GENERAL OBJECTIVES

During the course, students must acquire the theoretical knowledge and clinical skills that enable them to identify the main problems caused by cardiovascular pathology, reach a diagnosis, indicate the diagnostic methods required in a logical order, and decide upon suitable treatment. Given the nature of this pathology students must be able to identify those problems which require urgent attention and know how to manage them, especially where there is a need for hospital admission or surgery.

SPECIFIC OBJECTIVES

A. At the end of the course, students must be able to identify the main problems associated with cardiovascular pathology, specifically:
   1. Dyspnoea
   2. Water/salt retention (congestion)
   3. Chest pain
   4. Palpitations
   5. Syncope, shock and cardiorespiratory arrest
   6. Arterial hypertension
   7. Problems related to cardiac and vascular prostheses
   8. Ischemia of the extremities
   9. Ischemia of the different organs
   10. Venous insufficiency

B. Students must be familiar with the theoretical bases of the diagnostic methods used in cardiovascular pathology, specifically:
   1. Physical examination in cardiovascular pathology
   2. Auscultation and other methods of simple, instrument-based examination
   3. Non-invasive, instrument-based examination of the peripheral vascular system
   4. Electrocardiography
   5. Cardiac radiology
   6. Echocardiography
   7. Haemodynamics
   8. Angiography and ventriculography
   9. Other diagnostic methods: CAT, magnetic resonance, isotopes

C. Students must be familiar with the diagnosis and medical/surgical treatment of the main diseases of the cardiocirculatory apparatus, specifically:
   1. Cardiac insufficiency
   2. Shock
   3. Arrhythmias
   4. Acquired valvular disease
   5. Coronary disease
Diseases of the cardiocirculatory apparatus

6. Congenital cardiopathy
7. Myocardial disease
8. Pericardial disease
9. Hypertensive cardiopathy
10. Infectious endocarditis
11. Cor pulmonale
12. Cardiac tumours
13. Acute and chronic arterial disease
14. Aneurysms of the aorta and its branches
15. Cerebrovascular ischemia and ischemia of the abdominal organs
16. Venous and lymphatic disorders
17. Cardiovascular tissue and organ transplants
18. Specific knowledge of cardiac and vascular surgery

D. Students must acquire the following skills:

- Take a correct history, including investigating and interpreting the main symptoms. Students must be able to develop adequate doctor-patient communication and recognize symptoms through the expressions most commonly used by patients.
- Explore the most important signs associated with cardiovascular disease, and using them to identify the pathophysiological changes that cause them.
- Take the arterial pulse. Locate the most important pulses: carotid, radial, ulnar, femoral, popliteal, tibialis posterior and dorsalis pedis. Understand the most important properties of the pulse: frequency, regularity, volume and morphology. Palpate the precordial region: thrills, apical beat and abnormal beats. Inspect the jugular pulse. Identify the waves and jugular regurgitation. Hepatojugular reflex.
- Correctly determine arterial pressure. Know how to use the different kinds of sphingomanometers.
- Cardiac auscultation. Recognize the most common sounds and murmurs. Technique of auscultation: focus, correct use of the membrane and the bell. Manoeuvres for modifying murmurs and sounds: body positions, Valsalva, apnoea.
- Explore hepatomegaly, oedemas and pulmonary congestion. Explore the venous system.
- Record an electrocardiogram and interpret the most common morphologies. Recognize the sinusal rhythm and most common arrhythmias found in clinical practice: extrasystolic, sinusal tachycardia, supraventricular paroxysmal tachycardia, flutter and atrial fibrillation, ventricular tachycardia, sinusal bradycardia, AV blocking and ventricular fibrillation.
- Interpret a simple chest x-ray
- Identify cardiorespiratory arrest and perform cardiorespiratory resuscitation manoeuvres: ABC of resuscitation.
- Be familiar with and apply special measures in surgical wounds. Managing thoracic and mediastinic drainage.
- Apply emergency measures in the case of a vascular wound.
- Interpret pathoanatomical reports and, together with the pathologist, produce a good clinicoanatomical description.

SYLLABUS

A. IDENTIFYING PROBLEMS
Students must have fully assimilated the information about identification of cardiovascular problems taught in the module General Signs and an Introduction to Clinical Pathology prior to studying the diseases of the cardio-vascular system.

1. Dyspnoea
Dyspnoea of cardiac origin. Differential diagnosis with respect to functional dyspnoea (hyperventilation, anxiety) and dyspnoea of other aetiology, especially respiratory. Degree of severity according to current classification (NYHAC). Orthopnoea and paroxysmal dyspnoea. Symptoms that accompany cardiac dyspnoea: coughing and haemoptysis. Acute pulmonary oedema.

2. Water/salt retention (congestion)
Characteristics of cardiac oedema. Differential diagnosis with respect to renal oedema and other aetiologies. Other signs that indicate congestion: hepatomegaly, jugular regurgitation. Differentiate cardiac hepatomegaly from the secondary form and from other aetiologies.

