Chapter

The Newborn Baby Check

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Abstract

The newborn baby check is often the first encounter a General Practitioner (GP) has with an infant and their family. It is an excellent opportunity to review the journey the family has taken antenatally, at the time of delivery and the weeks that have followed. It is also a time to detect and identify conditions that can be managed in their early stages. If untreated, some conditions can result in major morbidity. In this chapter we will look at what makes up a newborn baby check and important considerations to think about when undertaking this assessment. The examination is also performed in a systematic way to maximise the chance of detecting any abnormalities.

Keywords: newborn baby check, physical examination, screening, developmental hip dysplasia, cradle cap

1. Introduction

The newborn baby check is often the first encounter a General Practitioner (GP) has with an infant and their family. It is an excellent opportunity to review the journey the family has taken antenatally, at the time of delivery and the weeks that have followed. It is also a time to detect and identify conditions that can be managed in their early stages. If untreated, some conditions can result in major morbidity.

At the time of birth and discharge from hospital, the newborn will often have an examination performed [1]. Following this period, the family is introduced to their local maternal child health nurse who monitors the infant and discusses important topics such as feeding, growth, family supports and maternal and paternal mental health. Provided no concerns have been raised, the family will only need to present for the first time to the doctor at around 6–8 weeks. For this reason, the newborn examination we refer to in this chapter is one taken around this time.

Although the routine examination performed prior to a child being discharged from hospital is thorough, conditions can evolve or go unnoticed. It is important that we do not solely rely on the discharge check but it can serve as a good reference if the nurse or doctor raised a concern at the time.

2. History

Before the examination is performed, a brief history should be taken to help understand the infant in front of you.

The history should include the following:

- The antenatal history including maternal conditions that may impact the child

- Birth history
  - Mode of delivery
  - Time spent in hospital
    - Were any interventions required? i.e., oxygen, antibiotics etc.
  - Elaborate on feeding i.e., when it was established and if there have been difficulties
  - Weight, length and head circumference measured to date and how it is trending
- Any parental concerns
- Any concerns raised by the maternal child health nurse

3. Examination

From here, we can move onto the examination. A summary of the steps involved in the examination can be found at the end of the chapter. The examination should be systematically performed and an ideal method is to examine the front of the infant from head to toe and then turn them over and examine them from top to toe again. This chapter has been designed with that in mind and the examination should follow this structure were possible.

3.1 Exposure and positioning

The correct exposure for the examination is important because signs can be easily missed if they are not obvious to us. The best level of exposure is with the infant fully undressed and their nappy on. The nappy can be removed and replaced at the time of the genital and hip examination which gives the examiner confidence that they will not encounter any unfortunate surprises.

Positioning the newborn for the examination should rely on the principle of ensuring both the examiner and infant are comfortable. It would be appropriate to have the infant resting supine on a firm standard examination bed. Have the infant laying straight in front with their legs towards you and head away. If the infant is larger where it may compromise your ability to visualise distal parts of their body, laying them as you would an older patient perpendicular to you and examining them from their right is also fine. Being able to appreciate subtle asymmetry is the key so if you cannot achieve this, position the patient so you can.

3.2 General inspection

Look at the infant from a distance and comment on any dysmorphic features, deformities, rashes, skin lesions or skin colour changes [2–4]. Remember to repeat this process when examining the infants back.

Make a note of whether the child is comfortable or distressed. This can influence how we interpret signs throughout the examination.

3.2.1 Dysmorphic features

Being familiar with congenital conditions such as Down's syndrome (trisomy 21) can help the examiner look out for signs that are seen more often in these patients by association [5]. In trisomy 21 this may include epicanthic folds, hypotonia, a sandal gap, Simian creases, upslanting palpebral fissures and a protruding tongue [5].

3.2.2 Skin

Gross skin changes seen include pallor, cyanosis or icterus (jaundice).

Identify any obvious skin rashes at this step. Categorise skin rashes into normal and abnormal with normal rashes including those that are transient or birth marks and abnormal skin rashes being those that can indicate a congenital abnormality [6].

Initially comment on the type of rash identified i.e., pustules, vesicles, bullae, whether the skin is dry, erythematous or scaly [6]. From here it would be worth reviewing possible differentials for these findings as there may be several causes.

In the authors experience, commonly encountered skin lesions include heat rashes, haemangiomas, resolving milia, cradle cap, Mongolian spots and occasionally pityrosporum folliculitis [6].

