HRUK CERTIFICATE OF ACCREDITATION SYLLABUS - 2009

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.

CORE SYLLABUS

ANATOMY AND PHYSIOLOGY
Structure, including cardiac chambers, valves and great vessels, pericardium, coronary circulation, innervations, foetal circulation, blood supply, conduction system, cardiac cycle, action potential, normal physiology, vascular system, autonomic regulation, cardiac output, cardiac failure

CLINICAL EXAMINATION
Basic knowledge will be expected of cardiovascular and respiratory examination to include knowledge of symptoms e.g. dyspnoea, chest pain, palpitations, syncope and signs such as pulses, jugular venous pressure, heart sounds, features of cardiac failure

ARRHYTHMIA MECHANISMS
Automaticity, re-entry, triggered activity

ARRHYTHMIAS – CLINICAL CHARACTERISTICS, DIAGNOSIS, ECG INTERPRETATION
ECG interpretation including normal intervals, axis, recording considerations, recognition of morphological abnormalities such as bundle branch block, electrolyte imbalance, myocardial infarction. Candidates should be aware of mechanism and features of common arrhythmias such as AV nodal re-entrant tachycardia, Wolff Parkinson White syndrome and other accessory pathways, atrial flutter, atrial fibrillation, ventricular tachycardia, ventricular fibrillation, sinus node dysfunction, carotid sinus hypersensitivity and vasovagal syncope, heart block, etc.

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, 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 and parameter characteristics, basics of device programming, malfunction, patient follow-up, hysteresis, mode switching, rate response, ICD detection and therapy, principles underlying device implantation

ARRHYTHMIAS / ELECTROPHYSIOLOGY / 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, patient preparation, indications for EP study / ablation, basics of programmed stimulation, recognition of common arrhythmias at EP study including electrogram pattern recognition, success rates and complications of ablation

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, management of heart failure e.g. role of beta-blockers, ACE inhibitors.

CURRENT DVLA REGULATIONS FOR PATIENTS WITH OR AT RISK OF EXPERIENCING ARRHYTHMIAS AND THOSE WITH IMPLANTABLE DEVICES (including occupational issues)

NATIONAL GUIDANCE AND POLICY FOR ARRHYTHMIA MANAGEMENT (including NSF, NICE etc.)

CLINICAL TRIALS RELATING TO ARRHYTHMIA MANAGEMENT

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 and CRT; selection of appropriate pacing mode

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 inc anode and cathode design, electrode size and spacing / shape; bipolar / unipolar and when to use

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

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; ICD and CRT troubleshooting, fusion, pseudofusion

Programming pacemakers / ICDs: optimising rate response, AV delay, rate-drop, mode-switching, AF suppression, promoting intrinsic conduction, detection and therapy algorithms; CRT programming: AV optimisation, V-V optimisation, significance of upper and lower rate, managing '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

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; DVLA regulations for ICDs and pacemakers

SPECIALIST SECTION – ELECTROPHYSIOLOGY

ANATOMY AND PHYSIOLOGY

Anatomy of the normal heart; anatomy of the specialised conduction system; anatomy and pathophysiology of common congenital heart defects; haemodynamic effects of brady- and tachy-arrhythmias

CELL PHYSIOLOGY

Cell membrane – ion channels; the cardiac action potential; conduction velocities; refractory periods

MECHANISMS OF TACHYCARDIAS

Re-entry; automatic tachycardias; triggered activity

SURFACE AND INTRACARDIAC ELECTROGRAMS

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

INVESTIGATION AND TREATMENT OF TACHYARRHYTHMIAS

Role of non-invasive testing; indications for electrophysiology study; indications for ICD therapy

ELECTROPHYSIOLOGY STUDIES

Preparation of the patient; components of the EP recording system; insertion and positioning of electrodes; basic principles of cardiac stimulation; baseline assessment of the conduction system / normal conduction intervals; stimulation to diagnose mechanisms of arrhythmias; entrainment; pacemapping; refractory periods; cycle length; coupling interval; potential complications of procedure; recognition of common arrhythmias

ABLATION PROCEDURES

Radio-frequency ablation – mechanisms, advantages and disadvantages; principles of ablation (including irrigated RF; cryoablation etc.) – mechanism, advantages and disadvantages; risks associated with ablation therapy; indications; preparation of the patient; treatment of: AV nodal re-entrant tachycardia, atrial flutter, atrial fibrillation, atrial tachycardia, ventricular tachycardia, accessory pathways; principles and application of 3-D mapping systems; complications

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