Neonatal Sepsis

D AGEDO

Definition & Incidence

- Clinical syndrome of systemic illness accompanied by bacteremia occurring in the first month of life
- Incidence
  - 1-8/1000 live births
  - 13-27/1000 live births for infants < 1500g
- Mortality rate is 13-25%
  - Higher rates in premature infants and those with early fulminant disease

Early Onset

- First 5-7 days of life
- Usually multisystem illness with prominent respiratory symptoms (probably due to aspiration of infected amniotic fluid)
- High mortality rate
  - 5-20%
- Typically acquired during intrapartum period from maternal genital tract
  - Associated with maternal chorioamnionitis

Late Onset

- May occur as early as 5 days but is most common after the first week of life
- Less association with obstetric complications
- Usually have an identifiable focus
  - Most often meningitis or sepsis
- Acquired from maternal genital tract or human contact

Nosocomial sepsis

- Occurs in high-risk newborns & is related to
  - the underlying illness of the infant
  - the flora in the NBU/NICU environment
  - invasive monitoring
- Breaks in the barrier function of the skin and intestine allow for opportunistic infection

Causative organisms

- Primary sepsis
  - Group B streptococcus
  - Gram-negative enterics (esp. *E. coli*)
  - *Listeria monocytogenes, Staphylococcus*, other streptococci (entercocci), anaerobes, *H. flu*
- Nosocomial sepsis
  - Varies by nursery
  - *Staphylococcus epidermidis, Pseudomonas, Klebsiella, Serratia, Proteus*, and yeast are most common

Risk factors

- Prematurity and low birth weight
- Premature and prolonged rupture of membranes
- Maternal peripartum fever
- Amniotic fluid problems (i.e. mec, chorio)
- Resuscitation at birth, fetal distress
- Multiple gestation
- Invasive procedures
- Other factors: sex, race, variations in immune function, hand washing in the NICU

Clinical presentation

- Clinical signs and symptoms are nonspecific
- Differential diagnosis
  - RDS
  - Metabolic disease
  - Hematologic disease
  - CNS disease
  - Cardiac disease
  - Other infectious processes (i.e. TORCH)

Clinical presentation

- Temperature irregularity (high or low)
- Change in behavior
  - Lethargy, irritability, changes in tone
- Skin changes
  - Poor perfusion, mottling, cyanosis, pallor, petechiae, rashes, jaundice
- Feeding problems
  - Intolerance, vomiting, diarrhea, abdominal distension
- Cardiopulmonary
  - Tachypnea, grunting, flaring, retractions, apnea, tachycardia, hypotension
- Metabolic
  - Hypo or hyperglycemia, metabolic acidosis

Diagnosis

- Cultures
  - Blood
    - Confirms sepsis
    - 94% grow by 48 hours of age
  - Urine
    - Don’t need in infants <24 hours old because UTIs are exceedingly rare in this age group
  - CSF
    - Controversial
    - May be useful in clinically ill newborns or those with positive blood cultures

Adjunctive lab tests

- White blood cell count and differential
  - Neutropenia can be an ominous sign
  - I:T ratio > 0.2 is of good predictive value
  - Serial values can establish a trend
- Platelet count
  - Late sign and very nonspecific

  ESR rises late
- Other tests: bilirubin, glucose, electrolytes

Radiology

- CXR
  - Obtain in infants with respiratory symptoms
  - Difficult to distinguish GBS or *Listeria* pneumonia from uncomplicated RDS
- Renal ultrasound and/or VCUG in infants with accompanying UTI

Maternal studies

- Examination of the placenta and fetal membranes for evidence of chorioamnionitis

Management

- Antibiotics
  - Primary sepsis: ampicillin and gentamicin
  - Nosocomial sepsis: vancomycin and gentamicin or cefotaxime
  - Change treatment to specific antibiotics depending on culture sensitivity results

Supportive therapy

- Respiratory
  - Oxygen and ventilation as necessary
- Cardiovascular
  - Support blood pressure with volume expanders and/or pressors
- Hematologic
  - Treat DIC with FFP
- CNS
  - Treat seizures with phenobarbital
- Metabolic
  - Treat hypoglycemia/hyperglycemia and metabolic acidosis
  - Correct electrolyte imbalance

