



CARDIOLOGY ATTACHMENT LEARNING OUTCOMES

Aims of the attachment:

By the end of your attachment you will have acquired a sound understanding of the scientific principles underlying cardiovascular structure, function and disease, developed clinical skills to assess and manage patients with common cardiac conditions, and gained insight into the professional values required to deliver safe, evidence-based cardiovascular care across a range of clinical settings.

Intended Learning Outcomes for the attachment:

Professional skills:

By the end of your attachment, you should be able to:

- Take a cardiovascular history, including assessment of chest pain, dyspnoea, palpitations, syncope and cardiovascular risk factors.
- Perform a structured cardiovascular examination and identify abnormal clinical signs including cardiac murmurs.
- Measure and interpret blood pressure accurately, including assessment for postural hypotension.
- Record a 12-lead ECG and apply a systematic approach to ECG interpretation.
- Recognise common ECG abnormalities, including atrial fibrillation, heart block, bundle branch block and acute myocardial infarction.
- Interpret common cardiovascular investigations, including ECG, chest X-ray, echocardiography and basic blood tests.
- Explain the indication for cardiac biomarker testing and their role in diagnosis, namely natriuretic peptides (NT-proBNP and BNP) and troponin.
- Formulate differential diagnoses and initial management plans for common presentations such as chest pain, heart failure, arrhythmias and syncope.
- Assess cardiovascular risk and counsel patients regarding lifestyle modification and risk reduction.
- Present cardiovascular findings clearly in written and verbal formats.

By the end of your attachment, you should be able to assess and manage patients presenting with:

- **Chest pain**, including cardiac and non-cardiac causes
- **Breathlessness**, including acute and chronic cardiovascular causes
- **Palpitations**
- **Blackouts, faints and dizziness**, including vasovagal syncope and arrhythmia-related syncope
- **Peripheral oedema and ankle swelling**
- **Low blood pressure and shock states**
- **Heart murmurs**
- **Cyanosis**
- **Cardiorespiratory arrest and cardiac arrest**
- **Wheeze and cough** where cardiovascular disease is contributory
- **Pain on inspiration** related to pericardial or pulmonary vascular disease
- **Fever** in the context of cardiovascular infection
- **Driving advice** related to cardiovascular diagnoses

Professional values and behaviours:

By the end of your attachment you should be able to:

- Demonstrate professionalism, confidentiality and respect when caring for patients with cardiovascular disease.
- Communicate diagnoses, investigations and management plans clearly and sensitively to patients and relatives.
- Describe the long-term and multisystem impact of cardiovascular disease on patients' lives.
- Recognise the importance of multidisciplinary team working in cardiology, including nursing, cardiac physiology, imaging and rehabilitation services.
- Apply principles of evidence-based medicine to cardiovascular care.

Professional knowledge:

By the end of your attachment, you should be able to:

Clinical Features and Management

- Describe the gross and microscopic anatomy of the heart, including chambers, valves, coronary circulation, pericardium and conduction system.
- Explain the cardiac cycle, electrical conduction, excitation–contraction coupling and the origin of heart sounds and murmurs.

- Describe the structure and function of cardiac myocytes and the specialised conducting tissue.
- Describe the anatomy and physiology of the systemic and pulmonary circulations, including foetal circulation and post-natal changes.
- Explain the basic physics underlying ECG recording and the relationship between the ECG and the cardiac cycle.
- Describe the principles and clinical applications of cardiac imaging, including echocardiography, cardiac MRI and coronary angiography.
- Identify normal anatomical features on chest X-ray and recognise radiological features of cardiac pathology.

