RAMA UNIVERSITY

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FACULTY OF NURSING

ICTERUS NEONATORUM

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INTRODUCTION

Icterus or jaundice is an important and common symptom of liver disease. It is a clinical term used for yellowish discoloration of the mucus membrane and skin due to increased serum bilirubin level .

DEFINITION

Icterus Neonatorum or physiological jaundice is the yellowish staining of the skin and sclera, mucus membrane and nails due to elevated levels of accumulated bilirubin in the blood.

It typically appears between 2^{nd} & 5^{th} day of life.

ETIOLOGY

Immature hepatic function

Increased bilirubin production

Absence of normal gut flora

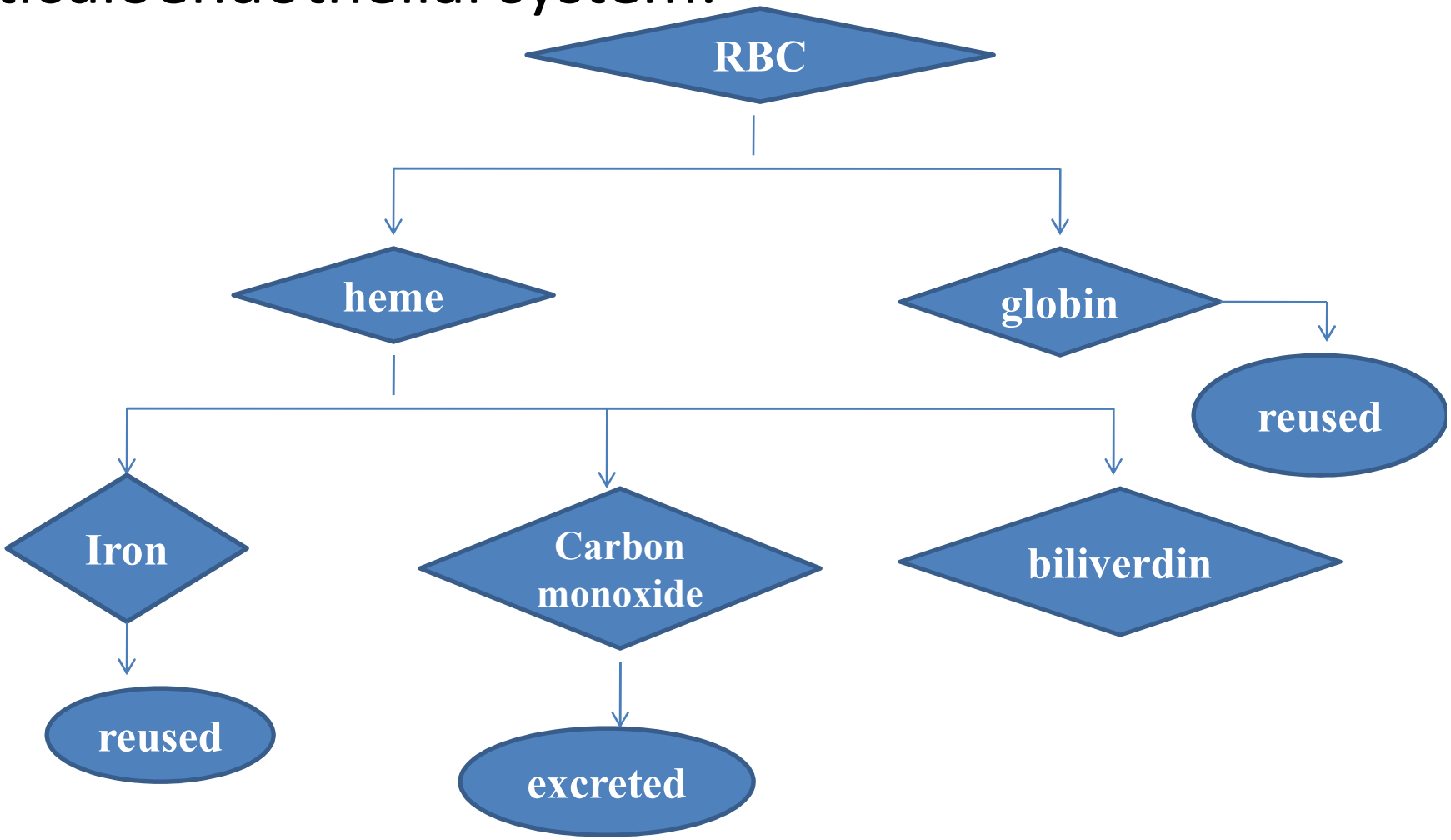
Increased breakdown of RBC

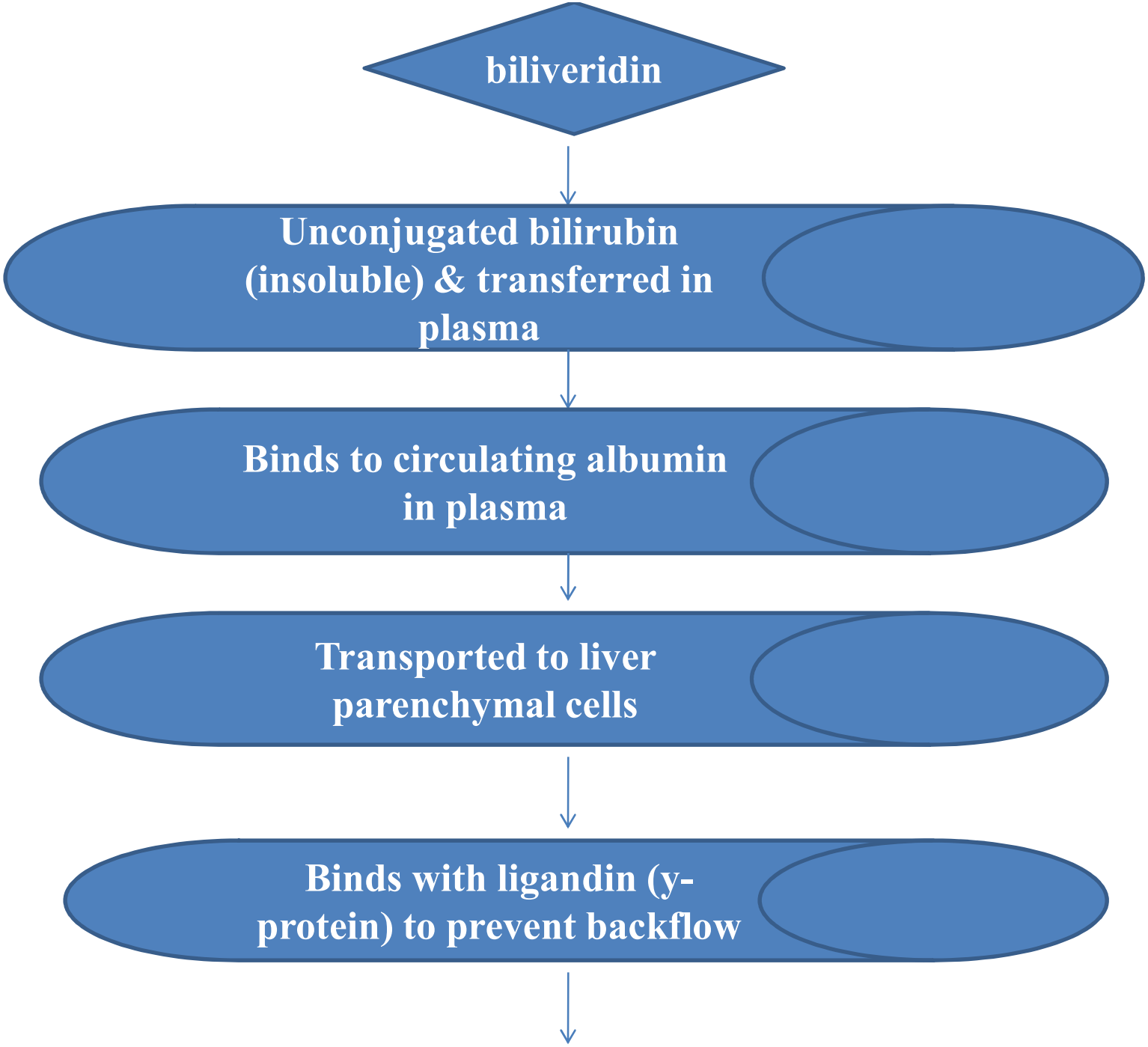
CHARACTERSTICS OF PHYSIOLOGICAL JAUNDICE

