FIBROUS – CAVERNOUS PULMONARY TUBERCULOSIS
Fibrous-cavernous pulmonary tuberculosis

- is a secondary form of tuberculosis, the substrate is a cavity (or more) with hard walls and massive fibrosis in adjacent tissue, with the bronchogenous dissemination in lower regions and the mediastinum shifted to the affected side; the clinical picture is characterized by a chronic evolution manifested through periods of remission and overheating of the process.
Fibrous-cavernous pulmonary tuberculosis develops from early forms of tuberculosis

- Infiltrative - 50-60%
- Nodular - 25%
- Disseminated - 10-15%
Causes of chronization of the cavity

- the incorrect treatment (irregular, one short of the violations)
- the refuse of the surgical intervention
- the persons who abuse alcohol
- the persons who are in detention
- the patients with comorbidities (diabetes, gastric ulcer, mental illness)
Cavity structure

- internal stratum - caseous-necrosis
- middle stratum - granulation
- external stratum - fibrotic
Cavities by the sizes

- small up to 2 cm
- medium up to 4 cm
- big up to 6 cm
- giant more than 6 cm
The aggravation of the process which is spread by broncho- and lymphogenous ways, extend from the appearing of some broncho lobar shadows with the character confluent, the formation of the new cavity and growth of the old cavities.
Clinical picture

- Limited and relatively stable
- Evolving
- Complicated fibrous-cavernous pulmonary tuberculosis
Clinical picture

- limited and relatively **stable**, due to treatment when the process is stable and overheating is dispensable for several years
Clinical picture

- **evolving**, characterized by the alternation of overheating and remission with different duration - short and long, but during overheating with the emergence of new and infiltrated cavities. In some cases lungs is completely destroyed, and in others, when treatment is ineffective, develops caseous pneumonia.
Clinical picture

- Complicated fibrous-cavernous pulmonary tuberculosis - often gradually evolving of cardio-pulmonary failure, amyloidosis and other complications of pulmonary TB
Overheating

- marked asthenia
- anorexia
- pronounced weight loss
- night sweats
- remittent fever
- chest pain
- cough with copious purulent sputum (100-200 ml per 24 hours)
- sometimes haemoptysis
- dyspnoea
- compensatory tachycardia
- cyanosis
Physical examination

- **habitus ftizicus** - cachexia with muscular atrophy
- deformation of the chest by retraction of affected party
- retraction of the intercostals spaces, supraclavicular fossae
- thoracic excursion is decreased on the involved side
Habitus ftizicus
Habitus ptizicus
Physical examination

- **Palpation:**
  - belt scapulars muscles atrophy (p. Vorobiov-Pottenger II)
  - trachea moving towards affected lung (s. "fork" Rubinstein)

- **Percussion:**
  - Dullness
  - giant cavity - tympanitis

- **Auscultation:**
  - The main findings are medium-sized consonating crepitations and bronchial breathing of the cavernous type
  - Amphoric breathing is heard if the cavity is of a big size
Remission

- signs of intoxication are weak or missing
- sometimes is present cough with expectoration and breathlessness due to pneumosclerosis, nonspecific bronchitis and bronchiectasis.
- the chest retracted
- presence of deformed cavity, with large and thick wall, surrounded with massive fibrosis
- the inner wall of a tuberculous cavity can be smooth or irregular
- cavities has a predilection for the upper lung zones
- the destruction of the lung parenchyma and gradual fibrosis lead to retraction of the neighbouring structures: the trachea may be displaced, the hilum may become elevated, the diaphragm may be pulled upward and the cardiac silhouette may change shape and place
- the heart shifted to the affected side
- confluence and spread of the nodules in the rest of both lungs
Fibrous-cavernous pulmonary tuberculosis
Fibrous-cavernous pulmonary tuberculosis
Diagnosis

- **Tuberculin test** is negative during overheating and positive in remission
- **Analysis of blood**: anemia, with moderate leucocytosis deviation to the left, eosinophilinopenie, lymphocitopenie, monocytosis, ESR accelerated.
- **Urine analysis**: proteinuria, granular cylinders and whey
- **FBS** - tubercular disease - 10-20%, non-specific endobronchitis
- **AFB** in sputum positive, resistant forms
Differential Diagnosis

