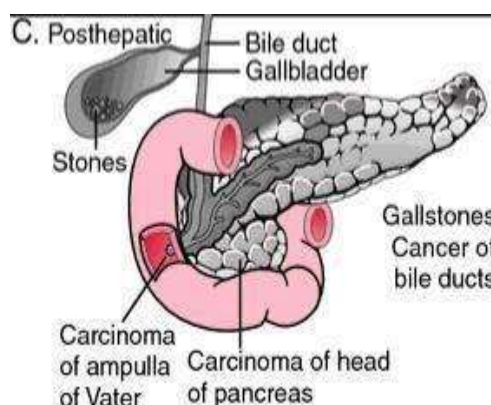
1. Viral Hepatitis
2. Alcoholic Hepatitis
3. Auto immune Hepatitis
4. Drug related Hepatitis (e.g. NSAIDs)
5. Sepsis
6. Pregnancy
7. Systemic Diseases (e.g. celiac disease)
8. Malnutrition
9. Physical Trauma
10. Hepatic Adenom

Clinical presentations:

The clinical presentations of hepatic jaundice include abdominal pain, fever, vomiting and nausea along with the complications involving satiety, Gastrointestinal bleeding, diarrhea, anemia, edema, weight-loss and associated weakness, if unchecked leading to mental disturbances like kernicterus, Coma or even death.(25)

3. Post hepatic jaundice:

Post hepatic jaundice is such type of a jaundice in which the cause lies in the biliary portion of hepatobiliary system. The major cause of post hepatic Jaundice is extra-hepatic biliary obstruction. Therefore it is also known as obstructive jaundice.(26)



Etiology:-

The major cause of post hepatic jaundice is extra-hepatic Biliary obstruction. (26) The causes of obstruction may be Classified into two types:

Congenital causes:-

The congenital obstruction involves following: (26,27)

- Biliary Atresia
- Cystic Fibrosis
- Idiopathic dilation of common bile duct
- Pancreatic biliary malfunction
- Choledochal Cyst

Acquired Causes:-

The acquired obstruction involves following: (27,28)

- Portal biliopathy
- Cholecystitis
- Trauma
- Pancreatitis
- Strictures
- Choledocholithiasis
- AIDS
- Intra-Abdominal Tuberculosis
- Tumors
- Common bile duct Obstruction

Classification of obstruction on the basis of anatomical location:- (29)

Classification of obstruction on the basis of anatomical location		
Upper third obstruction	Middle third obstruction	Lower third obstruction
Polycystic		Pancreatic
Liver Disease	Mirizzi Syndrome	Tumors
Oriental	Cystic Fibrosis	Ampullary
Choangiohepatit	Intrabiliary	Tumors
Sclerosing	Parasites	Duodenal
Cholangitis	Choledochal	Diverticula
Iatrogenic	Cysts	Penetrating
injury to the Bile Duct		Duodenal Ulcer

Clinical presentation:-

The clinical manifestations of obstructive jaundice are Dark urine, pale stools and generalized pruritus. History Of fever biliary colic, weight loss, abdominal pain and Abdominal mass are also the representatives of Obstructive jaundice.(27) Obstructive Jaundice may lead to Various complications including cholangitis, pancreatitis, Renal and hepatic failure.

Treatment of jaundice:-

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 Directedto address that particular condition, And it may or may not require hospitalization.

1. Treatment may consist of expectant Management (watchful waiting) at home With rest.
2. Medical treatment with intravenous fluids, Medications, antibiotics, or blood Transfusions may be required.
3. If a drug/toxin is the cause, these must be Discontinued.
4. In certain cases of newborn jaundice, Exposing the baby to special colored lights (phototherapy) or exchange blood Transfusions may be required to decrease Elevated bilirubin levels.
5. Surgical treatment may be required

Medical Treatment:-

Treatment varies based on the medical Condition responsible for causing jaundice, and The associated symptoms and complications. Treatments may include the following:

1. supportive care,
2. IV fluids in cases of dehydration,
3. medications for nausea/vomiting and pain,
4. antibiotics,
5. antiviral medications,
6. Blood transfusions,
7. steroids,
8. chemotherapy/radiation therapy, and
9. phototherapy (newborns)

Medications:-

Medications may or may not be necessary. After diagnosing the cause of the patient's Jaundice, the health care practitioner will direct The patient's treatment and prescribe Medications if they are necessary. As outlined Above, various medication options exist Depending on the underlying cause of the Jaundice.(12)

Surgery:-

Surgical treatment may be necessary in certain Cases of cancer, congenital malformations, Conditions that obstruct the bile Ducts, gallstones, and abnormalities of The spleen. Sometimes, a liver transplant may Be necessary.

Jaundice causes your skin and the whites of Your eyes to turn yellow. Too much bilirubin Causes jaundice. Bilirubin is a yellow chemical in Hemoglobin, the substance that carries oxygen In your red blood cells. As red blood cells break Down, your body builds new cells to replace Them. The old ones are processed by the liver. If The liver cannot handle the blood cells as they Break down, bilirubin builds up in the body and Your skin may look yellow.

