Acute coronary syndrome (ACS)

- Commoner in South Asian ethnicity; less so in Caribbean
- Symptoms - chest pain (>15mins), nausea / vomiting, dyspnoea, sweating, fever, palpitations
  - may be silent (effectively asymptomatic) - particularly in type-II diabetics
  - hyperglycaemia is poor prognostic indicator
- Troponin rise: STEMI (ST elevation / new LBBB) or NSTEMI (ST depression / T-wave inversion)
  - no troponin rise with NSTEMI ECG changes suggests unstable angina
- MONA - morphine/metoclopramide 10mg IV stat; oxygen; GTN 2 puffs SL; aspirin 300mg soluble
- Antithrombotics - clopidogrel 300mg PO stat, fondaparinux 2.5mg SC stat / bilvalirudin if PCI
- Anti-arrhythmic - atenolol 5mg IV stat (diltiazem / verapamil if hypotension, severe asthma)
- PCI within 12 hours if STEMI; CABG in other high-risk patients; angiography within 96 hours
- Long-term - aspirin 75mg od. for life, clopidogrel 75mg od. 4wks if STEMI / 1 year otherwise
  - beta-blocker, ACE inhibitor, statin likely for life (start high [80mg] and early - may prevent AF)
- Complications of MI - angina, re-MI, arrhythmia, thromboembolism, pericarditis, LV rupture, MVP
  - mechanical - heart failure / cardiogenic shock, papillary muscle rupture / MR, VSD, aneurysm
  - Dressler’s syndrome - pericarditis, effusions, febrile illness 1-2 months later; give NSAIDS

Angina

- Aetiology - CAD; rarely valve disease (AS), HCM, arrhythmias, coronary vasospasm (Prinzmetal)
- Cardinal features - constrictive chest (or neck/arm/jaw) pain on exertion relieved with 5mins’ rest
  - only 2 is atypical angina; only 1 is ‘non-anginal chest pain’
- Investigations - angiography, myocardial perfusion scintigraphy, stress echo, MR-cardiogram
- Management (acute) - rest, GTN every 5 minutes; call 999 if pain for more than 15 minutes
  - long-term - aspirin, statin, beta-blocker or / and CCB; consider ACE-inhibitor if diabetic
  - if insufficient - consider ISMN, nicorandil (potassium channel blocker) / ivabradine
  - surgery - CABG if severe LCA / multiple artery stenosis; also PTCA (PCI) if LCA sparing
  - driving - do not need to inform DVLA but cannot drive if symptomatic at rest / at wheel

Arrhythmias

Heart blocks

- With all rule out MI, endocarditis, SLE, Lyme disease (SMILE)
- First degree usually unproblematic - consider pacing if syncope / other malconduction
- Second degree (Mobitz) type I (Wenkeback) - increasing PR - usually unproblematic
- Second degree (Mobitz) type II - fixed ratio block - risk of complete block - permanent pacing
- Third degree (complete) - post inferior MI - often ultimately requires permanent pacing
Sick sinus syndrome (tachy-brady)

- SA node dysfunction due to idiopathic fibrosis, HHC, cardiomyopathy, MI, metabolic, drugs
- Causes episodic sinus bradycardia but may alternate with tachycardias e.g. AF, SVT
- Asymptomatic or fatigue, syncope, palpitations, confusion, angina, CVI, CCF, facial flushing
- Usually requires permanent pacing

Stokes-Adams attack

- Syncope in young / IHD elderly caused by paroxysmal AV / SA block - complete heart block
  - pallor, sudden collapse, LOC, flushing on rapid recovery, mild confusion - not postural
- Investigate for and manage any underlying cardiac disease; may require permanent pacing

Supraventricular tachycardia (SVT)

- Palpitations, dizziness (common); dyspnoea, syncope (rarer); women > men, incidence 0.2%
- Risks - advanced age, MI, pericarditis, pneumonia, chronic lung disease, alcohol, digoxin
- AVNRT - two distinct AV node pathways (fast / slow) - causes circular re-conduction
- AVRT - accessory non-nodal atrioventricular connections e.g. WPW
  - WPW may cause fatal VF; post-SVT polyuria (ANP); RF ablation is definitive
- Management - vagal manoeuvres; if haemodynamically unstable - DC cardioversion
  - IV adenosine (not if severely asthmatic) or IV verapamil (longer acting - risk of hypotension)
  - radiofrequency catheter ablation often curative and relatively safe

Atrial fibrillation (AF)

