

Newborn Examination

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Introduction

We do this examination just after birth, prior to discharge from hospital and at regular intervals throughout the first few months of life. Initial examination of the newborn should be done as soon as possible after delivery. This ensures early detection of any abnormalities and establishes a baseline for subsequent examinations.

As with all physicals, it is important to properly position both yourself and the patient. For the newborn examination, you should ensure that the ambient temperature is warm enough to allow for the infant's comfort while being exposed. Often, keeping the entire room warm is difficult. Using an examining table with a built in warmer is quite useful.

While having a routine order of procedure in the examination of the infant makes less likely the omission of any essential part of the examination, your routine should be flexible. If the infant is quiet and relaxed when first approached, auscultation of the heart and palpation of abdomen could precede more disturbing examinations such as the mouth and hips.

At the time of delivery the infant's APGAR scores should be recorded. The components of the score are colour, heart rate, reflex irritability, muscle tone and respiration. It should be documented at 1 and 5 minutes after birth. If the 5 minute score is less than 9, further recordings should be made at 5 min intervals until the newborn has clinically improved

General inspection

Once you have determined that the baby is stable from an airway, breathing and circulation perspective, you can begin your systemic exam.

It is important that a few exact measurements be made and recorded. These include weight, crown-heel length and head circumference. These should be plotted on the appropriate centile chart on each visit for early identification of growth problems.

Note how active the baby is and whether the baby's cry is normal. Look for any obvious malformations, dysmorphic phases or limb abnormalities that may suggest a syndrome such as trisomy 21.

Take note of the baby's respirations and effort of breathing. Grunting or labored breathing usually suggests pulmonary pathology such as respiratory distress syndrome.

Most often, the breathing of a newborn is diaphragmatic, so during inspiration the anterior thorax usually draws inward while the abdomen protrudes.

Pay attention to the baby's colour. See if there is any pallor, plethora, jaundice or cyanosis. Acrocyanosis, where the fingers and toes appear bluish is normal for a newborn infant. If there is generalized cyanosis, observe the response to oxygen administration as well as what happens during crying. In the absence of cardiac disease, the infant should spontaneously pink up over time or with positive pressure ventilation.

Very few babies need resuscitation. Often just drying, positioning the baby properly and patience is all that is needed for the infant to breathe and move spontaneously. If more active resuscitation is needed, follow current NRP protocols.

In this section we will go through the newborn examination from head to toe.

Skin

Besides the colour of the skin, there are some common skin changes or manifestations that you should look for. When the infant is delivered, it is often covered in a cheesy white covering called vernix. This is completely normal. Occasionally you may see milia, which are pinpoint white papules on the face that are keratin filled cysts. These resolve spontaneously.

Look for grey patches which are also known as Mongolian spots. These are bluish patches usually located on the lumbar, and buttock areas. They are commonly found in babies with darker skin. They are normal and become less obvious over time. Birth marks such as hemangiomas, salmon patches and small café au lait spots are found on most neonates. Rarely the presence of numerous or large birth marks may necessitate an expert dermatologic opinion.

The most common rash seen in newborns is a popular eruption known as erythema toxicum. This usually appears on day 2 or 3 of life; it resolves spontaneously and requires no treatment.

Also note any petechiae or bruising on the face which may indicate a traumatic delivery. This can place the infant at higher risk for neonatal jaundice.

HEENT

The infant's head is often molded from being engaged in the vaginal canal. It is not uncommon for the skull bones to overlap each other. Palpate the anterior fontanelle, coronal, sagittal, and lambdoid sutures and posterior fontanelle.

Take note of any trauma to the head, such as caput succedaneum, which is the diffuse swelling crossing the suture lines caused by pressure from the uterus or vaginal wall during a vertex delivery. Cephalohematomas, caused by bleeding into the periosteum and which does not cross suture lines may also occur. More concerning would be the presence of a subgaleal hematoma, a fluctuant boggy mass that is moveable over the entire scalp. These bleeds are rare but because bleeding is into the large potential space between the scalp and periosteum, a large volume of blood can be lost from the circulation.

The eyes are most easily examined if opened by the baby itself. This often occurs spontaneously if the eyes are shaded from light with hands or during feed. Shine a light to elicit the red reflex. Absence of this may suggest congenital cataracts or other intraocular pathology.

Note for dysmorphic features like a flattened nasal bridge or epicanthic folds. Choanal atresia is checked for by seeing if the infant can breathe with its mouth closed and then with the left and right nostril occluded alternately. If in any doubt check nasal airways with a catheter. Infants are obligate nose breathers until 4 months of age.

Ears that are floppy and lacking in normal cartilage, and especially if low placed are of significance and may be associated with urinary tract abnormalities. Universal hearing screening is recommended for all infants using formal audiological testing modalities such as automated auditory brainstem response or evoked otoacoustic emissions.

The mouth should be fully inspected with a good light and spatula and the palate inspected right back to the uvula to exclude minor degrees of cleft palate.

The sternomastoid muscles should be palpated and the range of motion of head to each side checked to rule out congenital torticollis. Also palpate the clavicles for fractures. Webbing or redundant skin in a female infant suggests intrauterine lymphedema and Turner syndrome.

