Ministry of Health of the Republic of Belarus

Educational Institution "Vitebsk State Order of Peoples' Friendship

Medical University"

Department of Faculty Therapy and Cardiology

with a course of the Faculty of Advanced Training and retraining

Approved at the meeting of the department

Protocol No. 10 from 09.01.2025

**METHODOLOGICAL GUIDELINES FOR STUDENTS**

**for practical training**

in the academic discipline "Internal diseases"

specialties 1-79 01 01 "Medical business"

4th year, Faculty of Medicine

full-time education

Lesson topic: Pulmonary embolism. Pulmonary hypertension, pulmonary heart disease

Duration: 6 hours

Compiled by:

L.V. Babenkova, Associate Professor, PhD

Vitebsk, 2025

**Motivational characteristics of the need to study the topic**

**Goals and objectives of the lesson:**

***The educational objectives*** are to develop students'

*scientific knowledge about:*

the importance of external and internal environmental factors in the development of pulmonary embolism, pulmonary hypertension, chronic pulmonary heart disease;

mechanisms of pathogenesis of pulmonary embolism, pulmonary hypertension, chronic pulmonary heart disease;

typical clinical manifestations of pulmonary embolism, pulmonary hypertension, chronic pulmonary heart disease;

modern methods of diagnosing pulmonary embolism, pulmonary hypertension, chronic pulmonary heart disease;

strategies and tactics for managing patients with pulmonary embolism, pulmonary hypertension, chronic pulmonary heart disease;

*skills and abilities necessary for:*

individual examination of patients with pulmonary embolism, pulmonary hypertension, chronic pulmonary heart disease;

diagnosis and differential diagnosis of pulmonary embolism, pulmonary hypertension, chronic pulmonary heart disease;

preparation of an examination plan for patients with pulmonary embolism, pulmonary hypertension, chronic pulmonary heart disease, evaluation of the results of laboratory and instrumental research methods;

selection and prescription of drugs for the treatment of pulmonary embolism, pulmonary hypertension, chronic pulmonary heart disease;

prevention of pulmonary embolism, pulmonary hypertension, chronic pulmonary heart disease;

provision of emergency medical care for pulmonary embolism.

***Developmental goals*** consist of the formation and development of the student’s mental properties, including attention, sensory-perceptual properties, mnemonic and thinking properties, psychomotor properties, professional inclinations and abilities.

***Educational goals*** are aimed at developing personal qualities of students during the course of study: a sense of mutual assistance, the ability to work in a team, subordination, tact, empathy, responsibility for the assigned task, diligence, accuracy, conscientiousness, understanding the importance of the profession, pride in the achievements of domestic medicine.

During the study of the topic of the lesson, the student must

**study:**

*basic concepts:* pulmonary embolism, venous thromboembolic complications, post-thrombotic disease, pulmonary hypertension, chronic post-embolic pulmonary hypertension, initial combination PAH-specific therapy, sequential combination PAH-specific therapy, chronic pulmonary heart disease;

epidemiology, etiology, pathogenesis, predisposing factors, classifications, clinical manifestations, complications, diagnostic methods, differential diagnostics, treatment, primary and secondary prevention, medical examination and prognosis for pulmonary embolism, pulmonary hypertension, chronic pulmonary heart disease;

**learn:**

*conduct* a survey (collect complaints and anamnesis) and clinical examination of patients with pulmonary embolism, pulmonary hypertension, chronic pulmonary heart disease;

*make* a plan for examining patients with pulmonary embolism, pulmonary hypertension, chronic pulmonary heart disease;

*interpret* the results of laboratory and instrumental studies in patients with pulmonary embolism, pulmonary hypertension, chronic pulmonary heart disease;

*formulate* a preliminary and final diagnosis for pulmonary embolism, pulmonary hypertension, chronic pulmonary heart disease;

*prepare* medical documentation (medical history, prescription sheet, referrals for laboratory and instrumental examinations and consultations, prescriptions for basic medications);

