



Pneumothorax and Air Leaks

An air leak occurs when the infant's lung sacs, or alveoli, become overinflated and rupture, allowing air to escape. This can occasionally occur with an infant's first breath, but it happens most frequently in infants who have lung disease, such as respiratory distress syndrome or meconium aspiration syndrome. The incidence of air leaks also increases when the infant is receiving some form of positive pressure ventilation, such as continuous positive

airway pressure, high-flow nasal cannula, or mechanical ventilation. The many different types of air leaks are identified by the location of the free air that escapes from the lungs (see table below). Pneumothorax occurs most frequently.

Air leaks are more likely to occur in the newborn period than at any other time of life. In the

Air Leak Types			
Name of Air Leak	Location of Free Air	Clinical Signs and Symptoms	Possible Treatments
Pneumothorax (most frequently occurring air leak)	Between the lung and the chest wall	If small, may be asymptomatic	None (if asymptomatic in the absence of positive pressure ventilation) Oxygen to promote nitrogen washout
Tension pneumothorax (can be life-threatening if there is a large enough pocket of air collected to increase pressure in the chest and decrease cardiac output)	Between the lung and the chest wall	Respiratory distress, decreased oxygen saturation, decreased breath sounds on affected side, movement of heart sounds away from affected side Bradycardia, hypotension, cyanosis	Increase oxygen high-frequency ventilation Needle aspiration for emergent evacuation, often followed by the placement of a chest tube
Pneumomediastium	In the mediastinal space	Most are asymptomatic. A large pneumomediastium may cause respiratory distress and cyanosis, distant heart sounds	Usually requires no treatment
Pulmonary interstitial emphysema	Air is trapped in the tissues that surround the air sacs and blood vessels in the lungs	Increasing oxygen and ventilation needs (may occur before and with other air leaks)	Supportive treatment, minimizing pressure to the lung (some use high-frequency ventilation)
Pneumopericardium	Area around the heart and inside the pericardial sac	Rapid development of tachycardia, hypotension, and narrowed pulse pressure. Heart sounds are distant.	Emergent needle aspiration, may require indwelling pericardial tube
Pneumoperitoneum (rare)	Peritoneal space	Abdominal distension	May require aspiration
Subcutaneous emphysema (rare)	Subcutaneous tissue	Crepitus (crackles) on palpation, usually in face, neck, or upper chest	Supportive treatment



extremely-low-birth-weight infant, air leaks are associated with an increased risk of intraventricular hemorrhage.

Transillumination with a high-intensity light source may demonstrate a halo or glow in the area of free air and give an initial clue to the diagnosis and location of the free air. A definitive diagnosis of all types of air leaks is made by X ray.

Bibliography

- Fernandes, C. (2011, September 13). UptoDate. Pulmonary air leak in the newborn. Retrieved from www.uptodate.com.proxy.library.vanderbilt.edu/contents/pulmonary-air-leak-in-the-newborn?source=search_result&search=pulmonary+air+leaks+in+newborn&selectedTitle=1~150
- Miller, J. & Carlo, W. (2008). Pulmonary complications of mechanical ventilation in neonates. *Clinics in Perinatology*, 273–281.



Pneumothorax and Air Leaks: Information for Parents

A newborn's lungs are very fragile. Occasionally, some of the air sacs in the lungs will burst, allowing air to escape outside of the normal airways. This "free air" can collect outside of the normal airways and make it difficult for the lungs to properly inflate and for the infant to breathe. Air outside of the normal airways is called an *air leak*, and air leaks are named by where the free air is located. The most frequent air leak, called a *pneumothorax*, is when the air collects between the lung and the chest wall. Air also can become trapped in the mid-chest, in the tissue of the lung, around the heart, and in other spaces.

Babies who develop air leaks usually have other lung problems and frequently already require assistance to breathe. These air leaks can cause breathing problems to worsen and usually require medical treatment to resolve. Your baby may need increased oxygen, a special type of ventilator, and in some cases, the removal of the air. The free air is removed by placing a needle into the space of the air leak and removing the air. A tube may be placed temporarily in the chest to continuously remove the air, if needed (see *Chest Tubes* in Procedures).

Rarely, an air leak can occur with the baby's first big breath, but these are usually small and sometimes resolve without help.

Air leaks can range from minor to life threatening. Ask your medical team to discuss the severity of your baby's air leak. Babies with large, sudden air leaks are at risk for low oxygen and changes in blood pressure. In very premature babies, these sudden changes may put them at risk for bleeding in the brain. Babies who develop air leaks due to severe lung illness may be at risk for long-term breathing problems.