JAUNDICE

Framework

- The definition of Neonatal Jaundice
- Billirubin Metabolism
- Special characteristic in neonates
- Dangerous of the Hyperbillirubinemia
- The diseases in relation with Neonatal Jaundice

Objectives:

How to suspect:

Babies are more likely to develop significant hyperbilirubinaemia if they have:

- gestational age under 38 weeks.
- a previous sibling with NJ requiring phototherapy.
- mother's intention to breastfeed exclusively
- Visible jaundice in the first 24 hours.

Physiological jaundice

- Jaundice begins after 36 hours of birth, most often after 48 hours. Jaundice is with indirect bilirubin. Bilirubin after the second day of life don't exceed 262 mcmol / l for in full- term newborn and 210 mcmol / l for premature infants. The clinical status of the newborn is good. The jaundice regression in the newborn takes 7-10 days to in term newborn and 21-28 days to premature infant.

- This type of jaundice do not require treatment.

Pathological jaundice

- Early onset than 36 hours after birth.
- It is manifested by: Rh- factor and/or ABO incompatibility, hemolytic anemia with Hb lower than 170 g / l at birth, reticulocytes > 8-10, total bilirubin> 65-85 mcmol / l per hour.
- Is a persistent clinical jaundice in the

newborn on pale skin background and with hepato-splenomegaly.

- Associate Clinical signs: lethargy, eating disorders, neurological disorders.

- This type of jaundice requires treatment.

Clinical evaluation

- Jaundice skin and mucous membranes

- Pallor

- Gray-white (acholic stool)

- Hepatosplenomegaly

Kramer diagram

Clinical signs suggesting probability of the hemolytic

disease

- Familiar anamnesis
- Jaundice <24 hours
- Bilirubin> 85.5 mcmol / hour at birth with growth of 8.5 mcmol / hour
- Pallor
- Hepatosplenomegaly
- Erythrocyte hemolysis increases rapidly after 24-48 hours (G6PD)
- Failure phototherapy

Laboratory examinations

- Bilirubin (total and indirect)
- Blood group and Rh factor of the child
- Maternal blood group and Rh antibodies screening
- Peripheral smear for red cell morphology
- Hematocrit level (Polycythaemia or anemia)
- The level of serum albumin and bilirubin / albumin ratio in hyperbilirubinemia

Reduce to a minimum loss of blood during collection.
Prevent Dolor syndrome during collection
For the analyzes collecting respect the protective and preventive measures for the nosocomial infection

The neonatal jaundice's treatment

- **Intensive phototheraphy**
- Intensive phototherapy decreases bilirubin level to 15-34 mcmol / l in 4-6 hours
- In case of hydrops, sepsis, asphyxia, severe anemia, the indicated limits should be reduced by 50
- Apply immediately intensive phototherapy in rhesus sensitization to keep bilirubin under 85 mcmol / l in the ABO isoimmunization - to keep bilirubin
  >120 mcmol / l in the first 12 hours;
  170 mcmol / l at 18 hours;
  260 mcmol / l at any time post-partum

Phototherapy technology

- Place the undressed baby under the lamp
- Monitorize your child's temperature every 3 hours
- Monitorize weight daily
- Protect your child's eyes and genital organs

- The distance between infant and phototherapy lamp must be 50 cm (where's no other distance specified in the Technical Passport)
- Duration of phototherapy depends on the bilirubin level (continuous or intermittent light flow)
- Increase your fluid intake by 10-20% compared to the physiological needs
- After 12-14 hours after stopping phototherapy check serum bilirubin level

Special characteristic in neonates

- **1.More billirubin produced**

- Much more Hemolysis
- The life-length of hemolysis(70~80)

Special characteristic in neonates

- **2.The low capability of albumin on**

unconjugated billirubin transportation

- acid intoxication
- Less albumin in neonates

Special characteristic in neonates

•3.The low capability of heptatocyte

- Less Y protein and Z protein
- The primary development of Hepato-enzyme system
- Easy-broken hepato-enzyme system
- After-born, the blood glucose level is very low.

