

Care of the Well Newborn

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Drs Stellwagen and Boies did not disclose any financial relationships relevant to this article.

Objectives After completing this article, readers should be able to:

1. Describe the purpose of the prenatal visit.
2. Recognize the significance of common abnormalities found on prenatal ultrasonography.
3. Discuss the importance of growth and maturity assessment as well as the careful examination of the newborn.
4. Delineate prevention strategies for hepatitis B, syphilis, and group B streptococcal infections.
5. Explain the basics of car seat safety and sudden infant death syndrome prevention in the newborn unit.
6. List the basic tenets of providing breastfeeding support for the breastfeeding mother and infant.
7. Explain appropriate outpatient follow-up for the healthy newborn.

Introduction

Recent advances in obstetrics and pediatrics have brought about numerous changes in the care of the healthy newborn and have led to a re-evaluation of old routines, a commitment to helping mothers breastfeed their infants exclusively, and improvements in infant medical care and safety. In this article, we review the care of the newborn, including issues of antenatal testing, the prenatal visit, delivery, care on the postpartum/newborn unit, discharge from the hospital, and the first outpatient visit, emphasizing contemporary practices.

Prenatal Visit

The most important focus of the prenatal visit is to begin a positive relationship with the parents. In addition, data can be recorded about pertinent medical and psychosocial history and potential high-risk situations, and basic education of the family regarding their newborn can begin. The clinician needs to address the following:

- The mother's medical and pregnancy history, including any history of depression and use of medication, tobacco, or other substances
- Maternal and paternal family medical history, including ethnicity, history of atopy, diabetes, neonatal jaundice, and children who have birth defects or serious illness
- Social history, including parental employment, education, planned maternity/paternity leave, and the individuals who will be the support system for the expectant parents
- Feeding plan and discussion of current breastfeeding recommendations
- Anticipatory guidance

Abbreviations

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| AAP: | American Academy of Pediatrics |
| CDC: | Centers for Disease Control and Prevention |
| GBS: | group B <i>Streptococcus</i> |
| HBV: | hepatitis B virus |
| HIV: | human immunodeficiency virus |
| IUGR: | intrauterine growth restriction |
| LGA: | large for gestational age |
| SGA: | small for gestational age |
| SIDS: | sudden infant death syndrome |
| US: | ultrasonography |
| VCUG: | voiding cystourethrography |

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- Routine office procedures, including office hours, other clinicians in the office, telephone triage, and after-hours routines

Hospital Care of the Newborn

Maternal History

At the time of the first postnatal examination, a history of the mother should be elicited and her obstetric chart reviewed, including:

- Pregnancy-related health issues
- Blood type, Rh antigen, red blood cell antibody status, and infant blood type, if known
- Prenatal laboratory values: hepatitis B, syphilis, rubella, group B *Streptococcus* (GBS) culture, glucose tolerance test, purified protein derivative, human immunodeficiency virus (HIV), hepatitis C (if obtained), sexually transmitted disease screening, and drug screening

The most important focus of the prenatal visit is to begin a positive relationship with the parents.

- Antenatal testing results, including triple screen, antenatal ultrasonography (US) reports, and chromosome analysis
- Medications
- Lactation history and history of breast abnormalities or surgery
- Family/social history, if not obtained prenatally

Antenatal US Findings

Clinicians need to know the postnatal management of infants who exhibit common abnormal findings on US.

Choroid plexus cysts are seen commonly on US prior to 24 weeks' gestation. If not associated with other anomalies, they are unlikely to be of any significance. There is no need for follow-up assessment if results of the baby's physical examination are normal.

Echogenic intracardiac focus is a bright spot near the papillary muscle of the left ventricle. There is a correlation with trisomy 21, but it is a normal finding in most cases. If the antenatal karyotype was normal or the baby does not have clinical findings suggestive of Down syndrome, the family can be reassured that the baby needs no further testing.

