Meconium Aspiration Syndrome

Meconium is a baby's first stool, typically passed after birth. In some cases, babies may pass meconium prior to birth, leading to **meconium-stained amniotic fluid (MSAF)**. **Meconium aspiration syndrome (MAS)** occurs when the baby breathes in, or aspirates, meconium-stained amniotic fluid. This often occurs in response to some stressor (such as infection or hypoxia) and can lead to respiratory distress.

PATHOPHYSIOLOGY

MAS can lead to respiratory distress through:

- **Inflammation:** Meconium can irritate the lung, leading to pneumonitis. ↑ risk of lung infections
- **Surfactant Inactivation:** Inflammatory processes in MAS can inactivate surfactant, although the exact mechanism is unknown. ↑ surface tension and ↓ oxygen delivery
- **Airway Obstruction:** Complete obstruction → can lead to collapse of distal airways. Partial obstruction → air enters the lungs but remains trapped. ↑ risk of rupture and pneumothorax

EPIDEMIOLOGY

- MSAF is most commonly seen in pregnancies > 42 weeks of gestation.
- Only 3-12% of babies born with MSAF will go on to develop MAS.

Babies born with MAS have a higher risk of developing **persistent pulmonary hypertension of the newborn**!

DIFFERENTIAL DIAGNOSIS

Pulmonary: transient tachypnea of the newborn, neonatal respiratory distress syndrome, pneumothorax
Cardiac: congenital heart malformations
Infectious: sepsis, pneumonia, meningitis

PRESENTATION

Respiratory distress → tachypnea, tachycardia, grunting, retractions, oxygen desaturations, cyanosis

Meconium staining → specifically of amniotic fluid, but also umbilical cord, nails, skin (may appear green/yellow)

INVESTIGATIONS

Chest X-Ray
Early → nonspecific
Late → hyperinflation, diaphragmatic flattening, atelectasis, consolidation

Arterial Blood Gas
Hypercapnic hypoxemic respiratory acidosis

Echocardiography
Investigate for persistent pulmonary hypertension of the newborn and exclude other diagnoses

Blood / Tracheal Cultures
Rule out sepsis / pneumonia

MANAGEMENT

- **Supportive Care** → monitor vitals, glucose, acid-base balance and fluid balance
- **Respiratory Support** → maintain an oxygen saturation of 90-95%; may require oxygen, non-invasive ventilation, intubation with mechanical ventilation, surfactant or inhaled nitric oxide
- **Antibiotic Therapy** → investigate and treat for possible sepsis/infection as clinically indicated

*Endotracheal suctioning is not routinely recommended but may be indicated based on the clinical situation!

July 2025
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