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Master's thesis

TREATMENT AND NURSING CARE IN NEWBORN HYPERBILIRUBENEMIA

223 - Nursing

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CONTENTS

LIST OF ABBREVIATIONS

TSB- Total Serum Bilirubin

BIND- Bilirubin -induced neurological dysfunction

GDM-Gestational diabetes Mellitus

TQ-Transcutaneous Bilirubin

ETCO-End-Tridal Carbon Monoxide

CO-Carbon monoxide

Hb-Hemoglobin

Hct-Hematocrit

WBC- White Blood Cells

ET-Exchange transfusion

ABSTRACT

The most common prevalent disorder in a newborn is hyperbilirubinemia. It is a combined disorder with many symptoms. Generally, physiological jaundice is the most frequent type, although, in some regions, pathological jaundice is also prevalent. Neonatal hyperbilirubinemia encountered during the first week of life. This contention focuses on a brief introduction to jaundice, its types, and causes, measuring the bilirubin level, nursing approaches towards hyperbilirubinemia, different precautionary measures for the parents of babies suffering from hyperbilirubinemia, and different remedial therapeutic measures for its treatment.

Purpose of the study: to study the structure, risk factors, the main diagnostic criteria for hyperbilirubinemia in newborns and to develop modern directions of its prevention and treatment

Research Assignments.

1. To study the disease Neonatal hyperbilirubinemia, its classification, diagnosis, features of the clinical picture and treatment.
2. To investigate the features of the occurrence and course of Neonatal hyperbilirubinemia.
3. Determine the features Neonatal hyperbilirubinemia.
4. Investigate the features of Neonatal hyperbilirubinemia.
5. To study the features of the work of a nurse for the effective prevention and management of Neonatal hyperbilirubinemia.

Object of research. Neonatal hyperbilirubinemia

Subject of research. Neonatal hyperbilirubinemia; classification, diagnosis, clinical manifestations of this disease and its features in newborns, as well as the organization of the nurse's work on the prevention and care of patients with Neonatal hyperbilirubinemia.

Research methods: general clinical methods of studying patients used in Neonatology for hyperbilirubinemia (laboratory and instrumental research methods), as well as analytical methods and statistical methods.

Scientific and practical significance of the study. With the help of this scientific study, Neonatal hyperbilirubinemia was studied - its classification, diagnosis, features of the clinical picture and treatment; the features of the occurrence of the occurrence were investigated. The features of the nurse's work are studied for effective prevention and management of Neonatal hyperbilirubinemia.

Conclusion

Until safe preventative pharmacological therapies evolve, jaundice will remain the most common clinical sign in the newborn. Advances in the antenatal management of rhesus disease, the effectiveness of phototherapy in preterms, and a gentler approach to the jaundiced term infant have made the need for exchange transfusion a rarity. This does not, however, mean that we can all relax. The yellow peril still exists! The current trend towards earlier postnatal discharge has meant that most babies develop their jaundice at home. It is, therefore, the responsibility of hospital midwives and pediatricians to identify newborns at heightened risk of significant jaundice and for health professionals in the community to be alert to features suggestive of pathology. Good communication between community

nurses, health visitors, general practitioners, and the pediatric unit is essential, with an established system for referring babies back to the hospital for assessment.

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Introduction

The most common prevalent disorder in a newborn is hyperbilirubinemia. It is a combined disorder with many symptoms. Generally, physiological jaundice is the most frequent type, although, in some regions, pathological jaundice is also prevalent. Neonatal hyperbilirubinemia encountered during the first week of life. This contention focuses on a brief introduction to jaundice, its types, and causes, measuring the bilirubin level, nursing approaches towards hyperbilirubinemia, different precautionary measures for the parents of babies suffering from hyperbilirubinemia, and different remedial therapeutic measures for its treatment.