- Leads to atrial stagnation (thromboembolism - stroke), impaired cardiac output - heart failure
  - paroxysmal (resolves in 7 days), persistent (may be cardioverted) or permanent (over 1 year)
- Aetiology - HTN (esp. with LVH), IHD, valvular disease (esp. MS), ASD, cardiomyopathy, hyperthyroidism, acute infection (esp. in elderly), ‘holiday heart’ (alcohol), COPD, HHC, obesity
  - 20% asymptomatic; otherwise palpitations, heart failure symptoms
- Investigations - ECG, echocardiogram (if structural disease suspected), TFTs (not routine)
- Four targets of treatment: arrhythmia, thrombosis, heart failure, underlying cause
  - rhythm control - young/symptomatic - DC cardioversion if recent / no structural disease
    - if onset < 48hrs - heparin; otherwise - TOE (exclude atrial thrombus), warfarin for 3wks
    - if long-standing / failed DC - flecaainide if no structural disease / amiodarone otherwise
  - rate control - older/persistent/IHD - diltiazem / verapamil / atenolol or digoxin in elderly
    - pill-in-the-pocket for paroxysmal AF if no structural disease or IHD, BP > 100, HR > 70
      - beta-blocker first line; flecaainide second line; amiodarone third line
  - CHADSVASC - CCF, HTN, age > 75, DM, prev. stroke / TIA, vascular disease, female sex
    - warfarin if > 0 (target INR 2-3); otherwise no anticoagulation preferred to aspirin
- treat other cardiac risk factors aggressively; avoid caffeine; correct hyperthyroidism if present
Congenital heart disease

- **Cyanotic** (Fallot’s tetralogy, pulmonary atresia/stenosis) or **acyanotic** (A/VSD, PDA, coarctation)
- All may present in infancy with **poor feeding, fatigue, FTT**, developmental delay
- **ASD** - commonest in adults with fixed split S2, ESM, right axis deviation, RBBB
- **VSD** - presents in infancy (esp. trisomies, GDM) with tachypnoea, sweating, feeding fatigue
  - signs - pansystolic murmur, heave/thrill, split S2 (though normal in infants)
  - complications - **endocarditis** (consider prophylaxis; heart failure medications may suffice)
  - some close spontaneously by 2 years; **surgical repair** otherwise recommended
- **PDA** - common in premature babies, FAS, maternal phenytoin use, congenital rubella syndrome
  - ductus held open in utero by prostaglandin E2 - should close completely by 3wks of life
  - typically asymptomatic; may be 'machinery' flow murmur, wide pulse pressure
  - complications - endocarditis, CCF, necrotising enterocolitis, bronchopulmonary dysplasia
  - management - **indometacin** (anti-PGE), cardiac catheterisation if > 1yr
- **Fallot's** - commonest cyanotic: tetralogy of VSD, RVH, pulmonary hypertension, aortic override
  - CATCH-22: cardiac defect, abnormal facies, thymic hypoplasia, cleft palate, hypocalcaemia
  - presents 6-12 months with poor feeding, FTT, fatigue, squatting to rest, developmental delay

Endocarditis

- Relatively rare (5 in 100,000 patient-years); commoner in males, IVDU, DM, alcoholism
- Risks - **valvular heart disease** / surgery, congenital heart disease, HOCM
- Mostly affects **mitral** / aortic valves, due to **bacteraemia** with **abnormal cardiac endothelium**
  - triggers - dental procedures, poor hygiene, IV drugs, cardiac surgery
  - organisms - **Staph. aureus**, Strep. viridans, other Strep., Pseudomonas aeruginosa, HACEK
- Symptoms - malaise, pyrexia, petechiae, haematuria, emboli, arthralgia, weight loss
- Signs - clubbing, splinter haemorrhages, Osler's nodes (painful red nodules), Janeway lesions (painless red macules), murmurs, Roth spots (cotton wool spot with surrounding haemorrhage)
- Investigations - **blood cultures** (3x, 6 hours apart), TOE / TTE
- Management (empirical) - IV coamoxiclav / vancomycin (severe / VR) + **gentamicin** (4-6wks)
- Complications - MI, arrhythmias, CCF, emboli / stroke, AKI, splenic infarction