*use* educational, scientific, regulatory and reference literature;

*comply* with the rules of medical ethics and deontology;

**work out:**

*skills* in providing emergency care for pulmonary embolism; using the Wells, Geneva, PESI scales, risk stratification for pulmonary hypertension; interpreting the results of a complete blood count, general urine analysis, biochemical blood serum test, coagulogram, ECG, radiographs, scanograms, angiograms, scintigrams, ultrasound of large arterial vessels, heart, abdominal organs and kidneys; formulating a diagnosis of pulmonary embolism, pulmonary hypertension, chronic pulmonary heart disease.

**Practical skills developed during the lesson, including the use of simulation training technologies:**

1. Providing emergency care for pulmonary embolism.

2. Interpretation of ECG.

3. Interpretation of the results of a complete blood count, complete urine analysis, serum biochemistry, coagulogram, ABPM, SMEKG, radiographs, scanograms, angiograms, scintigrams, ultrasound of large arterial vessels, heart, abdominal organs and kidneys.

4. Formulating a diagnosis.

**Interdisciplinary and intradisciplinary connections**

When studying the topic, use the knowledge and skills obtained in the study of normal and pathological human anatomy, normal and pathological human physiology, pharmacology, and propaedeutics of internal diseases.

Theoretical part

**Questions for classroom monitoring during the lesson**

1. Pulmonary embolism (PE): main causes, pathogenesis, classification.

2. Clinical manifestations of PE.

3. Assessment of the likelihood of PE.

4. Instrumental and laboratory studies in the diagnosis and differential diagnosis of PE.

5. Prognosis for PE.

6. Treatment tactics in accordance with the clinical protocols of the Ministry of Health of the Republic of Belarus, the National Clinical Guidelines and recommendations of the European Society of Cardiology for the diagnosis and treatment of acute pulmonary embolism.

7. Pulmonary hypertension: definition of the concept, etiology, pathogenesis.

8. Clinical manifestations of pulmonary hypertension.

9. International classification of pulmonary hypertension.

10. Fundamentals of treatment tactics for pulmonary hypertension.

11. Prognosis for pulmonary hypertension.

12. Chronic pulmonary heart disease: definition of the concept, etiology.

13. Clinical picture of chronic pulmonary heart disease

14. Laboratory and instrumental diagnostic methods for chronic pulmonary heart disease

15. Current international recommendations and clinical protocols of the Ministry of Health of the Republic of Belarus for the treatment of patients with pulmonary hypertension.

16. Pulmonary hypertension in lung diseases, features of diagnosis and treatment tactics.

17. Determination of indications for surgical treatment of chronic pulmonary heart disease, for lung transplantation, the "lungs-heart" complex.

**Practical part**

*Patient supervision:* collection of complaints and medical history of patients with pulmonary embolism, pulmonary hypertension, chronic pulmonary heart disease; objective examination; preparation of an examination plan; interpretation of results of laboratory and instrumental examination methods; formulation of a diagnosis; preparation of a treatment plan, algorithm for providing emergency medical care for pulmonary embolism. Preparation of medical documentation.

*Modeling and solving situational problems.*

**Tasks and questions to monitor the assimilation of the topic**

1. Prescribe basic medications for the treatment of pulmonary embolism, pulmonary hypertension, chronic pulmonary heart disease (rivaroxaban, warfarin, amlodipine, sildenafil, furosemide, indapamide).

2. Justify and formulate a diagnosis when solving a situational problem.

3. Test tasks on the topic of the practical lesson.

**Questions for guided independent work**

Guided independent work is not provided for by the educational institution's curriculum for the academic discipline "Internal Medicine" for the specialty 1-79 01 01 "General Medicine".