Newborn jaundice is a yellow discoloration of a newborn's skin and eyes. Infant jaundice occurs because the baby's blood contains an excess bilirubin level, a yellow pigment in the red blood cells. Just about 8%-11% of newborns develop hyperbilirubinemia. About 60%-80% of healthy infants are expected to encounter idiopathic neonatal jaundice.

When the bilirubin level rises, dermal icterus first appears on the face and eyes sclera and then proceeds to the body and then to the extremities. This condition is usually happening in 50%-60% of newborns during the first week of life.

Very common infant jaundice in babies born before 38 weeks gestation, some breastfed babies. Infant jaundice often happens because a baby's liver is not mature enough to get rid of bilirubin in the bloodstream. Also, the underlying disease may cause newborn jaundice. Most infants born between 35 weeks' gestation and full-term need no treatment for jaundice. Rarely, an unusually high blood level of bilirubin can place a newborn at risk of brain damage, particularly in the presence of certain risk factors for severe jaundice.

About five to ten percent of newborns who developed jaundice require management of hyperbilirubinemia. Gestational age, birth weight, rupture of

membranes, illness during pregnancy, or maternal infectious diseases could be account for neonatal jaundice.

Epidemiology

Increased bilirubin levels may be related to genetic, ethnic, and familial factors. Native American infants and Asian infants may have a higher rate of breast milk jaundice. Hispanics are prone to develop elevated total bilirubin (TSB) levels. Siblings of children with a history of elevated TSB tend to have a higher level of TSB. Also, children of Greek and Asian descent prove to develop PHYsiologic Jaundice.

Clinical Manifestation

Jaundice

Conjunctival icterus

Other physical findings

Bilirubin-induced neurologic dysfunction (BIND)

- Acute bilirubin encelopathy
- Chronic bilirubin encelopathy (kernicterus)
- Hyperbilirubinemia and autism

Classification

There are several ways to classify hyperbilirubinemia. Hyperbilirubinemia can be physiological or pathological. In addition, it can be classified as conjugated, unconjugated, or both also can be classified by mechanism.

Causes of Hyperbilirubinemia by Bilirubin Subgroup

Uncojucted predominance

Moat of the common causes of neonatal jaundice include

- Breastfeeding jaundice
- Breast Milk Jaundice
- Phisologic Hyperbilirubinemia
- Pathological Hyperbilirubinemia due to hemolytic disease

Breastfeeding jaundice develops on breastfed infants during the first week of life. Some infants with decreased milk intake have increases enterohepatic circulation of bilirubin. also increased of enterohepatic circulation may result from reduced intestinal bacteria that turn bilirubin to nonresorbed metabolities.

Breastmilk jaundice develops first 5-7 days of life and reaching its peak in about 2 weeks. Increased concentration of beta-glucoronidase in breast milk, causing an increase in the deconjugation and reabsorption of bilirubin.

Physiologic -occurs in most all neonates.

Bilirubin level can rise up to 18 mg/dl(308micromol/L) by 3 to 4 days of life , up to 7 days in Asian newborns and fall thereafter.

Pathologic heperbilirubinemia diagnosed if

- Jaundice appears in the first 24 hours, after first weeks of life, or if it last more then two weeks
- Total serum bilirubin rises by>5 mg/dl/day(>86 micromol/L/day)
- Total serum bilirubin is >18 mg/dl(>308 micromol/L/day)

Infant shows symptoms or signs of a serious illness.

Most common pathologic causes are

- Hemolitic anemia (Immune and nonimmune)
- Hematoma resorption
- Sepsis
- Hypothyroidism

Conjugated Predominance

There are many predisposing factors in the manifestation of this disease. Such as prematurity, GDM (Gestational diabetes mellitus), race, height, polycythemia, cephalohematoma, male sex, Trisomy21, medication, weight loss, delayed meconium passage, family history of jaundice, and breastfeeding. ABO incompatibility is the most common cause of jaundice. Additionally, more factors contribute to jaundice, for-instance congenital infections(TORCH: CMV, syphilis, rubella, toxoplasmosis), and age more than 25 years. Neonatal variables included gender, birth age, birth season, birth weight, blood group, and Rh.