Special characteristic in neonates

•4.High workload of the hepato-enteric circulation

- Less bacterial
- Low enzymatic activity in intestine
- High level of billirubin in meconium

The general symptom of neonatal jaundice

- Yellow skin
- Yellow eyes(sclera)
- Sleepiness
- Poor feeding in infants
- Brown urine
- Fever
- High-pitch cry
- Vomiting

Brown urine

Hemolytic disease of

newborn

This condition occurs when there is an incompatibility between the blood types of the mother and baby.

Kernicterus

- Kernicterus is damage to the brain centers of infants caused by increased levels of unconjugated-indirect bilirubin which is free (not bound to albumin).

TYPES OF JAUNDICE
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MANAGEMENT

- Phototherapy
- Drugs
- Exchange transfusion

Babies under phototherapy

Prognosis

- **Early recognition and treatment of *hyperbilirubinemia* prevents severe brain damage.**

phototherapy

- In practice light is used in the white ,blue and green>
- A dose response relationship

exists . Amount of irradiation directly propotion to decrease serum bilirubin .

•The energy delivered to infant skin decreased with increasing distance between infant and light source (50cm)

phototherapy

•Irradiating a large surface area is more efficient

•Nature and character of the light source

e.g (quartz halide spotlight)

•Fibrostic light is also used in phototherapy unit >

Key point in the practical execution of phototherapy

1- The infant should be naked except for diaper , eye to be covered
2- distance between the skin and light source .
3-when used spotlight , the infant is placed in centre .
4- routinely add 10-15% extra fluid .
5- timing of follow -up S.B testing must be indevedualized.

Adverse effect of

phototherapy

- Hypocalcemia appears to be more common in premature.
- Concentration of certain aminoacid may change.
- burn.

Diagnosis

Exchange transfusion

Risk and Complications

- Cardiac and respiratory disturbances
- Shock due to bleeding or inadequate replacement of blood
- Infection
- Clot formation

- Rare but severe complications include: air embolism, portal hypertension and necrotizing enterocolitis

- Breastfeeding
  - Should be encouraged for most women
  - 8-12 times/day for 1st several days
  - Assistance and education
  - Avoid supplements in non-dehydrated infants

Ongoing assessments for risk of developing severe hyperbilirubinemia

- Monitor at least every 8-12 hours
- Don't rely on clinical exam
- Blood testing
  - Prenatal : ABO & Rh type, antibody
  - Infant cord blood

Overproduction Hyperbilirubinemia:

- Blood group incompatibilities
- Maternal-fetal or feto-fetal transfusions
- Non Immune Hemolytic anemias
- Structurally Abnormal Red cells
- Extra-vascular Hemolysis

Blood Group Incompatibilities:

- Rh negative mother & Rh positive infant

- ABO incompatibilities

- Strongly considered if there is jaundice in the first 24 hours of life

Non-Immune Hemolytic

Anemias:

- G6PD Deficiency:

  Deficiency-decreased NADPH-decreased reduced Glutathione – decreased protection of RBCs from oxidants-hemolysis.

2. Excess of Vitamin K given IM

Structurally Abnormal RBCs:

➢Spherocytosis

➢Pyknocytes (irregular borders)

Under-secretion Hyperbilirubinemia:

➢Enzymatic Deficiency(Glucoronyl

transferase)

- Hormonal suppression (Breast milk jaundice)
- Inhibition of conjugation
- Hepatic cell injury due to Infections
- Substrate deficiency (hypoglycemia)
- Mechanical obstruction (biliary atresia)

Hormonal Suppression:

- Pregnandiol present in maternal breast milk suppresses bilirubin conjugation.
- Breast feeding may be stopped and restarted in a period of 48hours.

Jaundice after 1 week:

a) Prolonged direct Jaundice

- Neonatal hepatitis (common)
- Extra-hepatic biliary atresia
- Breast milk jaundice
- Metabolic disorders
- Intra-hepatic biliary atresia
- Amino acid toxicity
- Inspissated bile syndrome (uncommon)

b) Prolonged Indirect Jaundice

- Criggler Najjar Syndrome
- Breast milk jaundice

- Hypothyroidism
- Pyloric stenosis
- Ongoing hemolysis, malaria