Respiratory Disorders in Moderately Preterm, Late Preterm, and Early Term Infants

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KEYWORDS

• Moderately preterm • Late preterm • Early term • Respiratory distress
• Transient tachypnea of the newborn • Respiratory distress syndrome

KEY POINTS

- Even when it is just a few weeks before term gestation, early birth has consequences, resulting in higher morbidity and mortality.
- Respiratory issues related to moderate prematurity include delayed neonatal transition to air breathing, respiratory distress resulting from delayed fluid clearance (transient tachypnea of the newborn), surfactant deficiency (respiratory distress syndrome), and pulmonary hypertension.
- Management approaches emphasize appropriate respiratory support to facilitate respiratory transition and minimize iatrogenic injury.
- Studies are needed to determine the impact of respiratory distress coupled with mild-moderate prematurity on long-term outcome.

EPIDEMIOLOGY

Evidence accumulated in recent years shows that moderately preterm, late preterm, and early term births lead to significant acuity and expense. Twenty-four studies published between 2000 and 2009 have documented a consistently higher risk of respiratory morbidity in infants born at less than 37 weeks (**Fig. 1**).[1] Overall morbidities in late preterm infants have been noted to increase 20-fold with each week lost before 38 weeks' gestation.[2] The rate of respiratory compromise in 19 US hospitals was 10.5% of 19,334 late preterm and 1.13% of 165,993 term infants.[3] Often beginning as delayed respiratory transition and transient tachypnea, the course of respiratory distress in late preterm infants can be unpredictable. The scope and causes of

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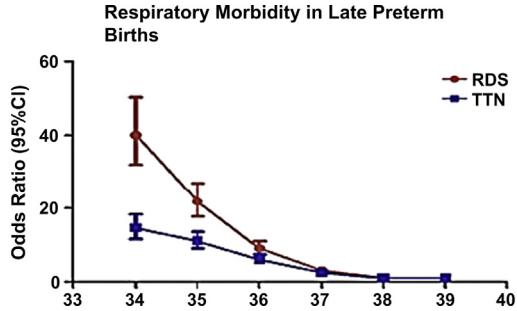

Fig. 1. Respiratory morbidity in late preterm births (infants born <37 weeks). CI, confidence interval; RDS, respiratory distress syndrome; TTN, transient tachypnea of the newborn. (*From* Kotecha S. Long term respiratory outcomes of late preterm-born infants. Semin Fetal Neonatal Med 2012;17(2):78; with permission; and *Data from* Hibbard JU, Wilkins I, Sun L, et al, Consortium on Safe Labor. Respiratory morbidity in late preterm births. JAMA 2010;304(4):419–25.)

respiratory disorders in this population can be varied and often overlap with transient tachypnea of the newborn (TTN), respiratory distress syndrome (RDS), persistent pulmonary hypertension (PPHN), and apnea.[4–17] Of the affected babies, the incidence of respiratory distress requiring mechanical ventilation corresponded with the degree of prematurity: 3.3% of late preterm infants born at 34 weeks' gestation, 1.7% at 35 weeks, and 0.8% at 36 weeks' gestation (**Fig. 2**).[10] Further, 29% of late preterm infants required intensive care, with 13% of those infants presenting with respiratory failure. Higher morbidity persists in early childhood; in one study, 30% of children less than the age of 2 years admitted to the pediatric intensive care unit for respiratory diseases were born prematurely (17% of these infants were classified as early preterm; 12% were classified as late preterm).[18]

Many late preterm infants develop respiratory distress soon after birth (sustained distress for more than 2 hours after birth accompanied by grunting, flaring, tachypnea, retractions, or supplemental oxygen requirement). Studies indicate that such

Neonatal Morbidity in Live Births Delivered Late Preterm (34, 35, 36 wk) and at 37 Weeks Compared With 39 Weeks as Referent

	Weeks of Gestation				
Morbidity	**34 (n=3,498)**	**35 (n=6,571)**	**36 (n=11,702)**	**37 (n=26,504)**	**39 (n=84,747)**
Respiratory distress					
Ventilator	116 (3.3)*	109 (1.7)*	89 (0.8)*	130 (0.5)*	275 (0.3)
Transient tachypnea	85 (2.4)*	103 (1.6)*	130 (1.1)*	187 (0.7)*	34 (0.4)
Intraventricular hemorrhage					
Grades 1, 2	16 (0.5)*	13 (0.2)*	7 (0.06)†	9 (0.03)	13 (0.01)
Grades 3, 4	0	1 (0.02)*	1 (0.01)	1 (0.004)	3 (0.004)
Sepsis					
Work-up	1,073 (31)*	1,443 (22)*	1,792 (15)*	3,274 (12)	10,588 (12)
Culture proven	18 (0.5)*	23 (0.4)*	26 (0.2)†	60 (0.2)*	97 (0.1)
Phototherapy	213 (6.1)*	227 (3.5)*	36 (2.0)*	418 (1.6)*	857 (1)
Necrotizing enterocolitis	3 (0.09)*	1 (0.02)†	1 (0.01)	3 (0.01)*	1 (0.001)
Apgar 3 or less at 5 min	5 (0.1)*	12 (0.2)*	10 (0.9)	21 (0.08)	54 (0.06)
Intubation in delivery room	49 (1.4)*	55 (0.8)†	36 (0.6)	154 (0.6)	477 (0.6)
One or more of the above	1,175 (34)*	1,565 (24)*	1,993 (17)*	3,652 (14)	11,513 (14)

Data are expressed as n (%).
* $P<.001$ compared with the 39 weeks referent.
† $P<.05$ compared with the 39 weeks referent.

Fig. 2. Percentage of infants born at late preterm gestations who require mechanical ventilation. (*From* McIntire DD, Leveno KJ. Neonatal mortality and morbidity rates in late preterm births compared with births at term. Obstet Gynecol 2008;111:38; with permission.)