Unconjugated Predominance	**Conjugated Predominance**
Physiologic jaundice Breast milk jaundice Birth Trauma (cephalohematoma) Polycythemia (delayed cord clamping) Hemolysis (ABO incompatability RBC defects) Intestinal obstruction Hypothyroidism	Urinary tract infection Congenital viral infection (CMV) Biliary artresia Dubin-Johnson syndrome Rotor Syndrome

Screening for Hyperbilirubinemia

The American Academy of Pediatrics recommends universal screening with TSB or transcutaneous bilirubin (TcB) levels or screening based on risk factors. The screening will identify infants earlier who require phototherapy, but there is no evidence that phototherapy or exchange transfusion decreases the risk of bilirubin encephalopathy.

Methods include visual assessment of skin color, laboratory testing transcutaneous bilimeter readings, end-tidal carbon monoxide monitoring, and predictive predischarge serum bilirubin levels.

Visual assessment should be done in a well-lighted room and are influenced by primary skin color and bilirubin deposition in tissue. Jaundice is progressing in a cephalocaudal manner from the face to the lower extremities. Therefore, visible jaundice in the first 24 hours of life should never be considered physiologic and always requires further evaluation.

Visual assessment is not an accurate method to determine bilirubin level, often misses severe hyperbilirubinemia. Therefore, all infants who appeared yellowish on assessment should be evaluated with a risk score or TSB/TcB measurements. The bilirubin level should be interpreted according to the infant's age in hours if the infant is at risk; further tests may be ordered depending on the infant's risk.

Laboratory testing

Maternal prenatal laboratory testing generally includes blood type, Coombs, and antibody screen. Blood -typing of jaundice, breastfeeding neonates born to O+ mothers should be considered to rule-out hemolysis due to ABO isoimmunization. Blood-typing of infants born to Rh- moms is a standard test at the hospitals.

Total serum bilirubin levels are the gold standard for evaluating hyperbilirubinemia. Total bilirubin is composed of both indirect (unconjugated) and direct (conjugated) molecules.

Cord blood can be used for screening high-risk male infants and female homozygotes for possible G-6-PD deficiency, while molecular genotyping is necessary to identify female heterozygotes.

Transcutaneous Bilimeter

Transcutaneous (TQ) devices for measuring bilirubin noninvasively have become very popular as screening tools for hyperbilirubinemia. Measurements are taken by placing the sensor on the forehead or sternum. Reading measurements over the sternum may be higher than measurements over the forehead. Related to face being exposed to ambient light more than the chest. In addition, TQ bilimeters may be less accurate when serum bilirubin is > 15 mg/dL or after the infant underwent phototherapy.

End-Tridal Carbon Monoxide

The end-tidal monoxide (ETCO) level may help evaluate hyperbilirubinemia in the neonate. Hemoglobin breakdown by heme oxygenase results in bilirubin and carbon monoxide, which are released in equal molecular weights. An elevated level of exhaled CO may help identify infants producing large amounts of bilirubin (CO) via a hemolytic process. ETCOc measurement alone or in combination with serum bilirubin levels could predict the development of hyperbilirubinemia during the first seven days of life.