3.3 Head

The head examination is next. At the level of the head, a few areas should be focussed on:

- Head shape
- Scalp
- Fontanelles
- Suture lines

3.3.1 Scalp

The main condition seen within the scalp at this age is seborrheic dermatitis or cradle cap [6, 7]. It presents from 2 weeks of age in some infants [6, 7]. It can present as redness through the scalp along with redness behind the ears and skin folds [6, 7]. More severe cases will have thick yellow plaques on the scalp [6, 7]. Although the cause is not clear, it is thought to be due to a combination of a type of yeast called *Malassezia* and abnormal sebum production [6, 7].

3.3.2 Fontanelles

At birth, the infant will have 6 fontanelles with the anterior fontanelle being the largest [8]. The anterior fontanelle is located between the two frontal and two parietal bones of the skull. The anterior fontanelle size varies greatly between infants with an average size of 2.1 cm reported in one study [8]. The initial size of the anterior fontanelle is not a strong indicator of when it will eventually close [8]. The average time for closure is 13.8 months [8]. Craniosynostosis is associated with early fontanelle closure, but given that approximately 1% of infants have closed

fontanelles by the age of 3 months, a small fontanelle is not necessarily an indicator of an abnormality but careful reviews of head circumference can assist with knowing if a timely referral is required [8].

3.3.3 Shape, symmetry and suture lines

The shape and symmetry of the skull will give clues about plagiocephaly and craniocynostosis [9]. During the examination, carefully check if the skull appears asymmetrical or misshaped, feel the fontanelles and the suture lines. A hard raised suture line may indicate premature closure and careful review of the infant's head circumference will help determine if this finding is significant [9].

3.3.4 Head circumference

Remember to review the head circumference and trends from previous measurements to ensure there is no significant change within the period since birth.

3.4 Face

The face consists of structures including the eyes, nose, mouth and ears [10].

3.4.1 Eyes

Red reflex examination can help detect early stages of disease [11]. Using an ophthalmoscope, shine the light directly into both eyes through the pupil. If the retina appears white, it can indicate retinoblastoma and the absence of this red reflex with lens opacity may indicate congenital cataracts [11–13]. A prompt referral to an ophthalmologist is appropriate in these cases or if you are not sure a red reflex is properly elicited. To complete the eye exam, remember to comment on the external eye, eye movements and visual fixation. At this age, monitor concerns raised about visual fixation as strabismus might need to be considered and may only be obvious in the following months [14].

3.4.2 Nose

Remember that infants are obligate nose breathers and nasal congestion is common. Observe the nasal passage visually and describe whether they are patent and symmetrical.

3.4.3 Mouth

Using a gloved finger, place it in the infant's mouth and observe their suck reflex and check if it's coordinated. Also remember to feel the palate [10].

You may be asked to comment on whether the infant has a lip tie or tongue tie especially if the infant has had difficulties with feeding. A tongue tie (ankyloglossia) refers to a short lingual frenulum [15]. You can observe this by seeing if the tongue fails to stick out or converts to a heart shape when protruding out. The tongue tie can impact on a tongues range of movement and ability to function [15]. A lip tie refers to a short labial frenulum and this results in a lip that looks like it's stuck to the gum [15]. This may affect the infant's ability to latch properly when feeding [15].

3.4.4 Ears

Comment on the position and structure of the ear. Preauricular sinuses, skin tags or cysts should be followed up as they can be associated with congenital syndromes. It is hoped that these conditions have already been identified by this stage.

To complete the head exam, remember to comment on the neck. Torticollis is a condition that can affect an infant's range of neck movement [16]. Observing if the head looks tilted or if there's a preference to one side and restriction to full neck movement on examination can suggest torticollis [16]. Other opportunistic signs to look for are neck masses which can be associated with the thyroid or cervical chain lymph nodes [10].

3.5 Upper limbs

The upper limb exam is not too complicated. The aim is to check the general range of movement of the shoulder joints, elbows, hands and fingers. Assess the brachial pulses in both arms by placing a finger over the antecubital fossa. Count the number of fingers and look for webbing and check the palm for any deep creases.

3.6 Anterior chest

Comment on the shape and symmetry of the chest. Respiratory effort and rate should be looked at but in a well-baby this is usually normal. Using your thumb, check capillary refill time by placing it over the sternum and holding it there for 5 seconds. After letting go, the blood should return to the area within 4 seconds [17].

