

S Were there any risk factors for meconium passage?

Late delivery or being postdates

- In one study, more than 30% of all pregnancies that lasted longer than 42 wks had passage of meconium.

These other causes of uteroplacental insufficiency are also a risk for meconium passage:

- Uterine infection
- Maternal sepsis
- Hypertension
- Smoking
- Long-standing diabetes
- Heart disease
- Chronic lung disease

Was meconium visualized on delivery of the neonate or on rupture of the amnion?

Meconium aspiration can occur with minimal meconium, but it is more common when there is more of it in the amniotic fluid.

What was the appearance of the meconium?

Meconium in the amnion that has been there for a while may appear yellow, thin, and watery. This is possibly less risky than the thick, particulate, pea soup–appearing, fresh meconium.

Was an effort made to remove meconium from the pt's airway before the first breath?

During the resuscitation of a neonate bathed in meconium, particularly thick meconium, suctioning of the mouth and nares is generally not sufficient. The larynx should have been directly visualized to search for meconium, and an endotracheal tube inserted in order to act as a meconium suction catheter. This should be done before the neonate makes its first respiratory efforts in order to prevent meconium particles from passing deep into the lungs. If this is done, the risk of aspiration is less. However, this is not definite as aspiration often occurs before birth.

O Look for physical signs of meconium staining.

Meconium that has just been passed will not have stained the neonate. Long-standing meconium will turn the neonate's umbilical cord and finger and toenails yellow/green.

What is the current respiratory status of the neonate?

Not all infants who aspirate meconium do poorly. In fact, two-thirds of all neonates who have been suctioned in the delivery room will be asymptomatic, even with an abnormal chest x-ray (CXR).

Signs of respiratory distress include:

- Tachypnea
- Shallow respirations
- Grunting
- Cyanosis
- Intercostal retractions
- Subcostal retractions
- Nasal flaring

Auscultate the chest for rales and rhonchi, which may be present.

Check O₂ sat and an arterial blood gas.

The clearest signs of respiratory distress are hypoxia (low O₂ sat, low pO₂) and hypercapnia (high pCO₂).

Send blood for a CBC with differential, a CRP, and a culture.

Pts with meconium aspiration require a septic workup (see Rule Out Sepsis/Meningitis p. 26).

Check a CXR.

Aspirated meconium appears as blotchy infiltrates in both lungs.

A Meconium aspiration

Meconium is the neonate's first stool passage. Ordinarily and physiologically, it does not occur until after birth. When it occurs before birth, there is a risk of aspirating it into the lungs. It is thick, sticky, and black-green in color. Unlike later stools, it is not infiltrated with bacteria.

Meconium is passed when the fetus is either acutely or chronically hypoxic. The hypoxia stimulates not only meconium passage but also gasping, increasing the chances that meconium floating in the amnion will find its way into the lungs. You may imagine that having a thick, sticky material in the parenchyma of the lungs is not good. It can cause various problems (e.g., mechanical obstruction, chemical pneumonitis, inactivation of surfactant), all of which make it difficult to oxygenate and ventilate the pt.

This causes a problem similar to that seen in premature lung disease. When the airway is obstructed, the alveoli may collapse (atelectasis). When blood runs through collapsed alveoli, it receives no oxygen. This is known as a ventilation-perfusion (V/Q) mismatch, and it is responsible for most hypoxia.

The pt is also at risk for pneumothorax, pneumomediastinum, and pulmonary hypertension.

Differential diagnosis:

Congenital heart disease

Diaphragmatic hernia

Pneumonia

Central hyperventilation

Hypoplastic lungs

Sepsis

- Sepsis should be ruled out regardless because meconium aspiration is a sign of distress in utero, and amnionitis is one of the leading causes of distress.

P Support the pt's ventilatory efforts. Give oxygen by oxyhood or nasal cannula for hypoxia. If the problem persists, the pt may be placed on nasal continuous positive airway pressure.

This will force open the airways that are obstructed, decrease the atelectasis, and decrease the V/Q mismatch.

Consider intubation and mechanical ventilation for rising pCO₂.

High-frequency oscillatory ventilation may be more effective than conventional ventilation because it allows for efficient ventilation at lower volumes.

High-volume ventilation is problematic because of the plugging of the airways, atelectasis, inactivation of surfactant, and air trapping caused by the sticky meconium.

Consider giving a dose of surfactant directly down the endotracheal tube.

This will compensate for the meconium-inactivated surfactant.

Start ampicillin and gentamicin.

This will cover the pt until the labs confirm or rule out sepsis.

Inhaled nitric oxide improves oxygenation in pts with meconium aspiration syndrome and pulmonary hypertension.