Heart Failure

- Describe the syndrome of heart failure including aetiology and pathophysiology.
- Describe the clinical presentation of heart failure and its appearance on chest X-ray.
- Describe the haemodynamic and neurohormonal compensatory mechanisms involved in heart failure.
- Explain how compensatory mechanisms initially maintain cardiac output but later contribute to disease progression.
- Describe the mechanisms of action and evidence base for pharmacological treatments for heart failure.
- Discuss non-pharmacological management strategies for heart failure.
- Describe the causes and types of cardiomyopathy.
- Describe the role of advanced heart failure services and the criteria patients for cardiac transplantation and mechanical support
- Describe the causes of and treatment of myocarditis

Ischaemic Heart Disease and Acute Coronary Syndromes

- Describe the pathophysiology of atherosclerosis and coronary artery disease.
- Explain the clinical features, diagnosis and classification of angina, acute coronary syndromes and myocardial infarction (STEMI and NSTEMI).
- Describe the different types of Acute Coronary Syndrome
- Describe the ECG changes seen in ischaemia and acute myocardial infarction
- Describe the role of exercise tolerance testing (ETT) in the assessment of chest pain.
- Outline the investigations and management of stable angina
- Describe the indications for and process of cardiac catheterization, coronary angiography and percutaneous coronary intervention.

- Describe the indications and clinical pathway for cardiac surgery in ischaemic heart disease
- Outline the pharmacological management for all stages of ischaemic heart disease and explain the rationale, practicalities, and the considerations of prescribing these medicines
- Explain the principles of primary and secondary prevention in coronary artery disease.
- Describe the actions, mechanisms and clinical use of antiplatelet, anticoagulant and fibrinolytic therapies.

Hypertension and Vascular Disease

- Define blood pressure and explain the haemodynamic and neurohumoral mechanisms regulating it.
- Describe the pathophysiology, causes (primary and secondary) and complications of hypertension.
- Describe the investigation and management of hypertension, including pharmacological and lifestyle interventions.
- Explain the mechanisms of action, effectiveness and side-effect profiles of major classes of antihypertensive drugs.
- Describe vascular structure and the structural changes associated with hypertension and altered flow.
- Describe the rationale behind treating hypertension and the principles of end-organ damage

Valvular, Pericardial, and Congenital Heart Disease

- Describe the anatomy and function of the cardiac valves and recognise common murmurs.
- Describe the aetiology, clinical features and management of common valvular heart disease
- Describe valve replacement strategies, including surgical valve replacement and TAVI, and patient-specific considerations.
- Describe the pathophysiology, investigation and management of pericardial disease, including pericarditis and cardiac tamponade.
- Describe the pathophysiology, investigation and management of endocarditis including common organisms and treatment.
- Explain the rationale of anti-coagulation in patients with artificial heart valves, and the management principles of safe anticoagulation

- Define adult congenital heart disease, recognise common lesions and understand their lifelong implications.
- Describe the common cardiac diseases that may affect pregnant women
- Describe the pathophysiology, presentation and treatment of pulmonary embolism
- Describe the causes, presentation and treatment of aortic dissection.

Cardiovascular Risk and Prevention

- Describe major cardiovascular risk factors and explain their contribution to disease development.
- Describe lipid metabolism, atherosclerosis and the role of lipid lowering therapies.
- Perform an assessment of cardiovascular risk and discuss strategies for primary and secondary prevention.

Syncope

- Describe the pathophysiology, causes and complications of syncope
- Explain the clinical features, diagnosis and classification of syncope
- Describe the investigation and treatment of syncope including lifestyle and pharmacological and non-pharmacological measures.

Cardiac Rhythm and Dysrhythmia

- Describe the anatomy and physiology of the cardiac conduction system, including the SA node, AV node, His–Purkinje system and their blood supply.
- Explain the electrophysiological basis of normal cardiac rhythm, including action potentials, automaticity, conduction velocity and refractoriness.
- Describe the mechanisms underlying arrhythmogenesis, including abnormal automaticity, triggered activity and re-entry.
- Explain how structural heart disease, ischaemia, electrolyte imbalance and drugs predispose to arrhythmias.
- Formulate a differential diagnosis and initial management plan for patients presenting with palpitations, syncope or tachycardia.
- Describe the pharmacological management of common arrhythmias, including:
 - Rate and rhythm control strategies
 - Anticoagulation for atrial fibrillation

- Discuss non-pharmacological treatments of common arrhythmias, including DC cardioversion, catheter ablation and device therapy (pacemakers, implantable cardioverter defibrillators).
- Describe the complications of arrhythmias, particularly stroke, heart failure and sudden cardiac death, and strategies for their prevention.
- Discuss the emergency management of arrhythmias including cardiac arrest protocols, emergency cardioversion and transcutaneous pacing