**Literature**

**Main:**

1. Internal Diseases = Внутренние болезни : textbook : in 2 vol. Vol. 1 : / edited by A. I. Martynov, J. D. Kobalava, S. V. Moiseev. - Moscow : GEOTAR-Media, 2022. - 683 p. : ill. - Bibliogr.: p. 677. - ISBN 978-5-9704-6766-4. - Режим доступа: https://www.studentlibrary.ru/book/ISBN9785970467664.html – 30 экз.

2. Internal Diseases = Внутренние болезни : textbook : in 2 vol. Vol. 2 : / edited by A. I. Martynov, J. D. Kobalava, S. V. Moiseev. - Moscow : GEOTAR-Media, 2022. - 614 p. : ill. - ISBN 978-5-9704-6767-1. - Режим доступа*:* https://www.studentlibrary.ru/book/ISBN9785970467671.html – 30 экз.

3. Special propedeutics of internal diseases : lecture course / Vitebsk State Medical University, Dep. of Propedeutics of Internal Diseases ; comp. by L. M. Nemtsov. - 2-е изд. - Vitebsk : VSMU, 2016. - 318 p. - Bibliogr.: p. 318. - ISBN 978-985-466-822-2. - Режим доступа: https://elib.vsmu.by/handle/123/9837 - 317 экз.

4. Немцов, Л. М. Пропедевтика внутренних болезней = Propaedeutics of Internal Diseases : учеб. пособие на англ. яз. : для иностр. студентов учреждений высш. образования по специальности "Лечебное дело" : [в 2 ч.]. Ч. 2 : : Обследование органов систем пищеварения, мочевыделения, желез внутренней секреции, крови и опорно-двигательного аппарата / Л. М. Немцов, В. А. Прищепенко, Ю. Г. Юпатов ; М-во образования Республики Беларусь, УО "Витебский гос. мед. ун-т". - Витебск : [ВГМУ], 2023. - 423 с. : ил. - Библиогр.: с. 421-423. - ISBN 978-985-580-165-9. - Режим доступа: https://elib.vsmu.by/handle/123/25144 Гриф(приоритет документа): МО - 250 экз.

**Additional:**

5. Examination of patients in clinic of internal diseases = Обследование пациентов в клинике внутренних болезней : educational instruction for students of 2nd and 3rd years in specialties "General Medicine" and "Stomatology" / Г. И. Юпатов [и др.] ; Ministry of Public Health of Republic of Belarus, EI "Vitebsk State of the order of International Friendship Medical University", Dep. of Internal Diseases Propedeutics. - Vitebsk : VSMU, 2016. - 59 p. - Bibliogr.: p. 31. - ISBN 978-985-466-838-3. – 254 экз.

6. Family Medicine : in 3 books : textbook for students of higher medical education establishments - medical universities, institutes and academies. Book 2 : : Symptoms and Syndromes in Clinical Course of Internal Diseases / L. S. Babinets [и др.] ; edited by O. M. Hyrina, L. M. Pasiyeshvili. - Kyiv : AUS Medicine Publishing, 2018. - 375 p. : ill. - Bibliogr. at the end of the chapters. - ISBN 978-617-505-652-3. Гриф(приоритет документа): МО Укр. *-* 1 экз*.*

7. Family Medicine : in 3 books : textbook for students of higher medical education establishments of the 4th level of accreditation. Book 1 : : General Issues of Family Medicine / O. M. Hyrina [и др.] ; edited by O. M. Hyrina, L. M. Pasiyeshvili. - Kyiv : AUS Medicine Publishing, 2016. - 558 c. : ill. - Bibliogr. at the end of the chapters. - ISBN 978-617-505-494-9. Гриф (приоритет документа): МО Укр. - 1 экз.

8. Internal Medicine: Critical Care : textbook / Babak O. Ya. [и др.] ; edited by O. Ya. Babak, O. M. Bilovol. - Kyiv : AUS Medicine Publishing, 2018. - 367 p. : ill. - ISBN 978-617-505-636-3. Гриф(приоритет документа): УМО Укр. - 1 экз.

