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Late-Preterm Infants

Committee on Obstetric Practice

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ABSTRACT: *Late-preterm infants* (defined as infants born between 34⅐ weeks and 36⅐ weeks of gestation) often are mistakenly believed to be as physiologically and metabolically mature as term infants. However, compared with term infants, late-preterm infants are at higher risk than term infants of developing medical complications, resulting in higher rates of infant mortality, higher rates of morbidity before initial hospital discharge, and higher rates of hospital readmission in the first months of life. Preterm delivery should occur only when an accepted maternal or fetal indication for delivery exists. Collaborative counseling by both obstetric and neonatal clinicians about the outcomes of late-preterm births is warranted unless precluded by emergent conditions.

During the past decade, the proportion of all U.S. births that were *late-preterm births* (defined as birth between 34⅐ weeks and 36⅐ weeks of gestation) increased 16% (1). The rate of all *preterm births* (defined as birth at less than 37 weeks of gestation) in the United States increased from 10.9% in 1990 to 12.7% in 2005 (2), an increase of 16.5%. This increase largely was caused by the increase in late-preterm births. Late-preterm infants often are mistakenly believed to be as physiologically and metabolically mature as term infants. However, compared with term infants, late-preterm infants are at higher risk of developing medical complications resulting in higher rates of infant mortality, higher rates of morbidity before initial hospital discharge (3–5), and higher rates of hospital readmission in the first months of life (4–6).

Infant Implications

Late-preterm births make up 71% of all preterm births (1). It is important to limit late-preterm deliveries to those with a clear maternal or fetal indication for delivery. As the number of late-preterm births increases, it is important to understand the unique problems that this growing population of infants may experience.

The American Academy of Pediatrics has published guidelines for the care of late-preterm infants (7). The following sections contain extracts taken from these guidelines.

Summary

During the initial birth hospitalization, late-preterm infants are 4 times more likely than term infants to have at least 1 medical condition diagnosed and 3.5 times more likely to have 2 or more conditions diagnosed (6). Late-preterm infants are more likely than term infants to be diagnosed during the birth hospitalization with temperature instability (6), hypoglycemia (6), respiratory distress (6, 8–11), apnea (12, 13), jaundice (6), and feeding difficulties (6). During the first month after birth, late-preterm infants are also more likely than term infants to develop hyperbilirubinemia (14–17) and to be readmitted for hyperbilirubinemia (18–20) and non–jaundice-related diagnoses such as feeding difficulties and "rule-out sepsis" (18).

In 2002, the neonatal mortality rate (deaths among infants 0–27 days' chronologic age) for late-preterm infants was 4.6 times higher than the rate for term infants (4.1 vs 0.9 per 1000 live births, respectively). This difference in neonatal mortality has widened slightly since 1995, when there was a fourfold difference in rates between late-preterm and term infants (4.8 vs 1.2 per 1000 live births, respectively). The infant mortality rate was also higher among late-preterm infants

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than term infants in 2002 (7.7 vs 2.5 per 1000 live births, respectively). This threefold difference has remained relatively constant since 1995, at which time the infant mortality rate was 9.3 per 1000 live births among late-preterm infants and 3.1 per 1000 live births among term infants.

Pulmonary Function

After birth, infants with fetal lung structure and immature functional capacity are at greatest risk of respiratory distress, need for oxygen and positive-pressure ventilation, and admission for intensive care (6, 9, 21, 22). From 34⁰⁄₇ through 36⁶⁄₇ weeks' gestation, terminal respiratory units of the lung evolve from alveolar saccules lined with both cuboidal type II and flat type I epithelial cells (terminal sac period) to mature alveoli lined primarily with extremely thin type I epithelial cells (alveolar period) (23, 24). During the alveolar period, pulmonary capillaries also begin to bulge into the space of each terminal sac, and adult pool sizes of surfactant are attained (25). Functionally, this immature lung structure may be associated with delayed intrapulmonary fluid absorption, surfactant insufficiency, and inefficient gas exchange (8, 26).

Apnea occurs more frequently among late-preterm infants than term infants. The incidence of apnea in late-preterm infants is reported to be between 4% and 7% (12, 21, 27, 28) compared with less than 1% to 2% at term (12, 29). The predisposition to apnea in late-preterm infants is associated with several underlying factors including increased susceptibility to hypoxic respiratory depression, decreased central chemosensitivity to carbon dioxide, immature pulmonary irritant receptors, increased respiratory inhibition sensitivity to laryngeal stimulation, and decreased upper airway dilator muscle tone (12, 13, 21, 30, 31).

Cardiac Function

It is generally believed that structural and functional immaturity restricts the amount of cardiovascular reserve that is available during times of stress (32, 33). Immature cardiovascular function also may complicate recovery of the late-preterm infant with respiratory distress because of delayed ductus arteriosus closure and persistent pulmonary hypertension (34).

Cold Response

Late-preterm infants have less white adipose tissue for insulation, and they cannot generate heat from brown adipose tissue as effectively as infants born at term. In addition, late-preterm infants are likely to lose heat more readily than term infants, because they have a larger ratio of surface area to weight and are smaller in size.

Hypoglycemia

The incidence of hypoglycemia is inversely proportional to gestational age. Preterm infants are at increased risk of developing hypoglycemia after birth, because they have immature hepatic glycogenolysis and adipose tissue lipolysis, hormonal dysregulation, and deficient hepatic gluconeogenesis and ketogenesis. Blood glucose concentrations among preterm infants typically decrease to a nadir 1 to 2 hours after birth and remain low until metabolic pathways can compensate or exogenous sources of glucose are provided (35, 36). Immature glucose regulation likely occurs in late-preterm infants, because hypoglycemia that requires glucose infusion during the initial birth hospitalization occurs more frequently than in term infants (6).

Jaundice

Jaundice and hyperbilirubinemia occur more commonly and are more prolonged among late-preterm infants than term infants, because late-preterm infants have delayed maturation and a lower concentration of uridine diphosphoglucuronate glucuronosyltransferase (14, 37). Late-preterm infants are 2 times more likely than term infants to have significantly elevated bilirubin concentrations and higher concentrations 5 and 7 days after birth (14). Late-preterm infants also have immature gastrointestinal function (38, 39) and feeding difficulties that predispose them to an increase in enterohepatic circulation, decreased stool frequency, dehydration, and hyperbilirubinemia (15, 19, 20, 40–46). Feeding during the birth hospitalization may be transiently successful but not sustained after discharge. Feeding difficulties in late-preterm infants that are associated with relatively low oromotor tone, function, and neural maturation also predispose these infants to dehydration and hyperbilirubinemia (45–48).

Obstetric Implications

Because of the aforementioned increase in rates of morbidity and mortality of late-preterm infants, preterm delivery should only occur when an accepted maternal or fetal indication for delivery exists. Examples may include nonreassuring fetal status or a maternal condition that is likely to be improved by delivery. Collaborative counseling by both obstetric and neonatal clinicians about the outcomes of late-preterm births is warranted unless precluded by emergent conditions.

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