

BRITISH HEART RHYTHM SOCIETY ACCREDITATION EXAMINATION
SYLLABUS

Candidates will be expected to demonstrate an understanding of the diagnosis and management of patients with, or at risk of, experiencing arrhythmias. Awareness of national policy and guidance, clinical trials and treatments available relating to arrhythmia management will also be required.

The core syllabus expects a basic, general understanding of the contents of this section. A more detailed and in-depth knowledge is expected for the specialist sections. This is not an exhaustive list and candidates are expected to read widely.

CORE SYLLABUS

ANATOMY AND PHYSIOLOGY

Structure, including cardiac chambers, valves and great vessels (with particular reference to sites of vascular access), autonomic nervous system, blood supply, conduction system, cardiac cycle, action potential, normal physiology, cardiac failure.

CLINICAL ASSESSMENT

Basic knowledge will be expected of cardiovascular and respiratory symptoms and signs. ALS guidelines and basic X-ray interpretation.

ARRHYTHMIAS – DIAGNOSIS & ECG INTERPRETATION

ECG interpretation of common morphological abnormalities. Candidates should be aware of the features of common tachyarrhythmias such as atrial fibrillation, atrial flutter, atrial tachycardia, AVNRT, AVRT, ventricular tachycardia and ventricular fibrillation. Ventricular pre-excitation and the importance of accessory pathways should be understood. The common bradyarrhythmias including sinus node disorders and heart blocks should be recognised. Clinical evaluation of syncope and its causes and risk assessment of individuals at risk of sudden cardiac death. Evaluation of patients with atrial fibrillation, including stroke risk.

DEVICES

Although a greater depth of understanding will be expected in the specialist section, a general understanding will be expected of: indications for pacing and ICD implantation including CRT & implantable cardiac recorders, device circuitry, sensing technology, conductors and impedance, lead technology, defibrillator testing, pacemaker codes, lead and device extraction, electromagnetic interference, pacemaker syndrome, basics of timing cycle, parameter characteristics and device programming, radiation safety, device malfunction, patient follow-up, hysteresis, mode switching, rate response, ICD detection and therapy, principles underlying device implantation, end of life issues and device deactivation.

ELECTROPHYSIOLOGY STUDIES & ABLATION

Although a greater depth of understanding will be expected in the specialist section, a general understanding will be expected of: arrhythmia diagnosis and management, arrhythmia mechanisms (automaticity, re-entry and triggered activity), patient preparation, indications for EP study / ablation, radiation safety, basics of programmed stimulation, recognition of common arrhythmias at EP study including electrogram pattern recognition, success rates and complications of ablation, awareness of mapping techniques.

PHARMACOLOGY

Action, duration of action, side effects, interactions and contra-indications of drugs used in the management of arrhythmias and heart failure including the Vaughan Williams classification, proarrhythmic effects, potential effect of drugs on implantable device function, agents used for moderate sedation, reversal agents, antibiotics, anticoagulation, pharmacological provocation e.g. isoprenaline, ajmaline and the management of heart failure e.g. role of beta-blockers, ACE inhibitors.

CURRENT DVLA REGULATIONS AND NATIONAL GUIDANCE AND POLICY FOR ARRHYTHMIA MANAGEMENT including NSF, NICE etc.

MEDICO-LEGAL ISSUES including informed consent, role of the MHRA, clinical governance and audit, data protection, research ethics.

SPECIALIST SECTION – DEVICES

Indications for pacing, ICDs, CRT and implantable cardiac monitors including national and international guidelines; selection of appropriate pacing mode.

Fundamentals of electronics, including knowledge of quantities (ampere, charge, ohm, volt), derived quantities (resistance, capacitance, capacity), relationships (Ohm's law, power, energy), strength duration curve. Haemodynamics of pacing and pacemaker syndrome; basic technology for devices; battery technology; shock wave forms; longevity calculations; circuit technology – telemetry; sensors; connectors; lead technology / materials; electrode design including anode and cathode design, electrode size and spacing / shape; bipolar / unipolar.

Pacemaker, ICD and CRT implant technique and complications; preparation of the patient; venous approach; selection of appropriate lead; measurements at implant; DFT testing and ideal values; intracardiac electrograms; drugs affecting thresholds; agents used for moderate sedation; reversal agents, analgesia.

Device troubleshooting – sensing issues, under / over-sensing; loss of capture / threshold rise; lead problems, EMI. Identification / interpretation of electrograms and counters; timing cycles; crosstalk; pacemaker mediate tachycardia; electrical interference in devices and the role of MRI conditional devices; ICD and CRT troubleshooting.

