NEONATAL NURSING
IN AUSTRALIA AND
NEW ZEALAND:
PRINCIPLES FOR PRACTICE

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Learning objectives

After reading this chapter you will be able to:

• demonstrate an understanding of how perinatal history is linked to findings from the neonatal physical examination
• perform physical and neurological examinations, using a systematic cephalo-caudal approach, interpreting both normal and abnormal characteristics
• coordinate neonatal management with the multidisciplinary team based on examination findings, while sharing information with the parents and involving them in all aspects of their baby’s care
• describe methods for the determination of gestational age
• identify the different neonatal classifications, based on maturity and growth, with a knowledge of implications for practice in each group.

Key words, terms and abbreviations

extremely low birthweight (ELBW)  small for gestational age (SGA)
gestational diabetes mellitus (GDM)  teratogen
intrauterine growth restriction (IUGR)  very low birthweight (VLBW)
low birthweight (LBW)  selective serotonin reuptake inhibitor (SSRI)
INTRODUCTION

Physical examination of the newborn is a vital component of neonatal care, as subsequent findings help to guide management and care. The neonatal nurse/midwife is in the unique position of being able to perform the examination and interpret data using a systematic head to toe approach, taking into account information obtained from the perinatal history, along with assessment of growth and maturity. This chapter offers an insight into the various perinatal issues that may impact on the neonate’s health, development and wellbeing, in addition to providing a general introduction to the physical and neurological examination (detailed information about normal and aberrant findings can be located in the comprehensive tables). The physical examination of the neonate is important for the family as it offers the opportunity for the neonate’s capacity for interaction, however limited, to be assessed (Fig. 3.1). If further investigation is required, parents are fully involved in the decision-making process and the appropriate multidisciplinary specialists are integrated into the ongoing care. Further discussion occurs around the various classifications of the neonate, their implication for practice, with a focus on intrauterine growth restriction (IUGR) and the methods used to determine gestational age, which is especially useful if the mother’s dates are uncertain.

THE IMPACT OF PERINATAL HISTORY ON THE GROWING FETUS

Complex interactions between the fetal and maternal systems during pregnancy are designed to promote normal growth and development with efficient gas exchange and optimal nutrient transfer by the placenta as required (Brett et al., 2014). The proper formation of the organs (organogenesis) early in pregnancy is necessary for a healthy neonatal outcome. During this critical period of development, the fetus is vulnerable to noxious exposures, such as maternal diseases, infections, chemicals, drugs, trauma and other environmental teratogens. Depending on the nature of the exposure, the fetus may be affected in the short term, but often there can be lasting consequences (Nodine et al., 2016).

It is essential that the neonatal clinician is able to anticipate the newborn’s needs with a sound knowledge of the perinatal history, so that physical findings are validated. Informed decisions for ongoing care, considering the wishes and needs of the family, can therefore be undertaken (Neonatal Nurses College Aotearoa [NNCA], 2015; Australian College of Neonatal Nursing [ACNN], 2012). The following sections provide an overview of the maternal influences and environmental factors that may impact on the development of the fetus.

MATERNAL DISEASE

Diabetes

The incidence of diabetes, including gestational diabetes mellitus (GDM), is increasing globally due to its link to obesity (Nodine et al., 2016). GDM increases the risk for poor maternal and neonatal outcomes with the mother predisposed to preeclampsia, kidney and vascular disease and a high rate of caesarean section. Potential consequences seen in the neonate include low birthweight, macrosomia, birth trauma and metabolic, cardiovascular and neurological disorders (Nodine et al., 2016). Its prevalence is higher in Australian and New Zealander indigenous populations, with studies demonstrating that maternal and neonatal outcomes are worse for those who are disadvantaged, of lower socioeconomic status and in a minority group (Jowitt, 2016).

Hypertension

Four categories of hypertension in pregnancy have been described: chronic, gestational, preeclampsia (a hypertensive disease specific to pregnancy) and preeclampsia superimposed on chronic hypertension (Kenner & Lott, 2014). Hypertension causes vasoconstriction of the uteroplacental circulation, which reduces placental perfusion. Growth restriction, being born small for gestational age (SGA) and a potential risk for stillbirth should be anticipated (Kenner & Lott, 2014). Severe pregnancy-induced hypertension can lead to HELLP syndrome, whereby the mother presents with haemolysis, elevated liver enzymes, low...
birthweight neonates, intrauterine growth restriction and other neonatal problems. Substance abuse is common in this group (Records, 2015). The prevalence of domestic violence is greater in rural Australia and among indigenous communities, with rates much higher than in non-indigenous populations. Limited resources, a strong kinship bond and fear of isolation often prevent this group from seeking help (Phillips & Vandenbroek, 2014). The time around pregnancy may afford obstetric health professionals opportunities for counselling if abuse is suspected; bearing in mind the sensitive nature of this topic and the different cultural beliefs and customs is paramount (Campo, 2015).