Heart failure

- ESC criteria - symptoms (dyspnoea, oedema), signs (tachypnoea, JVP), evidence (echo)
- Aetiology - IHD, HTN, valvular disease (esp. AS), HCM, thyroid / adrenal dysfunction
- LV dysfunction - **LV ejection fraction < 40%** (though may be preserved and still symptomatic)
- NYHA I - strenuous activity only; II - ordinary activity; III - less than ordinary activity; IV - at rest
  - decompensation in ischaemia, infection, arrhythmia, electrolyte imbalance, comorbidity
- Investigations - ECG; BNP first if no previous MI, otherwise **urgent echocardiogram**
- Management - **bisoprolol + ACE inhibitor** (spironolactone also improves mortality)
  - second-line - spironolactone, losartan (ARB), hydralazine + nitrate, ivabradine (SA inhibitor)
  - consider ICD or CRT (resynchronisation therapy) if sinus rhythm / LBBB and EF < 30%
Hypertension

• All adults should have BP tested at least **every 5 years** up to the age of 80; annually after
• Aetiology - PKD, RAS, Cushing’s, Conn’s, acromegaly, phaeochromocytoma, aortic coarctation
• Diagnosis now recommended by ABPM if **clinic BP > 140/90**
  • mild - average > 135/85 (only treat if age < 80)
  • moderate - average > 150/95
  • severe - clinic > 180/110
• Investigations - fundoscopy (retinopathy), echocardiogram (LVH), U&Es (nephropathy)
• Management - **ACE inhibitor** if aged < 55; **CCB** if age > 55 / Afro-Caribbean ethnicity
  • step 2 - combine A + C
  • step 3 - add *thiazide diuretic* - chlorthalidone (25-50mg od. AM) / indapamid
• Treatment target < 140/90 if age < 80; < 150/90 if age > 80 (ABPM 5mmHg less for each)

Hypertrophic cardiomyopathy (HCM)

• Severe LVH leading to ventricular fibrosis; commonest cause of sudden death in young people
• Incidence ~0.1%, often inherited (AD), presents in 20s/30s with dyspnoea, chest pain, syncope
• Signs - SVT / VT, AF; ESM, mitral regurgitation, cardiomegaly, ventricular outflow obstruction
• Management - **ICD** crucial; control AF; consider heart transplant if severe

Marfan’s syndrome

• Rare inherited **connective tissue disease** - chromosome 15 mutations affecting fibrillin 1
  • *autosomal dominant* with complete penetrance but *wide phenotypic variation*
  • most important feature is **progressive aortic dilatation** leading potentially to dissection
• Physique - tall, scoliotic, long face/arms/legs, arachnodactyly, chest wall malformations, striae
  • also hypermobile joints, high palate, A/MR, AAA, glaucoma, detached retina, lens dislocation
  • pelvic X-ray may demonstrate protrusio acetabula (into pelvic cavity)
• Management - **ACE inhibitor** or beta-blocker; consider aortic root replacement, losartan
• Complications - pneumothorax, aortic / AAA dissection / rupture (esp. rigorous sport)

Pericarditis

• Rare; usually **exudative pericardial effusion** with nucleocyte polymorphs and adhesions
• Aetiology - viruses (Coxsackie, EBV, HIV), CTD (SLE, RA, vasculitis), TB, IBD, MI, uraemia
  • drugs - hydralazine, isoniazid, phenytoin
• Symptoms - chest pain (pleuritic, relieved by leaning forward), dry cough, fever, weakness
• Signs - **pericardial rub**, tachypnoea, tachycardia, pyrexia, dyspnoea
  • if acute - saddle ST elevation across all ECG leads; ‘flask-shaped’ heart on CXR
  • if constrictive - high JVP, loud S3, hepatomegaly, Kussmaul’s sign (inspiratory JVP rise)
• Management (if low-risk) - **NSAIDs**; consider colchicine; avoid anticoagulants
  • if severe / tamponade - pericardiocentesis
  • if persists (>1wk) - consider blood cultures, AFB, ASO, RF, ANA, TFTs, viral serology
Cardiac tamponade
- Emergency; complication of pericarditis, cardiac trauma / surgery, aortic dissection, **LV rupture**
- Signs of pericarditis with **high JVP, hypotension, diminished heart sounds** (Beck’s triad)
  - *pulsus paradoxus*, bronchial breathing at left lung base (lingular compression - Ewart’s sign)
- Management - volume expansion, inotropes (dobutamine), **pericardiocentesis**