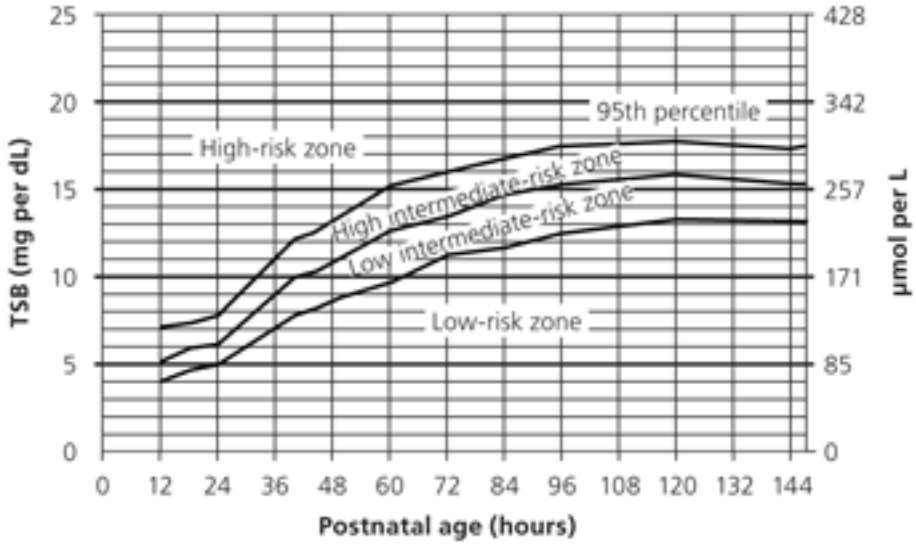
ETCOc measurements could have limited values in neonates whose mothers smoked during pregnancy because the fetus receives the CO, which may cause false-positive readings. So from there, we could see that ETCOc would have a limited impact on predicting hyperbilirubinemia in affected neonates.

Serum Bilirubin Level

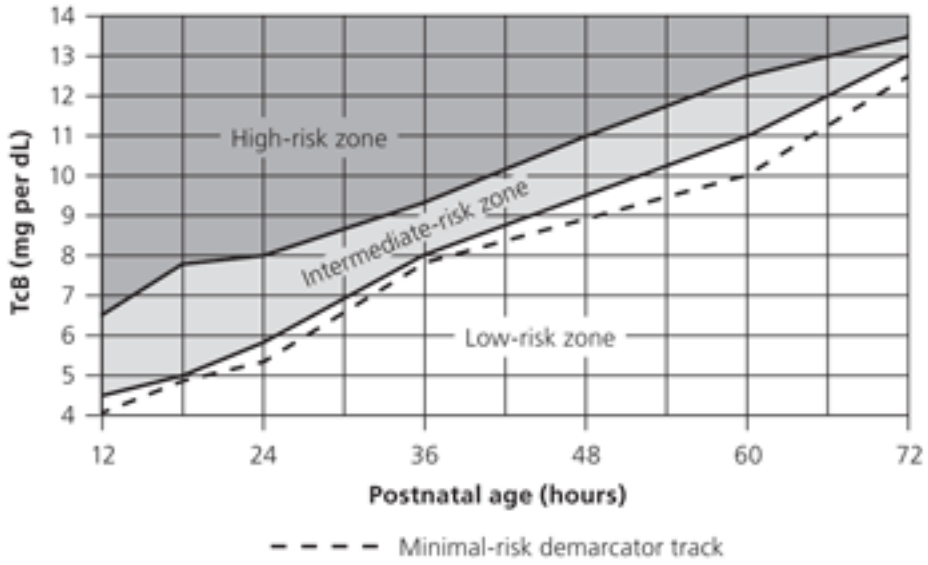
Neonatal hyperbilirubinemia defines as a total serum bilirubin level above 5 mg per dL. Even though sixty percent of term infants have clinical jaundice in the first week of life, some newborns have an underlying disease.

A percentile-based nomogram with hour-specific bilirubins for the first week of life was constructed (Fig 1) and found to be highly predictive of significant hyperbilirubinemia. In addition, using an adaptation of Bhutani's nomogram, found that predischarge serum bilirubin screening could identify G-6-PD deficient infants at low, intermediate, or high risk of developing severe hyperbilirubinemia.

