



Pleural effusion, pneumothorax

(presentation for english medical students)

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I. case

Anamnestic datas

- 40 years old male patient
- Musician
- Lives in a town, called Lőrinci
- No serious illness, or operation in the past
- Smoking history: for 5 years 1 pack/day
- Alcohol: occasionally
- His problem now is slowly developed chest pain and mild dyspnoe

I. case

Physical examination

- In the whole right side dullness with percussion
- In the right side diminished breath sound
- In the right chest side decreased tactile fremitus
- No other positive findings

I. case

- ***What kind of disorder you think about?***
 - pleural effusion!*
 - atelectasis!*
- ***What kind of test would you choose next?***
 - plain chest X-rays*

I. case

Plain chest X-rays



I. case

- *What are the origins of pleural fluids?*
 - *(transudate-exudate)?*
 1. *cardial- transudate*
 2. *inflammation (pneumonia/pleuritis)- exudate*
 3. *cancers (primary/secondary)- exudate (rarely transudate)*
 4. *pulmonary embolism- exudate (rarely transudate)*
 5. *liver cirrhosis with ascites- transudate*
 6. *nephrotic syndrome- transudate*
- +(haemothorax, chylothorax, empyema)*

I. case

- ***How can we get information about the fluid?***
 - *thoracocentesis /chest drainage*
- ***What do we examine?***
 - *macroscopically*
 - *protein, LDH (transudate-exudate differential diagnosis)*
 - *cytology*
 - *bacterial, fungal culture*

I. case

Chest tube drainage

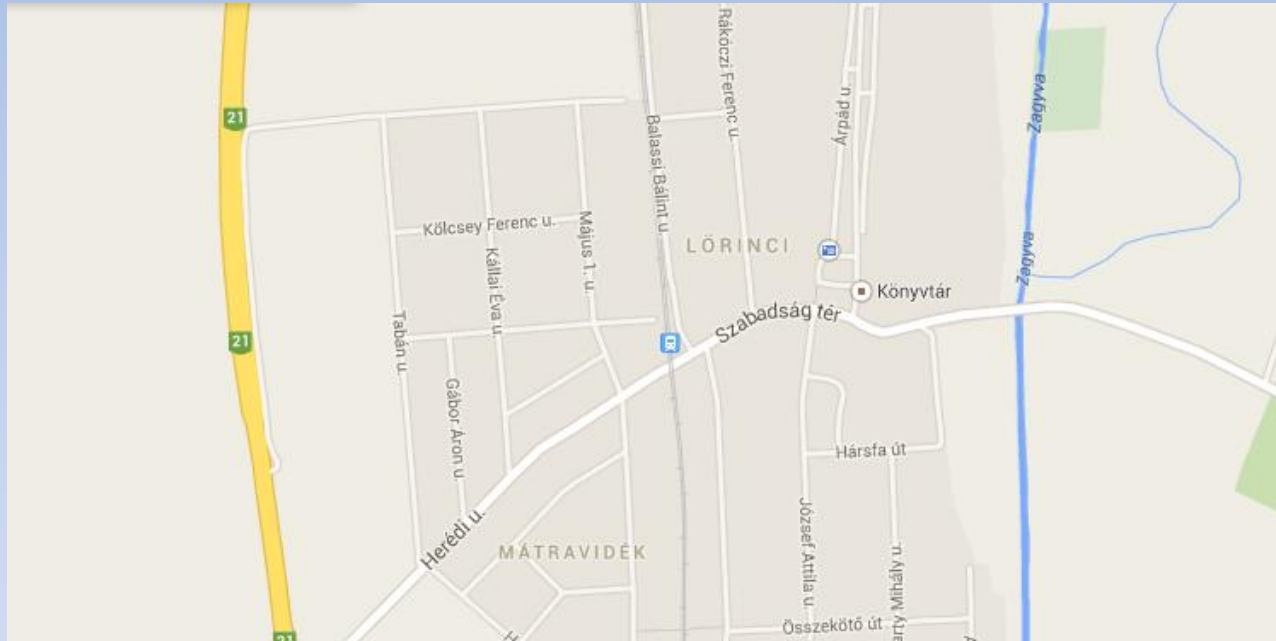
- 4. intercostal space in the midaxillary line
- 2. intercostal space in the medioclavicular line
- Test puncture!
- Always above the ribs!