Echogenic bowel may be a marker for aneuploidy, cystic fibrosis, congenital infections, or rare intestinal disorders. However, most infants who exhibit this finding are normal. The mother may have undergone fetal karyotype, cystic fibrosis, and cytomegalovirus testing before delivery. If the baby appears normal on physical examination and if the antenatal testing results were negative, the baby needs no further testing. The primary care practitioner should be aware of the finding in case other signs arise in the future.

Mild enlargement or asymmetry of the cerebral ventricles may have more significance. Often the obstetric service performs serial US, karyotype, and cytomegalovirus and toxoplasmosis testing. In addition to a physical examination, we recommend performing a cranial US after delivery to document the brain anatomy and the size and concordance of the ventricles. An infant who has abnormal findings on physical examination or US should be referred for consultation. These findings, when mild, often represent normal variation. However, children whose ventricles are enlarged or asymmetric may be at risk for neurodevelopmental problems.

Hydronephrosis is found on fetal US in as many as 4.5% of pregnancies. Many affected infants have some abnormality found on postnatal evaluation. Generally accepted criteria for fetal hydronephrosis are greater than 4 mm renal pelvic dilation in the antero-posterior diameter in the second trimester and greater than 7 mm dilation in the third trimester. Infants who meet these criteria should undergo postnatal renal US. Caliectasis, which refers to dilation of the calyces, may be more significant and warrants postnatal evaluation even if the fetus does not reach the previously noted thresholds for size. Opinions differ about the necessity of performing voiding cystourethrography (VCUG). Normal renal US findings do not rule out vesicoureteral reflux. Recent studies confirm that 10% to 30% of newborns who have antenatal hydronephrosis have vesicoureteral reflux and are at risk of renal scarring from urinary tract infection. (1) Depending on the assessment of patient compliance with follow-up, the renal US and VCUG may be performed during the newborn stay or later as an outpatient. If results of the full evaluation are normal, but it was performed in the days after delivery, a repeat US at 2 to 3 months of age may be prudent to assure that mild hydronephrosis was not missed. Infants who are not yet evaluated or have been found to have abnormalities should

be discharged on prophylactic antibiotics. Infants who are known to have bladder outlet obstruction, cystic kidneys, high grades of hydronephrosis, or reflux require prompt urologic referral. Those who have mild hydronephrosis or low-grade reflux can be seen by a urologist after hospital discharge.

Delivery

Understanding the impact that labor and delivery have on the baby as well as the metabolic and physiologic adaptation involved in the transition to extrauterine life is important. The clinician should be aware of fetal and maternal risk factors for neonatal depression. Antenatal evaluations such as nonstress tests and other assessments of fetal well-being, which may provide information about the adequacy of the intrauterine environment and uteroplacental function, should be reviewed. A biophysical profile includes results of a reactive nonstress test and assessments of fetal breathing, heart rate, tone, and amniotic fluid levels (fluid levels reflect fetal urinary output and, thus, renal perfusion).

Approximately 10% of infants require some form of resuscitation; 20% of such infants require aggressive intervention. Because resuscitation may be an infrequent event, preparation of staff and equipment is paramount. Physicians should familiarize themselves with their hospital's delivery suite, equipment, and staffing. The American Academy of Pediatrics (AAP) and the American Heart Association's Neonatal Resuscitation Program is an excellent standard for neonatal care in the delivery room (<http://www.aap.org/nrp/nrpm.html>).

Most infants begin effective respirations following delivery and should establish regular respirations by 1 minute of age. An infant who has primary apnea and fails to respond to stimulation generally responds to bag and mask ventilation. The clinician must be familiar with the bag and mask that he or she will be using, know how to obtain a good seal with the mask, and be able to judge the infant's response to ventilation. Periodic practice sessions with a mannequin or mock codes may help maintain skills. Vigorous babies who are delivered through meconium do not require intubation. Common errors in delivery room resuscitation include overly vigorous stimulation of an infant who has apnea and inappropriate or premature use of gastric suctioning.

