Recognising and managing neonatal infection

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Early-onset neonatal infection is a significant cause of mortality and morbidity in newborn babies. A term often used interchangeably with infection, 'sepsis' is a rare but serious complication defined as life-threatening organ dysfunction due to a dysregulated host response to infection (National Institute for Health and Care Excellence (NICE), 2016). Without quick treatment, sepsis can lead to serious complications including in the worst instance, organ failure and potential risk of death. It is imperative therefore that midwives are able to identify potential risk factors and recognise the signs of infection in the newborn baby as early as possible so that appropriate management is undertaken and complications are avoided. The most recent NICE guidance (2012) covers prevention of infection within 72 hours of birth in healthy babies, which will be the focus of the following discussion.

Assessment for signs of infection in the newborn

Thorough clinical assessment for early-onset neonatal infection is an ongoing process that should begin before the baby is born and continuing until 72 hours after birth. It includes identifying whether there are any risk factors or clinical markers for infection and performing a physical examination of the baby including an assessment of the vital signs if any are identified. Risk factors and clinical signs of infection are outlined in Tables 1 and 2 identifying 'red flags' for areas with a high level of concern.

Table 1: Risk factors for infection in the newborn
(adapted from NICE, 2012)

- Group B streptococcal infection in a previous baby
- Maternal group B streptococcal infection in the current pregnancy
- Prelabour rupture of membranes
- Suspected or confirmed rupture of membranes > 18 hours in a preterm birth
- Premature birth, before 37 weeks' gestation
- Maternal fever higher than 38°C, or chorioamnionitis (confirmed or suspected)

Red flags

- Antibiotic treatment given to the woman for confirmed or suspected invasive bacterial infection at any time during labour, or in the 24-hour periods before and after the birth.
- Suspected or confirmed infection in a multiple pregnancy, in the other baby.

Table 2: Signs of Infection in the baby

(adapted from NICE, 2012)

- Changes in behaviour or responsiveness
- Hypotonia
- Feeding difficulties and/or feed intolerance, including vomiting, excessive gastric aspirates and abdominal distension
- Changes to vital signs for example, abnormal heart rate (bradycardia or tachycardia)
- Signs of respiratory distress such as tachypnoea, chest recession, nasal flaring, grunting, apnoea
- Hypoxia shown as central cyanosis or reduced oxygen saturation levels
- Early onset jaundice (within 24 hours of birth)
- Signs of neonatal encephalopathy such as reduced level of consciousness and difficulty initiating and maintaining respiration.
- The need for cardiopulmonary resuscitation
- The need for mechanical ventilation in a preterm baby
- Persistent fetal circulation, known as 'persistent pulmonary hypertension'
- Temperature instability (lower than 36°C or higher than 38°C) not caused by environmental factors
- Unexplained bleeding, thrombocytopenia, or abnormal blood coagulation.
- Reduced urine output
- Altered glucose homeostasis (hypoglycaemia or hyperglycaemia)
- Metabolic acidosis (base deficit of 10 mmol/litre or greater)
- Local signs of infection (for example, skin or eye).

Red Flags

- Respiratory distress (see above) starting more than 4 hours after birth
- Seizures
- The need for mechanical ventilation in a term baby
- Signs of shock (as cool, pale skin, poor peripheral perfusion, prolonged capillary refill time)

Management of the baby with potential or actual infection

During labour, any risk factors (Table 1) should be identified and any new risk factors monitored, such as fever or the development of chorioamnionitis. Prelabour rupture of membranes at term should be managed according to the recommendations in the Intrapartum care NICE guideline 55.

After birth, if there are any risk factors for infection or any clinical markers (Table 2), a careful assessment should be performed including vital signs (heart rate, pulse, respiratory rate, saturation levels). The maternal and neonatal history should also be reviewed.

In babies with any red flags, investigations should be undertaken which include blood culture and C-reactive protein. Antibiotic treatment should be started without delay while waiting for the test results.

In babies with no red flags and only one risk factor or clinical marker, it may be considered safe to withhold antibiotics and to monitor the baby's vital signs and clinical condition. It is recommended, if monitoring is required, to continue for at least 12 hours (at 0, 1 and 2 hours and then 2-hourly for 10 hours) (NICE, 2012).

In babies being monitored, if clinical concern increases, necessary investigations and antibiotics may then be considered. If no further concerns arise during the period of observation, the family can be reassured. However, if a baby needs antibiotic treatment, it should be given as soon as possible within an hour of the decision to treat.

Specific cases should be managed according to the respective guidelines; for example, suspected bacterial meningitis and urinary tract infection in children (NICE clinical guideline 102 and 54) unless the baby is already receiving care in a neonatal unit.

Routine postnatal care according to the NICE clinical guideline 37 should be continued for babies without risk factors or clinical indicators of possible infection.

Prior to discharge, if there have been any concerns about early-onset neonatal infection, parents should be advised that they should seek medical advice from their general practice or an accident and emergency department. Such concerns may be that the baby is showing abnormal behaviour such as inconsolable crying, listlessness, floppiness, has developed difficulties with feeding, has an abnormal temperature, rapid breathing, or has a change in skin colour. When the baby is discharged from the hospital or midwifery-led unit or in the immediate postnatal period in the case of babies born at home, parents and the baby's GP should be informed if the baby is considered to be at increased risk of infection.

Specific advice will be required in the case of group B streptococcal infection. The woman will be advised that if she becomes pregnant again, there will be an increased risk of early-onset neonatal infection and she should inform her maternity care team that a previous baby has had this type of infection.

If a baby has been treated for suspected or confirmed early-onset infection: the parents should be informed about potential long-term effects of the baby's illness and likely patterns of recovery. If no problems are anticipated, reassurance is necessary and any parent concerns addressed when providing information and planning follow-up.

References

National Institute for Health and Care Excellence. (2012). *Neonatal infection (early onset): antibiotics for prevention and treatment.* nice.org.uk/guidance/cg149

National Institute for Health and Care Excellence. (2016). *Sepsis: recognition, diagnosis and early management*. nice.org.uk/guidance/ng51