Cardiovascular symptoms

# History

Always ask about:

* Chest pain
* Dyspnoeal, orthopnoea, PND
* Cough, sputum, haemoptysis
* Light headed, dizziness, (pre)syncope
* Palpitations
* Nausea, sweating
* Peripheral oedema
* Fatigue
* Wt loss, anorexia (IE)
* Cyanosis
* Claudication
* Relationship symptoms to exercise
* DH incl CVS, dyspepsia drugs, OCP, NSAIDs (incl response to drugs)
* PMH: TB, rheumatic fever, DM, HTN, stroke, venereal/tropical disease, thyroid, asthma, sx (PE, complications cardiac sx e.g. Dressler, mediastinitis, IHD), hypercholesterolaemia if known (ask about any investigations)
* SH: smoking, occupation, exercise, alcohol
* FH: MI/stroke <65yrs; sudden cardiac death
* IHD risk factors
  + Male
  + Age
  + Smoking
  + HTN
  + DM
  + FH IDH
  + Hypercholesterolaemia
  + Physical inactivity

# Systems review:

|  |  |
| --- | --- |
| System | Symptoms/signs |
| CVS | CP, SOB, orthopnoea, PND, ankle oedema, palpitations, syncope |
| Resp | Cough, sputum, haemoptysis, wheeze |
| GIT | Appetitie, vomiting, wt loss, haematemesis, indigestion, abdo pain, change bowel habit, description/frequency stool, blood/mucous PR |
| GU | Frequency, dysuria, hesitancy, urgency, poor stream, terminal dribbling, impotence, haematuria, menstrual cycle, menorrhagia, oligomenorrhoea, dyspareunia |
| Neuro | Headache, photophobia, neck stiffness, visual problems, focal (weakness, numbness, olfactory), tremor, memory, LOC |
| Other | Muscle pain, joint pain, rashes, depression  Menstrual |

Important drugs:

|  |  |
| --- | --- |
| Symptom | Medication |
| Dyspnoea | β-blockers in patients with asthma  Exacerbation HF by β-blockers  Some calcium channel blockers, NSAIDs |
| Dizziness | Vasodilators eg. Nitrates, α-blockers, ACE-inhibitors |
| Angina | Aggravated by thyroxine or drug-induced anaemia eg. Aspirin/NSAIDs |
| Oedema | Steroids, NSAIDs, calcium channel blockers (nifedipine, amlodipine) |
| Palpitation | Tachycardia and/or arrhythmia from thyroxine, β2-stimulants eg. Salbutamol, digoxin toxicity, hypokalaemia from diuretics, tricyclic antidepressants |

# Chest pain

|  |  |
| --- | --- |
| **Description** | **Cause** |
| Retrosternal heavy or gripping sensation  Radiation to L arm/neck  Worse with exertion  Relieved by rest & nitrates  May be accompanied dyspnoea | Angina |
| Similar to above at rest, not relieved by GTN  Prolonged >15-30mins  Sweaty, breathless, shocked, nausea | ACS |
| Severe tearing chest pain radiating through to back  Interscapular  Constant  Unequal radial & femoral pulse & BP; may be AR murmur | Aortic dissection |
| Sharp central pain worse with mvt/respiration  Better sitting forward  Fever, recent viral illness (rash, arthralgia) | Pericarditis |
| Sharp, usually very localised pain, usually no radiation  Worse with breathing/coughing/moving  Cough, haemoptysis, breathless, shock if PE | Pleuritic |
| Sharp stabbing L submammary pain assoc anxiety  Dull persistent ache in area apex hrs-days ± stabbing episodes  May be FH MI (fear)  May be hyperventilation, panic attacks, palpitations | Da Costa’s syndrome (psychogenic/functional) |
| Consider in all pts with CP not typically angina  Acute CP in ill patient or intermittent in relatively well pt  ± dyspnoea, haemoptysis, hypotension, sweating, sudden collapse, dry cough, cardiac arrest  Risk factors: prolonged bed rest, air travel, post-sx (esp abdo, pelvic, leg/hip), diuretics, polycythemia, malignancy, OCP, coag disease, CCF, AF, pregnancy, c/s | PE |
| Stabbing pain, episodes last seconds  Localised tender area of chest wall | MSK  Chostochondritis (Tietze syndrome) |
| Doesn’t radiate to arms, worse with hot drinks/alcohol  Relieved by antacids (sometimes nitrates)  More prolonged, not related to exertion, worse bending/lying | Oesophageal/reflux pain |

|  |  |
| --- | --- |
| **Central** | **Lateral/peripheral** |
| Cardiac | Pulmonary |
| IHD (infarction/angina)  Coronary artery spasm  Pericarditis/myocarditis  MV prolapse  Aortic aneurysm/dissection | Infarction  Pneumonia  Pneumothorax  Lung cancer  Mesothelioma |
| Non-cardiac | Non-pulmonary |
| PE  Oesophageal disease  Mediastinitis  Peptic ulcer  Pancreatitis  Cervical/thoracic spine disease  Costochondritis (Tietze’s disease)  Trauma (soft tissue, rib) | Bornholm disease (epidemic myalgia)  Herpes zoster  Trauma (ribs/muscular) |

