

# Tension pneumothorax (half heels)

**Tension pneumothorax** (tPNO) is caused by increasing excess pressure in the pleural cavity. Pressure is created by a valve mechanism in the injured tissue of the lung or chest wall. It is gradually transferred to the large veins and prevents blood from returning to the heart. Circulatory arrest occurs.

## Why is tPNO a problem in urgent care?

- the aural distinction between breathing and non-breathing lungs is not always clear
- it's a circulatory problem, not a respiratory problem
- circulatory failure sets in quickly
- symptoms are specific until just before circulatory arrest
- we often cause it by starting UPV in the injured chest

## Why is tPNO a problem in teaching?

The image of the lung is often influenced by dissection or butchery. However, the lungs in a living person are more like a plastic bag than a liver. They are full of air, not blood. Its "blowing" (collapse) is very easy when the pressures are equalized. A simple PNO is therefore easily created. In contrast, tPNO requires a functioning valve mechanism.

The different divisions of PNO do not relate to the risk of developing tPNO. Overpressure PNO can arise from open or closed, from traumatic or spontaneous, from iatrogenic or induced, from left or right ...

## How does tPNO occur?

*Valve mechanism, the hole in the chest is not a drain*

## Symptoms of tPNO

Symptoms of simple (normotensive) PNO:

- cough
- pain in the chest
- stuffiness
- hypersonic tapping, weakened or absent breathing on the PNO side
- limited mobility of the chest on the PNO side
- tachycardia
- subcutaneous emphysema

It is crucial that **simple PNO can be completely asymptomatic**. If overpressure starts to build, it is not noticeable at first. Symptoms of circulatory failure gradually develop:

- increased filling of jugular veins (may be reduced by concomitant hypovolemia)
- hypotension
- displacement of the trachea in the jugular cavity away from the tPNO side (late symptom)
- cyanosis (late symptom)
- the disappearance of the pulse (pulseless electrical activity - PEA) results in circulatory arrest :/

## tPNO therapy

*The puncture is temporary, the hole is functional, the drain is definitive, but it can break or pull out*

### **PICTURE** puncture

Super acute treatment is a puncture with a sufficiently wide and sufficiently long cannula/needle in the 2nd intercostal space in the medioclavicular line. An alternative procedure is in 4-5. intercostal (at nipple level in men) in the anterior axillary line at the upper edge of the lower rib to avoid injury to the neurovascular bundle. A 5 cm needle reaches the pleural space in half of the cases, while an 8 cm needle reaches the pleural space in 90% of cases. A cannula left in place often kinks, necessitating a stoma or drainage.

### **PICTURE** ostomy

**DRAWING PICTURE** Before inserting the drain, we do an orientation physical examination, position the patient and instruct about the entire procedure. This is a strictly aseptic procedure. Accordingly, we will prepare the operating field and instrumentation. It is advantageous to perform drainage under ultrasound control.

4-5. intercostal (at nipple level in men) in the front axillary line at the upper edge of the lower rib,

After infiltration with a local anesthetic, we perform aspiration with a needle and syringe. In this way, we localize the pathological content and clarify the place of drainage. We perform a skin incision and then blunt dissection of the soft tissues of the chest wall and pleura with a pean. We check the pleural cavity with our finger. Then we introduce the drain through the soft end without the introducer using a curved pean (Kelly clamp). As with the chest puncture, we should proceed at the upper edge of the lower rib.

A passive single-chamber drainage system is sufficient for the treatment of uncomplicated pneumothorax.

## Externí odkazy

- Akutně Tenzní pneumotorax – interaktivní algoritmus + test