NATIONAL INSTITUTE FOR HEALTH AND CLINICAL EXCELLENCE

SCOPE

1 Guideline title

Neonatal jaundice

1.1 Short title

Neonatal jaundice

2 Background

a) The National Institute for Health and Clinical Excellence ('NICE' or 'the Institute') has commissioned the National Collaborating Centre for Women's and Children's Health to develop a clinical guideline on the recognition and treatment of infants with neonatal jaundice for use in the NHS in England and Wales. This follows referral of the topic by the Department of Health (see appendix). The guideline will provide recommendations for good practice that are based on the best available evidence of clinical and cost effectiveness.

b) The Institute's clinical guidelines support the implementation of National Service Frameworks (NSFs) in aspects of care for which a Framework has been published. The statements in each NSF reflect the evidence that was used at the time the Framework was prepared. The clinical guidelines and technology appraisals published by NICE after an NSF has been issued will have the effect of updating the Framework.

c) NICE clinical guidelines support the role of healthcare professionals in providing care in partnership with patients, taking account of their individual needs and preferences, and ensuring that patients (and their carers and families, if appropriate) can make informed decisions about their care and treatment.

3 Clinical need for the guideline

a) Jaundice is one of the most common conditions requiring medical attention in newborn babies. Approximately 60% of term and 80% of preterm babies develop jaundice in the 1st week of life, and about 10% of breast fed babies are still jaundiced at 1 month of age. In most infants with jaundice there is no underlying disease, and this early jaundice (termed ‘physiological jaundice’) is generally harmless.

b) Neonatal jaundice refers to the yellow colouration of the skin and the sclera of newborn babies that result from accumulation of bilirubin in the skin and mucous membranes. This is associated with a raised level of bilirubin in the body, a condition known as hyperbilirubinaemia.

c) Bilirubin is a breakdown product of the red cells in the blood. Red cell breakdown produces unconjugated (or ‘indirect’) bilirubin, which is partly bound to albumin. Normally this is metabolised in the liver to produce conjugated (or ‘direct’) bilirubin, which then circulates through the gut and is excreted in the urine and the stool.

d) Newborn babies have more circulating red cells and a shortened red cell lifespan, so the bilirubin levels are higher than they are later in life. The breakdown and excretion of bilirubin is also slower. Thus degrees of hyperbilirubinaemia occurring as a result of this normal physiological mechanism are common in newborn babies and usually benign (harmless) compared with adult levels.

e) Breast fed infants are more likely to develop physiological jaundice within the 1st week of life. Prolonged jaundice, that is jaundice persisting beyond the first 14 days, is also seen more commonly in these infants. The mechanism for this ‘breast milk jaundice syndrome’ is still not completely understood and the condition appears to be generally harmless.

f) Jaundice may also have other, non-physiological, causes, including blood group incompatibility (Rhesus, ABO or similar problems), other causes of haemolysis, sepsis, bruising and metabolic disorders. Gilbert's and Crigler–Najjar syndromes are rare causes of neonatal jaundice. Deficiency of a particular enzyme, glucose-6-phosphate-dehydrogenase (G-6-PD), can cause severe neonatal jaundice. G-6-PD deficiency is more common in certain ethnic groups and runs in families. Congenital obstruction and deformities affecting the biliary system, such as in the condition known as biliary atresia, cause an obstructive jaundice associated with conjugated hyperbilirubinaemia. This condition needs specialist management and surgical treatment.

g) In young babies, unconjugated bilirubin can penetrate across the membrane that lies between the brain and the blood (the blood-brain barrier). Unconjugated bilirubin is potentially toxic to neural tissue (brain and spinal cord) because it acts as a ‘cell poison’ slowing essential processes. Entry of unconjugated bilirubin into the brain can cause both short-term and long-term neurological dysfunction. Acute problems include lethargy, abnormal muscle tone, irritability, temporary cessation of breathing (apnoea) and convulsions. This presentation is known as acute bilirubin encephalopathy. This deposition of bilirubin causes a yellow staining of a particular part of the deep neural tissue (the deep grey matter) within the brain; this staining is referred to as ‘kernicterus’. The term kernicterus is also used to denote a group of signs typical of chronic bilirubin encephalopathy. These signs include athetoid cerebral palsy, hearing loss, visual and dental problems. The exact level of bilirubin that is likely to cause neurotoxicity in any individual baby varies, and depends on the interplay of multiple factors that probably include acidosis, postnatal age, rate of rise of bilirubin level, serum albumin concentration, and whether the baby has another illness at the time (including infection).

h) Although neonatal jaundice is very common, kernicterus is very rare. There is a poor correlation between levels of bilirubin in the body and the clinical features of bilirubin encephalopathy. There seems to be tremendous variability in susceptibility towards bilirubin encephalopathy among newborns for a variety of unexplained reasons. However, there are certain factors that probably influence the passage of bilirubin into the brain and hence increase the risk of acute bilirubin encephalopathy. These include dehydration, prematurity, respiratory distress, sepsis, hypoxia, seizures, acidosis and hypoalbuminaemia. The rate of rise of the level of bilirubin is probably important, hence the increased risk of kernicterus in babies with haemolytic disease such as G-6-PD deficiency or Rhesus haemolytic disease.