Gram+VE Beta haemolytic Staphyococci (GBS) Prophylaxis

- GBS is the most common cause of early-onset sepsis
  - 0.8-5.5/1000 live births
  - Fatality rate of 5-15%
- 10-30% of women are colonized in the vaginal and rectal areas
- Most mothers are screened at 35-37 weeks gestation
- If +ve commence mother on antibiotics

Characteristics of Neonatal Sepsis

	Early Onset <7 days	Late Onset ≥ 7 days to 3 months	Late, Late Onset >3 months
Intrapartum complications	Often present	Usually absent	Varies
Transmission	Vertical; organisms often acquired from mother's genital tract	Vertical or via postnatal environment	Usually postnatal environment
Clinical manifestations	Fulminant course, multisystem involvement, pneumonia	Insidious, focal infection, meningitis common	Insidious
Case-fatality rate	5 percent to 20 percent	5 percent	Low

- Maswali????

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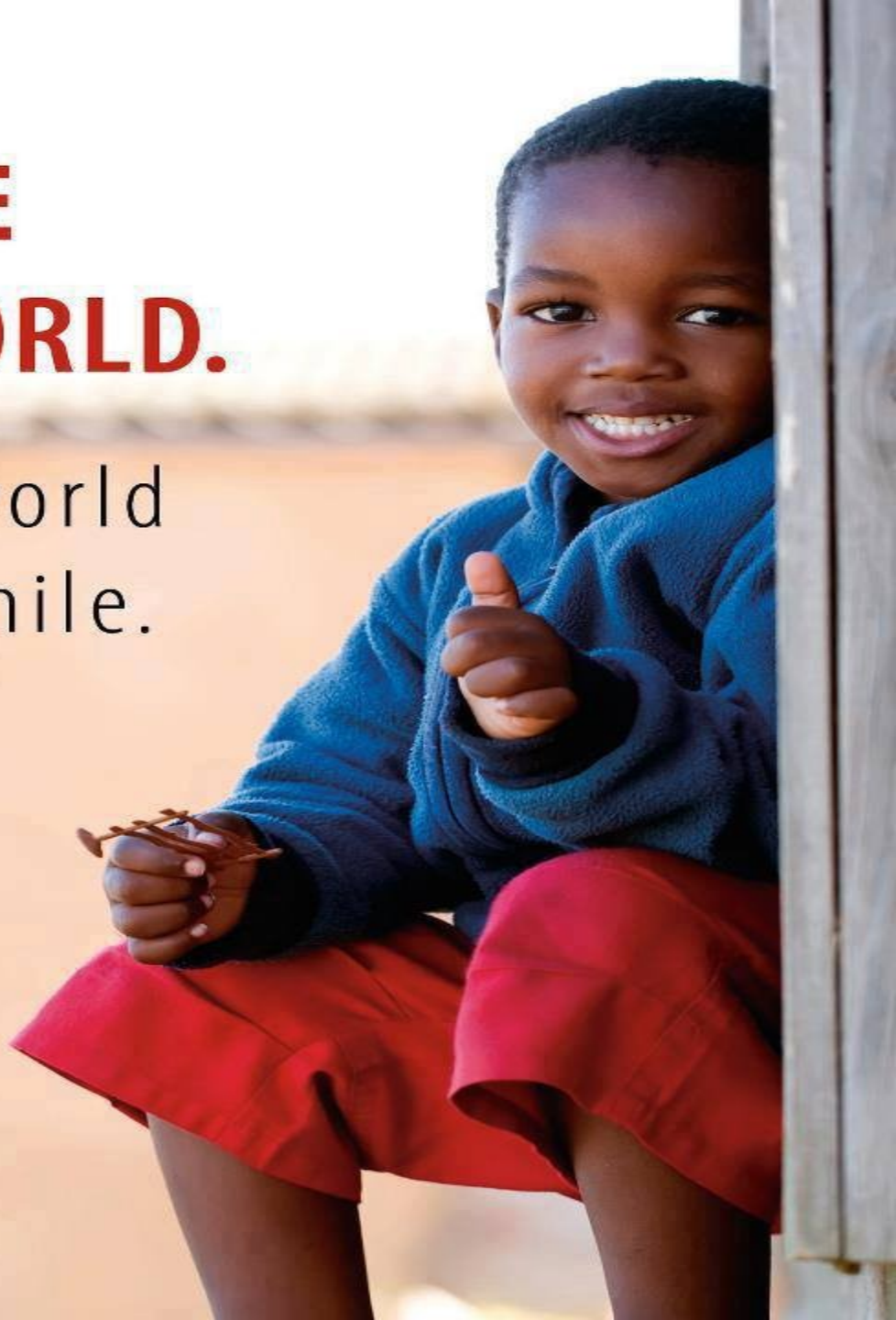