Keeping the baby warm after delivery and during resuscitation minimizes heat loss. Newborns are at risk of heat loss due to their large surface area-to-body mass ratio. Cold stress can lead to depletion of important stores of the infant's fat and glycogen. A radiant warmer that has a servocontrolled mechanism should be available

in the delivery area for babies who need resuscitation. Healthy infants should be dried, covered with dry linen, and kept warm. Placing infants skin-to-skin with the mother immediately after delivery may promote bonding and breastfeeding success while keeping the baby warm. (2)

The Apgar score (a table can be found in *Guidelines for Perinatal Care* (3)) has been used for many years to assess an infant's transition to extrauterine life. The 1-minute Apgar score reflects the infant's intrauterine environment and tolerance of the delivery process. The 5-minute score reflects the success of the infant's transition. The scores can provide information about the initial status of the baby and the response to interventions as well as help predict neonatal survival. However, Apgar scores should not be used to make decisions about the initiation or method of resuscitation. Cord blood gases may provide more useful information about the baby's physiologic status and the magnitude of any preceding hypoxic-ischemic insult. Infants who have 5-minute Apgar scores of less than 7 are at risk for suboptimal transition and may require close observation. Infants whose 5-minute Apgar scores are 3 or less need very careful subsequent monitoring and observation, often requiring intensive care. The ability of the infant to maintain his or her temperature and sustain a normal heart and respiratory rate generally indicates a successful transition.

After Delivery

Placing the healthy newborn skin-to-skin on the mother's chest immediately after birth may facilitate breastfeeding by encouraging latch-on during the baby's early alert period. (3) Infants often root and find the breast with minimal assistance. Vitamin K and erythromycin administration, as well as weighing and measuring the baby, can be delayed for 1 hour to allow this important mother-child interaction.

Nursing Routines

The infant's vital signs, including temperature, respiratory rate, heart rate, and pain assessment, should be monitored frequently in the first hours after birth until stable (and then per hospital routine). Blood pressure does not need to be assessed routinely in healthy babies. Blood pressure measurements are needed when infants are not transitioning well (blood pressure norms vary with gestational age). Parents should be instructed in skin and cord care. Studies that have evaluated cord care practices have not documented superiority of any one method. The recent trend of dry cord care without the application of antimicrobial agents has not led to in-

creased infection rates in newborns delivered in developed countries. (4)

Soon after birth, infants at risk for specific problems such as infection, hypoglycemia, HIV, or hepatitis B and those exposed to maternal medications should be identified because they may need additional screening. Medical problems diagnosed prenatally should be brought to the attention of the supervising clinician. The infant should be weighed daily and the percent weight loss from birth recorded on the bedside chart. Healthy infants may lose 2% to 3% of their birthweight daily for the first 2 to 3 postnatal days. When breastfeeding is optimal, the infant's weight loss begins to plateau after 48 to 72 hours, and an infant whose weight is more than 7% to 8% below birthweight should be evaluated. Excessive loss may indicate feeding problems such as inadequate milk or colostrum supply or poor milk transfer. Hospital routines that involve initial feeding of newborns with formula should be avoided in the absence of medical indications. Sterile water or glucose water should be avoided in newborns because of the risk of hyponatremia.

First Examination

Before examining the infant, the clinician should review the baby's gestational age, growth parameters, and vital signs. Starting with the best obstetric dates, the examination of the baby can aid in assigning a correct gestational age.

A tool such as the new Ballard score (a figure of which can be found in *Guidelines for Perinatal Care* (3)) can be used to assess maturity. A preterm infant is defined as one whose gestation is fewer than 37 weeks, a term infant as one whose gestation is between 37 and 41 6/7 weeks, and a postterm infant as one whose gestation is 42 weeks or greater. Near-term refers to infants whose gestations are 35 to 37 6/7 weeks.

