HUMANITAS MEDICAL SCHOOL

Course: Respiratory Diseases

Year (1st-2nd-3rd-4th-5th-6th): 3rd

Period (1st-2nd semester   annual): 2nd semester

Objectives

The lungs and the respiratory system are far more complex than many other organs and apparatus. The lungs must play multiple roles, gases exchanges, oxygen supplementation, removing of wastes, toxins, and defense against hostile intruders. Nowadays epidemiological data shows that the respiratory diseases are becoming more and more important in terms of morbidity, invalidity, and mortality. Lung diseases are not only a killer, but an impressive number of patients are now living worldwide with a chronic pulmonary disease with a terrific impact on hospitalization and general economic impact. Based on these data, the present course tries to focus on the most important aspects of respiratory medicine examining prevalence, risk factors, physiopathological and clinical features of the most important chapters of lung diseases. For more complex diseases or clinical presentations, an integrated approach with other specialists (i.e.: radiologists, pathologists, pharmacologists, ENT...) will be used to describe in an accurate way the complexity and the heterogeneity of them. The course has been designed according to the European Curriculum Recommendations for Training in Adult Respiratory Medicine (Loddenkemper R. Breathe 2008, Volume 5, No 1). Specific objectives of the Respiratory Diseases course include:

Patient-oriented approach according to respiratory signs and symptoms

- Describe characteristics and potential causes of cough, sputum production, dyspnoea, wheeze, stridor, haemoptysis, and chest pain.
- Describe characteristics and potential causes of abnormal examination findings, including cyanosis, finger clubbing, chest wall deformities, abnormal breathing patterns, and abnormal findings on inspection, palpation, percussion, and auscultation.

Respiratory Physiopathology
- Understand ventilation, mechanics of breathing and cardio-pulmonary relationship.
- Describe principles of plethysmography, bronchial hyper-responsiveness, diffusion, blood flow, ventilation-perfusion relationships, and control of ventilation.
- Interpret pulse oximetry, simple spirometry, plethysmography, bronchodilation test, bronchial provocation testing, single breath diffusing capacity, and peak flow monitoring.

Respiratory imaging
- Describe basic principles of chest radiography, computed tomography (CT; with and without contrast medium), high-resolution CT (HRCT) and bed-side lung ultrasound (LUS).

- Perform a basic interpretation of chest radiographs (PA, AP and lateral views).
- Perform a basic interpretation of CT scans (identification of mass lesions, consolidation, collapse, mediastinal/hilar lymphadenopathy, interstitial lung disease, hyperinflation/air-trapping, bronchiectasis, ground-glass shadowing, pneumothorax and pleural effusions/plaques).
- Perform a basic interpretation of bed-side LUS images (identification of pleural effusion, aspecific alveolar consolidation, wet lung/interstitial syndrome, diaphragm movements) and understand the role of LUS in assisting pleural procedures.
- Describe the main radiological features of the most common pulmonary and pleural diseases.
- Describe basic principles of chest radiography, computed tomography and molecular imaging.
- Understand and apply the appropriate multimodal imaging techniques (including X-ray, CT and PET) in diagnosing, staging, and managing respiratory diseases, particularly lung cancer, emphasizing the strengths and limitations of each modality.
- Identify and differentiate between the radiological features of common pulmonary and airway diseases: recognizing patterns, evaluating

asthma, vocal cord dysfunction, gastro-oesophageal reflux, upper respiratory tract disorders, bronchiectasis and COPD.
- Define, classify, describe the etiology and diagnose non-asthma allergic and eosinophilic lung diseases, including hypersensitivity pneumonitis, eosinophilic granulomatosis with polyangiitis (EGPA), acute and chronic eosinophilic pneumonia, allergic bronchopulmonary aspergillosis and drug-induced diseases.

Bronchiectasis
- Define, classify, describe the etiology and diagnose bronchiectasis and be awareness of its heterogeneity.
- Describe the epidemiology and pathophysiology of bronchiectasis.
- Describe basic principles, indications and contraindications of relevant investigations used in the management of bronchiectasis, including spirometry and other relevant lung function tests, arterial blood gas analysis, bronchodilator and bronchoprovocation testing, bronchoscopy, chest X-Ray, and chest CT.
- Understand basic principles for bronchiectasis management (including relevant therapeutic measures, respiratory physiotherapy and pulmonary rehabilitation, patient education, indications for hospitalization, and the role of vaccinations).
- Describe bronchiectasis-related complications, including exacerbations and haemoptysis.
- Define, classify and diagnose respiratory and non-respiratory manifestations of cystic fibrosis (CF).
- Describe the epidemiology and pathophysiology of CF.
- Become familiar with chest physiotherapy techniques used in CF, nutritional programs, indications for lung transplantation and new drugs (potentiators and modulators).
- Understand the importance of a multidisciplinary approach in the management of bronchiectasis and CF.

