Jaundice, anaemia and sepsis in the newborn
Danger signs in a neonate:

- Twitching
- Fast breathing >60 bpm
- Severe chest indrawing
- Nasal flaring
- Grunting
- Irregular respirations
- Bulging fontanelle
- Umbilical redness extending to the skin
- Temp >37.5 oC or <35.5 oC
- Irritability / lethargy
- Jaundice <24 hours or >14 days in a term baby or > 21 days in a premature baby
Jaundice

• Common problem
• Jaundice in 1st 24 hours
• Jaundice after 24 hours of age
• Prolonged jaundice:
  – > 14 days in term infants
  – >21 days in preterm infants
Jaundice

• Detection:
  – Yellow sclera
  – Pressure on nose
  – Proportional to level of jaundice
    • Any jaundice detectable >90 micromoles/L
    • Jaundice head and neck 70 – 130 micromoles/L
    • Trunk, elbows, knees 190 – 310 micromol/L
    • Hands and feet >300 micromoles/L
Jaundice at <24 hours

- ALWAYS PATHOLOGICAL
- Sepsis/ congenital infection
- Immune haemolysis
  - Rhesus disease, ABO incompatibility
- Non- immune haemolysis
  - G6PD, congenital spherocytosis
Jaundice at <24 hours

• Screen for infection
  – Blood culture and LP +/- urine
  – Maternal VDRL
• Start antibiotics
• Screen for haemolysis
  – PCV or FBC
  – Blood film
  – (enzyme test for G6PD)
• Start phototherapy
Jaundice day 2 – 14

• Common (65% newborns)
• Often physiological
  – Hepatic immaturity in bilirubin uptake and conjugation.
  – Excessive removal and destruction of fetal red cells (lifespan=60 days at term, 40 days if preterm)
  – Low plasma albumin (unconjugated bilirubin left unbound)
  – Absence of bowel flora impeding bile pigment elimination
  – Poor fluid intake
Jaundice day 2 – 14

• Other causes:
• Excess bilirubin production:
  – Bruising, cephalohaematoma, DIC, ingestion of maternal blood, polycythaemia (delayed cord clamping increases incidence of significant jaundice to over 30%)
• Infection:
  – Sepsis
    • Increased RBC destruction, decreased liver function, slow GI transit time
  – Congenital e.g. syphilis, CMV, rubella, toxoplasmosis
Jaundice day 2 – 14

• Are there any danger signs suggesting sepsis – if yes screen + treat for sepsis
• Feeding history – increase frequency of breast feeds.
• Start phototherapy if:
  – Term:
    • Bilirubin > 275 or involving hands and feet
  – Preterm:
    • Bilirubin > 100 X bwt (kg) or involving trunk/ elbows and knees
Kernicterus
(bilirubin encephalopathy)

- If bilirubin > around 350 (or less in preterms) more commonly >500.
- Stage 1: sleepy, reduced suck, lethargy
- Stage 2: increased temp, restless, lid retraction, odd mouth movements, seizures, shrill high pitched cry, opisthotonos
- Stage 3: death or latent period
- Stage 4: cerebral palsy (esp athetoid), deafness, reduced IQ.
Kernicterus
(bilirubin encephalopathy)

• Risk Factors include:
  – Preterm
  – Rapidly rising bilirubin levels
  – Low albumin (less for bilirubin to bind to)
  – Any illness disrupting the blood brain barrier:
    • Hypoxia, hypoglycaemia, sepsis…

• Prevention:
  – Intensive phototherapy (start early)
  – Exchange transfusion
Prolonged jaundice

- > 14 days in term infants
- >21 days in preterm infants
Prolonged jaundice

• Persistence of acute neonatal causes:
  – Haemolytic
  – Chronic low grade infection:
    • Bacterial, syphilis, viral, TB, malaria

• Increased enterohepatic circulation:
  – Intestinal obstruction, pyloric stenosis, Hirschprung’s disease, meconium ileus, underfeeding, breast milk jaundice

• Rare unconjugated causes:
  – Galactosaemia, hypothyroidism, intestinal obstruction, drugs, crigler-najjar, gilbert’s, CF
Prolonged jaundice - conjugated

