

Neonatal Infections

Objectives

Completing this lecture will provide you a better understanding of Neonatal Sepsis:

What are the defense mechanisms in the newborn?

In which neonate I should suspect infection?

How can I diagnose and treat neonatal infections?

Case 1

36 hours old neonate was presented with respiratory distress ,his RR was 70/m , temp. 36.5, didn't feed for more than 6 hours

What is a possible cause?

What can you find positive points in history?

How can you confirm the diagnosis?

Case 2

25 years old primi mother came to delivery room after having labour pain , gestational age was 35 weeks, she delivered vaginally after 20 hours ROM ,the newborn was resuscitated by oxygen and suction , started feeding 2 hours later ,after 1 day he had developed dyspnea and tachypnea with lethargy --- what is a possible diagnosis ----what are risk factors?

Case 3

8 days old neonate was delivered vaginally , bottle fed, he was well until 1 day before presentation when he started to develop jaundice and poor feeding on examination he had abdominal distension and head was retracted back with bulging ant. Fontanel .

What is the diagnosis?

What could be positive as lab. Tests?

What is the etiology?

Role of immunity in infection

I- Non specific

Surface protection: The skin is softer & more easily damaged in neonates

Phagocytes & PMN:

Decreased opsonization

Neonates are less able to concentrate inflammatory cells at the site of infection.

Complement system (low)

II- Specific

Cellular immunity

Neonatal natural killer (NK) lymphocytes have decreased cytotoxic activity

humeral immunity (Immunoglobulins)

IgG crosses placenta by passive transfer from mother

IgA & IgM do not cross the placenta.

By 3 months of age, the infant begins to synthesize significant amount of IgG, A & M.

Infections in the newborn

1- Congenital:

May result in abortion, stillbirth, cong. malformations, IUGR, premature birth, acute disease in the neonatal period, or asymptomatic persistent infection with neurologic sequale later in life.

E.g. CMV, Rubella, Toxoplasma gondii, Treponema pallidum.

2- Acquired:

A- Perinatal (intrapartum or ascending)

Acquired just before or during delivery.

e.g. group B streptococci., E.coli.

B- Postnatal (postpartum or nosocomial)

Results from environmental exposure in the hospital or community.

Early-onset infection

In early-onset sepsis (<48 hours after birth), bacteria have ascended from the birth canal and invaded the amniotic fluid. The fetus is secondarily infected because the fetal lungs are in direct contact with infected amniotic fluid. These infants have pneumonia and secondary bacteraemia/septicaemia

Etiology -early-onset neonatal sepsis

- GBS
- E coli
- Coagulase-negative Staphylococcus
- H influenzae
- L monocytogenes

factors predispose to early-onset neonatal sepsis

- Low Apgar score (< 6 at 1 or 5 minutes)
- Maternal fever greater than 38°C
- Maternal urinary tract infection (UTI)
- Poor prenatal care
- Poor maternal nutrition
- Low socioeconomic status
- African American mother
- History of recurrent abortion
- Maternal substance abuse
- Low birth weight
- Difficult delivery
- Birth asphyxia
- Meconium staining
- Congenital anomalies

Late-onset neonatal sepsis

- Coagulase-negative staphylococci
- S aureus
- E coli
- Klebsiella

- Pseudomonas
- Enterobacter
- Candida
- GBS
- Serratia
- Acinetobacter
- Anaerobes

Risk factors for late onset sepsis

- Prematurity
- Central venous catheterization (duration >10 days)
- Nasal cannula or continuous positive airway pressure (CPAP) use

- H2 -receptor blocker or proton pump inhibitor (PPI) use
- GI tract pathology

Clinical features of neonatal sepsis

Fever or temperature instability or hypothermia

- Poor feeding
- Vomiting
- Apnoea and bradycardia
- Respiratory distress
- Abdominal distension
- Jaundice
- Neutropenia

Clinical features of neonatal sepsis

- Hypoglycaemia/hyperglycaemia

- Shock
- Irritability
- Seizures
- Lethargy, drowsiness

In meningitis:

- tense or bulging fontanelle
- head retraction (opisthotonos)

Diagnosis:

Maternal history

Recovery of etiologic agent from body fluids or tissues

PCR

Procalcitonin

Coagulation studies

Lumbar Puncture and CSF Analysis

CBC:

Leucocytes count: < 5,000/ cm, immature cells or band cells > 20%, toxic granulations.

Thrombocytopenia

Elevated ESR & CRP

Ag. Detection (latex agglutination test)

Differential diagnosis

Asphyxia

Aspiration pneumonia

Hypoglycaemia

ICH

Severe anemia

CHD, myocarditis

Treatment:

Initial therapy

Ampicillin (100-200 mg/kg) + Gentamicin (5-7.5 mg/kg)

3rd generation cephalosporins.

When staph. infection is suspected treatment is initiated with methicillin or cloxacilin + gentamicin.

Once results of culture are obtained, select the most appropriate drug.

Treatment is continued for 10 -14 days in sepsis, 14-21 days in meningitis.

Supportive therapy

Monitoring fluid balance, regular weighing, temp. control.

Management of fluid & electrolyte disturbances.

Fresh blood transfusion or FFP

Adequate oxygenation of tissues.

Monitoring of hyperbilirubinemia.

Investigational Therapies:

- Granulocyte transfusion
- IVIg infusion
- Exchange transfusion
- Recombinant cytokine administration