Pulmonary arterial hypertension (PAH)
- Aetiology - **COPD / PE**, pulmonary fibrosis, obesity, congenital cardiac disease, CTD, systemic sclerosis, cardiomyopathy, mitral stenosis, hypothyroidism, sickle cell disease
- **Cor pulmonale** - pulmonary vasoconstriction due to **chronic hypoxia / hypercapnia** (type II RF)
  - most common cause is **COPD**; also PE (acutely)
- Symptoms (insidious) - **RVF**: dyspnoea, tachypnoea, fatigue, oedema, dry cough, **haemoptysis**
  - later - syncpe, **portal hypertension** (ascites, RUQ pain, jaundice), hoarseness (PA on RLN)
- Signs - cyanosis, heave, high JVP, split S2, murmurs (Graham Steell - early diastolic)

Eisenmenger’s syndrome
- **Pulmonary stenosis** secondary to large left-to-right shunt e.g. VSD, PDA, ASD (late)
- In pregnancy - maternal / foetal death up to 50%; leads to **haemoptysis**, bleeding disorders
- Management - **heart-lung transplant**

Rheumatic fever
- Caused by **Group A beta-haemolytic Streptococcus** - major killer in developing world
  - commonly occurs in school-age children; prevalence function of SES
- Symptoms (3 wks post-*Strep.* throat) - **arthritis**, **pancarditis**, chorea, **erythema annulare**
  - gout-like arthritis of large joints - transient, *moves between joints*
  - cardiac signs - high tachycardia, murmurs, pericardial rub, **mitral valve disease** (chronic)
  - *subcutaneous nodules* over extensors and lower spine in severe carditis
- Investigations - **antistreptolysin O** (ASO), anti-DNase B
- Management - bed rest, **penicillin**, aspirin/naproxen for arthritis, diazepam, CCF treatment

Valvular heart disease
- **Rheumatic fever** is risk factor for all of them (though rare nowadays)
- All may be asymptomatic or present with signs of **heart failure**
- **AF** often associated; all IHD risk factors should be managed accordingly

Aortic stenosis
- Commonest valve disease - mostly **calcific** in ageing adults, also **congenital bicuspid valve**
- Symptomatic triad - **angina, dyspnoea, syncope**; also fatigue, sudden death (rare)
- Signs - ESM, slow-rising pulse, narrow pulse pressure, thrill, soft S2 (normal in sclerosis)
- Management - AVR / TAVI early if symptomatic; consider balloon valvuloplasty if unsuitable
  - *mechanical* valves (with anticoagulation) generally for aged < 60; **prosthetic** valves otherwise
Mitral regurgitation

- Second commonest valve disease after AS - mostly **degenerative** (less rheumatic fever)
- other causes - LVH, cardiomyopathy, IHD, endocarditis, *papillary muscle rupture* (post-MI)
- Risks - female sex, low BMI, advancing age
- Associations - AF, Marfan’s syndrome / mitral valve prolapse, connective tissue disorders
- Complications - heart failure - acutely causes life-threatening pulmonary oedema (e.g. post-MI)
- Management - as for heart failure; consider surgery (*repair* better than replace) if severe

Mitral stenosis

- Rare; mostly **degenerative**; also SLE, RA, endocarditis; commoner in South Asian origin
- Signs - AF, malar flush, haemoptysis, RVF, heaves, opening snap
- Complications - MR (often coexists); significantly increases thromboembolic risk with AF

Aortic regurgitation

- Rare; caused by congenital cardiac disease, SLE, Marfan’s, Turner’s, endocarditis
- Signs - collapsing pulse, wide pulse pressure, Corrigan’s / De Musset’s / Quincke’s signs
- Management - valve replacement if severe

Mitral valve prolapse (MVP)

- Common - retrograde bulging of mitral leaflets into left atrium during systole (> 2mm)
  - caused by *myxomatous degeneration*; associated with Marfan’s, Ehlers-Danlos, OI, PKD
- Often incidental finding - mid-systolic click with dynamic *late-systolic murmur*
- Complications - MR, CCF, arrhythmias, endocarditis - treat according to MR severity

<table>
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<th>Region of heart</th>
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<td>Anteroseptal</td>
<td>V1-4</td>
<td>LAD</td>
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<tr>
<td>Anterolateral</td>
<td>V4-6, I, aVL</td>
<td>LAD / LCF</td>
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<tr>
<td>Lateral</td>
<td>I, aVL +/- V5-6</td>
<td>LCF</td>
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<tr>
<td>Inferior</td>
<td>II, III, aVF</td>
<td>RCA (usually supplies SA node)</td>
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<tr>
<td>Posterior</td>
<td>Tall R waves V1-2</td>
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