The weight, length, and head circumference should be plotted on standardized growth curves (available at <http://www.cdc.gov/growthcharts>). Infants whose birthweights are less than 2,500 g are referred to as being of low birthweight. Infants whose birthweights are below the 10th percentile are referred to as being small for gestational age (SGA). Babies can be small because they are preterm or constitutionally small or because they have experienced inadequate prenatal growth. Infants whose birthweights are greater than the 90th percentile are considered large for gestational age (LGA) and may be at risk for hypoglycemia and birth trauma (clavicular frac-

ture, scalp hematoma, brachial plexus injury). Intrauterine growth restriction (IUGR) refers to a baby who does not follow the expected prenatal growth pattern. The prenatal history, placental examination, or infant examination may explain the cause of the poor growth. Additional laboratory tests may be needed. Such small or poorly grown babies are at higher risk for problems related to poor reserve and increased metabolic requirements, including problematic transition, poor feeding, hypothermia, hypovolemia, and hypoglycemia. Postterm babies also may experience IUGR and be at risk for similar problems as well as for meconium aspiration and pulmonary hypertension.

Performance of the infant's first physical examination in the presence of the parents allows the clinician to assess the infant's transition and evaluate for abnormalities while highlighting the strengths of the healthy newborn and providing family-centered care. The examination should take place in a quiet area with good lighting and the necessary instruments to examine the newborn from

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head to toe. As the baby is examined, the clinician should narrate the findings to engage the parents' interest. Performing the less invasive aspects of the examination first, before fully undressing the baby, makes the examination easier. During the examination, the clinician also can assess the quality of the infant-parent interaction; the developmental strengths of the infant; and the infant's posture, tone, color, and state. A direct ophthalmoscope should be used to visualize the retinal red reflex and a bright light to inspect the palate. Time should be taken to calm the baby so the assessment of heart, lungs, abdomen, and hips is optimal. The baby may have undergone a stressful birth process that could result in injuries, bruising, or physical signs of stress.

The gestational age of the infant should be confirmed as predicted by dates. Preterm infants may have abundant vernix, decreased subcutaneous fat, pink thin skin, decreased tone, and immature reflexes. A normally developing term infant should be pink and chubby, alert and able to fixate visually, and have normal muscle tone and

Table 1. Near-term Order Set

- Lactation evaluation within 24 hours of delivery
- Mother to pump breasts every 3 hours after nursing unless infant nurses vigorously
- Infant put to breast at least every 3 hours; observe latching-on three times per day
- Consider supplement after nursing with expressed breast milk (or formula if needed) if weight loss is more than 3% per day, the infant is feeding poorly, or weight is less than 2,500 g
- Keep baby skin-to-skin or well bundled
- Take temperature every 3 hours prior to feeding

reflexes. Postterm infants may have decreased subcutaneous tissue, dry or peeling skin, and wrinkled skin or sparse hair, reflecting their malnutrition. Babies who experience IUGR may lack subcutaneous fat and have an alert, wide-eyed, or anxious appearance.

Care of Near-term Infants

The care of the healthy near-term infant (born between 35 and 37 6/7 weeks' gestation) deserves special consideration because these babies often appear robust but may have physiologic vulnerabilities. Such infants, even if weighing more than 3,000 g, are physiologically immature and may not feed well. They are prone to hypothermia, hypoglycemia, jaundice, kernicterus, dehydration, breastfeeding problems, and an increased rate of readmission. (5) Preterm infants have a greater daily fluid requirement per kilogram of body weight and often require more calories per kilogram per day than do term infants. Insensible water loss is increased with prematurity, phototherapy, and the use of radiant warmers. Infants born at fewer than 37 weeks' gestation at our hospital are monitored for 12 hours in the transitional unit and transferred to couplet care when their vital signs are stable. With lactation assistance, maternal breast pumping, and judicious use of supplementation, these babies breastfeed well. We have a specific written order set for the near-term infant that addresses their physiologic vulnerabilities (Table 1). Clinicians should consider keeping these infants (with their mothers) in the hospital until they are feeding well and gaining weight. Infants fewer than 37 weeks' gestation need a car seat test prior to discharge, which involves a 1- to 2-hour observation of heart rate, respirations, and oxygen saturation while in the car seat. (6)

Table 2. Evaluation of Delayed Voiding or Stooling

Delay in voiding (more than 24 hours after birth)