I. case

- Our patient puncture:
 - straw-coloured fluid
 - exudate
 - cytology was negative
 - no bacterial or fungal infection was found

I. case

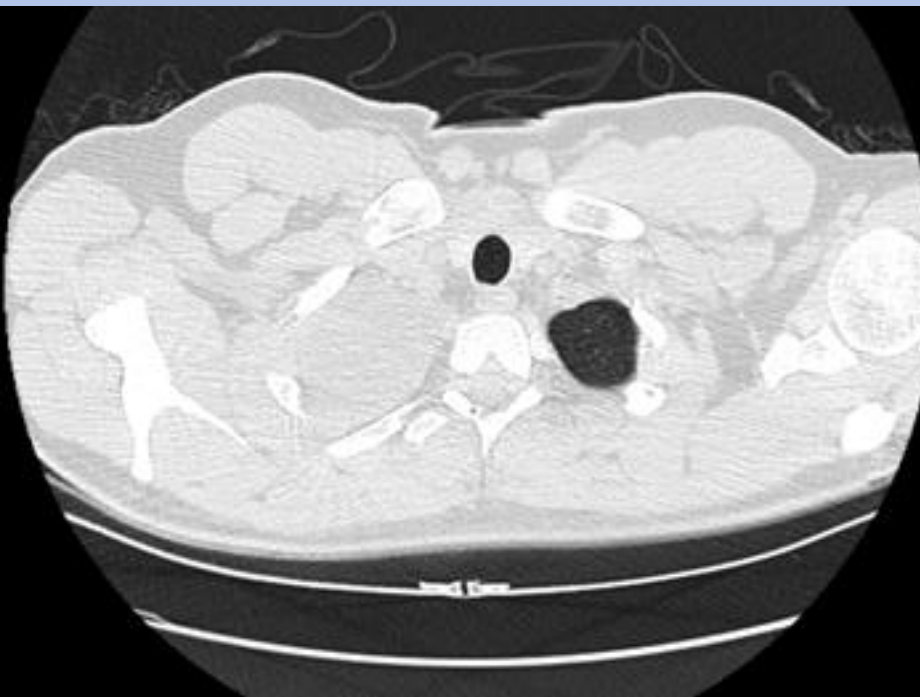
- *What's next?*



- *In his town (Lőrinci) was cement and eternit factory until 2004.*
- *Eternit contains asbestos*