9. Kumar & Clark's Clinical Medicine / ed. by Parveen Kumar, Michael Clark ; editor, Online Content Adam Feather. - 9th ed. - Edinburgh [etc.] : Elsevier, 2017. - XIV, 1437 p. : ill. - Bibliogr. at the end of the chapters. - ISBN 978-0-7020-6601-6. - 1 экз.

10. Буйневич, И. В. Болезни органов дыхания = Pulmonary Diseases : учеб.-метод. пособие для студентов 4 и 6 курсов фак. по подгот. специалистов для зарубеж. стран учреждений высш. мед. образования / И. В. Буйневич, Д. Ю. Рузанов ; М-во образования Республики Беларусь, УО "Гомельский гос. мед. ун-т", Каф. фтизиопульмонологии. - 2-е изд., стер. - Гомель : ГомГМУ, 2019. - 101 с. : ил. - Библиогр.: с. 101. - ISBN 978-985-588-153-8. - Режим доступа: http://elib.gsmu.by/handle/GomSMU/3133 - 45 экз.

11. Буйневич, И. В. Неотложные состояния в пульмонологии = Urgent conditions in pulmonology : учеб.-метод. пособие для студентов учреждений высш. образования, обучающихся по специальности 1-79 01 01 "Лечебное дело" / И. В. Буйневич, Э. Н. Платошкин, Н. Э. Платошкин ; М-во здравоохранения Республики Беларусь [и др.]. - Гомель : ГомГМУ, 2023. - 57 с. : ил. - Библиогр.: с. 56-57. - ISBN 978-985-588-269-6. - Режим доступа: https://elib.gsmu.by/handle/GomSMU/14251 Гриф(приоритет документа): УМО - 1 экз.

12. Внутренние болезни = Internal diseases : учеб. пособие для студентов фак. иностр. учащихся и магистрантов (с англ. яз. обучения) / В. М. Пырочкин [и др.] ; М-во здравоохранения Республики Беларусь, УО "Гродненский гос. мед. ун-т" ; под общ. ред. В. М. Пырочкина. - Гродно : ГрГМУ, 2016. - 389 с. : ил. - Библиогр. в тексте. - ISBN 978-985-558-617-4. – 1 экз.

13. Дополнительные методы исследования в клинике внутренних болезней. Практикум = Diagnostic methods in the internal medicine. Workbook : учеб.-метод. пособие для студентов учреждений высш. образования, обучающихся по специальности 1-79 01 01 "Лечебное дело" / Э. А. Доценко [и др.] ; М-во здравоохранения Республики Беларусь, Белорус. гос. мед. ун-т, Каф. пропедевтики внутрен. болезней. - 4-е изд. - Минск : БГМУ, 2024. - 158 с. - Загл. обл.: Diagnostic methods in the internal medicine. Workbook. - ISBN 978-985-21-1556-8. - Режим доступа: https://rep.bsmu.by/handle/BSMU/44425 Гриф(приоритет документа): УМО – 1 экз.

14. Платошкин, Э. Н. Неотложные состояния в пульмонологии = Urgent conditions in pulmonology : учеб.-метод. пособие для студентов 4-6 курсов фак. по подгот. специалистов для зарубеж. стран мед. вузов / Э. Н. Платошкин, Н. Э. Платошкин, И. В. Буйневич ; М-во здравоохранения Республики Беларусь, УО "Гомельский гос. мед. ун-т", Каф. внутрен. болезней № 2 с курсом эндокринологии. - Гомель : ГомГМУ, 2016. - 33 с. - Библиогр.: с. 33. - ISBN 978-985-506-841-0. - Режим доступа***:*** http://elib.gsmu.by/handle/GomSMU/2273 - 1 экз.

**Regulatory legal acts:**

15. О здравоохранении: Закон Республики Беларусь от 18 июня 1993 г. № 2435-XII: с изменениями и дополнениями. **Литература** / ООО «Профессиональные правовые системы». – Минск, 2019.