International Journal of Pharmaceutical Research and Applications
Volume 6, Issue 3 May - June 2021, pp: 1285-1290 www.ijprajournal.com ISSN: 2249-778

Jaundice in the Newborn

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Date of Submission: 10-06-2021 Date of Acceptance: 25-06-2021

ABSTRACT:- Jaundice is a common physiologic problem seen in both term and preterm infants. Normal transitional changes in bilirubin metabolism lead to physiological jaundice in many infants. In some infants these normal changes at birth may be exaggerated, such as occurs with immaturity, or may interact with health alterations (pathologic jaundice), resulting in the accumulation of excess bilirubin and development of hyperbilirubinemia. should be possible to confirm or exclude biliary atresia within one week, so that definitive surgery is not delayed unnecessarily. Babies with the neonatal hepatitis syndrome should have vigorous fat-soluble vitamin supplementation, including parenteral vitamin K if coagulation is abnormal.

JAUNDICE IN THE NEWBORN:-

(1) Introduction: jaundice is the most common condition that requires medical attention and hospital readmission in newborns.[The yellow coloration of the skin and sclera in newborns with jaundice is the result of accumulation of unconjugated bilirubin. In most infants, unconjugated hyperbilirubinemia reflects a normal transitional phenomenon. However, in some infants, serum bilirubin levels may rise excessively, which can be cause for concern because unconjugated bilirubin is neurotoxic and can cause death in newborns and lifelong neurologic sequelae in infants who survive .[ij]For these reasons, the presence of neonatal jaundice frequently results in diagnostic evaluation. aundice is the most common condition that requires medical attention and hospital readmission in newborns.

(2)PHYSIOLOGICAL JAUNDICE:- Yellowish staining of the skin and whites of the **newborn**'s eyes (sclerae) by pigment of bile (**bilirubin**). In newborn **babies** a degree of **jaundice** is normal. It is due to the breakdown of **red blood cells** (which release bilirubin into the blood) and to the immaturity of the newborn's **liver** (which cannot effectively metabolize the bilirubin and prepare it for excretion into the urine).

- Phase one

1. Term infants - jaundice lasts for about 10 days with a rapid rise of serum bilirubin up to 204 μmol/l (12 mg/dL).
2. Preterm infants - jaundice lasts for about two weeks, with a rapid rise of serum bilirubin up to 255 μmol/l (15 mg/dL).

- Phase two - bilirubin levels decline to about 34 μmol/l (2 mg/dL) for two weeks, eventually mimicking adult values.

1. Preterm infants - phase two can last more than one month.
2. Exclusively breastfed infants - phase two can last more than one month.

Mechanisms involved in physiological jaundice include:

- Relatively low activity of the enzyme glucuronosyltransferase which normally converts unconjugated bilirubin to conjugated bilirubin that can be excreted into the gastrointestinal tract.[19] Before birth, this enzyme is actively down-regulated, since bilirubin needs to remain unconjugated in order to cross the placenta to avoid being accumulated in the fetus.[20] After birth, it takes some time for this enzyme to gain function.
- Shorter life span of fetal red blood cells,[19] being approximately 80 to 90 days in a full term infant,[21] compared to 100 to 120 days in adults.
- Relatively low conversion of bilirubin to urobilinogen by the intestinal flora, resulting in relatively high absorption of bilirubin back into the circulation.[19]

3) **PATHOLOGICAL JAUNDICE:-** Any of the following features suggests pathological jaundice:

1. Clinical jaundice appearing in the first 24 hours or greater than 14 days of life.

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2. Increases in the level of total bilirubin by more than 8.5 µmol/l (0.5 mg/dL) per hour or (85 µmol/l) 5 mg/dL per 24 hours.
3. Total bilirubin more than 331.5 µmol/l (19.5 mg/dL) (hyperbilirubinemia).
4. Direct bilirubin more than 34 µmol/l (2.0 mg/dL).