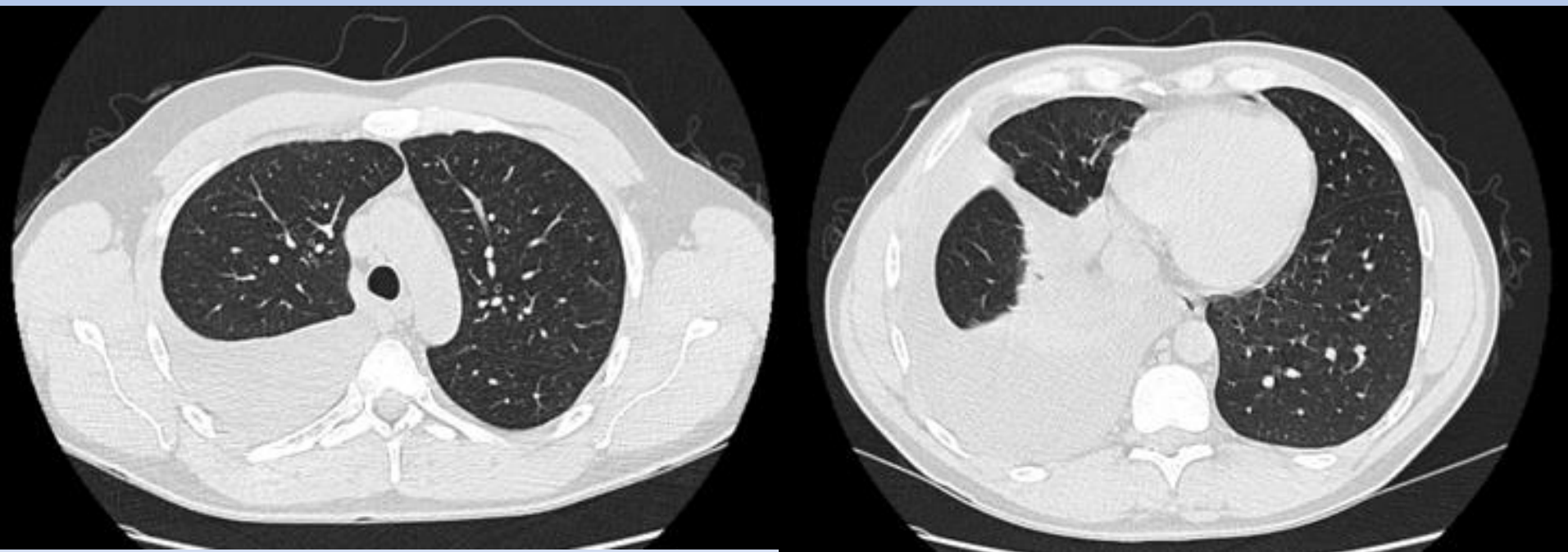
I. case

Chest CT-scan



I. case

Chest CT-scan



I. case

- Mesothelioma diagnosis based on:
 - VATS pleuroscopy and biopsy
- Prevent fluid appearance:pleurodesis

I. case

Treatment

1, In case of T1-3, epithelial and hemithorax localized form (no abdominal appearance or distant metastasis): Operation

A, Pleurectomy and decortication (resection of the visceral and parietal pleura)

B, Extrapleural pleuropulmonectomy (resection of the visceral and parietal pleura + lung + diaphragma + pericardium)

- After the operation: chemo-radiotherapy

2, Non operable diseases:

- Chemo-radiotherapy

II. case

Anamnesis

- 20 years old male patient
- No serious illness, or operation in the past
- Smoking: never
- Alcohol: sometimes
- His problem now is atypical left side chest pain.

II. case

Physical examination

- On the left, weakened respiratory sound
- On the left hyperresonant percussion sound
- On the left, missing the pectoral fremitus
- Moreover negative status

II. Case

Physical examination

- ***What kind of disorder you think about?***
pneumothorax
- ***What kind of test would you choose next?***
plain chest X-rays