- Repeat examination of abdomen and genitalia
- Assess for adequacy of feeding
- Catheterize baby to see if urine is present
- Obtain urinalysis
- Check blood urea nitrogen and creatinine levels
- Order renal ultrasonography
- If baby begins to void spontaneously and is observed to have no further problem, evaluation need not be completed
- If baby continues not to void, urology referral may be needed

Delay in stooling

- Repeat examination of abdomen and rectum
- Assess for adequacy of feeding
- If no stool at 48 hours, order barium enema to evaluate for Hirschsprung disease
- Order surgical consultation for rectal biopsy
- Observe for signs of intestinal obstruction, hydration, and feeding until a diagnosis is established

Breastfeeding

Policy makers, scientists, and parents increasingly have recognized that breastfeeding is the optimal method of infant feeding. Pediatricians need the knowledge and skills to help mothers make informed decisions and assist them with breastfeeding. To that end, we encourage all clinicians to review the recently published AAP policy statement on breastfeeding and the use of human milk. (2) Key points of the statement include:

- Recommend human milk for all infants except where contraindicated
- Educate and support both parents about the importance of breastfeeding and strategies for dealing with common problems that may arise
- Put healthy infants skin-to-skin after delivery and have them remain there at least until the first feeding is accomplished (longer if possible)
- Avoid procedures that may interfere with breastfeeding
- Avoid supplements of water or formula unless a medical indication exists
- Avoid using pacifiers during the initiation of breastfeeding
- Encourage mothers to feed the infant whenever he or she demonstrates interest in feeding or suckling, at least 8 to 12 times a day

- Conduct a formal evaluation of breastfeeding twice daily while in the hospital
- Provide close follow-up in the days following hospital discharge
- Know that exclusive breastfeeding for 6 months provides optimal infant nutrition
- Have mother and infant sleep in proximity to one another
- Should either mother or infant need hospitalization, make every effort to maintain breastfeeding or provide human milk for the infant

Norms of Renal and Gastrointestinal Function

Most infants void by 12 hours of age and pass stool by 48 hours. If either function is delayed, such delay must be evaluated prior to discharge. Clinical evaluation of a healthy infant who has delays in voiding or stooling is shown in Table 2.

Routine Screening and Testing

Blood glucose screening should be performed on infants at risk for hypoglycemia, including infants of diabetic mothers, low-birthweight infants (<2,500 g), SGA infants (<10th percentile for weight), LGA infants (>90th percentile for weight), infants experiencing hypothermia, and infants who have signs of hypoglycemia or sepsis. Such infants may require additional therapy and testing if their blood glucose levels are not maintained in the normal range with routine feeding.

Hearing screening of all newborns is the standard of care across the United States. Some 1 to 3 per 1,000 newborns have bilateral hearing loss. Multiple studies have confirmed the long-term benefit of early identification of the hearing-impaired infant. Each hospital should develop a plan for screening infant hearing. Either otoacoustic emission or auditory brainstem response screening provides efficient noninvasive screening of newborns; both methods are associated with low rates of follow-up testing. Clinicians should understand the basics of infant hearing screening and follow-up for hearing-impaired infants.

Newborn metabolic/genetic screening should be performed on every newborn according to the newborn screening program mandated in each state. Tandem mass spectrometry technology allows expanded screening for many inborn errors of metabolism, but is not yet standard in all states. There is evidence that this new method

ensures earlier diagnosis of affected infants and may decrease morbidity and parental stress related to the infant's diagnosis. (7) The infant's clinician is responsible for appropriate testing, follow-up of abnormal test results, coordination of care with the subspecialist if the child is found to have a disorder, and maintenance of accurate records. As with all chronic disorders, pediatric clinicians should assist the family by explaining the disease or test results and referring them to the appropriate community services.

The clinician must understand current prevention strategies for hepatitis B virus (HBV) transmission. The AAP Committee on Infectious Diseases and the Centers for Disease Control and Prevention (CDC) have created guidelines to prevent transmission of HBV from mother to infant. Current guidelines recommend screening all pregnant women, vaccinating all newborns, administering hepatitis B immune globulin and vaccine to all infants born to HBV surface antigen-positive mothers, and determining HBV serologies on high-risk infants at 9 to 15 months of age.