TSB concentrations have been defined as non-physiologic if concentration exceeds 5 mg/dl on first day of life in term neonate, 10 mg/dL on second day, or 12-13 thereafter. 6 Any TSB elevation exceeding 17 mg/dL should be presumed pathologic and warrants investigation for a cause and possible intervention, such as phototherapy. 7 Appearance of jaundice within 24 hours, peak TSB levels above the expected normal range (Fig. 1)8 , presence of clinical jaundice beyond 3 weeks and conjugated bilirubin (dark urine staining the clothes and light colored stool) would be categorized under pathological jaundice.

(4) BREAST-FEEDING AND JAUNDICE:- Although the optimally breastfed infant has serum bilirubin concentrations which are identical with that of the artificially fed infant during the first 5 days of life, many breastfed infants develop higher bilirubin levels during this early period of physiologic jaundice. While some authors have considered this higher level of bilirubin in the breastfed infant to be normal and expected, there is ample evidence that these elevations are, in fact, abnormal.22,23 Terminology is often the cause of confusion among both authors and readers. The term ‘‘breastmilk jaundice’’ should be reserved for the normally occurring prolonged unconjugated bilirubin, which has its onset after the fifth day of life. The increase in serum unconjugated bilirubin concentration seen in the first 5 days of life in some breastfed infants should be called ‘‘breastfeeding jaundice’’ or, more precisely, ‘‘breast-nonfeeding jaundice.’’

In addition to confusion in the terminology describing the relationship between human milk feeding and jaundice, there is also confusion in the literature regarding the precise definition of breastfeeding. Many papers, particularly in the earlier literature, failed to include descriptions of the breastfeeding techniques used in the study population.

(5) BREASTMILK JAUNDICE:- Nearly 40 years ago, the association between breastfeeding and prolongation of unconjugated hyperbilirubinemia in the newborn was recognized simultaneously by two separate groups of investigators.1,2 Initially, it was thought to be a relatively rare clinical situation, which occurred in only 1% of all breastfed neonates. Later studies in both England and in the United States demonstrated that at least one third of all breastfed infants are clinically jaundiced in the third week of life and that two thirds have significant unconjugated hyperbilirubinemia in the third week. This contrasts to the absence of hyperbilirubinemia in the third week in full-term artificially fed infants3–5 (Figure 1). What was once thought to be a clinical disorder has now been recognized to be a normally occurring extension of physiologic jaundice of the newborn.

Breast milk jaundice was first described in 1963. Arias et al. noted that some breastfed infants had unconjugated hyperbilirubinemia that persisted beyond the third week of life. [3] Breast milk jaundice typically presents in the first or second week of life and usually spontaneously resolves even without discontinuation of breastfeeding. However, it can persist for 8-12 weeks of life before resolution.[2] Infants with breast milk jaundice often have higher serum bilirubin peaks and slower decline, compared to the hyperbilirubinemia trend associated with other etiologies, leading to longer resolution time.[4] Pathological causes of unconjugated hyperbilirubinemia should be ruled out before a breast milk jaundice diagnosis can be made.

(6)CLINICAL ASSESSMENT OF JAUNDICE :- Clinical criteria: It is very widely used and utilizes the principle that clinical jaundice first becomes obvious in the face followed by a downward progression as it increases in intensity. Assessment of jaundice should be done in natural light. The finger is pressed on the baby's skin, preferably over a bony part, till it blanches. The underlying skin is noted for yellow color. Extent of jaundice thus detected gives a rough estimate of serum bilirubin. Clinical estimation of bilirubin by experienced person, though reliable, has to be confirmed by laboratory methods.