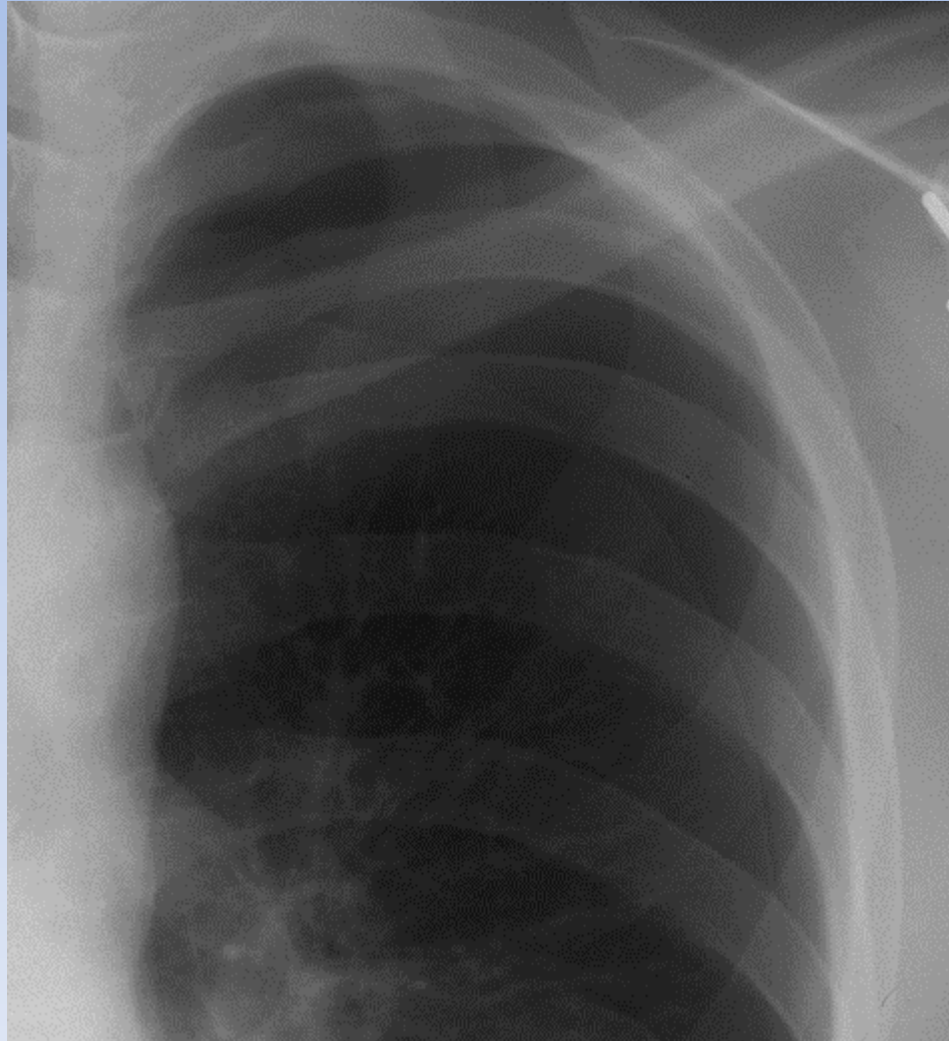
II. case

Plain chest X-rays



II. case

Plain chest X-rays



Pneumothorax symptoms

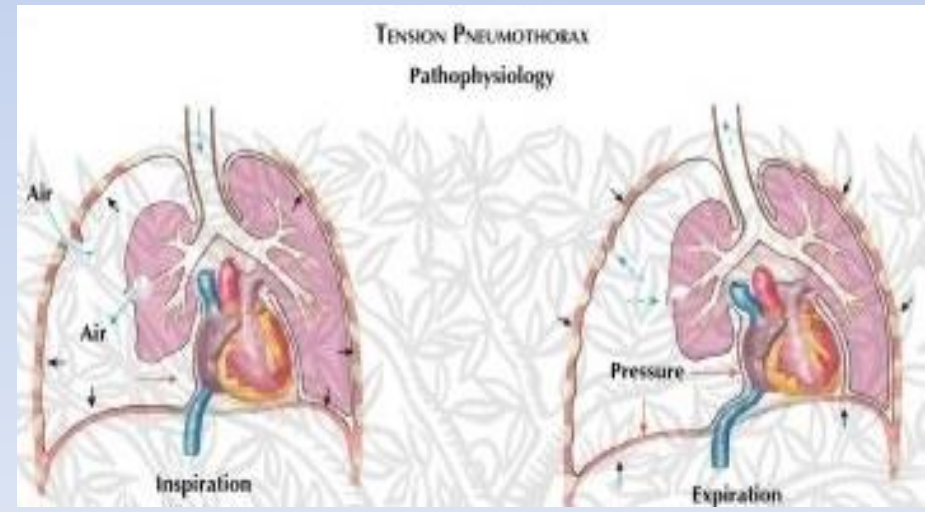
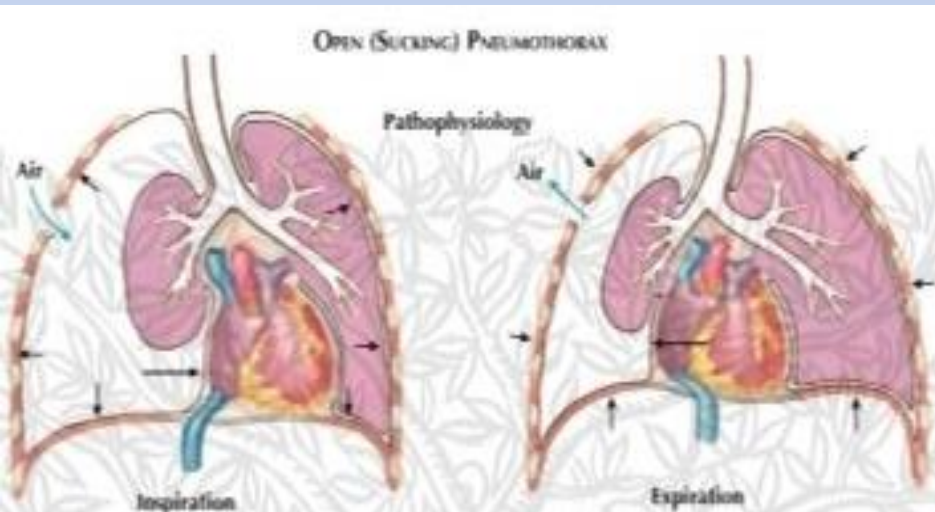
- most common is spontaneous pneumothorax
- typical symptoms:
 - stabbing chest pain
 - heavy cough
 - dyspnoea.
- in case of tension pneumothorax, and older patients always associated with cardiac complaints - tachycardia, extrasystoles, acute heart failure, cyanosis

