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Predictors of Mortality in Neonates with Meconium Aspiration Syndrome

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Meconium aspiration syndrome (MAS) is a major cause of respiratory difficulty after birth in term and post term infants across both the developing and developed world, and has a significant morbidity and mortality. MAS presents at or just after delivery with marked respiratory distress, hypoxemia, evidence of meconium beneath the vocal cords, and a chest *X*-ray showing hyperinflation, patchy infiltrates and occasional air leaks.

Meconium stained liquor (MSL) is relatively common occurring to 7-22% of all term deliveries [1]. The pathophysiology of the passage of meconium into the amniotic fluid prior to birth remains unclear but is associated with prolonged gestation, infection and hypoxia [2]. Only about 1% of infants born in the presence of MSL will develop MAS [3]. The factors that lead to the development of MAS in the presence of MSL are also not fully elucidated but chronic asphyxia and infection are considered to be the key factors [4]. A mechanism has been suggested whereby hypoxia and infection lead to the passage of meconium, and fetal gasping then leads to meconium aspiration [5]. Aspiration of meconium into the airways results in mechanical obstruction with an increased incidence of air leaks, adverse effects on pulmonary function, including reduced surfactant activity, a chemical pneumonitis and an inflammatory response. Significant respiratory difficulties after birth with sepsis or hypoxia may lead to pulmonary hypertension. Several factors contribute to the severity of MAS leading to a complex multisystem disorder requiring respiratory, cardiovascular, neurological and sepsis management [6].

The cause of death in infants with MAS is multifactorial and, for the neonatologist, predicting the likely causes of death helps target interventions to improve outcome. In this issue of *Indian Pediatrics*, Louis, *et al*. [7] have investigated the predictive factors for mortality after meconium aspiration in a major center of Northern India between 2004 and 2010. MAS was diagnosed when there were respiratory difficulties after birth in the presence of MSL and with a compatible chest *X*-ray. The authors identified a range of additional problems associated with MAS, including chorioamnionitis, persistent pulmonary hypertension of the newborn, hypotensive shock, myocardial dysfunction, hypoxic ischemic encephalo-pathy and renal dysfunction. Most of the diagnoses were made on the basis of clinical parameters and the specific cause was not identified. The authors undertook a retrospective observational study of 170 infants with MAS and identified a high mortality rate of 26% with median time to death of 24 hours. The authors speculate that the cause of the higher mortality rate than in other published data was due to a large number of small-for-gestational age infants. The authors identified that perinatal asphyxia with secondary hypoxic ischemic encephalopathy was associated with MAS in just under 50% of all infants. They reported a statistically significant difference in cord pH, 1 and 5 minute Apgar scores, persistent pulmonary hypertension, hypotensive shock and myocardial dysfunction in those who died.

A statistical prediction model identified that myocardial dysfunction and higher initial oxygen increased the odds of death whilst higher birth weight reduced the risk. The underlying cause for the myocardial dysfunction in conjunction with MAS was not elucidated in this study. The authors acknowledge the limitation that the diagnosis of myocardial dysfunction was made clinically but emphasize that knowledge of this as a risk factor can lead to close cardiovascular monitoring and early vascular support.

The data in this paper are helpful in understanding the predictors of mortality associated with MAS. However, if obstetricians – recognizing the association of perinatal infection, asphyxia and MSL with MAS – deliver at-risk

infants earlier, resulting in a reduction in the severity of MAS then this will aid neonatal management and reduce mortality [8].

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