Figure 1.Risk Assessment for Hyperbilirubinemia Using TSB



Risk Assessment for Hyperbilirubinemia Using TcB



Bilirubin encephalopathy

Bilirubin encephalopathy, also known as kernicterus, is bilirubin-induced neurologic damage typically found in infants. Kernicterus means "yellow kern," while the nuclear region of the brain is typically affected. Historically, the term refers to an anatomical diagnosis made at autopsy based on specific staining patterns found in babies who had marked hyperbilirubinemia before they died.

Condition	Phase	Clinical manifestations
Acute bilirubin encephalopathy	Early	Lethargy Hypotonia Poor suck
	Intermediate	Moderate stupor Irritability Hypertonia manifested by backward arching of the neck (retrocollis) and trunk (opisthotonos) Fever and high-pitched cry, which may alternate with drowsiness and hypotonia
	Advanced	Pronounced retrocollis and opisthotonos Shrill cry No feeding Apnea Fever Deep stupor to coma Sometimes seizures and death
Kernicterus	NA	Athetoid cerebral palsy Auditory dysfunction Dental-enamel dysplasia Paralysis of upward gaze Some or all of the signs listed in the advanced phase of bilirubin encephalopathy

*From 2004 clinical guidelines (reference 4). NA indicates not applicable.

Treatment

Mild infant jaundice disappears on its own within two or three weeks without any intervention. Moderate jaundice requires staying longer in the newborn nursery or being readmitted to the hospital. Severe hyperbilirubinemia is a medical emergency requiring immediate treatment. Common treatment strategies to lower serum bilirubin levels include hydration, phototherapy, drug therapy, and exchange transfusion.

Enhanced Nutrition

Preventing weight loss requires more frequent feeding or supplementation to ensure that the infant receives adequate nutrition. Supplementing infants with water/glucose water is not advised as disruption in the mother's milk production may occur, and neither solution supplies the calories of breastmilk. Many health care providers recommend cessation of breastfeeding with the substitution of formula for 24 to 48 hours. Breastmilk jaundice, serum bilirubin will rapidly fall during the formula-fed period. It observed that serum bilirubin levels rise again, but usually not to the previous high level. Full-term newborns with breastmilk jaundice with serum levels <20 mg/dL may require no intervention. Infants with serum bilirubin levels ranging 20 to 25 mg/dL require close monitoring and may require supplementation with formula.

Light therapy (phototherapy)

Phototherapy is a unique lamp that emits light in the blue-green spectrum. Only specific light colors are absorbed by bilirubin, a yellow pigment; blue light is absorbed most effectively. However, green light is more deeply absorbed into the

skin. Therefore, fluorescent white light with a broad spectrum is not so effective in decreasing serum levels. The most effective is four Special Blue Bulbs(F20T12/B) flanked on either side by two daylight fluorescent tubes.

The effectiveness of phototherapy treatment depends on light irradiance, the most effective in the 400 to 550 nm light range. This is because the light changes the shape and structure of bilirubin molecules to be excreted in both the urine and stool. During treatment, the newborn is wearing goggles and diapers, maximizing skin exposure to the light.

Double light therapy may be supplemented with the use of a light-emitting pad or mattress.

Phototherapy usually starts after serum bilirubin reaches a specific level. Data suggest that conventional phototherapy with fluorescent tubes may decrease postprandial blood flow response, adversely impacting the neonatal GI tract.

Over recent years Fiberoptic pads have become very popular for hyperbilirubinemia treatment. The advantage of that treatment is that the infant swaddled while lying on the pad, and no eye goggles were needed. The disadvantage of fiberoptic pads is the limited ability to deliver high light intensity to large skin areas. Fiberoptic pads are more effective in premature infants cause their skin is thinner, which allows light to penetrate deeper into the tissue.

Study shows that blue LEDs may be better absorbed by bilirubin, and bedside nurses reported discomfort from blue light.

All nurseries and services treating infants should have the necessary equipment to provide intensive phototherapy.