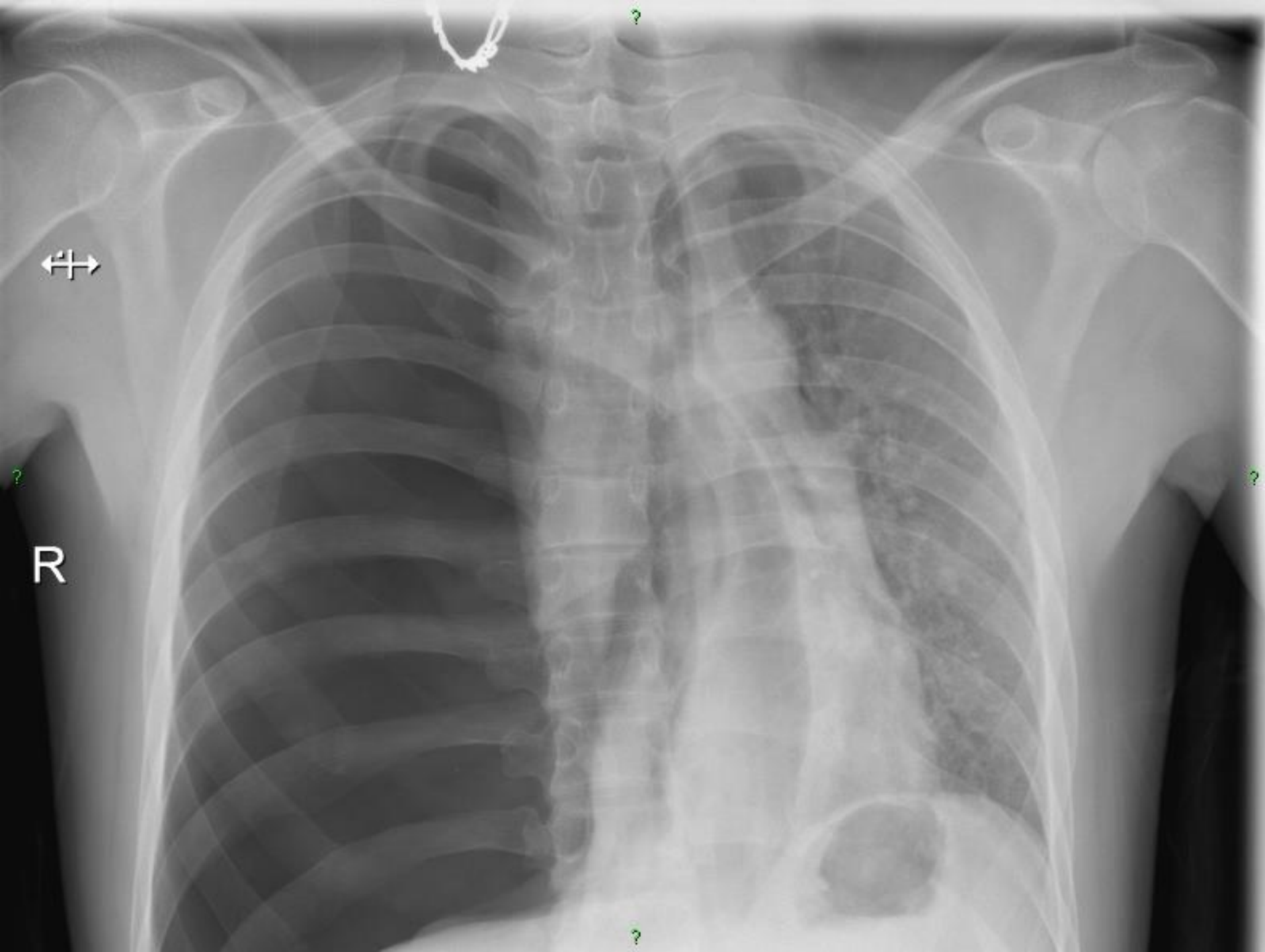
Types of PTX

- 1. Based on pressure conditions**
- 2. Based on extension**
- 3. Based on etiological**

1. Based on pressure conditions

- ❖ simple PTX