i) The correlation between actual bilirubin levels and kernicterus is poor for the various reasons discussed above in 3 g and h. Kernicterus in healthy term babies with none of the factors (as described above) is virtually unknown below a threshold level of 425 micromoles of bilirubin per litre of serum, but the number of cases rises above this threshold level and the risk of kernicterus is greatly increased in full term newborns with bilirubin levels above 515 micromol/litre. Kernicterus is also known to occur at lower levels of bilirubin in full term babies who have any of the factors described in 3 h.

j) Levels of bilirubin can be controlled by placing the baby under a lamp emitting light in the blue spectrum; this is known as phototherapy. Light energy in the appropriate part of the spectrum converts the bilirubin in the skin to a harmless form that can be excreted in the urine. Phototherapy has proved a very efficient safe and effective treatment for jaundice in newborns, reducing the need to perform an exchange transfusion of blood (the only other means of removing bilirubin from the body).

k) Clinical recognition and assessment of jaundice can be difficult. This is particularly the case in babies with darker skin. Once the diagnosis is made, there is uncertainty about when to treat raised bilirubin levels and there are variations in the use of phototherapy, exchange transfusion and other treatments. There is a need for more uniform, evidence-based practice, and for more widespread consensus-based practice in areas lacking evidence.

4 The guideline

a) The guideline development process is described in detail in two publications that are available from the NICE website (see 'Further information'). 'The guideline development process: an overview for stakeholders, the public and the NHS' describes how organisations can become involved in the development of a guideline. 'The guidelines manual' provides advice on the technical aspects of guideline development.

b) This document is the scope. It defines exactly what this guideline will (and will not) examine, and what the guideline developers will consider. The scope is based on the referral from the Department of Health (see appendix).

c) The areas that will be addressed by the guideline are described in the following sections.

4.1 Population

4.1.1 Groups that will be covered

a) All newborn infants (both term and preterm) from birth to 28 days.

b) Special attention will be given to the recognition and management of neonatal jaundice in babies with darker skin.

4.1.2 Groups that will not be covered

a) Babies with jaundice that lasts beyond the first 28 days.

b) Babies with jaundice that requires surgical treatment to correct the underlying cause.

c) Management of babies with conjugated hyperbilirubinaemia.

4.2 Healthcare setting

a) The guideline will cover management in primary (including community care) and secondary care. Guidance regarding tertiary referral will also be included.

4.3 Clinical management

a) Identification of factors that increase the risk of kernicterus in a baby with jaundice

b) Recognition and management in primary care (includes community care).

- Role and timing of assessment in primary care.
- Estimation of hyperbilirubinaemia and its management.
- Management at home, in the community and after discharge.
- Indications for referral to secondary care

c) Recognition and management in secondary care.

- Assessment in secondary care.
- Investigations including:
  - bilirubin – components and methods of estimation
  - other relevant haematological and biochemical tests
  - urine tests
  - screening for metabolic disorders
  - end tidal carbon monoxide concentration
- Timing of lab investigations including point of care testing. Indications for referral to tertiary care.

d) Treatment of hyperbilirubinaemia.

- Interpretation of bilirubin levels and use of nomograms.

- Phototherapy (various modalities).
- Blood exchange transfusion.
- Other treatment modalities.
- Role of nutritional support and rehydration.

e) Outcomes that will be considered:

- major outcomes:
  - mortality
  - morbidity, seizures
  - neurological complications (immediate, short-term and long-term)
  - impact on resource use and costs
- other outcomes:
  - auditory, visual and other non-neurological complications
  - hospital admission (duration, frequency, acquired infections)
  - effect on maternal infant bonding, breast feeding and family bonding

f) Information and support that should be given to parents and carers:

- at the time of initial presentation
- after diagnosis and during management
- about long-term effects, including significant morbidities and functional outcome.

g) Note that guideline recommendations will normally fall within licensed indications; exceptionally and only if clearly supported by evidence, use outside a licensed indication may be recommended. The guideline will assume that prescribers will use the summary of product characteristics to inform their decisions for individual patients.

h) The guideline development group will take reasonable steps to identify ineffective interventions and approaches to care. If robust

and credible recommendations for re-positioning the intervention for optimal use, or changing the approach to care to make more efficient use of resources can be made, they will be clearly stated. If the resources released are substantial, consideration will be given to listing such recommendations in the ‘Key priorities for implementation’ section of the guideline.

4.4 Status

4.4.1 Scope

This is the final scope.

Related NICE guidance

- Diabetes in pregnancy: management of diabetes and its complications from pre-conception to the postnatal period. NICE clinical guideline 63. Available from www.nice.org.uk/CG063
- Intrapartum care: care of healthy women and their babies during childbirth. NICE clinical guideline 55. Available from www.nice.org.uk/CG055
- Routine postnatal care of women and their babies. NICE clinical guideline 37. Available from www.nice.org.uk/CG037
- Antenatal care: routine care for the healthy pregnant woman. NICE clinical guideline 6. Available from www.nice.org.uk/CG006

4.4.2 Guideline

The development of the guideline recommendations will begin in April 2008.

5 Further information

Information on the guideline development process is provided in:

- ‘The guideline development process: an overview for stakeholders, the public and the NHS’
- ‘The guidelines manual’.

These are available as PDF files from the NICE website (www.nice.org.uk/guidelinesmanual). Information on the progress of the guideline will also be available from the website.

Appendix: Referral from the Department of Health

The Department of Health asked NICE:

‘To prepare a clinical guideline on the recognition and treatment decisions of babies who are jaundiced.’