Common Adverse Effects of Phototherapy
Increased insensible water loss
Loose watery stools with potential for loss of nutrients
Skin rashes
Hyperthermia
Decreased maternal-infant interaction
Lack of visual sensory input

Intravenous immunoglobulin (IVIg)

Jaundice may be related to blood type differences between mother and infant. This condition results in the baby carrying antibodies from the mother that contribute to the rapid breakdown of the baby's red blood cells. Intravenous transfusion of immunoglobulin — a blood protein that can reduce levels of antibodies — may decrease jaundice and lessen the need for an exchange transfusion, although results are not conclusive.

Drug Used for Hyperbilirubinemia

With severe hyperbilirubinemia, primarily if hemolysis presents, various drugs have been used. The most widely used drug is Phenobarbital which enhances enzyme activity in the hepatocytes, resulting in increased bilirubin conjugation. However, a side effect of that drug is the oxidation of bilirubin in the brain and increase the risk of bilirubin encephalopathy. In addition, it takes several days before it affects serum bilirubin level, making this medication a limited value in an acute setting. Cholestyramine and agar have the effect of decreasing serum bilirubin by binding bilirubin and bile acid in the intestine. Clofibrate enhances

hepatocyte activity. Metalloporphyrins(SNMP) prevent bilirubin formation. SNMP treatment on high-risk neonates has shown high effectiveness, according to the studies. Therefore, SNMP was approved by the FDA for clinical use.

Exchange Transfusion

Exchange transfusion helps reduce circulating bilirubin, and it helps with severe cases of hyperbilirubinemia in the neonatal period. When severe jaundice does not respond to other treatments, a baby may need an exchange transfusion of blood. This involves repeatedly withdrawing small amounts of blood and replacing it with compatible donor blood, thereby diluting the bilirubin and maternal antibodies â€" a procedure performed in a newborn intensive care unit. Exchange transfusions should be performed only by trained personnel in a neonatal intensive care unit with complete monitoring and resuscitation capabilities.

The serum bilirubin level by itself, except when it is extremely high and associated with bilirubin encephalopathy, is an imprecise indicator of long-term neurodevelopmental outcome.[2] Additional studies are needed on the relationship between central nervous system damage and the duration of hyperbilirubinemia, the binding of bilirubin to albumin, and changes seen in the brainstem auditory evoked response. These studies could help to better identify risk, clarify the effect of bilirubin on the central nervous system, and guide intervention.

Indications

Increasing the antigen-negative red cells as a solution to alloimmunized haemolysis in newborns By reducing blood bilirubin levels and preventing kernicterus, remove antibody-coated cells and replace them with antigen-negative ones. In neonatal intensive care units, severe hyperbilirubinemia due to

alloimmune hemolytic disease is the most common reason for exchange transfusions. An exchange transfusion level or higher total serum bilirubin level should be considered a medical emergency, and intensive phototherapy (multiple lights) should begin immediately. The Consultant Neonatologist on call should be contacted as soon as possible.

Acute Bilirubin Encephalopathy

Severely jaundiced newborns become lethargic, hypotonic, and suck poorly in the early stages of acute bilirubin encephalopathy. Moderate stupor, irritability, and hypertonia define the intermediate phase. The baby may experience a fever and a high-pitched cry, as well as lethargy and hypotonia. Backward arching of the neck (retrocollis) and trunk are signs of hypertonia (opisthotonos). Anecdotal information suggests that an emergent exchange transfusion at this stage could correct the central nervous system abnormalities in certain patients. The advanced stage, which is marked by pronounced retrocollis-opisthotonos, shrill cry, no feeding, apnea, fever, deep stupor to coma, seizures, and death, is characterized by pronounced retrocollis-opisthotonos, shrill cry, no feeding, apnea, fever, deep stupor to coma, sometimes seizures, and death.

Kernicterus

Surviving newborns with chronic bilirubin encephalopathy may have a severe form of athetoid cerebral palsy, auditory dysfunction, dental-enamel dysplasia, upward gaze paralysis, and, less frequently, intellectual and other disabilities. Kernicterus affects the majority of babies.

