Why is it important?

8% of preterm babies with respiratory distress are infected, 25% of NICU admissions are due to or develop infections, and 30% of preterm babies with “bacteraemia” will have meningitis.

There is very little scientific evidence to guide treatment for or prophylaxis of neonatal bacterial infections. Babies get bacteria from their mothers perinatally, or from healthworkers postnatally. It is important to identify:

- babies at risk for acquiring an infection
- babies already with an infection
- the extent of the infection (i.e. does the infection include meningitis, is the Systemic Inflammatory Response Syndrome / SIRS already established?)

If you put a baby onto antibiotics, then you think that the baby is at risk for and has already acquired a bacterium. And therefore you must manage accordingly.

What causes sepsis neonatorum?

Host
Babies have immature, undeveloped defences, and with decreasing gestational age defence systems become even weaker.

Organisms
a. Primary
Group B streptococcus, E.coli, listeria, staphylococcus aureus, other streptococci, haemophilis, anaerobes etc.

b. Nosocomial
Staphylococcus epidermidis, klebsiella, pseudomonas, MRSA, etc.

Carriers
If a baby is born without a bacterium, and later acquires one, it has been transmitted via hands. Organisms on mother’s hands are usually important for normal colonisation of baby (unless she’s picked it up in the hospital). Organisms on healthworkers hands are lethal.

WASH YOUR HANDS

How to suspect SN?

You must know the risk factors…

Maternal risk factors
In order of importance:
1) Group B streptococcus (GBS) colonisation
2) Chorio-amnionitis
3) P(P)ROM
4) Maternal pyrexia (> 38.0º C) during labour

It is rare in state hospitals to know whether or not the mother is colonised with GBS

It is important, in the presence of maternal risk factors, to establish whether or not baby was “pretreated” with antibiotics. If mother received antibiotics ≥ 4 hours prior to delivery, this is considered pretreated.

Neonatal risk factors
Preterm (< 34/40), low birth weight (< 2kg)

And you must know the clinical features…

When it’s obvious, it’s easy…
“Collapse”, shock, purpura, coma etc

When it’s subtle, it’s not…
“Handles poorly”, apnoea, lethargy, O₂ requirement, respiratory distress, not feeding so well, a little abdominal distension, low birthweight, etc.
What then?

1) **Confirm the “sepsis” diagnosis**
   - Do a septic workup

2) **Start intravenous antibiotics**
   - GENTAMICIN 5mg/kg/dose 24H and BENZYL PENICILLIN (penicillin G) 50 000 units/kg/dose 12H or AMPICILLIN 50mg/kg/dose 12H

3) **Assess how sick the baby is**
   - Clinical, FBC, ABG

**What is a “septic workup”?**

1) **Blood culture**
   - Finds the organism

2) **CSF analysis**
   - Determines duration of antibiotics, and long term follow up.

   **If baby is too sick or unstable, the LP can be delayed. However, for managing the “sepsis neonatorum” problem, the earlier it is done the better.**

3) **Urine analysis**
   - Bag and dipstix is an unreliable screen, especially in the first 24 hours. A negative dipstix for white cells and nitrates does not exclude a UTI. A positive dipstix for WC’s and/or nitrites should be followed by a suprapubic aspirate for formal M, C&S.

**What about the FBC?**

No parameter in the full blood count is a good predictor of the presence of infections in babies, especially in the first 24 hours.

**If baby is too sick or unstable, the LP can be delayed. However, for managing the “sepsis neonatorum” problem, the earlier it is done the better.**

Sensitivity for the absolute WCC picking up infection is **only** 44%.

The full blood count is useful for determining how sick baby is. If the WC (< 5) and/or platelet (< 50) counts are low, and infection is present, then the infection is likely to be advanced.

**What about the CSF?**

The risk for having meningitis starts climbing when the total CSF white cell count starts climbing from 8. Most neonatologists use a “cut-off” of 20, above which meningitis is extremely likely.

**A CSF white cell count below 20 does not exclude meningitis**

If CSF suggests meningitis, change antibiotics to CEFOTAXIME 100mg/kg/dose 12H (and AMPICILLIN 100mg/kg/dose 12H). Treat for 14 days for gram positive organisms, and for 21 days for gram negative organisms.

**What are the markers of severity?**

It is important not only to determine the presence or absence of infection, but also to assess how sick baby is, and this will assist with deciding on the appropriate place of management.

The following clinical markers indicate severity:

- **Immaturity:** the more preterm the more at risk - refer according to “Referral Criteria for Sick Neonates” guideline
- **Apnoea:** refer if apnoea persists after standard apnoea prophylaxis and treatment (“Neonatal Apnoea” guideline)
- **Respiratory failure** (any cause): refer according to “Respiratory Distress” guideline
- **Necrotising enterocolitis (NEC):** refer all cases once baby’s condition is stabilised

The following laboratory markers indicate severity:

- **Acidosis** (as indicated by a low bicarbonate on a standard U&E printout, or on a formal Acid-Base assay) There are three big causes of acidosis in babies:
  1) Hypoxia (peri and post natal)
  2) Shock
  3) Dead tissue (typically NEC)
  Hypoxia and shock must always be corrected prior to transfer.
- **Neutropaenia, thrombocytopenia** (see above)

By getting the basics right, and picking up and managing “Sepsis Neonatorum” early, you will make this common neonatal problem less difficult for you to handle, and less deadly for the babies you look after.