Differentials acute new onset central CP at rest in ill patient:

* MI
* Unstable angina
* Pericarditis
* Dissection thoracic aorta
* Mediastinitis 2° to oesophageal tear (e.g. after endoscopic/oesophageal sx; occasionally due to vomiting-Boerhaave syndrome)
* PE
* Non-cardiac

Assessment:

1. Inspection
   1. Signs shock (MI, dissecting aorta, PE)
   2. Laboured breathing (MI with LVF, pulmonary)
   3. Vomiting (MI/GI)
   4. Coughing (LVF, pneumonia)
2. HR, BP
   1. Abnormal rhythm, rate, inequalities (dissection)
3. Mucous membranes-pallor (anaemia exacerbating angina), cyanosis
4. JVP (RV infarction, PE)
5. Carotid pulse waveform (collapsing in AR-may complicate dissection; slow rising in AS)
6. Displaced apex, abnormal cardiac impulses (e.g. paradoxical mvt in anterior MI)
7. Auscultation: pericardial rub, 3rd HS (LVF), MR (MI), AR (aortic dissection), AS (cause of angina)
8. Respiratory
   1. Breathlessness, cyanosis
   2. Unequal hemithorax expansion (pneumothoraz, pneumonia)
   3. Signs consolidation
   4. Pleural rub (pleurisy)
9. GI
   1. Tenderness/guarding
   2. Scanty/absent BS (ileus due to perforated PU + peritonitis)

Risk stratification:

* FBC (anaemia exacerbates angina)
* Cardiac troponin
* U&E (if vomiting-dehydration, hypokalaemia or if diuretics)
* ABG (hypoxia in PE, LVF; hypocapnoea in hyperventilation)
* LFTs, amylase (cholecystitis, PU disease)
* ECG (STEMI, ST depression, Q waves, AF, PE, pericarditis)
* CXR: cardiomegaly, wide mediastinum in dissection, lung lesions, pleural/pericardial effusion, oligaemic lung fields in PE
* Echo
* Urgent CT if dissection suspected
* CTPA if PE suspected
* Coronary angio is first line in high risk patients >60%
* Medium risk: functional imaging (MI perfusion)
* Low risk: calcium scoring

# Dyspnoea

Cardiac disease (LV dysfunction, aortic/mitral valve disease)→rasied pulmonary venous pressure→pulmonary venous congestion→distended pulmonary veins, congested/oedematous bronchial walls→irritative non-productive cough & wheeze

LV failure→oedema (transudate) pulmonary interstitium & alveoli→lungs less compliant→increased resp effort + frothy sputum (pink if ruptured small bronchial vessels)

Often tachypnoea due to stimulation pulmonary stretch receptors

* Acute cardiac
  + Myocardial ischaemia/infarction
  + **Acute LVF**
  + MR due to chordal rupture
  + Onset of AF in mitral/aortic valve disease
  + Tachycarrhythmia
* Chronic cardiac
  + LV dysfunction
  + Mitral/aortic valve disease
  + Atrial myxoma
* Acute non-cardiac
  + **PE**
  + **Pneumothorax**
  + **Asthma (may be life-threatening)**
  + **Fulminant pneumonia**
  + Hyperventilation syndrome
    - Also peri-oral numbness, clouding consciousness, stabbing L infra-mammary CP, tetany
* Chronic non-cardiac
  + Obstructive/restrictive lung disease
  + Pulmonary hypertension
  + Chest wall abnormalities
  + Anaemia
  + Obesity, lack fitness

