



Spontaneous Pneumothorax

Patient and family information, brought to you by the Education Committee of APSA

Overview - “What is it?”

Often referred to as “collapsed lung,” pneumothorax (Figure 1) refers to the presence of air around the lung in the chest. This air is introduced either from the outside world through a chest wound or from leakage of a portion of lung itself. Such air leakage is usually caused by injury or recent surgery; spontaneous pneumothorax specifically refers to those instances in which there was no apparent cause for air leakage from the lung.

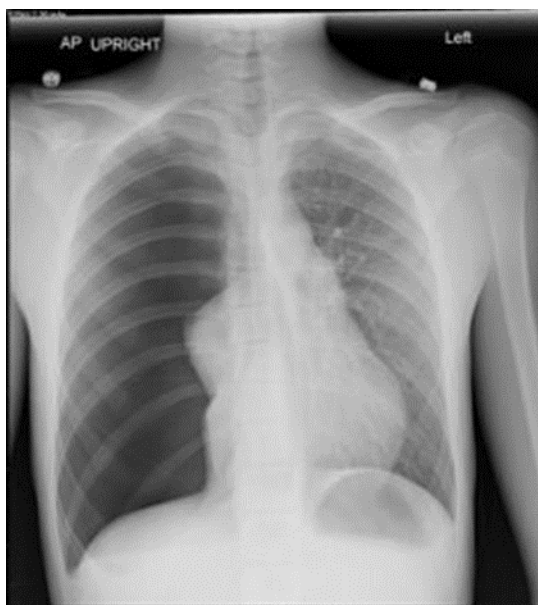


Figure 1: A chest X-ray of a patient with a large right pneumothorax

The chest space on the left half of the picture (which is the patient’s right) is much darker than the other side. This is because the lung is totally collapsed.

It is estimated that roughly 20,000 cases of adult and pediatric spontaneous pneumothorax occur in the United States each year. Males are affected six times more frequently than females. While they are more common in tall, thin males, only in rare circumstances is an associated genetic alteration present.

Signs and Symptoms - “What symptoms will my child have?”

Early symptoms: The early signs are pain and shortness of breath. Pain is on the affected side of the chest and typically worse with deep breaths. Shortness of breath can make the child feel like they can't catch their breath or just that they can't exert themselves. There may be coughing as well. The pain is not typically associated with tenderness (pressing on the chest won't make it worse).

Later signs/symptoms: As pneumothorax progresses, the lung shrinks smaller and smaller. This will not cause different symptoms, but the existing symptoms will become worse.

Diagnosis - “What tests are done to find out what my child has?”

Labs and tests: A chest X-ray is the first test that is usually taken when a child has breathing problems or chest pain. If a pneumothorax is seen, a computed tomography (CT) scan of the chest may be obtained to look for blebs that may be the cause of this problem. Imaging tests (chest X-rays and CT scans) are used to diagnose spontaneous pneumothorax.

Conditions that mimic this condition: Pneumonia and rib fractures can mimic pneumothorax.

Treatment - “What will be done to make my child better?”

There are three basic means of treating the condition: Observation, chest tube placement and operation (surgery).

- Observation relies on the body to reabsorb the air around the lung, presuming that the amount is small and the lung has already sealed over so that it is not continuing to leak air. There are no medications that can be prescribed to cure pneumothorax. Oxygen is sometimes used to speed the reabsorption of the air around the lung (in those cases of small pneumothorax in which observation is planned).
- Placement of a temporary chest tube between two ribs actively withdraws air and helps the lung re-expand. Alternatively, in some cases, a needle may be introduced into the chest cavity to aspirate the air to allow the lung to expand.
- Surgery is an option if the pneumothorax does not get better with the first two options, pneumothorax returns or there are circumstances that require definitive results. Most spontaneous pneumothoraces are believed to be caused by a weakness in the lung called a bleb (Figure 2). The bleb pops and air exits from the lung to the chest cavity. The goals of surgery goals include removal of the bleb and preventing the lung from collapsing should another bleb occur. A pleurodesis operation aims to generate scar formation between lung and chest cavity to prevent future collapse. A temporary chest tube is left in place after surgery to evacuate air and allow the lung to heal.



