

Neonatal Jaundice

- Visible form of bilirubinemia
 - Adult sclera $>2\text{mg / dl}$
 - Newborn skin $>5\text{ mg / dl}$
- Occurs in 60% of term and 80% of preterm neonates
- However, significant jaundice occurs in 6 % of term babies

Hb → globin + haem
1g Hb = 34mg bilirubin

Non – heme source
1 mg / kg

Bilirubin

Ligandin
(Y - acceptor)

Bilirubin
glucuronidase

Bil glucuronide

Intestine

Bil
glucuronide

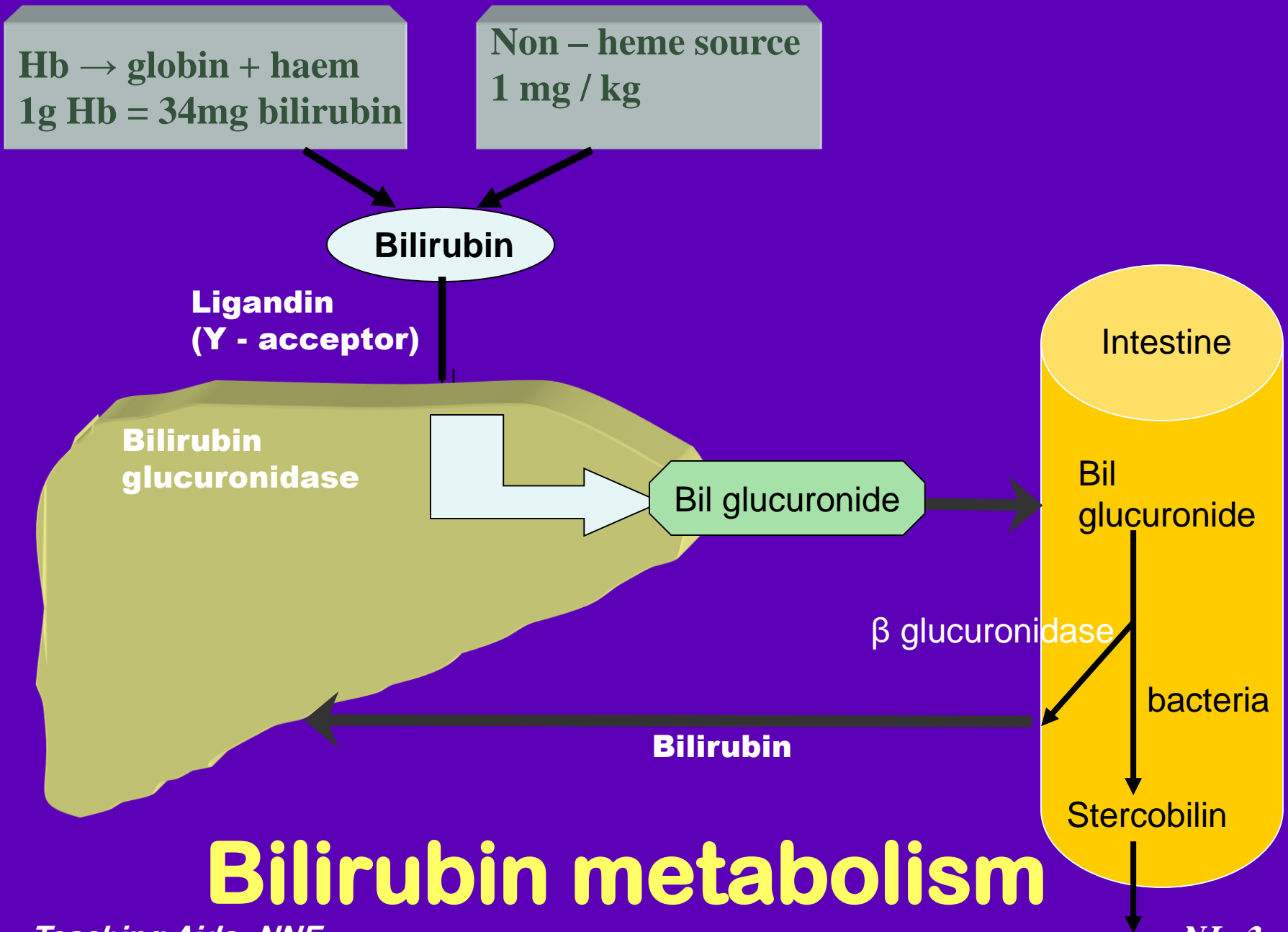
β glucuronidase

bacteria

Stercobilin

Bilirubin

Bilirubin metabolism



Clinical assessment of jaundice

Area of body	Bilirubin levels mg/dl
Face	4-8
Upper trunk	5-12
Lower trunk & thighs	8-16
Arms and lower legs	11-18
Palms & soles	> 15