Chest

Moving down to the chest look for any asymmetry of the rib cage. Breast hypertrophy is common in males and females due to transfer of maternal hormones.

Auscultate the chest to ensure equal air entry to both lung fields. Crackles may indicate infection, respiratory distress syndrome or transient tachypnea of the newborn, particularly in a baby who was born via C-section.

Listen for heart sounds and murmurs on both the chest and the back. Transient murmurs are common and often benign. On the other hand, congenital heart defects may initially not produce any abnormal heart sounds.

Brachial and femoral pulses should be palpated and their strength and timing compared. Absence of femoral pulses or brachial femoral delay is suggestive of left sided heart lesions and coarctation of the aorta. It takes practice to feel the femoral pulses in an infant. They should be felt using gentle pressure over the inguinal area.

Abdomen

Inspect the abdomen for any obvious defects. The umbilical cord should have three vessels - two arteries and one vein. Finding a variation to this should prompt formal renal investigation by ultrasound.

The abdominal wall is usually weak, especially in preterm infants. Therefore diastasis recti and umbilical hernias are not uncommon. A scaphoid abdomen suggests diaphragmatic hernia, while abdominal distension suggests obstruction, often due to meconium ileus.

Following inspection, palpate for internal organs. The liver is normally palpable as much as 2cm below the costal margin. Less commonly, the spleen tip may be felt. The kidneys, especially on the right can often be felt on deep palpation.

Genito-Urinary

Now we will move on to the genital examination. Inspect that the infant does not have ambiguous genitalia. In a newborn female, the labia majora are prominent. Non-purulent discharge is a normal phenomenon. A whitish or pinkish red discharge can be present secondary transfer of maternal hormones. Ensure that there is no clitoromegaly; that is the enlargement of the clitoris beyond 1cm in size.

In the male infant, the normal scrotum is relatively large. Both testes should be descended into the scrotum. Any scrotal swelling can point to the presence of a hydrocele or a hernia. Penile length of less than 2.5cm is indicative of a micropenis and should be investigated. The prepuce of the newborn is normally tight and adherent, and erection of the penis is common and bears no significance.

Most infants void within a 12hr period, and by 24hrs 95% of newborns would have passed urine.

Check that the anus is in a normal position and is patent. An imperforate anus is not always visible and may require evidence obtained by gentle insertion of the little finger or a rectal tube. A sacral dimple caused by irregularity of a skin fold is often present in the sacral-coccygeal midline and may be mistaken for an actual or potential neurocutaneous sinus. Concerning features would include a dimple that is higher on the back than the tip of the sacrum, tufts of dark hair overlying the dimple or actual visualization of a fluid filled meningocele.

Meconium should be passed within the first day of birth. Passage of meconium beyond the first 24hrs of life warrants investigation.

Musculoskeletal

In examination of the musculoskeletal system, deformities observed in the infant are often due to the way the fetus was positioned in utero, or due to the presentation and trauma of delivery itself.

Spontaneous symmetric movements of the extremities should be observed. Absence of this may indicate nerve damage or fractured bones.

The hands and feet should be examined for polydactyly, syndactyly, and abnormal dermatoglyphic patterns such as a single palmar crease.

The feet should be examined for evidence of talipes equinovarus or club foot, where the feet are permanently inverted at the ankles. A large gap or deep crease in between the first and second toe can indicate possible Down Syndrome.

The hips of all infants should be examined with specific maneuvers to rule out the presence of congenital dislocation. In the Barlow maneuver, the hips are flexed and thighs adducted. Apply a force posteriorly in line of the shaft of the femur in the attempt to dislocate the femoral head from the acetabulum. Dislocation is confirmed by the Ortolani maneuver, where the dislocated hip is reduced back into the acetabulum. The hips and knees again are flexed, with the thumbs on

the medial aspect of the baby's knee while the index finger is placed over the greater trochanter. Upon gentle abduction of the hip, push upward with the index finger and push toward the bed and laterally with the thumb.

Finally, examine the baby's spine. Make sure there is no scoliosis by running a finger down the back. Spinal disraphisms such as tufts, lipomas, hemangiomas or large dimples above the gluteal crease and anal verge need to be ruled out.

Neurologic exam

The neurologic examination consists of a general screen as well as some reflexes that are specific to newborns.

Observe the posture of the infant while lying supine. There should be flexion at the hips, knees and elbows. In infants with hypotonia, the baby often assumes a 'frog leg' position where the hips are abducted with thighs resting on the bed.

The infants' level of alertness can be tested by tactile stimulation of the foot or cheek. The baby should awaken.

Tone is best assessed by suspending the infant in a ventral position. In a baby with normal tone, the back should show some resistance to gravity

Lastly, primitive reflexes should be elicited. These include the plantar reflex, rooting or sucking reflex, Moro reflex, Galant Reflex as well as the grasp reflexes.

Conclusion

Routine physical examination takes only a few minutes and should be carried out in all infants at the earliest possible moment after birth, just before discharge from hospital and at regular intervals throughout the first few months of life. Routine physical examination excludes obvious abnormalities and helps make possible an earlier diagnosis of many not quite so obvious conditions.