The Meconium Aspiration Syndrome

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Aspiration of meconium-stained amniotic fluid during the birth process is a common event that can have catastrophic results. In fact, meconium aspiration syndrome has emerged as a leading cause of death in the neonatal period, with a mortality rate in the term infant as high as 20 times that of all other causes combined (22). Moreover, the impact on infant and family of the prolonged hospitalization, complications, and sequelae of the neonatal disease can be enormous and devastating.

In the past decade, intrapartum aspiration and the subsequent respiratory distress have received considerable attention from clinicians and investigators as other causes of neonatal mortality and morbidity have yielded to the techniques of newborn intensive care. Although the pathophysiology of meconium aspiration syndrome is not clearly defined, it has become apparent that the course and prognosis are mostly determined in the delivery room, perhaps even before the first breath is taken. The direction of current management is therefore toward anticipation and prevention of the syndrome; once pulmonary disease is established, there is little to offer but supportive therapy. The challenge for the physician is first to identify the infant at risk for aspiration and then to choose appropriate measures to prevent or at least minimize the developing symptoms.

Incidence

In general, the incidence of meconium aspiration parallels that of meconium passage in utero, although the physiologic mechanisms for the two processes may be quite different. Even with optimal obstetric management, 8.8% (14) to 29% (18) of vertex deliveries occur through meconium.
Of course, breech presentation is associated with far higher rates of meconium passage during delivery, but this is of no clinical significance if the rush of amniotic fluid following the aftercoming head is clear. Until recently, as many as 20% (14) to 35% (4) of infants born through meconium have been reported to develop respiratory symptoms ranging from mild to most severe, making this a leading cause of extended hospital stay in the term or postterm infant. In our experience, as many as 20% of the admissions to our newborn intensive care unit have been for treatment of meconium aspiration.

Pathophysiology (Fig. 10.1)
Meconium passage in utero can occur as a natural phenomenon in the maturation of a fetus and is, in fact, most common when gestational age is greater than 42 weeks. However, the incidence of meconium-stained amniotic fluid also increases with signs of fetal distress, specifically low-scalp pH or heart-rate abnormalities. Hyperperistalsis and relaxation of the anal sphincter have been associated with umbilical cord compression and the resultant fetal bradycardia (18).

Although Dawes and others have clearly demonstrated fetal breathing and gasping under normal and stressed conditions, it is not clear whether movement of amniotic fluid into the fetal lung occurs in sufficient quantity to cause significant respiratory distress. The pathophysiology of meconium aspiration syndrome is complex and involves many factors, including the amount and composition of meconium, the rate of its aspiration, and the degree of respiratory distress that results.

Fig. 10.1 Pathophysiology of meconium aspiration syndrome.