Late Preterm Birth: More Complex Than Almost Term

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The risks of continuing a late preterm pregnancy must be weighed against the associated morbidity of delivery and complications for the newborn.

Late preterm birth is defined as the delivery of infants between 34 0/7 and 36 6/7 weeks' gestational age. As of 2005, deliveries within this population accounted for approximately 71% of all preterm births. The rate of late preterm deliveries rose from 6.8% in 1990 to 8.1% in 2006, a 20% increase.[1-3] Late preterm births are therefore considered the fastest growing population of all preterm deliveries.

There are many theories to explain the drastic increase in the rate of late preterm delivery. For instance, increased maternal surveillance during pregnancy, including genetic screening, ultrasonography, and external fetal monitoring, allows for early detection of those at risk for stillbirth as a result of intrauterine growth restriction (IUGR), congenital anomalies, or placental insufficiency. Preexisting and pregnancy-related medical conditions are also followed closely, leading to delivery when signs of worsening disease emerge. These findings correlate with both the increase in medically indicated births from 29% in 1992 to 41% in 2002, and the steep decline in stillbirths between 1990 and 2004.[4-7]

The increase in multiple births as a result of assisted reproductive techniques also contributes, because of the higher likelihood that these infants deliver at an earlier gestational age as compared to singleton gestations.[4,8] Maternal obesity, which is becoming more common, impacts the rate of preterm delivery because of the associated medical and antenatal complications. Other factors include increasing maternal age and inaccurate pregnancy dating.

FOCUSPOINT
Late preterm delivery should occur only when an accepted maternal or fetal indication exists.

INDICATIONS FOR DELIVERY

Per ACOG recommendations, late preterm delivery should occur only when an accepted maternal or fetal indication exists, including nonreassuring fetal status or a maternal condition likely to be improved by delivery (Table 1).[9] Ananth and Vintzileos found that 23% of births prior to 35 weeks were medically indicated.[10] Of those indications, preeclampsia was the most common, followed by fetal distress, small for gestational age, and placental abruption.

Another study that compared the effect of maternal medical conditions on late preterm neonatal outcomes found that the most commonly reported conditions were diabetes, antenatal hemorrhage, and hypertensive disorders, including chronic hypertension, preeclampsia, and eclampsia.[11] However, 79% of the late preterm deliveries analyzed in this study were not associated with any maternal comorbidities. This corresponds with Loftin et al, who found that 75% of preterm births are spontaneous in nature, 60% of which are caused by preterm labor and 40% of which are due to premature preterm rupture of membranes.[12] Other medical indica-

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TABLE 1. Common Indications for Late Preterm Delivery

- Preeclampsia/hypertensive disorders of pregnancy
- Fetal distress
- Small for gestational age
- Placental abruption
- Diabetes
- Antenatal hemorrhage
- Preterm labor
- Premature preterm rupture of membranes
- Intrauterine growth restriction
- Autoimmune disorders
- Cardiac disease
- Renal disease

tions for delivery include IUGR, oligohydramnios, Rhesus isoimmunization, autoimmune disorders, cardiac disease, and renal disease.

NEONATAL COMPLICATIONS

The newborn delivered during the late preterm is at risk for several complications (Table 2).

Hypothermia

Two different types of adipose tissue are responsible for maintaining an infant's temperature: white and brown. White adipose tissue serves as insulation, and brown adipose tissue can be metabolized by prolactin, leptin, norepinephrine, cortisol, and triiodothyronine in order to generate heat. Late preterm infants lack adequate stores of both white adipose tissue and the hormones mentioned above, and they are therefore more likely to be hypothermic. Due to their size, late preterm infants are also more likely to lose heat than term infants.[13]

Hypoglycemia

Although infants of all gestational ages are at risk for hypoglycemia after birth, late preterm newborns are at most risk, secondary to their immature compensatory pathways. They have deficient hepatic gluconeogenesis, ketogenesis, glycogenolysis adipose tissue lipolysis, and hormonal dysregulation.[13] Therefore, once separated from maternal glucose levels, late preterm infants' blood glucose will remain low until they either are able to compensate or are given exogenous glucose.[13]

Jaundice

Uridine diphosphoglucuronate glucuronosyltransferase, the hepatic enzyme responsible for conjugating bilirubin, is deficient in late preterm infants. They also have feeding difficulties secondary to immature swallowing mechanisms and the lack of oral coordination. This in turn leads to increased enterohepatic circulation, decreased stools, dehydration, and therefore hyperbilirubinemia.[9] In comparison with term infants, the factors mentioned above lead to a 2-fold increased likelihood of developing elevated bilirubin levels.

Respiratory

In order to fully understand the effects that late preterm birth have on respiratory function, it is necessary to be familiar with the stage of lung development affected at the time of delivery. Weeks 28 to 36 are considered the saccular stage, during which the alveoli are composed of primitive, thick cells and are inefficient at gas exchange. Mature alveoli are not present until the alveolar stage, which occurs during weeks 36 through term.[14,15]

This explains why respiratory distress syndrome (RDS) was the most common complication in late preterm births during a retrospective multicenter trial that focused on respiratory morbidity in this population.[16] Approximately 10.5% of 34-week infants were affected by RDS, compared with a gradual decline to 0.3% in 40-week infants. Transient tachypnea of the newborn was the second most common, followed by pneumonia, pneumothoraces, and respiratory failure.

Apnea is also seen approximately 2- to 3-fold more often in late preterm infants than in term infants (4%-7% vs 1%-2%).[13] Likely factors that contribute to apneic events in this population include an immature central nervous system, hypoxic respiratory depression, decreased central chemosensitivity to carbon dioxide, and decreased upper airway dilator muscle tone.[9,13]

FOCUSPOINT

Each potential late preterm birth should be evaluated against risks of continuing pregnancy and associated morbidity of delivery.

TABLE 2. Late Preterm Neonatal Complications

- Transient tachypnea of the newborn
- Respiratory distress syndrome
- Apnea of prematurity
- Hypoglycemia
- Hypothermia
- Jaundice
- Feeding difficulties

Neurologic

Late preterm infants have less gyri, sulci, myelin, and overall brain volume than term infants.[13,17] This affects both the short-term morbidities listed above and long-term morbidities including behavior and performance in school. Morse et al evaluated the early-school-age outcomes of late preterm infants and found that these children had higher rates of developmental delay, disability in prekindergarten, retention, and suspension in kindergarten.[18]

CONCLUSION

Per ACOG, delivery in the late preterm range should occur only if absolutely indicated. The literature suggests that this is not the case. One study found that 23% of late preterm deliveries had no recorded indication for delivery on the birth certificate.[1] However, a recent study by Bailit found that birth certificates may overestimate the number of nonmedically indicated inductions by 11-fold.[19]

Multiple authors feel that obstetric providers are more likely to deliver patients at gestational ages approaching term, regardless of the severity of the indication. For example, preeclampsia diagnosed at an extremely preterm gestational age would require a significant degree of severity to prompt delivery compared with a case of mild preeclampsia at 36 weeks of gestation.[12] Therefore, each potential late preterm birth should be evaluated while weighing the risks of continuing the pregnancy against the associated morbidity of delivery. These patients should also be seen in conjunction with neonatology to thoroughly prepare them for the complications associated with late preterm birth.

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