

**MINISTRY OF HEALTH CARE OF UKRAINE
KHARKIV NATIONAL MEDICAL UNIVERSITY**

Department of Phthiology and Pulmonology

The 2nd Medical Faculty

**METHODICAL RECOMMENDATION
FOR THE STUDENT'S SELF WORK**

Educative discipline

”Current Problems of Phthiology and Pulmonology”

for students of 5 course of 6th medical faculty

“Approved”

Educative-methodical counsel of

Department of

Phthiology and Pulmonology

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Head of Department

Professor Shevchenko O.S.

Topic “Haemoptysis. Lung hemorrhage. Definition. Classification. Diagnosis. Management. Treatment”.

1.Quantity of hours 2

2.Financial and methodical support of the topic: tables, results of patients examination and their case histories, X-ray pictures.

3.Currency of the topic.

Pulmonary hemorrhage and haemoptysis are frequent and dangerous complications of pulmonary diseases, needing an urgent care. Lung hemorrhage can be fatal. Patients, even with scanty haemoptysis, should immediately be taken to the hospital. Every doctor must know the main principals of clinical signs, differential diagnosis and treatment of lung hemorrhage and haemoptysis.

4.Educative goal:

- **General goal:** To create for students the appropriate terms, which provide knowledge gaining, and abilities, allowing to recognize, diagnose and treat lung hemorrhage and haemoptysis.

- **Concrete aims:**

- To identify the symptoms of lung hemorrhage and haemoptysis.

- To diagnose lung hemorrhage and haemoptysis.

- To differentiate lung hemorrhage and haemoptysis according to the classification.

- To differentiate lung hemorrhage and nose hemorrhage and stomach and esophageal hemorrhage

- To institute complex therapy of lung hemorrhage and haemoptysis.

- To diagnose complications of lung hemorrhage and haemoptysis. and to render urgent aid in emergency cases.

a) **To know** definition lung hemorrhage and haemoptysis;

- etiology and pathogenesis of lung hemorrhage and haemoptysis;
- classification of lung hemorrhage and haemoptysis;
- differential diagnosis lung hemorrhage and nose hemorrhage and stomach and esophageal hemorrhage.

b) **To be able to** interpret data of clinical investigations in lung hemorrhage and haemoptysis;

- to manage a case with lung hemorrhage and haemoptysis.

c) To master **practical skills:**

- Palpation of the chest (elasticity, resistance, vocal phremitus);
- Topographic percussion of the lungs;
- Assessment of low lung edge excursion;
- Comparative percussion of lungs;
- Auscultation of lungs;
- Assessment of bronchophony;
- Performance of urgent care in case of lung hemorrhage and haemoptysis.

5. Grapgs of logical structure.

6. Reference student's card.

HAEMOPTYSIS. LUNG HEMORRHAGE.

In clinical practice they distinguish between lung hemorrhage and haemoptysis but the difference depends on the quantity of coughed blood. **Haemoptysis** is discharging of blood clots or streaks during coughing. A patient may discharge up to **50 ml** of blood a day. **Lung hemorrhage** means one-time expectoration more than 50 ml of blood. The source of haemoptysis (bleeding) is pulmonary and bronchial vessels. Pulmonary bleeding usually develops from bronchial vessels.

Pathogenesis: Bleeding can arrive *per diapedesin, per diabrosum and per rexin.*

Per diapedesin lung hemorrhage arrives due to increased permeability of small pulmonary vessels and capillaries conditioned by specific inflammatory changes in the lungs, toxic agents influence on vessel wall.

Per diabrosum lung hemorrhage arrives due to erosion of vessels, for example, with tuberculosis, when caseous necrosis destroys vessel wall.

Per rexin lung hemorrhage arrives due to mechanical rupture of the wall of the large vessel.

Factors promoting the development of pulmonary bleeding:

1. Increased pressure in the system of pulmonary artery.
2. Disturbances of blood coagulation
3. Increased fibrinolytic activity of the blood
4. Increased permeability of the vessel wall.

The main signs of lung hemorrhage and haemoptysis:

1. The blood is discharged from the lung during coughing. Without cough lung hemorrhage and haemoptysis do not observed.
2. The blood is bright red.
3. The blood is frothy.

Depending on the amount of coughed blood they distinguish **small** (up to 100 ml), **medium** (up to 500 ml) and **profuse** hemorrhage (over 500 ml).

