NEONATAL SEPSIS

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LEARNING OUTCOMES

- Define N. sepsis
- State the aetiology
- Outline the clinical manifestation
- Discuss the management
- State the prevention

DEFINITION & INCIDENCE

- Clinical syndrome of systemic illness accompanied by bacteremia occurring in the first 4weeks 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 fulminant 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

EARLY ONSET:

Infection occurring in the first 5 days
of life. Usually sets in within less than 72 hours of birth.

Exposure can occur:-

Before delivery = Infected amniotic fluid
= Untreated maternal sepsis

During delivery = Organisms in maternal genital tract

After delivery = Exposure to organisms in infants

Environment (Suction tubes; ambubags, resuscitoire, 0_2 masks)

- Early onset neonatal sepsis manifests frequently as pneumonia and less commonly as septicaemia or meningitis.

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
- Pathogenesis is related to
  - the underlying illness of the infant
  - the flora in the 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
- Galactosemia
- Other factors: sex, race, variations in immune function, hand washing in the NICU

CLINICAL PRESENTATION

- Clinical signs and symptoms are nonspecific are usually **VAGUE** and demand a **HIGH INDEX OF SUSPICION** for early diagnosis.

1. Respiratory distress in early onset neonatal sepsis
2. Altered feeding behavior in a well established feeding newborn (aspirate; vomiting etc)
3. Baby who was active/feeding suddenly or gradually becomes lethargic, inactive or unresponsive and refuses to suckle
4. Temperature instability

DDX

- 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

LAB TESTS

- White blood cell count and differential
  - Neutropenia can be an ominous sign
- Platelet count
  - Late sign and very nonspecific
- Acute phase reactants
  - CRP rises early, monitor serial values
  - ESR rises late
- Other tests: bilirubin, glucose, sodium

RADIOLOGY

- CXR
  - Obtain in infants with respiratory symptoms
  - Difficult to distinguish Group B Streptococci or *Listeria* pneumonia from uncomplicated RDS
- Renal ultrasound 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 based on culture sensitivities
  - Don’t forget to check levels

SUPPORTIVE THERAPY

- Respiratory
  - Oxygen and ventilation as necessary
- Cardiovascular
  - Support blood pressure with volume expanders and/or pressors
- Hematologic
  - Treat DIC with Fresh Frozen Plasma
- CNS
  - Treat seizures with phenobarbital
  - Watch for signs of Syndrome of Inappropriate ADH (decreased Urine Output, hyponatremia) and treat with fluid restriction
- Metabolic
  - Treat hypoglycemia/hyperglycemia and metabolic acidosis

GBS PROPHYLAXIS

- Group B Streptococcal 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

- **Prevention**
- Good antenatal care
- Maternal infections diagnosed early and treated adequately
- Babies should be breastfed EARLY (or fed exclusively on EBM). Avoid pre-lacteal feeds (Offers cover with maternal flora to baby)
- **VERY IMPORTANT** – Infection control policies applied in the unit.

PREVENTION

- Handling of neonates should be MINIMIZED

IV Cannular Insertion

- Wash hands aseptically
- Wear sterile (or clean) gloves
- Disinfect neonate's skin
- Use a no - touch technique

IV Therapy

- Aseptic technique should be observed during these procedures

- Skin care
- Cord should be cleaned/dried

Skin should be kept clean with warm water with or without mild soap

Maternal/Breast Milk

- EBM should be collected and stored aseptically
- Hands washed with an antiseptic and milk expressed into sterile containers.

QUESTIONS