- lung abscess
- lung cancer
- pulmonary fibrosis of different etiologies
- actinomycosis
COMPLICATIONS

- Reversible:
  - Spontaneous pneumothorax
  - Pulmonary hemorrhage
  - Pleurisy
  - Empyema
  - Bronchial, laryngeal, intestinal tuberculosis
COMPLICATIONS

- **Irreversible:**
  - Pulmonary fibrosis
  - Bronchiectasis
  - Chronic respiratory failure
  - Amyloidosis
Pneumothorax

- Pneumothorax is the air presence in the pleural cavity
- It is classified according to the communication between pleural cavity and the atmosphere:
  - open
  - closed
  - tension type (pressurized, ventilate)
PNEUMOTHORAX

- Closed pneumothorax
- Open pneumothorax
- Tension pneumothorax
Closed pneumothorax

- pleural defect is closed after ingress of air and intrapleural pressure increases slightly, but remain still negative
Open pneumothorax

- due to bronchopleural fistula, air enters the pleural sac during inspiration and rushes out during expiration and the intrapleural pressure oscillates around zero.
Tension pneumothorax

- this is the most serious type
- valvular pleura tear allows air enter into the pleural sac during inhalation, but prevents its exit during exhalation
- the intrapleural pressure is initially negative, but rapidly rises causing lung collapse on the pneumothorax side, then pushes the mediastinum to the opposite side
- if does not urgently relieved, outcomes are asphyxia, acute cardiac tamponade and death
Clinical symptoms

- Chest pain radiating to shoulder at the site of pneumothorax
- Dyspnea
- Evident percussion sound, restriction of range of movements and decrease of alveolar sound on auscultation
- Mediastinum shift towards non-affected site
- In extreme conditions: hypoxia, hypercapnia, right-left blood shunt of deoxygenated blood from pulmonary circulation to the systemic circulation
- Lung collapse verified with X-ray
Clinical symptoms

- Main symptom is sudden severe tearing pain in the chest, usually followed by dyspnoea.
- Dry cough and sometimes haemoptysis.
- Pain usually radiates to the shoulder and arm on the affected side and is exacerbated with breathing.
- Occasionally pain is vague and may be overlooked.
- Shock, cyanosis and acute cardiac failure may complicate tension pneumothorax.
Physical signs

- the mediastinum may be shifted to the opposite side and the T.V.F. is diminished on the affected side
- **on percussion:** tympanitic or hyperresonance sound may be detected
- **auscultation:** diminished air entry and vocal resonance over the affected side and amphoric breathing may be heard over a bronchopleural fistula
- in large pneumothorax a metallic bellsound can be heard, close to when the stethoscope is applied to the affected side and one coin is tapped against another held to the chest opposite to the site of auscultation "Coin sign".
X-ray findings

- The lung is separated from the chest wall by a homogeneous jet-black zone.
- It is best seen above the lung apex and on X-ray in exhalation.
- The lung lies close to the mediastinum and may show the underlying disease.
- The cupola of the diaphragm is flattened and the mediastinum is shifted to the opposite side.
PNEUMOTHORAX
Treatment

- Bed rest is essential until air has been largely absorbed
- Pleural pain should be relieved by analgesics
- Painful cough can be relieved by codeine phosphate
- Pneumothorax is better left to absorb spontaneously
- Oxygen, 24 to 28% for 2 to 3 days speeds air resorption
- Pleurectomy or stripping of the parietal pleura obliterates the pleural space permanently and is the treatment of choice for recurrent pneumothorax
Treatment

- **Tension pneumothorax:**
  - this is a medical emergency
  - a trocar or wide-bore needle is urgently introduced through the anterior part of the affected chest, just into the pleural space to avoid trauma to expanding lung
  - If pain is severe, pethidine, 50mg i.m. is given but morphine is to be avoided (respiratory depressant), together with oxygen inhalation, correction of shock and treatment of heart failure if present
Therapy