GBS infection has been a leading cause of neonatal morbidity and mortality since the 1970s. Strategies to

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prevent transmission of GBS from mother to infant have reduced the incidence of early-onset GBS disease from 1.7 per 1,000 live births in 1993 to 0.6 per 1,000 live births in 1998. The recently published CDC guidelines for prevention of perinatal GBS disease recommend that: 1) all pregnant women be screened for GBS at 35 to 37 weeks' gestation, 2) these results be available to the baby's clinician, 3) all GBS-positive mothers receive intrapartum antibiotic prophylaxis, 4) the asymptomatic infant of a GBS-positive mother who received appropriate intrapartum antibiotic prophylaxis generally not receive sepsis evaluation or treatment, 5) the infant of a GBS-positive mother who did not receive proper intrapartum antibiotic prophylaxis receive a sepsis evaluation and possibly further evaluation or treatment, and 6) infants undergo a full diagnostic evaluation and treatment if the mother is suspected of having chorioamnionitis.

Mothers generally are tested serologically for syphilis

Table 3. Ten Key Elements in Preventing Severe Hyperbilirubinemia (8)

1. Promote and support successful breastfeeding.
2. Establish nursery protocols for the identification and evaluation of hyperbilirubinemia.
3. Measure the total serum bilirubin or transcutaneous bilirubin of infants who exhibit jaundice in the first 24 hours after birth.
4. Recognize that visual estimation of the degree of jaundice can lead to errors, particularly in darkly pigmented infants.
5. Interpret all bilirubin levels relative to the infant's age in hours.
6. Recognize that infants born at fewer than 38 weeks' gestation, particularly those who are breastfed, are at higher risk of developing hyperbilirubinemia and require closer surveillance and monitoring.
7. Assess all infants before discharge for the risk of severe hyperbilirubinemia.
8. Provide parents with written and verbal information about newborn jaundice.
9. Provide appropriate follow-up based on the time of discharge and the risk assessment.
10. Treat newborns, when indicated, with phototherapy or exchange transfusion.

early in pregnancy, and the American College of Obstetrics and Gynecology recommends a repeat test at delivery. Protocols for management of mothers and infants who have positive syphilis test results should address the diagnosis and treatment of infants who have congenital syphilis or those born to the inadequately treated mother as well as follow-up for the infant who has a passively acquired positive syphilis blood test.

Vitamin K administration after delivery reduces the risk of hemorrhagic disease in the newborn. Concerns about increased risk of malignancy from vitamin K injection are unfounded. Skeptical parents can be referred to the AAP policy statements of 1999 and 2003. Reviewing package inserts with families also may allay fears of additives or preservatives.

Erythromycin eye ointment for the prevention of ophthalmic gonorrhea is recommended.

Common Problems

Recent concerns about kernicterus have led to the recommendation that newborns receive specific care to prevent severe hyperbilirubinemia. There are several risk factors for excessive production or decreased elimination

Table 4. Safe Sleep Instructions

- Always have baby sleep on the back (supine)
- Place the baby on a firm mattress in a safe sleep environment
- Avoid loose bedding, pillows, and blanket rolls and use proper sleep clothing
- Avoid overheating
- Avoid waterbeds, soft mattresses, and sofas
- Avoid cigarette smoke exposure
- Avoid nonparent adults, children, or pets in the bed
- Encourage breastfeeding
- Discuss risks and benefits of cosleeping

of bilirubin that may lead to hyperbilirubinemia. The increase in breastfeeding rates, the multiethnic population in the United States, and early discharge of newborns all have contributed to the increase in babies who have significant hyperbilirubinemia. The recent AAP policy for the prevention of hyperbilirubinemia outlines 10 key elements (Table 3). (8) We recommend that each newborn unit develop a policy that addresses these key points. The AAP Web site provides answers in English and Spanish to frequently asked questions that can be used for parent education (www.aap.org).