**Maternal age**

The age of pregnant women at either end of the spectrum (<19 and >35 years) has been linked with neonatal and maternal morbidities (Von Kohler, 2013). In the adolescent, hypertensive disorders with preterm and low birthweight are more likely, whereas the older mother may have infertility, a Down syndrome baby, GDM, hypertension or placenta praevia (Von Kohler, 2013). Further information on all these considerations in the perinatal history is discussed in more detail in other chapters.

Having a healthy term baby is reliant on good placental function and a well mother. With the public health issues of today and more complicated maternal disease processes, the clinician is met with many challenges. Fortunately, antenatal screening technologies continue to be ‘fine-tuned’ for accurate determination of fetal wellbeing and diagnoses. However, it is equally important for clinicians to be familiar with the maternal perinatal history.

**Congenital abnormalities**

Malformations and genetic conditions can be caused by chromosomal abnormalities, multifactorial disorders and abnormalities from teratogenic exposures (Matthews & Robin, 2016). Antenatal morphology scans are essential for early identification of problems. This allows time for parents to prepare themselves psychologically and for the clinician to be able to plan appropriate care (Gardner & Carter, 2016).

**FAMILY-CENTRED CARE 3.1**

A rise in cortisol levels in the fetus as a result of the stress associated with domestic violence is responsible for lower birthweights, while there is an increased risk of antepartum haemorrhage, sexually transmitted diseases, trauma, depression and anxiety for the mother (Baird & Gamble, 2016; Campo, 2015).

**EVIDENCE-BASED PRACTICE RESEARCH 3.1**

When a baby with a congenital abnormality is born, good communication with parents as partners in the decision-making process, is essential, as is being culturally aware and sensitive to the needs of our increasingly multicultural society (Gardner et al., 2016; NNCA [Standard 1.5], 2015).

**PHYSICAL ASSESSMENT OF THE NEWBORN**

The first assessment of the newborn is immediately after birth, with two aims: to quickly determine the adequacy of the neonate’s adaptation to extrauterine life and, all being well, to follow up with an unobtrusive assessment of normal physical findings and obvious defects prior to placing the newborn safely on the mother’s chest for skin-to-skin contact and a breastfeed. The first complete physical assessment of the newborn is a critical event that should be performed in all newborns within the first 24 hours of life. While there are specific occasions when the newborn examination is performed, periodic physical assessments are also conducted for a variety of reasons, such as when there is a deterioration in the neonate’s condition, prior to discharge or transfer, and at home by the neonatal outreach team if the neonate has been sent home on a neonatal early discharge program.

Whenever possible the neonate’s parents or, at the least, the mother should be present for the assessment to meet the family-centred care principles described in both the ACNN Standard 1 (ACNN, 2012) and NNCA Standard 3 (NNCA, 2015). The neonatal nurse/midwife should communicate with the parents throughout the steps of the examination, allow them to participate and ask questions, and provide teaching as needed. If any concerns arise, the parents should be provided with reassurance and a clear plan of action. Having both parents present also provides the neonatal nurse/midwife with an opportunity to observe the level of interest they show in their baby, indicating their degree of attachment. Aside from these bonding behaviours between the parents and the baby, the clinician can observe interactions between each parent, to add to a risk assessment for child protection if concerns have been raised.

**FAMILY-CENTRED CARE 3.2**

When conducting the head to toe examination of the neonate, consider strategies to involve the parents in a meaningful way. The neonatal nurse/midwife can begin with ‘Tell me about your baby’ and, later in the examination, ask ‘What have you observed?’ to encourage interactive dialogue during the exam.
## Table 3.2 Newborn head to toe examination findings: normal and abnormal