 - Open pneumothorax
 - Closed pneumothorax
- ❖ ventil PTX





2. Based on extension

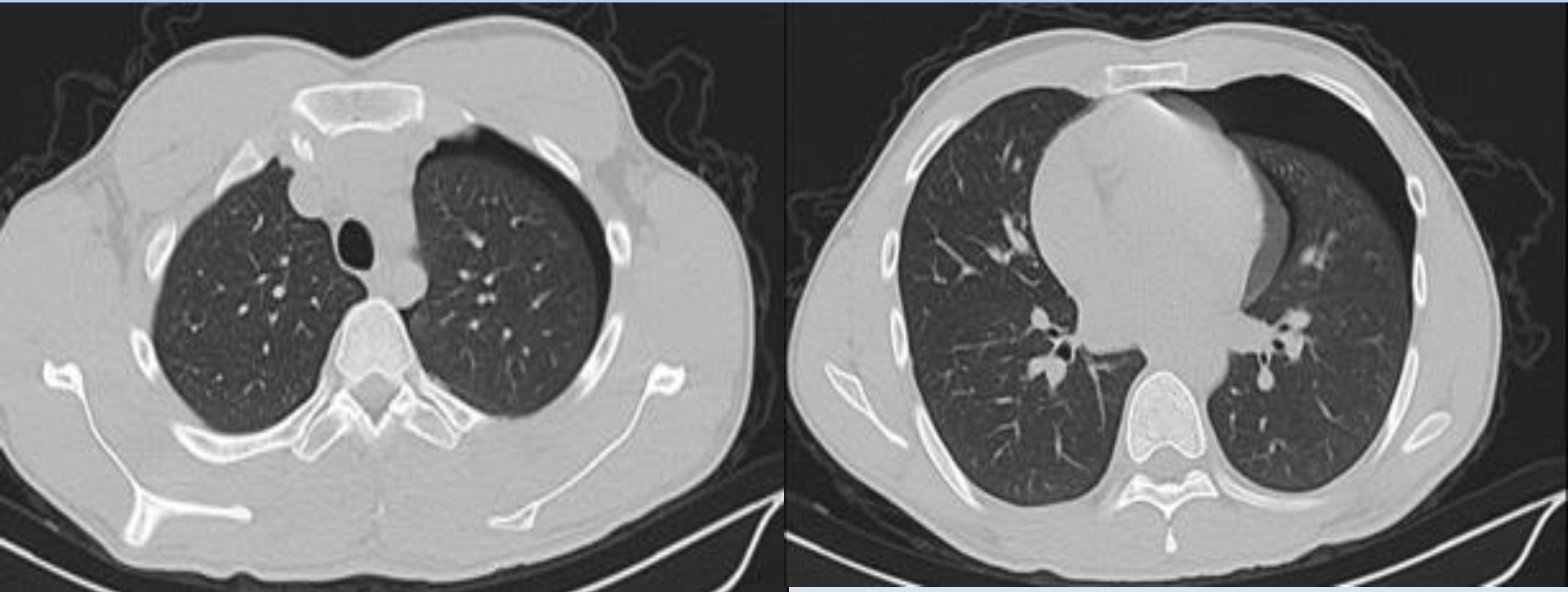
- ❖ complete
- ❖ partial
- ❖ tension PTX
- ❖ bilateral pneumothorax