Many healthy babies have some jaundice during The first week of life. It usually goes away. However, jaundice can happen at any age and May be a sign of a problem.

Jaundice can Happen for many reasons, such as(12)

1. Blood diseases
2. Genetic syndromes
3. Liver diseases, such as hepatitis or cirrhosis
4. Blockage of bile ducts
5. Infections
6. Medicines

HOME REMEDY FOR JAUNDICE:-

1. Extract the juice of bitter luffa by pounding And squeezing through a cloth. Take the Juice on the palm and slowly sniff it. The Juice should be drawn through the nostrils.
2. The green leaves of the radish are also an Effective home remedy. Pound the leaves And extract the juice from them. Intake at Least one pound of this juice daily.
3. Another effective remedy would be to mash A banana and add to it a tablespoon of Honey. Have this mixture two times a day.
4. In a glass of buttermilk, mix a pinch of black Pepper. Intake this for about a week.
5. Take 4 grams of Indian gooseberry with a Glass of water. Have this thrice a day for About 20 days.
6. In a cup of boiling water, add 8-10 lemon Leaves. Cover it with a lid for about 5 Minutes. Now, strain the liquid and drink it. Repeat this for 4-5 days.
7. Take a cup of water and boil it. To this, add 2 teaspoons of oregano and leave it for 10 Minutes. Filter the solution and have it.
8. In a glass of buttermilk, add a pinch of Roasted alum. Have this 2-3 times a day, Regularly.
9. Mix ¼ tsp of turmeric powder in a glass of Hot water. Have this 2 to 3 times a day.

10. Take tender papaya leaves and make a Paste out of it. Consume ½ tsp of this paste With1 tsp honey.

11. Consuming lots of lime juice is beneficial for A person suffering from jaundice.

12. Mix ½ tsp ginger juice and 1 tsp each of Mint juice and lime juice. Have this mixture After a span of few hours.

HERBAL REMEDIES FOR JAUNDICE:-

Following are some of the effective herbal Remedies for jaundice:

1. Jaundice berry is a useful herb for all kinds of Liver ailments, especially jaundice. It is a bitter Tonic which must be given to a jaundice patient Several times a day in does of quarter Teaspoons.
2. Indian aloe is also used in liver problems such As jaundice. For good results, the pulp of one of Its leaves is to be taken with black salt and Ginger every morning for a period of ten days.
3. Indian Sorrel is also beneficial in treatment of Jaundice. It is taken with buttermilk that is Prepared from cow's milk.(12)

THERAPEUTIC APPROACHES AND MANAGERMENTS:

1. Pre-hepatic jaundice:

Immune globulin injection is used as initial treatment for pre-hepatic jaundice. (30) Phototherapy is an effective treatment for jaundice. Bilirubin concentration in pre-hepatic jaundice. (31 ,32) Bilirubin decreases rapidly within 2 hours of starting phototherapy.(33) However, the duration of treatment The intensity of phototherapy depends on the severity of hyper-bilirubinemia.(32,34) Metalporphyrin is also a treatment option. Pre-hepatic jaundice These metalporphyrins target the enzyme hemoxygenase to reduce bilirubin production.(34)

2. Hepatic jaundice:

Includes treatment and management of hepatic jaundice.(30) Phenobarbital can be used to treat physiological jaundice in newborns, but it is not routinely used due to a number of associated limitations. Drowsiness and febrile convulsions.

Supportive treatment – fluids, rest and pain relief – for hepatitis A.

Abstain from consuming alcohol and stop taking medications that contribute to liver dysfunction.

Steroids – for autoimmune hepatitis.

Immuno-suppressants – for autoimmune hepatitis.

Interferon – treatment of chronic hepatitis B and C.

Liver transplantation for fulminant hepatitis and end-stage liver failure.

3. Post-hepatic jaundice:

A low-fat diet should be applied to patients with post-hepatic jaundice to reduce the discomfort caused by fat intake and diarrhea. (22, 34) Treatment for reversible obstructive jaundice is mechanical decompression, but other complications and symptoms may also occur. Swear Decompression can be achieved by bypass surgery, percutaneous stent placement, debridement of the lesion, and arthroscopic stent placement.

Dichlorphenamide, hydroxyzine, cholestyramine, ursodeoxycholic acid and naltrexone are used as therapeutic agents in the treatment of and Treatment of post-hepatic jaundice.(22,34).

II. CONCLUSION :-

Jaundice is not a problem but a symptom of a Problem. It should not be ignored. Jaundice is The yellow discoloration of the skin or white Part of the eyes which signals a dysfunctional Liver. Treat jaundice in an adult by seeking Medical attention. Jaundice in an adult can be Much more serious than in a newborn. An adult May require an ultrasound to check for signs of Obstruction, especially if abdominal pain is Present. An obstruction may require surgery. Jaundice in an adult may also be caused by a Virus and may require prescription medication.

Eat healthy if you are an adult with symptoms Of jaundice. Lots of fresh fruits and vegetables Along with whole-grain breads can help. Of Course, to cure jaundice the underlying problem Must be corrected. But healthy eating can help To treat jaundice.

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