

Pneumothorax and Tension Pneumothorax

A plain-English guide for you and your family

WHAT IS HAPPENING

Your lungs sit inside your chest, wrapped in a thin double-layered lining called the pleura. Between those two layers is a very thin space—the pleural space—that normally holds almost no air, just a tiny bit of fluid. That space is kept at negative pressure (like a gentle vacuum) so your lung stays pressed against the chest wall and fills with air when you breathe in. A pneumothorax happens when air leaks into that pleural space. Once air gets in, the vacuum is broken and the lung on that side starts to collapse inward, like a balloon losing air. You feel sudden, sharp chest pain and it gets hard to breathe. If the leak is small, your body can often reabsorb the air slowly and the lung will re-expand on its own. But if the leak is big, or if air keeps getting in and cannot escape (a tension pneumothorax), the pressure builds up so much that it squeezes not only the lung but also your heart and the big blood vessels in your chest. That stops blood from returning to your heart, your blood pressure drops, and without emergency treatment—putting a needle or tube into the chest to let the air out—you can go into shock and your heart can stop. This is why tension pneumothorax is a true emergency: every second counts.

What you might feel

- Sudden sharp chest pain on one side
- Shortness of breath
- Fast breathing
- Decreased or absent breath sounds on one side (heard with a stethoscope)
- Fast heart rate
- One side of the chest does not move as much when breathing
- Bulging neck veins and very low blood pressure (tension pneumothorax)
- Trachea (windpipe) shifted to one side (tension pneumothorax)
- Confusion or loss of consciousness (tension pneumothorax)

Call the doctor right away if...

- Very low blood pressure or shock (systolic below 90 mmHg)
- Bulging neck veins with respiratory distress
- Trachea visibly or palpably shifted away from the affected side
- Severe trouble breathing or unable to speak in full sentences
- Confusion, dizziness, or fainting

What the care team will do

- Check for tension pneumothorax signs every 15 minutes: blood pressure dropping, heart rate above 120, oxygen saturation falling, neck veins bulging, and if the windpipe (trachea) looks shifted to one side when you look at the neck.
- Place patient sitting upright at 45 to 90 degrees and keep the affected side (collapsed lung side) up if they lie down.
- Give high-flow oxygen by non-rebreather mask at 10 to 15 liters per minute if oxygen saturation is below 94 percent or patient has underlying lung disease.
- Prepare needle decompression supplies at bedside: 14-gauge or 16-gauge angiocath (big IV needle), alcohol wipes, and gloves. Know the landmark is second rib space at midclavicular line (in line with middle of collarbone).
- Start a large-bore IV (18-gauge or bigger) in case the patient crashes and needs emergency fluids or medicines.
- Keep patient NPO (nothing by mouth) if pneumothorax is larger than 2 cm on chest X-ray or if a chest tube or surgery is planned.
- Monitor the chest tube system every hour: check that tubing has no kinks, water seal chamber bubbles with breathing (shows air escaping lung), and suction level stays at ordered amount (usually minus 20 cm water pressure).
- Teach patient to report new or worse chest pain, trouble breathing, or feeling like their heart is racing immediately, and never clamp the chest tube unless a doctor orders it for a specific test.

Medicines you may be given — and why

Oxygen (supplemental O₂)

Breathing pure oxygen (or air with extra oxygen) raises the oxygen level in the blood. This creates a concentration difference between the trapped air in the chest (which is mostly nitrogen) and the oxygen-rich blood in the tiny blood vessels lining the chest wall. Nitrogen moves from the trapped air pocket into the blood and is breathed out through the lungs. This

speeds up how fast the body reabsorbs the air pocket—normally around 1–2% of the pocket shrinks per day on room air, but oxygen can speed that up to roughly 4 times faster.

Analgesics (pain relievers: acetaminophen, ibuprofen, or opioids if severe)

A pneumothorax—especially after chest-tube placement or needle decompression—causes sharp chest pain. Acetaminophen (Tylenol) blocks pain signals in the brain. Ibuprofen (Advil, Motrin) reduces inflammation at the injury site in the chest lining and blocks pain chemicals called prostaglandins. Opioids (like morphine or oxycodone) attach to opioid receptors in the brain and spinal cord, turning down the volume on pain signals. Controlling pain helps the patient breathe deeply and cough, which prevents lung collapse and pneumonia.

Where this information comes from

- British Thoracic Society (BTS) Pleural Disease Guideline 2010
- CHEST 2018 Pneumothorax Consensus Statement
- American College of Chest Physicians (ACCP)
- Advanced Trauma Life Support (ATLS) 10th Edition

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