- Appears between 30 to 72 hrs of age(term)
- Appears earlier not before 24 hrs of age(preterm)
- Serum bilirubin level does not exceed 15 mg/dl.
- Disappears by 7^{th} to 10^{th} day(term) and by 14^{th} day in preterm.
- Subsides spontaneously & no treatment is needed.

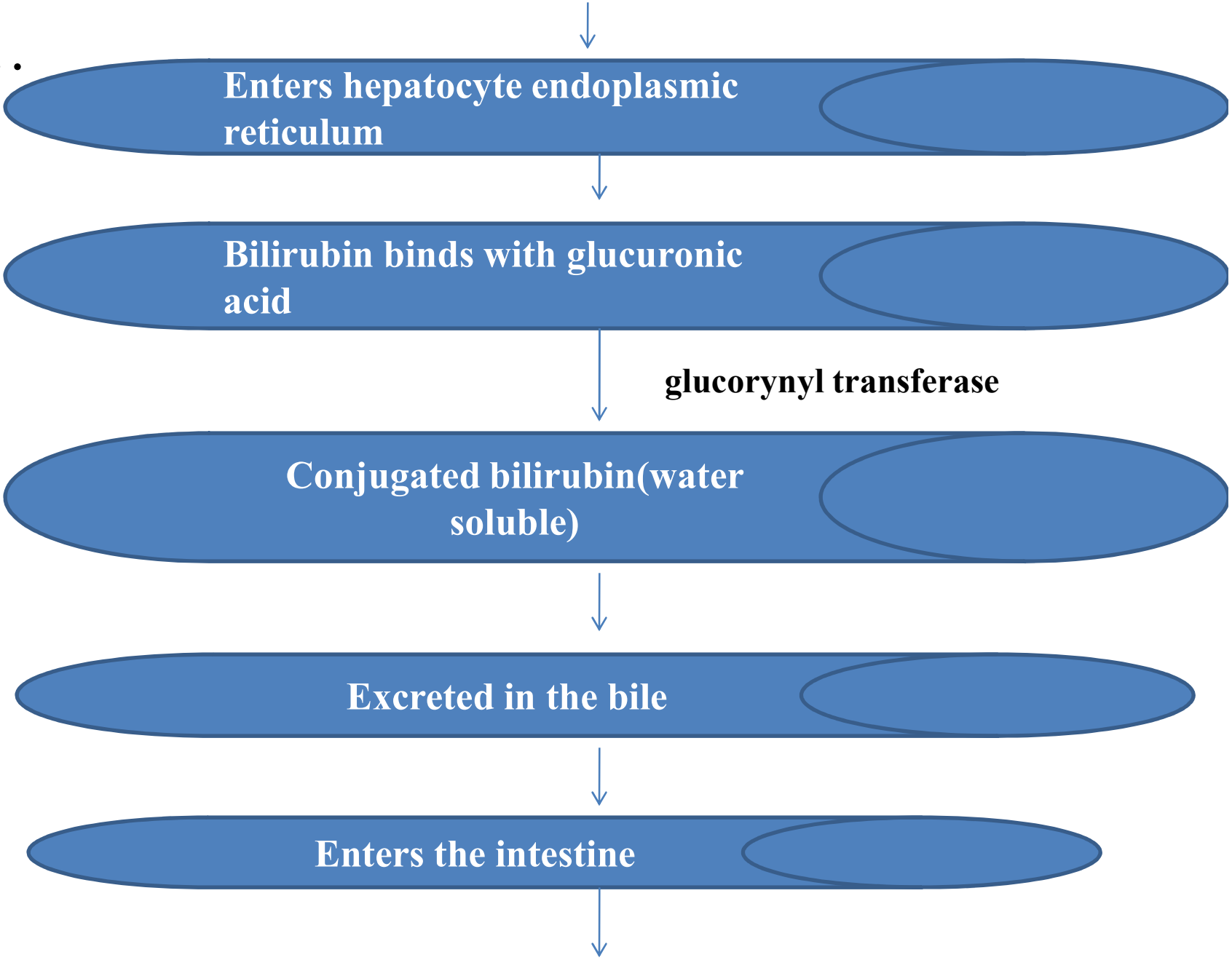
PHYSIOLOGY-

In reticuloendothelial system:

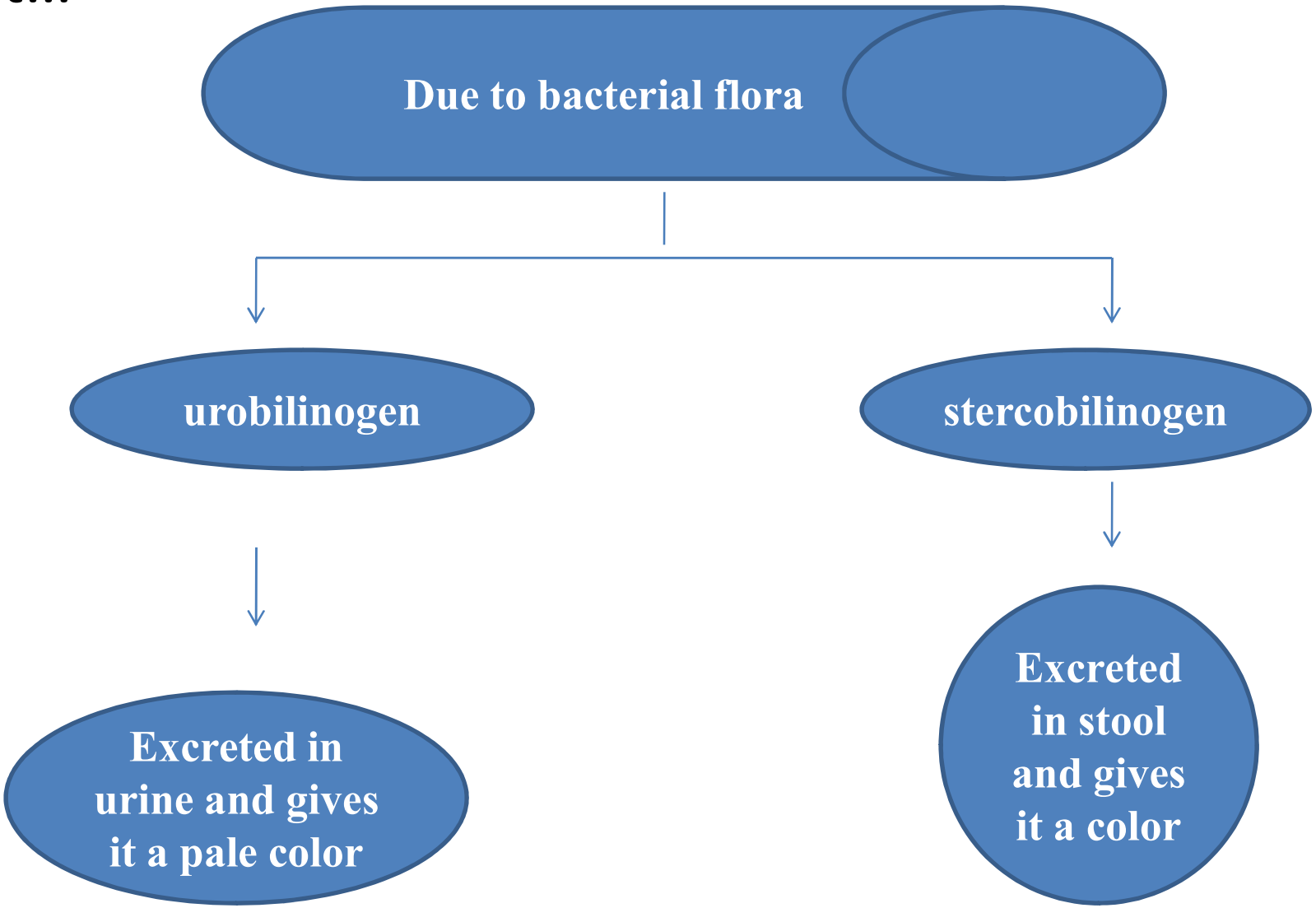



biliveridin
Unconjugated bilirubin (insoluble) & transferred in plasma
Binds to circulating albumin in plasma
Transported to liver parenchymal cells
Binds with ligandin (y-protein) to prevent backflow

Cont…


Enters hepatocyte endoplasmic reticulum
Bilirubin binds with glucuronic acid
glucorynyl transferase
Conjugated bilirubin(water soluble)
Excreted in the bile
Enters the intestine

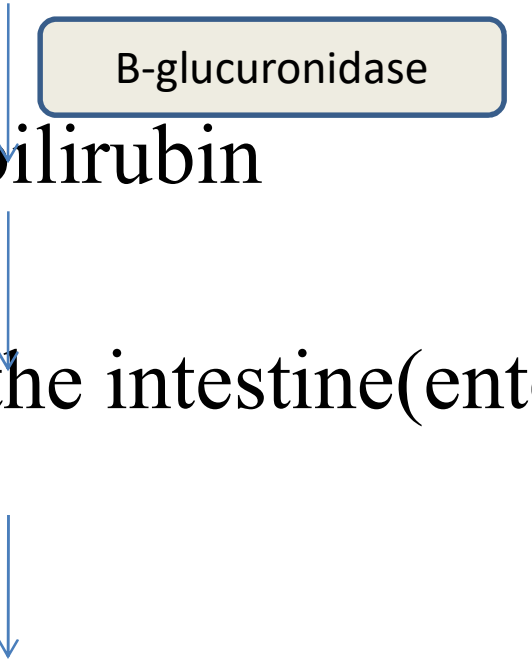
Cont…


Due to bacterial flora
urobilinogen
stercobilinogen
Excreted in urine and gives it a pale color
Excreted in stool and gives it a color

PATHOPHYSIOLOGY-

In newborn's intestine:

Conjugated bilirubin



Unconjugated bilirubin

Reabsorbed in the intestine(enterohepatic circulation)

Physiological jaundice

PATHOLOGICAL JAUNDICE

- Occurrence of jaundice within 24 hours of age is always pathological.
- It is due to Hemolytic Disease Of The Newborn (HDN) i.e incompatibility due Rh or ABO group.
- Despite deep jaundice the urine is colorless and does not stain the diaper because unconjugate bilirubin is lipid soluble & is not filtered in the urine.