3. Chest pain
Types of chest pain of cardiac origin: coronary, pericardial, pulmonary thromboembolism, aortic dissection. Differential diagnosis between these forms, according to the pain characteristics. Specific diagnostic tests and the order in which they must be performed. Exploring coronary pain, in both its typical and atypical forms. Differential diagnosis with respect to pain of functional origin. Assessing the degree of severity (CCS classification) and the urgency of treatment, especially in terms of identifying pain that indicates acute myocardial infarct. Identification of pericardial pain and its specific characteristics: relationship to breathing, body position and movements.

4. Palpitations
Differential diagnosis of palpitations. Identification through interview of those situations that suggest the presence of arrhythmias. Identifying the types of palpitations that suggest serious, potentially fatal, arrhythmias. Conducting the tests required to reach a diagnosis.

5. Syncope, shock and cardiorespiratory arrest

6. Arterial hypertension
Correct identification of hypertensive patients through appropriate physical examination. Differentiation of different types and degrees of hypertension in order to decide upon any special tests and the urgency of treatment needed. Identification of hypertensive crises.

7. Problems related to valve prostheses
Identification of the most common complications associated with valve prostheses. Risk of anticoagulation and identification of subsequent complications. Infection of valve prostheses (infectious endocarditis): detection and prophylaxis. Identification of prosthesis dysfunction and the tests needed to confirm it.

8. Ischemia of the extremities
Acute and chronic ischemia of the extremities. Diagnostic criteria: differential diagnosis of pain of arterial origin compared to other vascular, neurological or musculoskeletal aetiologies; signs of ischemia in the physical examination. Assessing the degree of severity and the urgency of treatment. Specific diagnostic tests and the order in which they should be performed.

9. Venous insufficiency
B. THEORETICAL BASES OF THE DIAGNOSTIC METHODS USED IN CARDIO-VASCULAR PATHOLOGY

1. Physical examination methods
Taking the venous pulse; identifying the different waves, understanding their meaning and how they are modified in different cardiac disorders. Palpating the precordial region: thrills and apical beat. Palpating the arterial pulse at different levels. Clinical significance of the characteristics of the arterial pulse. Examining the skin in the lower extremities and its clinical significance.

2. Auscultation
Origin of cardiac sounds and murmurs. Normal and abnormal sounds. Their physical characteristics. Types of stethoscope and their uses. Differential diagnosis of murmurs. Manoeuvres that modify cardiac murmurs and sounds and thus facilitate diagnosis.
Origin of Korotkoff sounds and their usefulness in determining arterial pressure. Auscultation of peripheral vascular murmurs.

3. Non-invasive, instrument-based examination of the peripheral vascular system

4. Electrocardiography

5. Cardiac radiology
Radiology of the heart and large vessels. Cardiac and vascular angiography; complications. Clinical anatomy: distribution of the coronary tree; normal morphology of the cardiac cavities and the main vessels.

6. Echocardiography

7. Haemodynamics
Intracavitary pressure, cardiac output, vascular resistance and short-circuits. Calculating the valve area.

8. Angiography and ventriculography

9. Other diagnostic methods
Other non-invasive complementary examination methods: CAT, magnetic resonance.

C. DIAGNOSIS AND TREATMENT OF THE MAIN DISEASES OF THE CARDIOCIRCULATORY APPARATUS

1. Cardiac insufficiency
Epidemiology of cardiac insufficiency. Most common causes. Physiopathology of cardiac insufficiency. Heart compensation mechanisms. Diastolic and systolic dysfunction. Cardiac insufficiency with high cardiac output. Haemodynamic profile and neurohumoral alterations in cardiac insufficiency. Triggers of cardiac insufficiency. Clinical features of cardiac insufficiency: signs and symptoms of right and left insufficiency. Radiological signs of pulmonary congestion. Changes in laboratory parameters. Natural history of cardiac insufficiency. Treatment of chronic cardiac insufficiency. General, non-pharmacological measures: diet, rest and correction of triggers. Digitalis: action on contractility and electrophysiological properties. Most common digitalis drugs, pharmacokinetics,

2. Acute circulatory insufficiency (shock)

3. Arrhythmias

Extrasytolic arrhythmias. Diagnostic criteria, differential diagnosis with respect to supraventricular and ventricular arrhythmias. Most important causes. Prognostic importance: diseases in which extrasystolic arrhythmias pose a risk. Treatment of extrasystolic arrhythmias.


4. Acquired valve disorders


5. Coronary disease

Chest angina. Concept of stable and unstable angina.


Unstable angina. Clinical forms of chest angina that are considered to be unstable.


6. Congenital cardiopathy
Anatomical and functional characteristics of pulmonary circulation. Concept of left-right and right-left short-circuit. Functional consequences of short-circuits: pulmonary hypertension, cyanosis, effects on the child’s development and growth. Diagnostic criteria: cyanogenic and non-cyanogenic cardiopathy. Clinical and electrocardiographic manifestations of the most important forms of congenital cardiopathy: persistence of the ductus
arteriosus, aortic coarctation, interatrial communication, interventricular communication, pulmonary and aortic valve stenosis, Fallot’s tetralogy, large vessel transposition.