Physiological jaundice

Characteristics

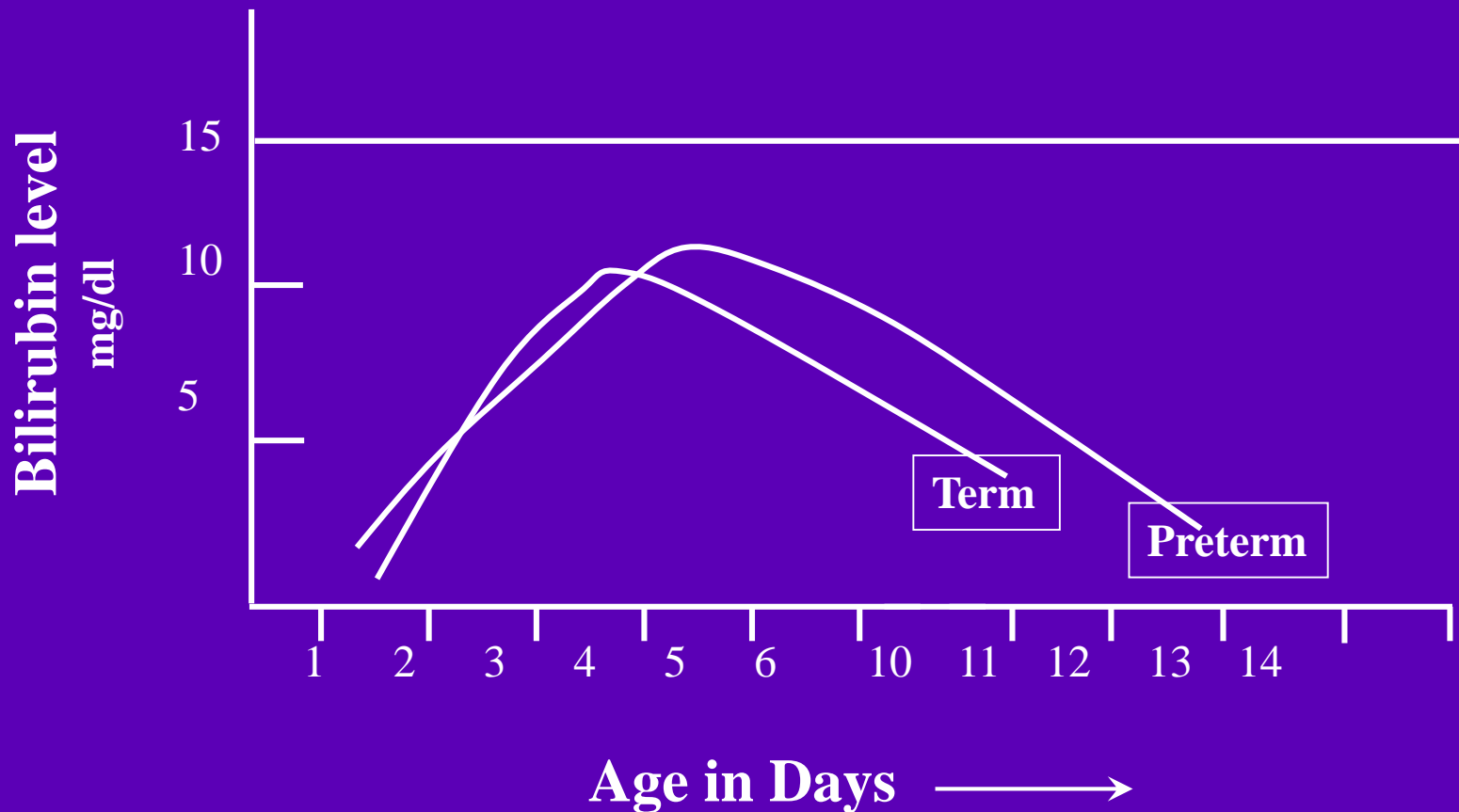
- Appears after 24 hours
- Maximum intensity by 4th-5th day in term & 7th day in preterm
- Serum level less than 15 mg / dl
- Clinically not detectable after 14 days
- Disappears without any treatment

Note: Baby should, however, be watched for worsening jaundice

Why does physiological jaundice develop?

- Increased bilirubin load
- Defective uptake from plasma
- Defective conjugation
- Decreased excretion
- Increased entero-hepatic circulation

Course of physiological jaundice



Pathological jaundice

- Appears within 24 hours of age
- Increase of bilirubin $> 5 \text{ mg / dl / day}$
- Serum bilirubin $> 15 \text{ mg / dl}$
- Jaundice persisting after 14 days
- Stool clay / white colored and urine staining clothes yellow
- Direct bilirubin $> 2 \text{ mg / dl}$

Causes of jaundice

Appearing within 24 hours of age

- Hemolytic disease of NB : Rh, ABO
- Infections: TORCH, malaria, bacterial
- G6PD deficiency

Appearing between 24-72 hours of life

- Physiological
- Sepsis
- Polycythemia
- Concealed hemorrhage
- Intraventricular hemorrhage
- Increased entero-hepatic circulation

Causes of jaundice

After 72 hours of age

- Sepsis
- Cephalhaematoma
- Neonatal hepatitis
- Extra-hepatic biliary atresia
- Breast milk jaundice
- Metabolic disorders