<table>
<thead>
<tr>
<th>Body part</th>
<th>Examination procedures</th>
<th>Normal findings</th>
<th>Abnormal findings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HEAD</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>Palpate</td>
<td>Size depends on many factors – ethnic group, gestational age and growth in utero. Cranial moulding or oedema of the scalp may affect the size or shape of the head, but should revert to normal within a few days of birth. Normal term range head circumference is 31–38cm.</td>
<td>Hydrocephalus (bulging fontanelles, “split” sutures; swollen scalp veins) Microcephaly</td>
</tr>
<tr>
<td>Shape</td>
<td>Palpate</td>
<td>Moulding Caput succedaneum</td>
<td>Cephalhaematomas Plagiocephaly/asynclitism Scaphocephaly Subgaleal haemorrhage</td>
</tr>
<tr>
<td>Fontanelles</td>
<td>Palpate</td>
<td>Vary in size Anterior – diamond-shaped, soft, flat and admits the tip of the small finger Posterior – triangular in shape and may be closed at birth</td>
<td>Bulging (raised ICP) Depressed (dehydration) Subgaleal haemorrhage – soft fluctuant feel, crosses suture lines and may displace ears</td>
</tr>
<tr>
<td>Sutures</td>
<td>Palpate</td>
<td>Ballotable (mobile)</td>
<td>Rigid and fixed, i.e. craniosynostosis Widely separated Craniohypertelorism (usually harmless in newborns unless associated with other problems such as rickets or osteogenesis imperfecta)</td>
</tr>
<tr>
<td>Hair</td>
<td>Observe and palpate</td>
<td>Soft One colour</td>
<td>Low hair line Coarse hair Coloured tufts Cutis aplasia (areas of skin loss, usually only the epidermis, usually on the scalp) Overly abundant</td>
</tr>
<tr>
<td><strong>FACE</strong></td>
<td>Observe and palpate</td>
<td>Symmetrical</td>
<td>Facial palsyies (after forceps application) Dysmorphic features</td>
</tr>
<tr>
<td><strong>EYES</strong></td>
<td>Observe</td>
<td>Position – space between eye/nose/eye = one-third each</td>
<td>Hypotelorism (fetal alcohol syndrome) Hypertelorism</td>
</tr>
<tr>
<td>Sclerae</td>
<td>Observe</td>
<td>White and clear</td>
<td>Inflamed Excessive lacrimation Discoulouration (jaundice) Scleral haemorrhages due to birth (should fade within days)</td>
</tr>
<tr>
<td>Pupils</td>
<td>Penlight test Observe</td>
<td>Red eye reflex – a penlight is used to shine a bright light on the lens of the eye. A clear red colour should be reflected back from the retina Pupils should react equally and constrict briskly to light Size and shape look normal Pupils are parallel</td>
<td>Opague with absent red light reflex Cataract Unequal or slow to react to light Non-parallel Brushfield spots (“speckles’ on the iris, frequently seen in trisomy 21)</td>
</tr>
<tr>
<td>Eyelids</td>
<td>Observe</td>
<td>Lid oedema</td>
<td>Unusual slant or size Epicanthal folds Excessive oedema</td>
</tr>
<tr>
<td>Vision</td>
<td>Penlight test</td>
<td>Reacts to light with squints and blinks</td>
<td>Does not react to visual stimulation</td>
</tr>
<tr>
<td><strong>EARS</strong></td>
<td>Observe</td>
<td>Position – the pinna should be located above a line extended from the inner to outer canthus of the eye</td>
<td>Low set ears Ears posterioly rotated more than 10° from the vertical axis of the head Skin tags</td>
</tr>
</tbody>
</table>

Continued
Luke was born at 33 weeks gestation weighing 1.02kg. On examination after birth, the neonatal nurse/midwife found that he had a single umbilical artery. Luke’s head circumference and length were 26cm and 36cm, respectively. This symmetrical growth failure was assumed to be the result of deficient placental blood flow due to the single artery, as described in the systematic review conducted by Kim et al. (2017).

Luke’s Apgar scores were 7 and 9 and he was admitted to the neonatal special care unit for observation. His initial axillary temperature was 36°C and he was placed in a prewarmed incubator. An early blood glucose level revealed hypoglycaemia, and a 10% glucose infusion was commenced. Luke had low oxygen saturations on admission to the neonatal unit, which normalised after a few hours in 23% oxygen.

The neonatal nurse/midwife admitting Luke to the neonatal unit uses their knowledge of the potential problems of growth restricted neonates such as Luke to plan his care and anticipate his needs.

FIGURE 3.15 Intrauterine growth charts: male
Source: Beeby et al. (1996).
CONCLUSION

This chapter has described the potential impacts that elements of family and maternal medical and obstetric history can have on the neonate. Gestational age assessment can provide important clues about the neonate’s capacity for self-regulation, communicating with caregivers and feeding. The neonatal nurse/midwife is perfectly placed to conduct the comprehensive newborn examination, having gained substantial evidence-based information, and should then communicate the findings to both the parents and the multidisciplinary team. With the ongoing acquisition of knowledge and repeated practice, these skills should become more familiar and well honed.

Recommended reading


References/Acknowledgements