- Clinically
- Causes:
  - Neonatal hepatitis
    - Congenital infections, metabolic causes
  - Abnormalities of excretion of bilirubin by hepatocyte
    - Dubin-johnson, Rotor syndromes
  - Non- neonatal hepatitis
    - Infections, drugs, autoimmune
  - Intrahepatic cholestasis
    - Alagille’s
  - Extrahepatic cholestasis
    - Biliary atresia, choledochal cyst
Bleeding or pallor in neonates
Bleeding or pallor in neonates

- **Possible causes**
  - Active bleeding e.g. poorly clamped umbilicus, subaponeurotic bleed, intraventricular haemorrhage.
  - Coagulopathy e.g. DIC (in very sick baby), bleeding disorder, congenital/TORCH infection.
  - Ante/peripartum fetal haemorrhage
  - Twin to twin transfusion.
  - Haemorrhagic disease of the newborn.
  - Haemolysis - if jaundiced and pale
Case 1

- Preterm ~ 31/40
- Compound presentation – difficult delivery
- Marked bruising and grade 4 intraventricular haemorrhage
Case 2 – Day 1 preterm twins.
Term twins day 1
2.6kg and 1.7kg
PCV=65% and 40%
Case 3 – 34/40.
PCV= 29%, weight=1.3kg.

No VDRL in pregnancy.
Case 4

- 36/40 gestation
- Birthweight = 2.4kg
- Mum VDRL positive
- Not treated antenatally
Case history

- FZ
- Gravida 4 para 3
- Uneventful pregnancy up to 34/40
- HIV not tested
- VDRL – not tested
- At 34/40 developed fever and given treatment at health centre? What – proceeded into preterm labour at around 34/40
Case 5

- SVD live born male infant at Mdeka h/centre
- Birthweight 2000g
- Apgar score 4/10 and 8/10
- Transferred to QECH due to prematurity
Case 5

- Noted 2cm splenomegaly, 1cm hepatomegaly
- ‘puffy feet’
- ? Congenital syphilis
- Start Xpen
- Check RPR baby = positive
- Received 10 days X-Pen
- Xray taken day 9
Osteochondritis
Congenital syphilis

- 4 – 10% of antenatal attenders in Malawi have active syphilis infection (often not detected antenatally)
- Active syphilis increases the risk of low birthweight, premature delivery and stillbirth
- Over half of all infants born to mothers with primary or secondary syphilis will be infected.
- Maternal syphilis infection is also associated with an increased risk of in-utero mother-to-child transmission in HIV
- Antenatally syphilis is readily treated with benzathine penicillin (ideally before the 3rd trimester)
Presentations of congenital syphilis
At birth

• Diagnosis of congenital syphilis is difficult.
• More than half of all infected babies will be asymptomatic at birth
• Symptomatic infants signs may be subtle and non-specific:
  – Fever, jaundice, anaemia, thrombocytopenia, rash, hepatosplenomegaly, osteochondritis, non-immune hydrops fetalis, IUGR, generalised lymphadenopathy, pneumonitis
Presentations of congenital syphilis
At birth

- Definitive diagnosis depends on identifying organisms in body fluid or tissue by darkfield microscopy, immunofluorescence, or histological examination

- WHO recommends that in developing countries all infants with suspected clinical syphilis or with a mum who is VDRL positive and wasn’t adequately treated antenatally are treated.
Bullous lesions, rashes
Presentations of congenital syphilis at 1 – 3 months of age

• Classic triad:
  – Snuffles (haemorrhagic rhinitis)
  – palmar and plantar bullae
  – Splenomegaly

• May also show any of the features from birth
Presentations of congenital syphilis
In later infancy

• Dentition:
  – Hutchinson’s teeth, mulberry molars

• Eye:
  – Interstitial keratitis, healed chorioretinitis, glaucoma (2 to uveitis), corneal scarring

• Ear:
  – 8th nerve deafness

• Nose and face:
  – Saddle shaped nose

• Skin:
  – Rhagades (linear scars around mouth and anus)
Presentations of congenital syphilis
In later infancy

• Central nervous system:
  – Mental retardation, arrested hydrocephalus, epilepsy, optic nerve atrophy, juvenile general paresis, cranial nerve palsies

• Bones and joints (rare):
  – Secondary to periosteal reactions:
    • Saber shins, frontal bossing
Bleeding or pallor in neonates

- **Important points in history**
  - Any history of ante/ peri partum haemorrhage.