Developmental dysplasia of the hip refers to the presence of an unstable, subluxated, dislocated, or malformed hip. The incidence is approximately 11.5 per 1,000 infants, but infants who have risk factors have a much higher rate. The AAP practice parameter of April 2000 provides an excellent review of the problem. (9) The standard of care is for all infants to have repeated hip examinations until they are walking well. Pediatric clinicians should document each hip examination in the medical record. Newborns who have positive Ortolani or Barlow signs need orthopedic referral; infants who have equivocal signs may be re-examined in 2 weeks and referred if the signs persist. Those who have risk factors, such as breech presentation or a positive family history, should undergo screening hip ultrasonography at 4 to 6 weeks of age, even if the physical examination results are normal.

Pain assessment and management is important. Every newborn unit should have a procedure to assess and document pain in the newborn. Offering newborns the breast, sucrose solution, or non-nutritive sucking is recommended for infants undergoing painful procedures. When a newborn male is being circumcised, adequate analgesia in the form of a regional nerve block or topical anesthetic cream should be used for pain reduction.

Deformational plagiocephaly and brachycephaly are

becoming increasingly common. The causes are many, with excessive time on the back, use of infant positioning devices, and the presence of torticollis all probably contributing. Infants who are born with a head turn preference and are not given adequate “tummy time” may quickly develop positional cranial flattening. The excessive use of infant seats, car seats, and “travel system” strollers probably also contribute. (10) Parents should be instructed how to prevent plagiocephaly, reminding them always to place the baby in a supine position for sleep. Recommendations include altering the baby’s head position and body orientation when putting him or her to sleep, placing the baby prone when awake as much as possible during the day, minimizing the use of infant seats, using the car seat primarily in the car, and using front carriers and slings when the baby can support his or her head.

Safety

Prevention of sudden infant death syndrome (SIDS) begins in the newborn unit. The supine sleeping position has reduced the rate of SIDS by almost 50% in the last 12 years. Infant sleep position used by the hospital staff influences how parents position their babies. We recommend providing written materials about the other aspects of infant care that may affect the risk of SIDS (Table 4). Free educational materials can be obtained by contacting the National Institute of Child Health and Human Development Back to Sleep Campaign (phone: 800-505-CRIB (2742), www.nichd.gov/SIDS).

Car seat safety counseling should be provided by clinicians caring for newborns. The AAP has published recommendations for the safe transportation of newborns at hospital discharge: (11)

- Families should be informed of particular car seat laws in their state
- Maternity units should have provision for educating parents about car seat safety; Safe Ride News (www.saferidenews.com) and the National Highway Traffic Safety Association (www.nhtsa.gov) both provide up-to-date patient educational materials
- Every newborn should be discharged in a properly fitting car seat, and “hands-on” teaching should be part of the instruction provided to parents
- Infants younger than 37 weeks’ gestation require car seat safety testing before discharge

- The newborn unit may want to have free car seats and beds available for donation to indigent families or preterm infants who fail the car seat test, respectively

Discharge

Most infants are ready for discharge at 48 hours after a vaginal delivery and 72 to 96 hours after a cesarean section delivery. The infant is medically ready for discharge when he or she has stable vital signs for at least 12 hours, appears healthy and has normal results on physical examination, has stoolled and voided, is feeding well (or will be sent home after additional lactation evaluation with a feeding plan in place), has completed all screening tests, and has appropriate follow-up care planned. Additionally, parent education should be completed and competency demonstrated.

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Early discharge prior to 48 hours may be appropriate for selected well infants. (12) Early discharge should only occur after a vaginal delivery; when the antepartum, delivery, and postpartum course are uncomplicated for both mother and baby; when the baby is term and appropriate for gestational age; and when the baby has been evaluated for jaundice. The family should be assessed for risk factors and prompt medical follow-up assured. Early discharge can benefit the family, improving bonding and attachment while minimizing iatrogenic risks. Complications of early discharge include delayed detection of treatable medical conditions, hyperbilirubinemia, poor feeding, early termination of breastfeeding, or hospital readmission.