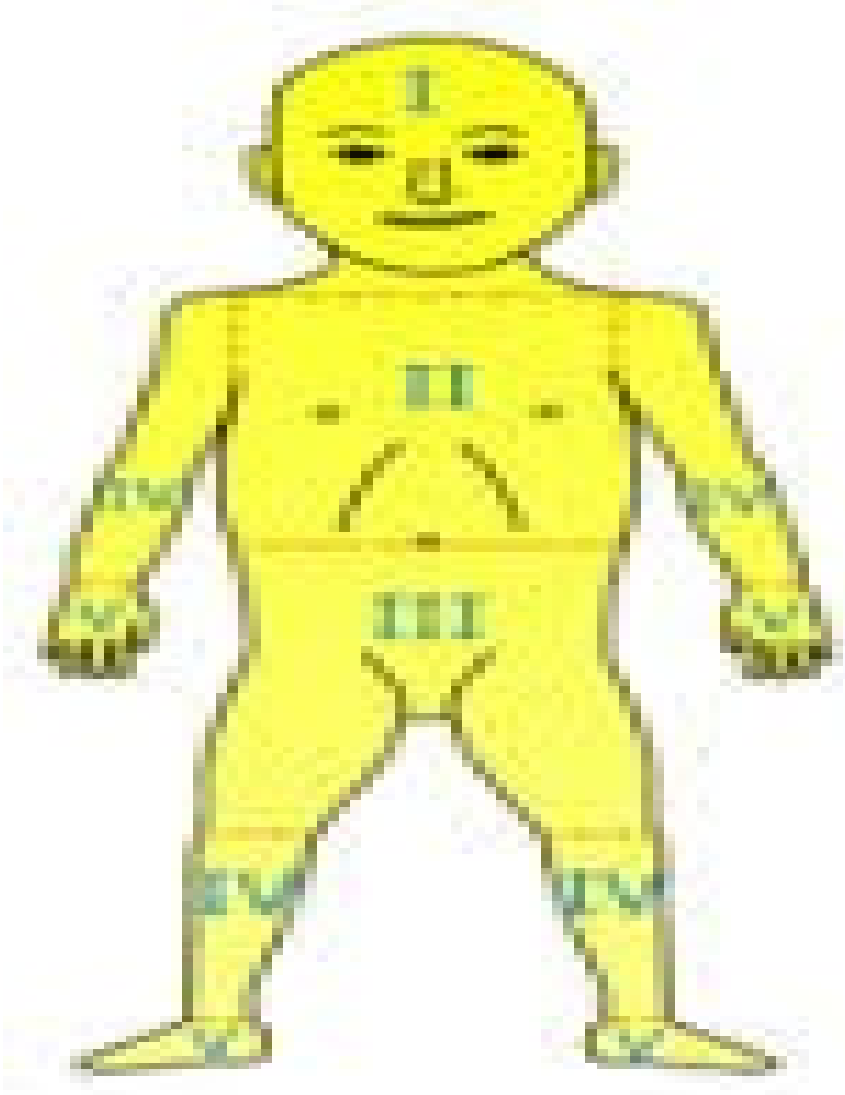
CLINICAL MANIFESTATIONS-

- Yellowish discoloration
- Pale stools
- Dark colored urine
- Hepatospleenomegaly
- Anemia
- Pallor

DIAGNOSTIC EVALUATION-

1. History
2. Physical examination
3. Laboratory test
4. Non-invasive assessment of jaundice

PHYSICAL EXAMINATION



SBR	MMOL/L
I	100
II	150
III	200
IV	250
V	>250

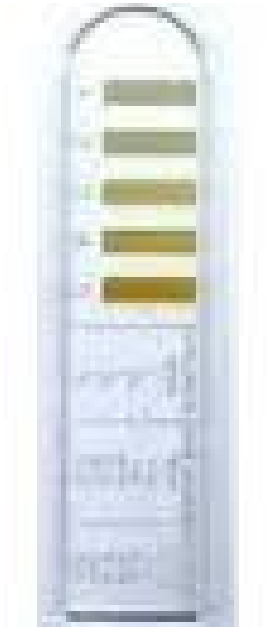
KRAMER'S RULE:

LABORATORY TEST:

- Blood group & Rh factor
- S.bilirubin level
- Hemoglobin
- S.albumin level
- GBP
- Direct coomb's test
- Blood culture
- G6PD deficiency
- LFT & TFTS
- Radiology- I.O.