|  |  |
| --- | --- |
| Causes | Features |
| HF | Acute/chronic; continuous/intermittent  Worse with exertion, lying flat, PND, occasionally food  Relieved by rest, sitting up, oxygen, GTN  May be CP (ischaemia causing LHF); cough + pink frothy sputum  Acute LHF: severe dyspnoea, central cyanosis, upright, bilateral basal end-resp creps, hypotension, hypoxia ± hypocapnoea, met acidosis |
| CAD | Acute; usually intermittent (may be continuous if acute MI & severe LVF)  Worse with exertion, cold; may be relieved by oxygen  CP (ischaemic), sweating, ± AF ppt by ischaemia (palpitations) |
| Pneumonia | Pyrexia, shock, hypoxia (severe in PCP); consolidation on CXR |
| PE | Acute (occasionally recurrent small PEs may be chronic)  Continuous  Pleuritc CP; bright red haemoptysis; ±AF  Syncope/collapse; more comfortable lying flat |
| Pneumothorax | Acute, continuous, pleuritic CP, may be trauma  Tension: severe & worsening dyspnoea; displaced trachea & apex; hyperresonance; progressive hypotension; collapse, cardiac arrest |
| COPD & asthma | Acute/chronic  Acute asthma: unable to talk in sentances, leaning forward, accessory muscles, lip pursing, PEF<30%, tachycardia, pulses paradoxus (drop systolic >10mmHg in inspiration), silent chest  If hypercapnoea in asthma suggests exhausted and could be imminant resp arrest  Continuous/intermittent; may be acute life-threatening exacerbation or chronic mild episodes  Worse with exertion, pulmonary infection, allergen; relieved by bronchodilators  Cough with sputum; pleuritic CP if infection; wheeze |

Orthopnoea: dyspnoea on lying flat (blood redistributed legs to torso→increased central & pulmonary blood volume); need more pillows

Nb. If RV function severely impaired (e.g. dilated cardiomyopathy), orthopnoea may reduce because right heart unable to increase pulmonary blood flow in response to increase in venous return

PND: woken from sleep fighting for breath (IHD, aortic valve disease, HTN, cardiomyopathy, AF, MV disease, atrial tumours)

Cheyne-Stokes respiration (hyperventilation with alternating episodes apnoea): severe HF

Central sleep apnoea syndrome

* If hypopnoea-periodic breathing
* Malfunctioning respiratory centre in brain caused by poor cardiac output + concurrent cerebrovascular disease
* Daytime somnolence & fatigue
* May lead to myocardial hypertrophy & fibrosis, deterioration cardiac function, complex arrhythmias incl non-sustained VT, HTN, stroke
* Worse prognosis

NYHA cardiac status:

1. Grade 1: uncompromised (no breathlessness)
2. Grade 2: slightly compromised (on severe exertion; fatigue, dyspnoea)
3. Grade 3: moderately compromised (on mild exertion)
4. Grade 4: severely compromised (breathless at rest)

Assessment:

* Acute/chronic; intermittent/continuous
* Exacerbating/relieving (exertion, lying flat, sleep)
* Cough, sputum (pneumonia, COPD, CVF), haemoptysis (LVF, PE, carcinoma lung)
* CP, palpitations
* Ankle oedema (worse end day in HF)
* Wheeze (asthma, COPD, malignancy, LVF)
* Ask exercise tolerance (stairs, change-how far month/yr ago?)
* PMH resp disease?
* Recent weight gain?
* Response to rest, position, oxygen, nebs, inhalers
* Signs shock (acute LVF, pneumonia, PE)
* Laboured/obstructed breathing (recession), tachypnoea, cyanosis
* Clubbing, CO2 retention flap
* Barrel chest (empysema), kyphoscoliosis
* Pyrexia (infection; PE/MI may be low-grade)
* BP, HR
* Mucous membranes (pallor-anaemia; cyanosis-LVF, COPD, PE, pneumonia, lung collapse)
* JVP, carotid pulse waveform
* Apex displacement, RV heave (pulmonary htn), auscultation (valve disease)
* Peripheral oedema
* Respiratory exam
  + Expansion (asymmetrical-pneumothorax, pneumonia)
  + Vocal fremitus (consolidation, effusion, pneumothorax), dullness/consolidation (pneumonia/effusion), creps, bronchial breathing (pneumonia), wheeze
  + PEF (asthma, COPD)
* GI: hepatomegaly & ascites (RHF/CCF)

Investigations:

|  |  |  |
| --- | --- | --- |
| Test | Findings | Notes/cause |
| FBC | Anaemia  Pneumonia  Inflammatory process e.g. pneumonia | Leucocytosis  Raised CRP |
| U&E | Diuretic treatment of HF  Pneumonia | Deranged  SIADH |
| Cardiac enzymes |  | MI |
| LFT | Hepatic congestion 2° to CCF | Deranged |
| D-dimer | PE | Only after Wells score ≤4 in suspected PE (if >4 CTPA) |
| CXR | Acute LVF | Pulmonary oedema ± large heart shadow |
|  | Acute asthma | Hyperexpansion |
|  | Pneumothorax | Absence lung markings between lung edge & chest wall |
|  | Pneumonia | Consolidation |
| ECG | Evidence MI, ischaemia, PE | May be AF ppt by lung pathology or ischaemia |
| ABG | LVF, significant lung disease  Hyperventilation  Ventilatory failure (COPD, severe asthma with exhaustion) | Hypoxia  Low PCO2, alkalosis, normal O2  Hypercapnoea, hypoxia, acidosis |
| PEF | Asthma, COPD | Reduced (may be reduced in sick because of weakness) |
| Echo | LV dysfunction, valves, myxoma, RV hypertrophy, pul htn |  |
| Pul function tests | COPD, restrictive lung disease |  |