Auscultation of the heart will help identify any murmurs and additional heart sounds. In a child that is failing to thrive, looking for underlying heart disease is important [18].

Comment on the shape and position of the nipples. Evidence of breast buds and galactorrhoea may be present due to the maternal oestrogen effect and will resolve around the 2-month mark [19]. Seeking an endocrinologist opinion would be advisable if breast buds or galactorrhoea persists.

3.7 Abdomen

Comment on the shape and symmetry of the abdomen. Organomegaly can be detected by palpating the abdomen and feeling the liver, spleen and kidneys. It may be difficult to assess the abdomen if the infant is unsettled. Follow this by auscultating the abdomen for bowel sounds.

3.7.1 Umbilicus

Umbilical hernias are common and present in about 20% of newborns [20]. They can increase in size over the first few months of life [20]. Multiple references report that an umbilical hernia can be monitored if asymptomatic at this age [20]. Australian guidelines recommend that referral for such hernias wait until a child is 2 to 3 years of age and it is expected that up to 90% of hernias will close on its own by 5 years of age [20]. This is helpful to know when faced with a common presentation of a soft reducible umbilical hernia at this check.

3.7.2 Inguinal hernias

Inguinal hernias are common and present in up to 5% of newborns with a higher percentage seen in those born prematurely [20]. If present in an infant, a timely referral within 2–4 weeks is recommended [20]. This referral interval may vary for a neonate or an older child.

3.8. Genitourinary

3.8.1 Male genitalia

The penis should be observed and commented on for size, chordee and hypospadias [20, 21]. Chordee is when the penis is curved during an erection. Hypospadias is common and occurs in 1 in 125 males born [21]. It is a defect resulting in an opening of the urethra along the penile shaft, scrotum or perineum [21].

The scrotum should be felt for the presence of testes [21]. If they are empty, the examiner should locate the position of the testes. Maldescended testes may be "undescended" or "ectopic" [21]. The term undescended refers to a testis that presents within the normal line of descent and an ectopic testis is one outside this line. A retractile testis may be brought down by milking it down. A technique for examination would be to use one hand to lift up the suprapubic fat and then use two fingers of the other hand to palpate the areas of interest in the inguinal region with a circular motion [21].

Whilst examining the scrotum, look for the presence of a hydrocoele. This can be normal up until the age of 1 year for most infants [21]. If suspected, use an examination torch pressed against the side of the testis (transillumination) to confirm the presence of fluid surrounding the testis [22].

Signs of ambiguous genitalia may include a micropenis or bilateral undescended testes [23].

3.8.2 Female genitalia

The aim is to observe whether the genitalia is developing normally. Abnormal findings that may indicate ambiguous genitalia include clitoromegaly and fused labia [23].

3.9 Anus

After the genital examination, briefly look between the buttocks to observe the anus and particularly the skin around it. It's not uncommon to see a significant rash hidden within this area. There is no reason for performing a per rectal examination and this should not be done.

3.10 Lower limbs

3.10.1 Hips

The hip examination is a critical step during this examination as a delayed diagnosis of hip dysplasia can result in significant morbidity to the infant involved.

When taking the initial history, remember to go through potential risk factors for developmental hip dysplasia (DDH). Risk factors for DDH include being female, being a breech birth and having a family history of DDH [24]. Postnatally, some risk factors include tight swaddling of lower limbs in extension and adduction [24].

In those babies up to the age of 8 weeks, the Ortolani and Barlow test are the preferred tests to detect DDH [24]. Leg length discrepancy, asymmetric gluteal creases and restricted hip abduction are also helpful signs to work up a DDH.

The Ortolani and Barlow test are performed as follows. The Ortolani test checks to see if a dislocated hip can be relocated or reduced back into the hip joint [24]. By holding the flexed and adducted hip, abduct the hip while putting gentle upward pressure with your fingers on the greater trochanter [24]. If the test is positive, a "clunk" should be heard as the hip is reduced back into the joint [24]. The Barlow test aims to dislocate a hip that is sitting within the joint [24]. The test is performed with the hip adducted while gently putting pressure down in the direction of the examination bed [24]. During this step, the examiner may feel the hip move out of the acetabulum. This is a Barlow-positive test.