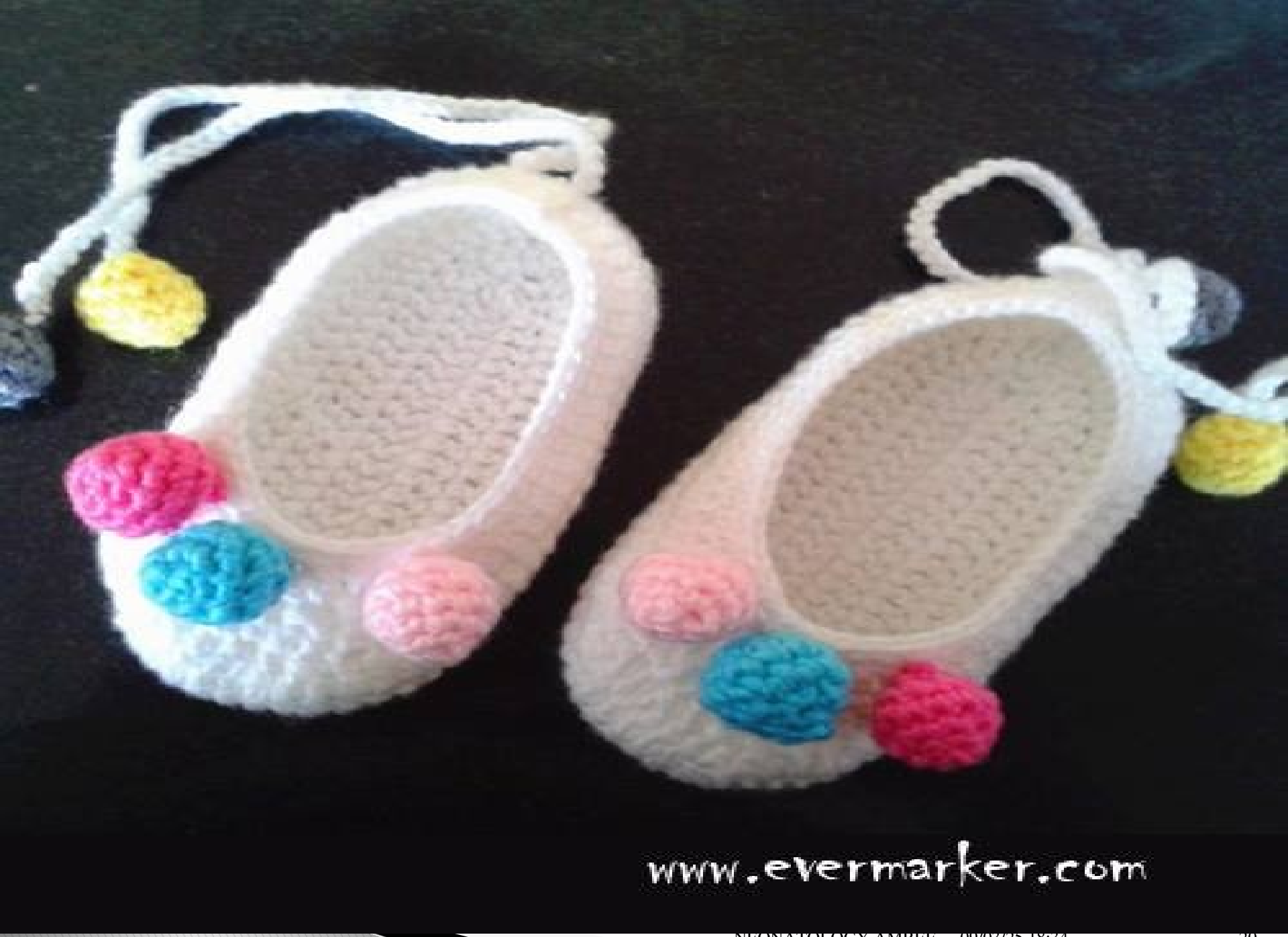
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