Echocardiographic diagnosis of the most important forms of congenital cardiopathy. Indications for cardiac catheterization. Most common forms of congenital cardiopathy that continue into adult life and their associated problems. Diagnosis of secondary pulmonary hypertension (Eisenmenger's reaction). Natural history of each one of the most common forms of cardiopathy. Medical and surgical treatment options. Palliative and reparative interventions. Early and late outcomes of surgical techniques. Indications for surgery in the main forms of congenital cardiopathy. Genetic counselling of patients who are carriers of congenital cardiopathy.

7. Myocardial disease
Classification of myocardial disease.


**Restrictive myocardial disease.** Most frequent causes. Cardiac amyloidosis, its relationship to cardiac insufficiency in the elderly. Systemic disorders that cause myocardial disease.

**Myocarditis.** Most frequent causes. Clinical diagnosis. Indications for endomyocardial biopsy. Medical treatment of myocarditis

8. Pericardial disease
Classification of pericardial disease.


**Constrictive pericarditis.** Most frequent causes. Haemodynamic changes. Differential diagnosis with respect to tamponade and restrictive myocardial disease. Medical support treatment. Surgical options: pericardiectomy. Outcomes and indications for pericardiectomy

9. Hypertensive cardiopathy

10. Infectious endocarditis
Most common germs and risk factors. Prophylaxis of endocarditis: types of cardiopathy that require prophylaxis, most common germs and recommended treatment regimes. Forms of development and their relationship with the causal agent. Clinical and echocardiographic diagnosis. Indications, point at which it should be carried out and the benefits of blood cultures. Medical treatment and surgical indications. Signs of poor prognosis in endocarditis: situations that require urgent intervention. Right endocarditis and drug abuse: clinical features and most common germs.

11. Cor pulmonale

12. Cardiac tumours

13. Acute and chronic arterial disease

14. Aortic aneurysms

15. Venous and lymphatic disorders

16. Specific knowledge of cardiovascular surgery

THE TEACHING PLAN

THEORY CLASSES
1. Cardiac insufficiency and shock
2. Treatment of cardiac insufficiency. Heart transplant
3. Myocardial disease
4. Atrial fibrillation and other supraventricular arrhythmias
Diseases of the cardiocirculatory apparatus

5. Ventricular arrhythmias
6. Atrio-ventricular blocks. Pacemakers
7. Mitral and tricuspid valve disease
8. Aortic valve disease
10. Ischemic cardiopathy. Stress angina
11. Unstable angina
12. Acute myocardial infarct
13. Treatment following myocardial infarct
14. Myocardial revascularization
15. Congenital cardiopathy
16. Infectious endocarditis
17. Pericardial disease and treatment
18. Arterial hypertension and ventricular hypertrophy
19. Pulmonary embolism. Cor pulmonale.
20. Vascular and aorta disease
21. Acute arterial disease
22. Chronic arterial disease
23. Aorta disease and trauma.
24. Supra-aortic trunk disease
25. Diseases of the venous and lymphatic systems

SCHEDULED CLINICAL TEACHING

A. Seminars run simultaneously for all students, alternating with theory classes
   1. Specific methods for examining the cardiovascular system: echocardiography; haemodynamics; stress test and cardiac nuclear medicine; angiography, CAT, MRI
   2. Management of the surgical patient (access, drains, postoperative care)
   3. Methods and techniques in cardiac surgery (ECC)
   4. Treatment procedures in congenital cardiopathy
   5. Valve and vascular replacements
   6. Endocarditis: from process to clinical intervention and treatment
   7. Atherosclerosis. Acute infarct and mechanical complications
   8. Cardiac and vascular tumours
   9. Bases of pharmacological treatment of AHT and angina
  10. Prevention and treatment of thromboembolic disease
  11. Physical examination of the peripheral vascular system
  12. Management of the patient with acute myocardial ischemia

B. Seminars run during placement, in the corresponding service
   1. Simple cardiovascular radiology
   2. Cardiac auscultation in daily clinical practice
   3. Electrocardiography and arrhythmias. Practical cases
   4. Cardiorespiratory arrest
   5. Preparing for placements in the surgical area

C. Elective seminars (to be run at the HCP in accordance with student demand)
   1. Clinical anatomy of the heart: echocardiography and angiography
   2. Embryology and congenital cardiopathy
3. The kidney and the physiopathology of circulatory homeostasis
4. Pathological anatomy of ischemia. Aneurysms and vascular tumours
5. Electrocardiography and arrhythmias
6. Echocardiography
7. Cardiovascular pharmacological treatment
8. Interventionist treatment in the cardiovascular system
9. Surgical indications of myocardial revascularization
10. Differential diagnosis of chest pain
11. Extracorporeal and assisted circulation (laboratory practice in experimental surgery)
12. Primary and secondary prevention of arteriosclerosis
13. Molecular biology and cardiology
14. Vasculitis