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and special problems in treatment (e.g. multidrug resistant TB, extensively resistant TB, pregnancy and breast feeding, TB and HIV infection, and latent TB infection).

Pleural diseases and procedures

- Define, classify, describe the etiology, and diagnose pleural effusions (serothorax, chylothorax, hemothorax, and empyema)
- Describe epidemiology and pathophysiology of infectious, inflammatory, and neoplastic pleural disorders.
- Describe the macroscopic appearance of pleural fluids, distinction between transudative and exudative pleural effusions.
- Define, classify, describe the etiology, and diagnose pneumothorax (primary and secondary) and related complications such as tension pneumothorax.
- Illustrate relevant investigations to manage pleural diseases, including non-invasive (chest X-ray, ultrasound, and chest CT) and invasive (thoracentesis, pleural biopsy, pleural drainage, medical thoracoscopy, and biopsy) techniques.
- Understand indications for pleural ultrasound, thoracentesis, and intercostal tube drainage.

Sleep-related, chest and neuromuscolar disorders

- Define, classify, describe the etiology, and diagnose obstructive sleep apnoea syndrome (OSA), central sleep apnoea syndrome (CSA), periodic breathing (PB), and obesity hypoventilation syndrome (OHS).
- Describe the epidemiology and pathophysiology of OSA, CSA, PB, and OHS.
- Illustrate relevant investigations used in the management of sleep-related disorders, including pulmonary function tests, respiratory polygraphy and polysomnography.
- Recognize complications of OSA, CSA, PB, and OHS.
- Define, classify, describe the etiology and diagnose chest wall diseases -CW-(including

Acute and chronic respiratory failure and respiratory high-dependency unit
- Define, classify and describe the etiology of both acute and chronic respiratory failure (RF).
- Describe the pathophysiology of RF.
- Describe relevant investigations used in the management of RF including non-invasive (chest x-ray, ultrasound, chest CT, pulmonary function tests) and invasive (bronchoscopy) techniques
- Become familiar with relevant therapeutic measures such as oxygen therapy (including high-

- Lung Cancer

- Mediastinal tumours

- Interventional pulmonology

- Respiratory Imaging: Basics in molecular imaging

- Respiratory Imaging: Multimodality imaging in Lung Cancer

- Respiratory Imaging: PET imaging of granulomatous disease

- Principles of Thoracic Surgery

- Lung Transplant

- Eosinophilic Diseases and respiratory allergies

Teaching Methods

- Lectures. Students are encouraged to actively participate to the lectures with questions and comments.

Assessment

- Written examination only. No oral examination.
- 40 MCQs
- Each MCQ will have 5 answers (only 1 correct)
- 75 minutes total to answer the 40 MCQs
- 60% of the 40 MCQs should be correct to pass the exam

The final score will be calculated according to the number of correct answers out of the 40 MCQ as follows: <= 23 correct answers: Failure; 24 correct answers: 18/30; 25 correct answers: 19/30; 26 correct answers: 20/30; 27 correct answers: 21/30; 28 correct answers: 22/30; 29 correct answers: 22/30; 30 correct answers: 23/30; 31 correct answers: 24/30; 32 correct answers: 25/30; 33 correct answers: 26/30; 34 correct answers: 26/30; 35 correct answers: 27/30; 36 correct answers: 28/30; 37 correct answers: 29/30; 38 correct answers: 30/30; 39 correct answers: 30/30; 40 correct answers: 30/30 cum laude

Texts

- Essentials of Clinical Pulmonology. Edited by Pallav L. Shah, Felix JF Herth, YC Gary Lee, Gerald J Criner. CRC Press
- Robbins & Cotran Pathologic Basis of Disease (Robbins Pathology) 10th Edition, Elsevier 2020
- Lawrence Martin. All You Really Need to Know to Interpret Arterial Blood Gases