In situations where a hip is dislocated and irreducible, it will be interpreted as an Ortolani negative and Barlow negative test. In this scenario, checking if the hip can abduct completely will pick up this uncommon presentation [24].

3.10.2 Legs and feet

With both hands on the infant's knees, straighten their legs to see if the knees, medial malleoli and feet line up. Leg length discrepancy can be a sign of unilateral hip dysplasia.

As we did for the upper limbs, check the range of movement of the lower limbs by moving the joints at the level of the hips, knees and ankles. Check the feet to see if there is evidence of talipes [25]. Again, count the number of digits on the infant's feet as you did for the hands earlier.

3.11 Back

Now that the front of the examination is complete, you can turn the baby over onto their tummy and continue with the remainder of the examination with the infant in a prone position.

Observe the back of the head to look for skull moulding or rashes. If you are able to, observe the degree of neck control and position of the head. This may not be possible with all infants due to immaturity.

Look at the back to see if there are any skin rashes. Skin lesions are discussed earlier in the chapter but one in particular that is seen on the back are Mongolian spots.

Look at the positions of the scapula and buttocks to see if they are roughly symmetrical and in line with each other and then run your hand along the infant's spine to see if it's straight [10]. At the base of the spine, you may find clues for spina bifida including sacral dimples or tufts of hair [10].

3.12 Newborn reflexes

To finish off the examination, a screen for reflexes can be performed. This includes the stepping reflex, palmar grasps, moro reflex and rooting reflexes. Most of these reflexes should still be present. The stepping reflex tends to disappear around 2 months of age so this might not be illicited if the infant is close to 8 weeks when the exam is done.

3.13 Measurements and finishing the exam

Finish off by checking the infant's weight, head circumference and length. Remember to document the findings of the examination and arrange

appropriate follow up for any abnormalities that need attention. Thank the patient's family and allow the family to dress the infant.

Newborn baby check
Introduce yourself and ask parents identifying questions i.e. name, age, date of birth
Wash hands
Exposure – undress the child leaving them in a nappy which will be removed at the time of the genital and hip exam.
Position – place the child on an examination bed which is relatively firm and start with them in the supine position
General inspection
• Is the child comfortable or not? • Look for skin rashes • Dysmorphic features
Head
• Scalp – palpate fontanelles, palpate sutures, head shape and symmetry, look for cradle cap. Opportunistically measure head circumference • Eyes – red reflex • Ears – low set, pre-auricular skin tags, deformity • Nose – patency of nostrils and symmetry • Mouth – Suck reflex, cleft lip, tongue tie and lip tie
Shoulders and arms
• Check the shoulders are well aligned with appropriate range of movement • Check arm movements including general tone. Comment on palmar creases, number of fingers (more = polydactylyl or less = syndactyly)
Anterior chest
• Capillary refill time • Observe breathing • Auscultate heart and comment on heart sounds
Abdomen
• Comment on size including distension and observed masses • Palpate for masses and organomegaly • Auscultate for bowel sounds • Comment on the umbilicus for hernia
Femoral region
• Check pulse • Check for inguinal hernias
Genital examination
• Male – palpate testes and comment on if they have descended, review penis and comment on presence of hypospadias or chordee. Check for signs of ambiguous genitalia including a micropenis or absent testes. • Females – check for fusion of labia and clitoromegaly to suggest ambiguous genitalia

Newborn baby check
Hips and legs
• Check for asymmetric creases • Look for limited abduction of both hips • Perform Barlow and Ortolani test • Check leg length – both true and apparent • Check range of movement of lower limbs • Comment on feet for talipes or deformities • Count the number of toes (more or less)
Change baby's position so they are now on their tummy (prone position)
• Assess head control
Posterior chest
• Auscultate lung fields • Feel the spine – comment on how straight it is • Look for signs of spina bifida distally including tufts of hair and sacral dimples • Look for any more skin rashes
Reflexes
• Grasp • Rooting reflex • Moro (startle reflex) • Walking reflex

Table 1.
Summary of the newborn baby check.

4. Conclusion

This completes the overall baby check. A summary of the key steps to the examination can be found in **Table 1**.

Conflict of interest

The author declares no conflict of interest.

Notes/Thanks/Other declarations

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Key Points

- The newborn check performed at roughly 6–8 weeks is often the first encounter the GP has with the infant and their family
- Having a systematic approach to the newborn check will reduce the chance of missing important signs

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