Clinical criteria to assess jaundice

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Area of body	Range of bilirubin (mg/100 ml)
Face	4-8
Upper trunk	5-12
Lower trunk & thighs	8-16
Arms & lower legs	11-18
Palms & soles	>15

(7)MEASUR MENT OF TSB LEVELS:- In an older child or adult, normal values of direct **bilirubin** are from 0–0.4 milligrams per deciliter (mg/dL). Normal values of total **bilirubin** are from 0.3–1.0 mg/dL. The indirect **bilirubin level** in the bloodstream is the total **bilirubin** minus the direct **bilirubin levels** in the bloodstream.

Biochemical

The gold standard method for bilirubin estimation is the total and conjugated bilirubin assessment based on the van den Bergh reaction .

Bilimeter

Spectrophotometry is the base of Bilimeter and it assesses total bilirubin in the serum. Because of the predominant unconjugated form of bilirubin, this method has been found a useful method in neonates.

Transcutaneous Bilirubinometer

This method is noninvasive and is based on the principle of multi wavelength spectral reflectance from the bilirubin staining in the skin . The accuracy of the instrument may be affected by variation of skin pigmentation and its thickness .

(8)CAUSES:- Excess bilirubin (hyperbilirubinemia) is the main cause of jaundice. Bilirubin, which is responsible for the yellow color of jaundice, is a normal part of the pigment released from the breakdown of "used" red blood cells.

Newborns produce more bilirubin than adults do because of greater production and faster breakdown of red blood cells in the first few days of life. Normally, the liver filters bilirubin from the bloodstream and releases it into the intestinal tract. A newborn's immature liver often can't remove bilirubin quickly enough, causing an excess of bilirubin. Jaundice due to these normal newborn conditions is called physiologic jaundice, and it typically appears on the second or third day of life

Other causes

An underlying disorder may cause infant jaundice. In these cases, jaundice often appears much earlier or much later than does the more common form of infant jaundice. Diseases or conditions that can cause jaundice include:

- Internal bleeding (hemorrhage)
- An infection in your baby's blood (sepsis)
- Other viral or bacterial infections
- An incompatibility between the mother's blood and the baby's blood
- A liver malfunction
- Biliary atresia, a condition in which the baby's bile ducts are blocked or scarred

(9) RISK FACTORS:- Major risk factors for jaundice, particularly severe jaundice that can cause complications, include:

- **Premature birth.** A baby born before 38 weeks of gestation may not be able to process bilirubin as quickly as full-term babies do. Premature babies also may feed less and have fewer bowel movements, resulting in less bilirubin eliminated through stool.
- **Significant bruising during birth.** Newborns who become bruised during delivery gets bruises from the delivery may have higher levels of bilirubin from the breakdown of more red blood cells.
- **Blood type.** If the mother's blood type is different from her baby's, the baby may have received antibodies through the placenta that cause abnormally rapid breakdown of red blood cells.
- **Breast-feeding.** Breast-fed babies, particularly those who have difficulty nursing or getting enough nutrition from breast-feeding, are at higher risk of jaundice. Dehydration or a low caloric intake may contribute to the onset of jaundice. However, because of the benefits of breast-feeding, experts still recommend it. It's important to make sure your baby gets enough to eat and is adequately hydrated.
- **Race.** Studies show that babies of East Asian ancestry have an increased risk of developing jaundice.