The clinician must arrange for an outpatient visit within 2 to 3 days of discharge or determine that a mechanism is in place for parents to make the appointment. If a mother is discharged before her infant, every effort should be made to allow the mother to stay on the postpartum unit with her baby.

Outpatient Visits

As noted previously, the first outpatient visit must occur several days after hospital discharge to evaluate for hyper-

bilirubinemia, dehydration, and general well-being. The 2-week newborn visit no longer is viewed as an appropriate first outpatient appointment. We encourage the mother to bring her spouse or support person to the visit. The clinician should review pertinent aspects of the maternal history, newborn hospital course, and interim feeding and elimination and perform a physical examination. The 4- to 5-day-old infant who is consuming an adequate amount of human milk should have 6 to 8 voids and yellow, seedy stools daily; have lost no more than 7% to 8% of birthweight; and be satisfied after 20 to 30 minutes of nursing. The clinician should observe a feeding at the breast if the mother reports a problem with breastfeeding or if the infant has lost excessive weight. The infant who is not gaining weight may need to be supplemented with pumped human milk or formula, but every effort should be made to address the underlying breastfeeding problem.

Infants who have problems such as hip dysplasia, hearing screen failures, or abnormal antenatal testing results may need additional follow-up or referrals to a specialist.

Subsequent Visits

Many newborns, even those doing relatively well, benefit from a second outpatient visit about 1 week after the first to ascertain that appropriate weight gain (ie, at least 1 oz/d) and return to birthweight have been achieved. Office visits may occur every 2 to 3 days if adjustments are being made to feeding routines until the infant is gaining weight consistently. Other topics to cover include vitamin D supplementation, a review of metabolic/genetic screening results, and assessment of maternal mental health. High-risk situations, as in the case of a single mother, a teen parent, or a mother who has had limited or no prenatal care, should prompt specific questions about infant safety.

Postpartum Depression

During the weeks after delivery, the pediatric clinician is in an excellent position to screen for postpartum depression. Although 50% to 80% of all mothers experience “baby blues” during the first 2 weeks postpartum, 10% of mothers experience postpartum depression. “Baby blues” are characterized by heightened emotions and tearfulness and usually resolve by the third week after delivery. The mother may be assessed for depression with a standardized screening tool such as the Edinburgh Postnatal Depression Scale (<http://www.dbpeds.org>). Inquiring about the mother’s ability to eat, sleep when given a chance, and experience pleasure usually reveals depressive symptoms, if present. The pediatrician should refer the mother to her obstetrician or a psychiatric care

clinician when postpartum depression is suspected. If the mother is deemed at risk to injure herself or her infant or appears to be exhibiting psychotic symptoms, an emergent referral is mandated. It should be noted that most antidepressants are compatible with breastfeeding.

Conclusion

The mission of pediatric clinicians in caring for well newborns is to ensure the physical health and well-being of the child while supporting and educating the family during this critical time.

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PIR Quiz

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6. The infant must make many adaptations from the intrauterine to the extrauterine environment. A healthy newborn should be expected to establish regular respirations by:
 - A. 30 seconds.
 - B. 1 minute.
 - C. 2 minutes.
 - D. 3 minutes.
 - E. 4 minutes.

7. At a delivery, the attending pediatrician needs to be concerned about excessive heat loss in a newborn. The *most* likely reason for such heat loss in a newly delivered infant is:
 - A. Group B streptococcal sepsis.
 - B. Low Apgar score.
 - C. Maternal narcotics administered shortly before delivery.
 - D. Oligohydramnios.
 - E. The newborn's large surface area-to-body mass ratio.

8. First voiding by a newborn is an important function to document. *Most* newborns void by:
 - A. 3 hours.
 - B. 6 hours.
 - C. 9 hours.
 - D. 12 hours.
 - E. 15 hours.

9. For a number of reasons, pediatricians continue to receive pressure to permit a newborn to be discharged early after delivery. Early discharge now is considered to be before the age of:
 - A. 48 hours.
 - B. 72 hours.
 - C. 96 hours.
 - D. 120 hours.
 - E. 144 hours.