Programming pacemakers / ICDs: optimising rate response, AV delay, rate-drop, mode-switching, AF suppression, promoting intrinsic conduction, detection, SVT discrimination and therapy algorithms; CRT programming: AV optimisation, V-V optimisation, significance of upper and lower rate, managing phrenic stimulation ('twitching'), high thresholds etc.; complications of pacemakers and ICDs; pacemaker and ICD X-rays; identification of appropriate / inappropriate shocks / ATP.

Management of infected implanted devices; indications for lead extractions, techniques and complications, dealing with device advisories including Riata and Fidelis leads.

Generator change; electromagnetic interference; follow up; VT storms; end of life / palliative care issues.

MHRA reporting and traceability; pacemaker and ICD follow-up and support, remote monitoring, DVLA regulations for ICDs and pacemakers.

SPECIALIST SECTION – ELECTROPHYSIOLOGY

SURFACE AND INTRACARDIAC ELECTROGRAMS

Timing and morphology, recognition of common arrhythmias; differential diagnoses of arrhythmias.

INVESTIGATION AND TREATMENT OF ARRHYTHMIAS

Role of non-invasive testing; indications for electrophysiology study; vascular access; epicardial and endocardial access; indications for ICD therapy, patient selection for catheter ablation.

ELECTROPHYSIOLOGY STUDIES

Indications, preparation of the patient; components of the EP recording system; insertion and positioning of electrodes; SVT basic principles of cardiac stimulation; baseline assessment of the conduction system; SVT & techniques of differentiating mechanisms; entrainment; pace mapping; refractory periods; potential complications of procedure; recognition of common arrhythmias. VT: unique forms of VT, exercise-induced VT, ARVC, bundle branch re-entry, adenosine and verapamil-sensitive VT, VT mapping and entrainment.

ABLATION PROCEDURES

Radio-frequency ablation – mechanisms, advantages and disadvantages; principles and biophysics of ablation (including irrigated RF; cryoablation etc.); risks associated with ablation therapy; indications; preparation of the patient. Principles and application of 3-D mapping systems; role of adjunctive imaging, management of complications, post procedure care and follow up.

PHARMACOLOGY IN THE EP LAB

Mode of action and effects of common oral and intravenous anti-arrhythmic drugs; mode of action and effects of drugs commonly used in EP studies; agents used for moderate sedation; reversal agents, provocation agents e.g. isoprenaline, atropine, ajmaline.

SPECIALIST SECTION – CLINICAL / NURSING

ARRHYTHMIAS – CLINICAL CHARACTERISTICS, DIAGNOSIS, ECG INTERPRETATION & MANAGEMENT

ECG interpretation. Mechanism and features of common arrhythmias. Diagnostic testing, risk assessment, screening and management of arrhythmias.

SYNCOPE: DIAGNOSIS & TREATMENT

Classification and pathophysiology of syncope (reflex syncope, orthostatic hypotension, cardiac syncope, POTS) diagnostic testing and management. DVLA regulations.

PHARMACOLOGY & NON-MEDICAL PRESCRIBING

A greater level of understanding will be expected than in the core section, including actions, pharmacokinetics, side effects, interactions and contra-indications of drugs used in the management of arrhythmias, heart failure and syncope including the Vaughan Williams classification. Effect of drugs on implantable device function. Agents used for moderate sedation, reversal agents, antibiotics, anticoagulation, pharmacological provocation e.g. isoprenaline, ajmaline, management of heart failure e.g. role of beta-blockers, ACE inhibitors, anticoagulants. Medico legal issues relating to non-medical prescribing.

RISK STRATIFICATION FOR THROMBOEMBOLISM IN ATRIAL FIBRILLATION AND ANTICOAGULATION

Risk factors, stroke risk assessment schemes, bleeding risk assessment schemes. Pharmacological and non-pharmacological methods to prevent stroke.

ELECTROPHYSIOLOGY STUDIES

Preparation of the patient; components of the EP recording system; insertion and positioning of electrodes; basic principles of cardiac stimulation. Potential complications of procedure; recognition of common arrhythmias.

Ablation – mechanisms, advantages and disadvantages; principles of ablation (including irrigated RF, cryoablation etc.); indications; preparation of the patient. Principles of 3-D mapping systems.

DEVICES

Indications for pacing, ICDs and CRT; selection of appropriate pacing mode. Haemodynamics of pacing and pacemaker syndrome. Pacemaker, ICD and CRT implant technique and complications; preparation of the patient. Management of infected implanted devices. End of life and palliative care issues. Pacemaker and ICD follow-up and support; DVLA regulations for ICDs and pacemakers.