NON-INVASIVE ASSESSMENT:

Ingram icterometer



Piece of transparent plastic, which is painted with 5 transverse strips of yellow lines.
It is pressed over the nose of the baby & the color of the blanched skin is matched with the appropriate yellow strip & the level of jaundice is assessed by the marked level of bilirubin.

Transcutaneous bilirubinometer

Measures the intensity of jaundice by reflecting light rays on the blanched skin.

MANAGEMENT-

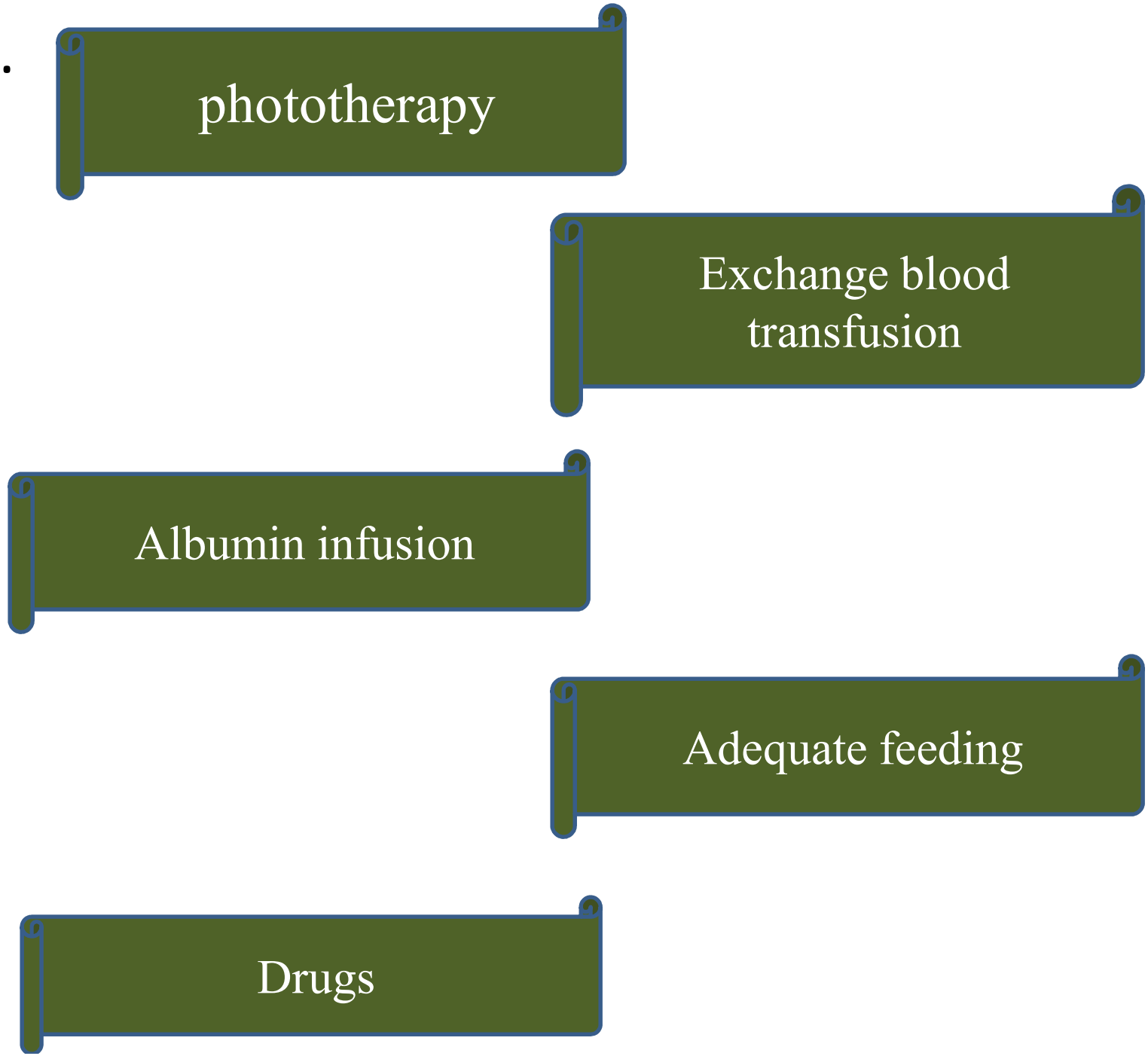
1. MEDICAL MANAGEMENT

The main aim of the treatment is:

- Decrease level of bilirubin
- Decrease the risk of complication related to jaundice.