Most frequently haemoptysis and lung hemorrhage discharge from the vessels of large blood circulation. Most frequently haemoptysis occurs with aspergilloma (in 55-85 %), adenoma of lung (48-55 %), bronchogenic cancer (in 37-53 %); bronchiectatic disease (28-53 %), abscess of lung (11-15 %), pulmonary tuberculosis (6-19%). In recent years haemoptysis is observed in cases of chronic bronchitis (in 30%). However at present time in 10-15 % of cases the cause of haemoptysis cannot be elucidated.

It is important to know, that:

- the loss of 10% of blood (on average 500 ml) of its total volume is compensated by the body
- the loss of 10-20% of blood is sublethal,
- the loss of 20-40% of blood is critical,
- the loss of more than 40% of blood is fatal.

15% of tuberculosis patients with complications of medium or profuse lung hemorrhage die. The immediate cause of death is asphyxia, blood loss, aspiration pneumonia, tuberculosis progression, lung and heart insufficiency and atelectasis.

Clinical picture and diagnosis.

Lung hemorrhage manifests by foamy, usually bright-red blood expectorated at slight cough impulses. Before the blood expectoration the feeling of tickling appears in the patient's larynx-gullet, sterna contraction, sometimes pain in the certain part of chest, the feeling of asthma, then – cough with a gurgling sound in larynx-gullet. The patient feels the smell of blood and sour aftertaste.

Peculiar to profuse lung hemorrhage are anemia, collapse, marked pallor, vertigo, nausea, adynamia, frequent soft thread pulse, lowering of blood pressure.

After hemorrhage or haemoptysis cessation blood clots are coughed up for some more days, owing to blood aspiration fever appears. Auscultation findings testify of moist rales over the lower segments of lungs, predominantly on the side of hemorrhage. X-ray picture can show atelectasis or aspiration pneumonia.

The principal methods of diagnosis are x-ray investigation and bronchoscope examinations.

Table 1. Differential diagnosis of lung, nose and stomach hemorrhage

Lung hemorrhage	Nose hemorrhage	Stomach hemorrhage
In anamnesis –lung illness, respiratory distress and hypoxia	In anamnesis –nose traumas, hypertensive disease, hemophilia	In anamnesis –stomach illness, liver cirrhosis, oesophagus varicose veins and alcoholism
Cough or stream bleeding	Bleeding without cough	Bleeding at vomiting or at inclination of vomiting
Blood is expectorated but not eructated, of bright-red color, foamy, sometimes blood clots, with sputum, alkaline reaction	Dark blood, often coagulated, alkaline reaction	Blood is eructated but not expectorated, black gruel-like or liquid matter, airless. Sometimes the vomited matter is of chocolate color with food admixtures
At considerable hemorrhage simultaneous mouth and nose bleeding	Nose bleeding, sometimes mouth bleeding	Pharynx bleeding, rarely nose bleeding, sputum with blood is not observed
Pain in the side, gurgitation in the chest. Auscultation reveals moist rales	Pulmonary anamnesis and lung involvement are absent	Vomiting, pain in the stomach of pressing character
Faecal matter is usually	Faecal matter is colorless	Black, fetid faecal matter,

colorless		meal admixture
Blood in the sputum is noted for some days after hemorrhage. Anemia is not observed prior to the hemorrhage	Prior to the hemorrhage anemia is not observed	Anemia signs frequently precede bloody vomiting

Treatment.

The treatment for lung hemorrhage and haemoptysis depends on their pathogenesis and presupposes rendering first aid and expert care.

First aid: a doctor provides the semisitting position of a patient (eases blood clot expectoration), applies tourniquets on the lower extremities (in case of tissue compression tissue thromboplastin gets into the blood). One should remember that the tourniquets must be loosened every 30 min for 5-10 min.

Expert care:

1. Treatment for the causative disease.
2. Vessel pressure reduction:
 - a) **spasmolytics:**
 - **aminophylline, No-Spa** are injected intramuscularly;
 - b) **ganglionic blockers:**
 - benzohexonium** - intramuscularly;
 - pentamine** – intramuscularly or intravenously;
 - pirilen or temechin.**

When ganglionic blockers are used, one controls systolic arterial pressure. It must not be lower than 80 mm Hg in brachial artery;

- c) **antitussive drugs** –cough may provoke haemoptysis due to pressure increased in pulmonary artery. **Atropine sulfate** is administrated subcutaneously.
3. Blood clotting enhancement:
 - **dicinone** (sodium ethamsylate) – intravenously or subcutaneously;
 - **fibrinogen** (in hypofibrinogenemia) – intravenously dropping;
 - **fresh frozen plasma** -100-200 ml;

4. Reduction of the fibrinolytic activity of the blood:

a) Synthetic inhibitors:

- **aminocaproic acid** - intravenously dropping. In case of repeated lung hemorrhage and haemoptysis may be taken 3-4 times a day;
- **amben** – intramuscularly or intravenously;

b) natural inhibitors:

- **contrical, trasylol**

5. Reduction of pulmonary vessel wall permeability:

- **calcium gluconate;**
- **ascorbic acid.**

7.TASKS FOR SELF-ASSESSMENT OF THE TOPIC

Questions:

1. What is haemoptysis?
2. What is lung hemorrhage?
3. What are patient's complaints with haemoptysis and lung hemorrhage?
4. What is heard over the percussion at lung hemorrhage?
5. What is heard over the auscultation at lung hemorrhage?
6. What classification of lung hemorrhage do you know?
7. Which investigation is the most sensitive for detection of the source of haemoptysis and lung hemorrhage?
8. What is the treatment of haemoptysis and lung hemorrhage?
9. What is the differential diagnosis of lung hemorrhage?
10. Which lung hemorrhage is fatal?
11. With which diseases haemoptysis and lung hemorrhage occurs frequently?

Tests:

Tests:

1. **The method of the definition of a source of hemoptysis and lung hemorrhage?**
A. X-ray.

- B. Clinical data.
 - C. Computer tomography.
 - D. Fibrobronchoscopy.
 - E. A and D.
- 2. Which of those complications of Tb can lead to asphyxia?**
- A. Tuberculosis laryngitis.
 - B. Pulmonary hemorrhage.
 - C. Spontaneous pneumothorax.
 - D. Chronic *cor pulmonale*.
 - E. Pleurisy.
- 3. An urgent care at lung hemorrhage?**
- A. Aminophylline, No-Spa
 - B. Benzohexonium, pentamine, pirilen or temechin
 - C. Dicinone.
 - D. Aminocapronic acid.
 - E. All of them.
- 4. Female patient Z., 29 years old, was brought by the ambulance to a regional tuberculosis dispensary. She complains on cough, dyspnea, blood expectoration during 3 days about 100 ml per day, fever about 37,5-38°C. Objectively: dull sound at the percussion, the weakening of breathing and crepitation above the right side of the chest. What is the most probable diagnosis?**
- A. Lung infarction.
 - B. Atelectasis.
 - C. Lung hemorrhage.
 - D. Lung hemorrhage, aspiration pneumonia
- 5. More frequently lung hemorrhage arrives in patients with pulmonary diseases:**
- A. Tuberculosis.
 - B. Chronic bronchitis.

C. Aspergilloma

D. Lung cancer.

E. All of them.

6. Which type of lung hemorrhage is fatal?

A. Hemoptysis.

B. 40% of blood loss.

C. 10% of blood loss.

D. 50%.

E. All of them.

7. Which color of blood is specific for lung hemorrhage?

A. Black.

- B. Pink.
- C. Red.
- D. Bright-red.
- E. All incorrect.

8. Which sign is mostly typical for identifying of aspiration pneumonia during percussion?

- A. Tympanic sound.
- B. Dull sound.
- C. Resonant sound.
- D. “Band box”.

E. A and D.

9. Which amount of blood is characterized like profuse lung hemorrhage?

- A. 1000 ml.
- B. 100 ml.
- C. 600 ml.
- D. 200 ml.
- E. A and C.

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10. Which amount of blood is classified like hemoptysis?

- A. 100 ml
- B. More than 50 ml.
- C. Less than 50 ml.
- D. Less than 10 ml.
- E. All incorrect.

9. Further reading:

Main literature:

1. Phthiology. Textbook / Petrenko V.I., Kyiv – Medicine, 2008 - 288 p.
2. Phthiology A teaching manual in Ukrainian and English / Pyatnochka I.T., Ternopol, - Ukrmedknyga, 2002. - 257 p.

Additional literature:

1. Clinical Tuberculosis. Manual / Crofton I., Horne N., Miller F. London, 1992. – 210 p.
2. WHO. 2008. WHO Report 2008 Global tuberculosis control - surveillance, planning, financing. WHO/HTM/TB/2008.393
3. Crofton J. Clinical Tuberculosis / J.Crofton, N. Horne, F.Miller – London.: Macmillan press LTD, 1995. - 210 p.
4. Harryes A.TB. Clinical manual for South East Asia/ A.Harryes, D. Maner, M. Uplecar – Biella: WHO, 1997 – 145 p.

Methodical recommendations are composed by O.C.Shevchenko, S.L.Matveyeva, D.A.Butov, A.I.Choporova

Methodical recommendations are analyzed and approved at the sub-faculty meeting of the Department:

With the changes and additions:

Head of the Department

O.S.Shevchenko