General Discussion

Excessive bilirubin levels in the blood (hyperbilirubinemia) during infancy is a rare neurological disorder called Kernicterus. Bilirubin is an orange-yellow bile shade resulting from the regular breakdown of hemoglobin in red platelets (hemolysis). Poisonous degrees of bilirubin might amass in the cerebrum, conceivably bringing about an assortment of manifestations and actual discoveries. These side effects might incorporate the absence of energy (torpidity), helpless taking care of propensities, fever, and spewing. Impacted babies may likewise encounter the shortfall of certain reflexes (e.g., Moro reflex, etc.); gentle to serious muscle fit remembering those for which the head and heels are twisted in reverse, and the body withdraws from); (or potentially uncontrolled compulsory muscle developments (spasticity). At times, babies with Kernicterus might foster hazardous entanglements.

Signs and Symptoms

Now and again, discoveries of kernicterus seem two to five days after birth. Inside the initial not many long periods of life, impacted babies grow unusually significant degrees of bilirubin in the blood (hyperbilirubinemia) and determined yellowing of the skin, mucous layers, and whites of the eyes (jaundice). In addition, poisonous degrees of bilirubin might collect in specific spaces of the mind (i.e., the basal ganglia and the brainstem), conceivably bringing about an assortment of side effects and actual discoveries that, now and again, may cause dangerous intricacies.

Beginning discoveries related to kernicterus might shift from one case to another, yet regularly incorporate absence of energy (torpidity) or sleepiness, helpless taking care of propensities, fever, a harsh piercing cry, and additionally

nonattendance of certain reflexes (e.g., Moro reflex, etc.) In addition, impacted babies may ultimately encounter respiratory trouble, gentle to serious muscle fits remembering those for which the head and heels are bowed in reverse, and the body quits), (and additionally lessened muscle tone (hypotonia).

As an impacted babies ages, different manifestations and actual discoveries might create including postponed and additionally strange movements or engine advancement; spasms or seizures; weakened capacity to facilitate intentional developments (ataxia); unusual muscle unbending nature bringing about muscle fits (dystonia); slow, nonstop, compulsory, squirming developments (athetosis) of the arms and legs (appendages) as well as the whole body; issues with tactile discernment; absence of up look; or potentially hearing misfortune. At times, impacted babies might show mental impediments and trouble talking (dysarthria). However, by and large, the disorder is typical for kernicterus created by three to four years old.

Causes

A few instances of kernicterus happen haphazardly, for reasons unknown (irregularly). As per the clinical writing, abundance levels of bilirubin (hyperbilirubinemia) alone isn't adequate to create kernicterus. Potential causes might incorporate Rh sickness as well as obscure elements.

Rh Disease, otherwise called isoimmunization or Erythroblastosis Fetalis, can likewise cause jaundice during outset that might prompt kernicterus. In Rh Disease, red platelets from the hatchling might cross the placenta and go into the mother's circulatory system. This animates maternal neutralizer development against these "unfamiliar" platelets. These antibodies ultimately arrive at the embryo through the placenta and cause annihilation of fetal red platelets (hemolysis), bringing about low degrees of coursing red platelets (iron deficiency)

in the baby. Accordingly, the fetal bone marrow discharges youthful red platelets (erythroblasts) into the fetal circulation system. The hemoglobin from the annihilated red platelets is separated into bilirubin, a yellow-orange bile color. Bilirubin is cleared from the fetal circulatory system by intersection the placenta into the mother's circulatory system. Be that as it may, after birth unusually significant degrees of bilirubin (hyperbilirubinemia) may gather in the infant's circulatory system and cerebrum. This infection is currently practically non-existent because of the accessibility of against Rh globulin, which forestalls isoimmunization.