3. Based on etiological

- ❖ primary (spontaneous) PTX
- ❖ secondary
 - preliminary pulmonary disease
 - traumatic: open or closed
 - iatrogenic pneumothorax

II. case

- What kind of test would you choose then?
-Chest CT



Treatment

- **Observation:** tire pneumothorax, or pneumothorax case of small-scale
- **Aspiration:** pneumothorax may be solved, the action can be repeated. In case of complete or tension pneumothorax is applicable only in medical first aid.
- **Drainage (thoracentesis):** This is the main therapeutic procedure in the treatment of pneumothorax. In 80-90% of cases lead to a cure
- **Surgery:** 10-20% of the patients so they can achieve the healing process, which may thoracotomy / VATS. Surgery is indicated for: (1) if neither expands the lungs during treatment intake for 48-72 hours; (2) if the drain was inserted through the 24 hours is too long-term flow is observed; (3) if hemopneumothorax was observed and the rate of major bleeding or is not reduced; (4) other vital organ injury, or a reasonable suspicion; (5) recurrent pneumothorax

Empyema thoracis

Staging

- 1. exudative stage:** 24-72 hours – inflammation of pleura and enhanced permeability of blood vessels, clear pleural effusion develops a low white blood cell count
- 2. fibrinopurulent stage:** 7-10 days - fibrin in the pleural space -> septa, the denser the liquid, turbid, white blood cell count increases Indicating the presence of anaerobic bacterial metabolism of the exudate shows a decrease in pH and glucose combined with high LDH activity
- 3. organised stage:** 2-4 weeks - fibroblasts infiltrate in the pleural space, the thin intrapleural membranes thicken, become inelastic. This rigid fibrous sheath inhibits lung to expand and reduce the respiratory function and difficult to cure infections.

Etiology

1. Parapneumonic effusion
2. Haematogenous spread into pleural space
3. Iatrogenic infection of the pleural space (thoracocentesis)
4. Postoperative (pulmonary, cardiac, abdominal, urological)
5. Descending oropharyngeal infection
6. Mediastinal infection (oesophageal perforation)
7. Chest wall and spine infection
8. Traumatic penetrating injury

Bacteriology

- most common Streptococcus milleri, Sterptococcus pneumoniae, Staphylococcus aureus
- most common in nosocomial infection: Klebsiella, Proteus, Staphylococcus aureus, Pseudomonas aeruginosa, MRSA
- fungal empyema is most common in immunosuppressive conditions

Symptoms

- acute state: septic-toxic symptoms
- chronic state: improving the general condition; often been without a fever; laboratory abnormalities get better; cardiopulmonary capacity reduced; chest pain; cough; dyspnoe

Therapy

- **1st stage:**
 - pleural drainage
 - targeted antibiotic therapy
 - additional treatment (diet, vitamins, roboration, symptomatic therapy)
- **2nd stage:**
 - drainage and lavage
 - early decortication, lavage, debridement (VATS / thoracotomy)
 - fibrinolysis (streptokinase),
- **3rd stage:**
 - decortication (VATS / thoracotomy)
 - if the decortication not feasible, residual empyema cavity remains fenestration ("open window" chest training window)