Figure 2: View of lung tissue from inside the chest during a thoracoscopic (minimally invasive operation). In the middle of the image, a third of the way up from the bottom, there is an outpouching of tissue with a whiter color; this is a “bulla” or “bleb” of lung, which is a weakened area that can rupture and cause spontaneous pneumothorax.

There are two approaches to this operation. An *open operation* requires a large cut between the ribs on the side of the pneumothorax. Most commonly, the operation is performed using *thoracoscopy*. In this approach, several small cuts (incisions) are made. Through one of the cuts, a video camera is placed. The surgery itself is done using small instruments placed through the other incisions.

Preoperative preparation: Preparation for operation requires a skin cleansing and dose of antibiotic.

Postoperative care: This portion of the care is focused on minimizing pain and waiting for the lung to heal. The chest tube can only be removed once the lung has no air leaking from it and is able to remain fully inflated without the tube providing assistance by suction. Typically, the tube is removed by 3-5 days after operation.

Risks/Benefits: The benefit of operation is that it is the most definitive means of treating the condition as well as minimizing the possibility of recurrence. Every operation has risks; for this operation are bleeding, infection, recurrence of pneumothorax, and injury to chest structures requiring conversion to an open operation.

Informed consent: A consent form is a legal document that states the tests, treatments, or procedures that your child may need and the doctor or practitioner that will perform them. Before surgery, your doctor should tell you what the operation is, the goal of the surgery and other possible treatment options that are available. Your doctor should explain the risks and benefits of the surgery. You give your permission when you sign the consent form. You can have someone sign this form for you if you are not able to sign it. You have the right to understand your child’s medical care in words you know. Before you sign the consent form, make sure all your questions are answered. It is important to know that during surgery, there are things that can happen that your doctor may have not predicted before going in. They will explain these to you after the surgery.

Home Care - “What do I need to do once my child goes home?”

Diet: No restrictions. Maintaining adequate nutrition (including calories from protein) speeds wound healing.

Activity: If surgery or chest tube placement was performed, sports and vigorous play may be a little painful in the first two weeks or so. Within a few weeks, most patients are feeling “like themselves” and have no lingering discomfort. Controversy exists when discussing special situations such as traveling to altitude or SCUBA diving. Your surgeon will discuss their recommendations with you.

Wound care: If surgery was performed, the wounds should stay dry for three days, then the child may shower. Wait for about one week after surgery before soaking the wounds. There may be a small healing area (less than half an inch) where the chest tube was in place that may need special attention. Ask your surgeon what should be done with the chest tube dressings.

Medicines: No long-term medications are required. Medicines for pain such as acetaminophen (Tylenol®) or ibuprofen (Motrin® or Advil®) or something stronger like a narcotic may be needed to help with pain for a few days after surgery. Stool softeners and laxatives are needed to help regular stooling after surgery, especially if narcotics are still needed for pain.

What to call the doctor for: Any concern about the incisions or difficulty breathing.

Follow-up care: A routine clinic visit to ensure proper healing. Long-term follow-up is not generally necessary.

Long Term Outcomes - “Are there future conditions to worry about?”

There are two long-term issues to keep in mind.

- Recurrence (pneumothorax occurring again) is expected about 30% of the time if operation is not performed. If operation (pleurodesis) is performed, that risk is less than 5%.
- Activity in settings of altered pressure (extreme altitude, skydiving and SCUBA) is a gray area for which we don’t expect to ever have firm, scientific recommendations. Because of the changes in pressure that the lung experiences in these settings, it is believed that recurrence is more likely and that the consequences can be much more severe. The threat to life is probably reduced in patients who have undergone thorough pleurodesis, but we can’t be certain.

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