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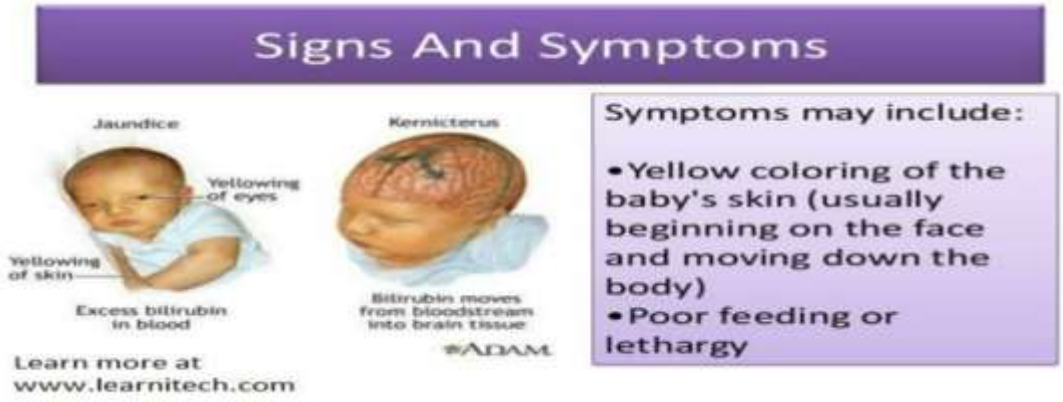
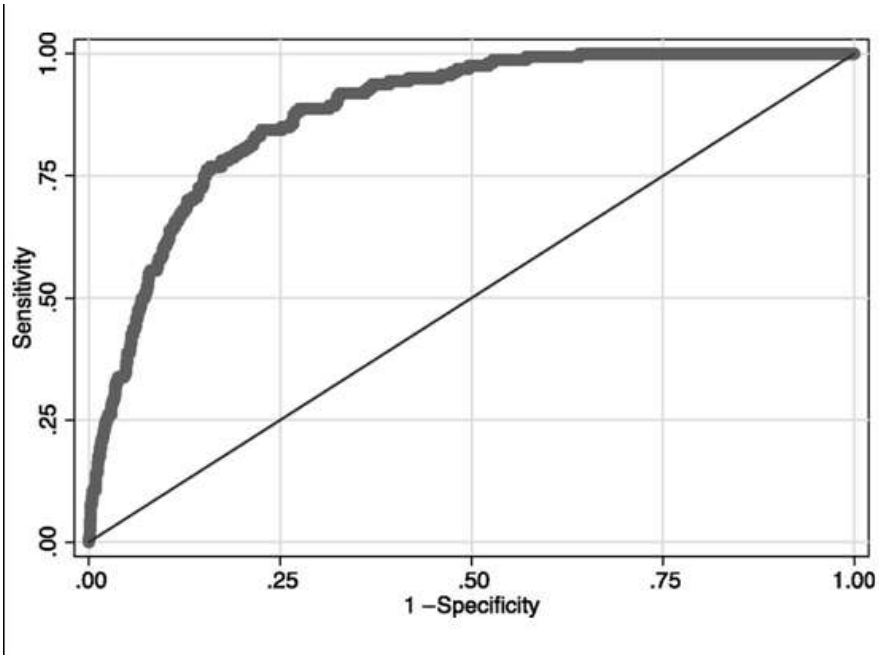
(10) SYMPTOMS:-



(11)PREDICTION OF HYPERBILIRUBINEMIA:- The new born needs the utmost care for all the neonatal problems for its better outcome in the future and neonatal hyperbilirubinemia is one of them and with its timely detection and management a good prognosis can be predicted. The main objective is utility of first day serum bilirubin level in predicting subsequent development of neonatal hyperbilirubinemia in term and near term babies.



(12) DIAGNOSIS:- Your doctor will likely diagnose infant jaundice on the basis of your baby's appearance. However, it's still necessary to measure the level of bilirubin in your baby's blood. The level of bilirubin (severity of jaundice) will determine the course of treatment. Tests to detect jaundice and measure bilirubin include:

- A physical exam
- A laboratory test of a sample of your baby's blood
- A skin test with a device called a transcutaneous bilirubinometer, which measures the reflection of a special light shone through the skin

Your doctor may order additional blood tests or urine tests if there's evidence that your baby's jaundice is caused by an underlying disorder.