Fenestration



Fenestration



Haemothorax

Etiology

- most often injuries of the chest of the bleeding in the chest wall and blood vessels, lungs, heart and major blood vessels or damage to the diaphragm.
- iatrogenic hemothorax: most common reasons for central venous cannulation, drainage, pleurabiopsy, transthoracic pulmonary biopsy,
- spontaneous hemothorax: rare disease

Symptoms

- vascular symptoms caused by blood pooling exacerbated respiratory deterioration due to compression atelectasis
- young, otherwise healthy patients - eg. In case of accident caused by acute hemothorax - a relatively greater blood loss symptoms can be surprisingly poor for a while

Diagnosis

- anamnesis
- physical examination
- often in connection with pneumothorax accident mechanism, subcutaneous emphysema can be detected
- X-ray examination shows the effusion, possible pneumothorax, mediastinal throughput rate, rib fractures, etc.
- puncture

Therapy

- bed rest, routing: less than 500 ml in case of hemothorax; lower-grade fever may accompany absorption; Duration: 1-2 weeks
- puncture: partly diagnostic and partly for therapeutic purposes; First get the medical care have a role (diagnosis, relief)
- drainage: if more than 1000 ml hemothorax; Advantages: (1) improved evacuation, (2) constant control bleeding, (3) faster than expected, fewer complications
- VATS exploration: a causative diagnosis and the severity of the bleeding to clarify
- thoracotomy is indicated when (1) vascular, lung, heart, diaphragm injury there is a reasonable suspicion; (2) from the drain strong non damped bleeding (more than 100 ml / h).

Chylothorax

Etiology

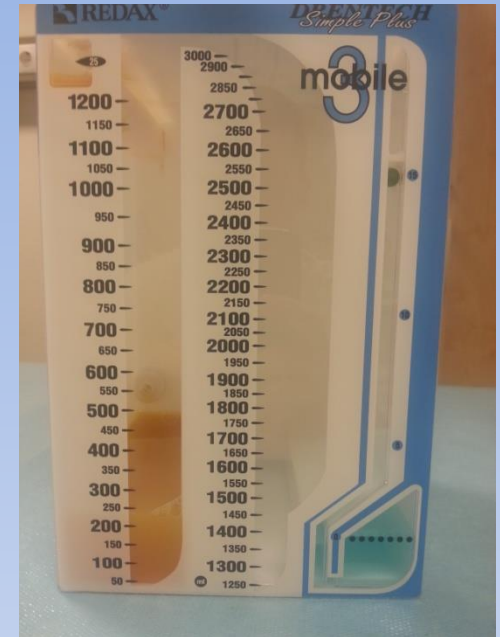
1. **congenital chylothorax**
2. **spontaneous chylothorax:** no demonstrable cause in the background
3. **secondary chylothorax**
 - accident: thoracic duct or inferiority branch injury
 - malignant lung or mediastinal tumor: a rare
 - postoperative
 - after central venous catheter insertion left subclavian vein thrombosis

Symptoms

- general symptoms of thoracic effusions (pleural, cardiac, respiratory)
- after a long period of time corresponding significant fat and protein as lost serious consequences

Diagnostic

- anamnesis
- physical examination
- lab test
- X-ray
- puncture test: chylus viscous, cream color and consistency, fats, triglycerides, high in protein, high specific gravity (> 1016), usually sterile, odourless liquid with a pH greater than 7.5.
- (A pseudo-chylus pathogen protein and usually rich in fat, viscous, white fluid in the chest.)



Therapy

- pleural drainage
- low-fat diet and protein, electrolytes and fluids replacement
- sometimes the sustained sucking chest also comes into play, although it is rarely a permanent solution
- in case of postoperative chylothorax drainage should be considered in addition to the long-term possibility of surgery as well (the thoracic duct and ligation visit to the site of injury)

Prognosis

- definitely wrong
- developed cancer as a result of chylothorax worsen due to the underlying disease already bad prognosis
- „spontaneous" chylothorax mortality is around 50%, with significant amounts of fat, protein, fluid and electrolyte loss
- intravenous nutrition favorably affect the prognosis
- after successful surgery, the patient can heal, although recurrences are common

Thank you for your attention!