- **Important points in examination**
  - Airway, Breathing and Circulation – is there evidence of shock (fast heart rate, cool peripheries, slow capillary refill time)
  - Pallor
  - Any obvious source of active bleeding (including umbilicus, subaponeurotic bleed)
  - Any petechial (pinpoint) rash.
Bleeding or pallor in neonates

**Relevant investigations**

- PCV (may be normal initially due to haemoconcentration)
- Consider cross match.
- Consider FBC if suspect congenital infection or platelet problem.
- If septic / unwell blood culture.
- If no obvious cause consider cranial ultrasound scan
- Maternal VDRL
Bleeding or pallor in neonates

Treatment

– Resuscitate baby following ABC principles.
– If shocked give 20ml / kg IV fluid bolus.
– Stop cause if possible
– Give vitamin K 1mg IM (IV if coagulaopthy suspected and avoid further IM injections)
– Consider blood transfusion if:
  • Anaemia within 24 hours of birth PCV <36%
  • Chronic O2 dependency PCV <30%
  • Late anaemia, stable patient PCV <25%
– Volumes - 15ml / kg packed cells or 25ml / kg whole blood over 4 hours.
Sepsis in the neonate

Important points in the history:

- Poor feeding
- Fever
- Irritability or lethargy
- Vomiting
- Seizures/ twitching
- Breathing difficulties

Risk factors for sepsis:

- Prolonged rupture of membranes >18 hours
- Maternal fever >38°C
- Offensive liquor
- Mother being treated with antibiotics for infection
- Prematurity or small for gestational age
- Skin abrasions from a traumatic delivery
Sepsis in the neonate

Important points in the exam:

- **General** – does not look well, off colour, fever/ hypothermia, jaundice
- **CNS** – lethargic, irritable, high pitched cry, jittery, hypotonia, convulsions, bulging fontanelle
- **Respiratory** – apnoea, tachypnoea, cyanosis, grunting, respiratory distress
- **Gastrointestinal tract** – poor feeding, vomiting, diarrhoea, abdominal distension, hepatosplenomegaly, erythema of abdominal wall
- **Musculoskeletal** – joint swelling, pain on moving a joint.
- **Cardiovascular** – pallor, prolonged capillary refill, brady or tachycardia, cold clammy skin, hypotension, oedema
- **Skin** – spots, erythema, petechiae/ purpura, pustules, periumbilical infection (indicated by a purulent discharge +/- erythema)
Common pathogens in neonates at QECH:

- Gram positive organisms
  - Group B strep – 16%
  - Staph aureus – 15%
  - Strep pneumonia – 6%
  - Group A strep – 4%
  - Others – 13%

- Gram negative organisms
  - Non-typhi salmonella – 5%
  - E.Coli – 11%
  - Klebsiella – 11%
  - Others – 19%
Sepsis in the neonate

Relevant investigations:

– Blood sugar if irritable, lethargic, poor feeding, vomiting, weight<2.5kg, fits or twitching

– Blood culture

– Lumbar puncture
  • In any symptomatic baby (irritability, lethargy, bulging fontanelle, seizures)
  • ideally before commencing antibiotics

– Measure head circumference if meningitis is suspected
Sepsis in the neonate

Treatment:

- Administer oxygen if breathing difficulty or cyanosis
- Treat hypoglycaemia if present
- Antibiotics (1st line):
  - Penicillin (Xpen) 50,000 IU/kg IM or IV -
    - bd if <7 days of age, tds if >7 days of age, qds if meningitis
  - And Gentamicin 5mg/kg IM or IV OD
  - For a minimum of 5 days
- If there is a strong suspicion that the infection is staphylococcal in origin (e.g. Staph scaled skin syndrome or breast abscess) add:
  - flucloxacillin 50mg/kg
- Paracetamol can be considered if temperature >39°C and infant distressed. Avoid in premature infants.
- Consider giving any unwell neonate 1mg IM vitamin K.