Following are the treatment modalities for physiological jaundice:

Cont….

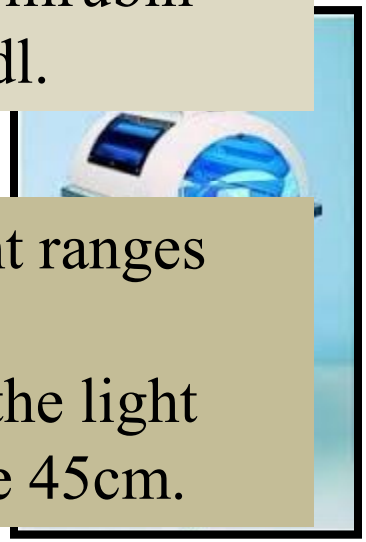

phototherapy
Exchange blood transfusion
Albumin infusion
Adequate feeding
Drugs

PHOTOTHERAPY

Degradation of unconjugated bilirubin by configurational isomerization , structural isomerization & photo-oxidation.

Light waves convert the toxic bilirubin into water soluble non toxic form.

It is recommended that phototherapy may be started early when serum bilirubin approaches 15 mg/dl.



Wavelength of light ranges from 420-600 nm.
Distance between the light and baby should be 45cm.

EXCHANGE BLOOD TRANSFUSION

It is done when phototherapy fails.

Pre-Procedure:

- It is done in strict aseptic technique by expert team members.
- Process is very slow and continued for an hour.
- The baby must be kept warm & well restraint.
- The stomach content should be aspirated.

- Baby's baseline vital signs must be checked.
- Blood should be brought from blood bank for transfusion.
- Prepare heparinized saline, calcium gluconate and soda-bi-carbonate.
- Arrange the following items near the baby:

- Sterile tray- drapes, bowls
- 10 ml dispovan-2
- Umbilical catheters or IV canula
- Blood transfusion set
- IV stand
- Cotton & gauze

- Stopcock 4 way or tri-way
- Tegaderm and micropore
- Extra 5 ml dispovan

During procedure:

✓Umbilical vein and artery are catherized or canulated in the periphery.

✓The blood is withdrawn with gentle suction & donor's blood is injected slowly in aliquots of 10 to 20 ml depending on the size of the baby.

✓This push and pull method can be repeated for 30 to 40 cycles with same amount of withdrawal and replacement.

- ✓ Accurate record of in & out amount of blood should be maintained.
- ✓ Calcium gluconate should be injected slowly after every 50 ml of exchange to prevent tetany, if CPD(citrate phosphate dextrose) blood is transfused.
- ✓ Sodium bicarbonate may be needed to prevent acidosis.

Post- procedure:

Post exchange care should include-

- Close monitoring of baby's condition
- Phototherapy
- Antibiotics
- warmth

- Routine essential care
- Bilirubin estimation
- Detect for complication
- Emotional support to parents.

ALBUMIN INFUSION

- Administered half to 1 hour before E.T., it facilitates effective removal of bilirubin and also improves the bilirubin binding capacity of the baby.
- It should be avoided in babies with CCF coz of risk of overloading of the circulation.

COMPLICATIONS-

- IN BRAIN:
  - Kernicterus
  - Mental retardation
  - Learning disabilities
  - Cerebral palsy
  - Sensory perceptual deafness
  - Visual-motor incoordination
- In liver:
  - Biliary atresia
  - Neonatal hepatitis

THANK YOU