Initial management

- Open pneumothorax should always be changed into closed pneumothorax with the use of air tight opatrunki and then sucking drainage
- The initial decrease of pleural pressure with the insertion of thick needle of 2,5 mm into 2nd intercostal space in the mamary line with cute rubber finger or fixed small drainage with outflow below the water surface
Therapy

The site of drainage insertion

- II or III intercostal space in mammary line in case of pneumothorax
- V or VI intercostal space in maxiallary medial line in case of pneumothorax and fluid
Drainage
Surgery is indicated in the following conditions

- Failure of closure of the tear after 48 hours of continuous drainage
- If there is history of pneumothorax in the opposite side
- Intrapleural haemorrhage
- Bronchopleural fistula
PULMONARY HEMORRHAGE AND HEMOPTYSIS
Pulmonary Hemorrhage

- Bleeding that occurs within the lungs and that has a parenchymal or bronchial source
- May or may not lead to hemoptysis
Hemoptysis

- Expectoration of fresh blood derived from the lungs
- Blood is coughed out in variable amounts
- Usually the patient will mention a ‘mouthful’ or 1 to 2 ounces of bright red, foamy blood being spit out
Pulmonary Hemorrhage

- the first is the condition of the ruptured vessel
- the second, the condition of the elements of the blood which make up the clot
- the third is the pressure under which the blood is flowing in the vessel
Pulmonary Hemorrhage

- Rasmussen, in 1868, studied pathological specimens of the lungs in pulmonary hemorrhage, and came to the conclusion that hemorrhage nearly always took place from the pulmonary arteries.
- Preceding the hemorrhage small aneurisms were formed, which caused a thinning of the vessel wall.
- Probably the cases in which the sputum is only slightly streaked come from ruptured capillaries.
Pulmonary Hemorrhage

- **Nonmassive** if blood loss is less than 100 ml per day
- **Mild** - less than 500 ml per day
- **Massive (profuse)** - more than 500 ml per day
Analysis

- Chest radiograph
- Hematocrit (Hct)
- Type and crossmatch blood for possible transfusion
- If fever and productive sputum: AFB and culture
- Bronchoscopy
Treatment

- absolute rest
- little food or liquids, with thorough evacuation of the bowels by means of saline laxatives, are among the most important features of the treatment.
- further management is dictated by the etiology of the bleeding
- if bleeding persists in spite of aggressive intervention, lobectomy is appointed
- assess and ensure adequate ventilation and oxygenation
Phase I
Minor or moderate hemoptysis

- bed rest
- monitor patient closely
- avoid NSAIDs and aspirin
- if evidence of respiratory superinfection, initiate appropriate antibiotic treatment
- use cough suppressant containing codeine, 16-60 mg Q 6 hrs
Phase II
For massive hemoptysis

- Place large bore IV and resuscitate with 1-2 liters of normal saline within the first hour.
- Thereafter, maintain fluid (normal saline 0.9%).
- Lay patient with likely source of hemorrhage in dependent position.
- Provide oxygen, if needed.
- Check vital signs frequently.
- Administer vitamin K 5 mg SC QD for three days if malnutrition or coagulopathy present.
Phase III
If Hct < 30%

- Place large bore IV and resuscitate with 1-2 liters of normal saline within the first hour
- Thereafter, maintain fluid (normal saline 0.9%)
- Lay patient with likely source of hemorrhage in dependent position
- Provide oxygen, if needed
- Check vital signs frequently
- Administer vitamin K 5 mg SC QD for three days if malnutrition or coagulopathy present
Phase III
If Hct < 30%

- Transfuse with matched blood
- Follow Hct closely
Phase IV

If recurrent episodes without improvement

- Consider bronchoscopy to localize the bleeding site
- Consider surgical evaluation: bronchiectasis, cavities, or coin-shaped lesions may be hemorrhagic sources (e.g., tuberculous destruction, erosion of blood vessels, aspergilloma) and may require surgical resection