Risk factors for jaundice

JAUNDICE

- J - jaundice within first 24 hrs of life
- A - a sibling who was jaundiced as neonate
- U - unrecognized hemolysis
- N – non-optimal sucking/nursing
- D - deficiency of G6PD
- I - infection
- C – cephalhematoma /bruising
- E - East Asian/North Indian

Common causes

- Physiological
- Blood group incompatibility
- G₆PD deficiency
- Bruising and cephalhaematoma
- Intrauterine and postnatal infections
- Breast milk jaundice

Approach to jaundiced baby

- Ascertain birth weight, gestation and postnatal age
- Assess clinical condition (well or ill)
- Decide whether jaundice is physiological or pathological
- Look for evidence of kernicterus* in deeply jaundiced NB

**Lethargy and poor feeding, poor or absent Moro's, opisthotonus or convulsions*

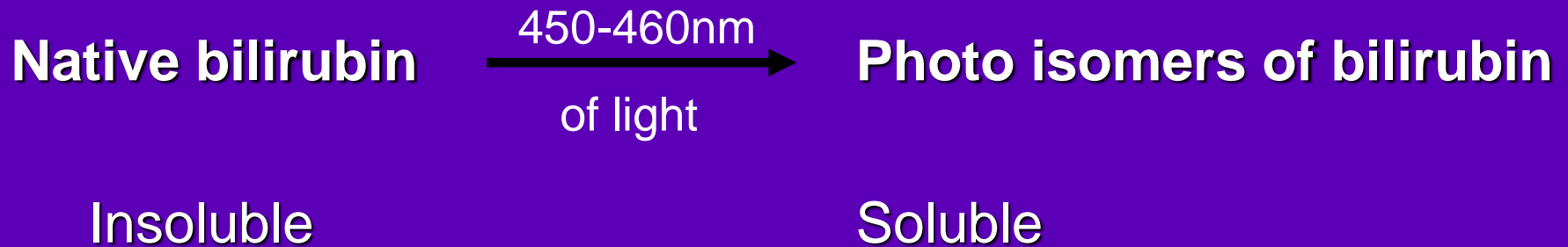
Workup

- Maternal & perinatal history
- Physical examination
- Laboratory tests (must in all)*
 - Total & direct bilirubin*
 - Blood group and Rh for mother and baby*
 - Hematocrit, retic count and peripheral smear*
 - Sepsis screen
 - Liver and thyroid function
 - TORCH titers, liver scan when conjugated hyperbilirubinemia

Management

- Rationale: reduce level of serum bilirubin and prevent bilirubin toxicity
- Prevention of hyperbilirubinemia: early feeds, adequate hydration
- Reduction of bilirubin levels: phototherapy, exchange transfusion, drugs

Principle of phototherapy



Phototherapy equipment

- White light tubes 6-8*/ 4 blue light tubes
- Cradle or incubator
- Eye shades

*May use 150 W halogen bulb

Babies under phototherapy



**Baby under conventional
phototherapy**



**Baby under triple unit intense
phototherapy**

Phototherapy

Technique

- Perform hand wash
- Place baby naked in cradle or incubator
- Fix eye shades
- Keep baby at least 45 cm from lights, if using closer monitor temperature of baby
- Start phototherapy

Phototherapy

- Frequent extra breast feeding every 2 hourly
- Turn baby after each feed
- Temperature record 2 to 4 hourly
- Weight record- daily
- Monitor urine frequency
- Monitor bilirubin level

Side effects of phototherapy

- Increased insensible water loss
- Loose stools
- Skin rash
- Bronze baby syndrome
- Hyperthermia
- Upsets maternal baby interaction
- May result in hypocalcemia

Choice of blood for exchange blood transfusion

■ ABO incompatibility

- Use O blood of same Rh type, ideal O cells suspended in AB plasma

■ Rh isoimmunization

- Emergency O -ve blood
Ideal O -ve suspended in AB plasma
or baby's blood group but Rh -ve

■ Other situations

- Baby's blood group

Maisel's chart

Sr Bilirubin (mg/dl)	Birth weight	Age in hrs			
		< 24	24 – 48	49 – 72	>72
<5	All				
5-9	All	Phototherapy if hemolysis			
10-14	< 2500g	Phototherapy if hemolysis	PHOTOTHERAPY		
	> 2500g			Investigate if bilirubin > 12mg%	
15-19	< 2500g	EXCHANGE		Consider Exchange	
	> 2500g			Phototherapy	
≥ 20	All	EXCHANGE			

Prolonged indirect jaundice

Causes

- Crigler Najjar syndrome
- Breast milk jaundice
- Hypothyroidism
- Pyloric stenosis
- Ongoing hemolysis, malaria

Conjugated hyperbilirubinemia

Suspect

- High colored urine
- White or clay colored stool

Caution

- ☞ Always refer to hospital for investigations so that biliary atresia or metabolic disorders can be diagnosed and managed early

Conjugated hyperbilirubinemia

Causes

- Idiopathic neonatal hepatitis
- Infections -Hepatitis B, TORCH, sepsis
- Biliary atresia, choledochal cyst
- Metabolic -Galactosemia, tyrosinemia, hypothyroidism
- Total parenteral nutrition