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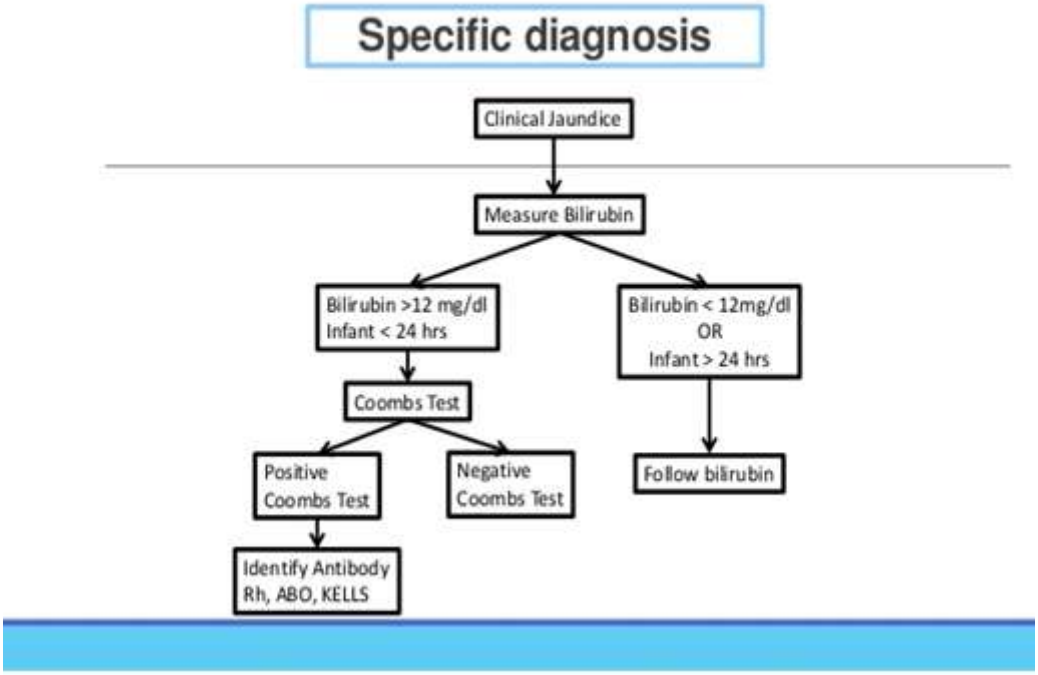

(13)TREATMENT:- Typically, treatment for mild jaundice in infants is unnecessary, as it tends to disappear on its own within 2 weeks.

If the infant has severe jaundice, they may need to be readmitted to the hospital for treatment to lower levels of bilirubin in the bloodstream. In some less severe cases, treatment may be done at home.

Some treatment options for severe jaundice include:

- **Phototherapy (light therapy)** – treatment by light rays. The baby is put under a special light, covered by a plastic shield to filter out ultraviolet light. The light manipulates the structure of bilirubin molecules so they can be excreted.
- **Exchange blood transfusion** – the baby's blood is repeatedly withdrawn and then replaced (exchanged) with donor blood. This procedure will only be considered if phototherapy does not work because the baby would need to be in an intensive care unit (ICU) for newborns.
- **Intravenous immunoglobulin (IVIg)** – in cases of rhesus or ABO incompatibility, the infant may have a transfusion of immunoglobulin; this is a protein in the blood that lowers the levels of antibodies from the mother, which are attacking the infant's red blood cells.

(14)CONCLUSION:- For most newborns who need treatment exposing the bodys skin to light ,called phototherapy works very in rare cases of very high bilirubin level that phototherapy can't help an exchange transfusion may by done , this treatment involves removing blood that has high bilirubin level and replacing it within different blood feed your baby often this help the baby pass more stool which reduces the amount of bilirubin that the intestine absorb.

Medical scientists should search for new treatments and preventive measures having no side effects and capable of recovering babies more speedily. Partners should screen their ABO blood groups as well as Rh factor before marriage.

Consanguineous marriages should be avoided. It is believed that this will help reduce the effects of jaundice on children's health and well-being in developing countries in the **WORLD**.

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