Diagnosis

Kernicterus can be suspected within the first days of life. â€‹â€‹The diagnosis may be based upon a thorough clinical evaluation and identification of characteristic physical findings (e.g., jaundice, abnormal cry, loss of Moro reflex, etc.). In most cases, persistent yellowing of the skin, mucous membranes, and whites of the eyes (jaundice) is apparent within the first few days of life.

Treatment

Treatment for Kernicterus centers around diminishing the measure of unconjugated bilirubin in the blood. Early treatment is basic in the endeavor to forestall the manifestations and actual discoveries related with kernicterus durint the primary long stretches of life. Such medicines might remember trade blood bondings for which limited quantities of blood are removed over and over and supplanted with blood from a benefactor until the greater part of the blood has been traded. In one more strategy known as plasmapheresis, undesirable substances (poisons, metabolic substances and plasma parts) are eliminated from the blood. During this system, blood is taken out from the impacted individual and

platelets are isolated from plasma. The plasma is then supplanted with other human plasma and the blood is bonded into the impacted person.

Furthermore, phototherapy is utilized for infection the board purposes. During this strategy, exceptional bright light is centered around the exposed skin, while the eyes are safeguarded. This assists with accelerating the discharge of bilirubin from the skin and helps in its deterioration. As an impacted individual ages, weight increments and the skin thickens; phototherapy turns out to be less successful against forestalling the side effects and actual discoveries related with kernicterus. In this manner, liver transplantation might be performed. A few scientists accept that liver transplantation ought to be performed at an early age, before cerebrum harm conceivably connected with kernicterus can create.

Nursing Care Plan For Hyperbilirubinemia

1. Deficit knowledge related to new diagnosis

Goal: family got knowledge about disease that affects newborn.

Expected outcomes:

- The family said the understanding of the disease, condition, prognosis and treatment programs.
- Families are able to carry out the procedure described correctly.
- The family was able to explain again what is described nurse

Intervention:

- Describe the pathophysiology of the disease.

- Describe the signs and symptoms of the disease that usually appears in the right way
- Provide information on the patient's family about the conditions

2. Fluid volume deficit related to inadequate fluid intake,phototherapy
   Goal: adequate body fluids.
   Expected outcomes:
- Adequate fluid.

   Intervention:
- Record the number and quality of feces.
- Monitor intake output.
- Monitor the skin turgor.
- Give water between breastfeeding or giving a bottle.

3. Hyperthermia related to exposure to a hot environment.
   Goal: temperature in the normal range.

   Expected outcomes:
- Body temperature within normal range.
- Pulse and respiration within normal limits.
- There is no change in skin color.
  Intervention :
- Monitor the temperature as much as possible.

- Monitor blood pressure, pulse, and respiration
- Monitor intake and output.

4. Impaired Skin Integrity related to jaundice or radiation.

Goal: good skin integrity/normal.

Expected outcomes:

- Good skin integrity could be maintained.
- No injuries/lesions on the skin.
- Good tissue perfusion.
- Protect the skin and retain moisture and natural treatments.

Interventions:

- Avoid wrinkles in the crib
- Keep skin dry and clean
- Turn infant with each feeding
- Monitor the existence of skin redness

Conclusion

Until safe preventative pharmacological therapies evolve, jaundice will remain the most common clinical sign in the newborn. Advances in the antenatal management of rhesus disease, the effectiveness of phototherapy in preterms, and a gentler approach to the jaundiced term infant have made the need for exchange transfusion a rarity. This does not, however, mean that we can all relax. The yellow

peril still exists! The current trend towards earlier postnatal discharge has meant that most babies develop their jaundice at home. It is, therefore, the responsibility of hospital midwives and pediatricians to identify newborns at heightened risk of significant jaundice and for health professionals in the community to be alert to features suggestive of pathology. Good communication between community nurses, health visitors, general practitioners, and the pediatric unit is essential, with an established system for referring babies back to the hospital for assessment.

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