# Palpitations

Increased awareness of normal heart beat or sensation of slow/rapid/irregular heart rhythms

Most common arrhythmias felt as palpitations:

* Premature ectopic beats
  + Pause followed by forceful beat
  + (usually followed by pause then next beat more forceful as longer diastolic period to fill with more blood)
* Paroxysmal tachycardias
  + Sudden racing heart beat, sudden onset/cessation
  + May be terminated by vagal manoeuvres (SVT)
  + AF: irregular
  + Atrial/AVN/ventricular tachy-sudden on & offset
  + If gradual on/offset more likely sinus tachy
* Bradycardias
  + Slow, regular, heavy or forceful beats
  + Often not sensed
* Non-cardiac cause
  + GORD
  + Anxiety
  + Stimulants (caffeine, alcohol)
  + Drug s/e
  + Phaeochromocytoma
  + Anaemia
  + Thyrotoxicosis (may be AF)
  + Fever
  + Dehydration

Characteristics:

* Forceful beat-increase SV in AR/MR, ectopic, high-output (pregnancy, thyroid, anaemia)
* Rapid: sinus tachy, atrial flutter, atrial tachy, SV re-entry tachy
* Irregular: AF, multiple ectopics
* Slow: sick sinus, AV block, occasional ectopics with pauses

# Syncope

Sudden & brief LOC with deficit of postural tone (presyncope: feeling imminent LOC)

Cardiac: usually rapid onset, without aura, not assoc convulsions/incontinence, exercise-induced rapid recovery, may be assoc profound vasodilatation; older, PMH cardiac disease, FH sudden cardiac death, abnormal ECG

Cardiovascular causes (see 3a MOP syncope for more detailed/others):

|  |  |
| --- | --- |
| **Neurocardiogenic** |  |
| OH | Idiopathic  Hypovolaemia, anti-hypertensive drugs, autonomic neuropathy |
| Vasovagal | Painful situations, standing up, prolonged standing, emotional stress  Over many years |
| Carotid sinus syndrome | Sensitivity to neck mvt ± palpitation  Bradycardia & hypotension |
| **Structural heart disease** |  |
| Aortic stenosis | Usually excertional, ES murmur, slow rising pulse, heaving apex  At rest with onset of AF or heart block |
| Pulmonary stenosis |  |
| LV outflow tract obstruction (HOCM) |  |
| Tetralogy of Fallot |  |
| Atrial myxoma | Rare; intermittent MV obstruction  May be postural |
| Defective prosthetic valve |  |
| Myocardial ischaemia | Rarely syncope in absence other disease e.g. AS except if left main stem coronary artery stenosed |
| Severe pulmonary hypertension | Exertional; fixed obstruction to blood flow |
| Acute PE | Only if massive |
| Pericardial tamponade |  |
| Aortic dissection |  |
| **Arrhythmias** |  |
| Tachyarrhythmias | May be awareness of palpitation |
| Heart block | May be aware of bradycardia/pauses  Sick sinus, AV block |
| Stokes-Adams attacks | Sudden LoC unrelated to posture  No warning, pale, deeply unconscious, slow very slow/absent  Recovery after few secs, flushes  Intermittent AV block, profound bradycardia or ventricular standstill |
| Cardiac drugs | Beta-blockers, verapamil |
| PPM failure |  |
| **Other** |  |
| Vertebrobasilar syndrome | Obstruction arteries to brainstem/cerebellum  Vertigo, dizziness, may be cervical spondylosis |
| Subclavian steal syndrome | Severe subclavian artery stenosis/occlusion causing steal of blood by retrograde flow down vertebral artery  With ipsilateral arm mvt |
| Cerebrovascular disease | Dizzy spells-TIA |
| Metabolic | Hypoxia, hypoglycaemia |
| Hyperventilation | Hypercapnoea & cerebral vasoconstriction  Light-headed, mental dysfunction, digital/periorbital paraesthesia, rarely LOC, anxiety |

Differentials: seizure, hypoglycaemia (tremor, hunger, sweating), intoxication, posterior TIA (neuro signs, no LOC), NPH, trauma LOC, drop attacks (sudden leg weakness, no LOC), choking, PE, septic shock

Recent onset syncope in ill patient:

* Intermittent VT/VF
* Intermittent asystole
* PE
* Shock
* Hypoglycaemia

Assessment (NICE):

* History from patient and witness
  + Circumstances of event (precipitating: stimuli, illness, emotion/distress, coughing, micturition, head mvt/shaving/tight collars, change in posture, warm env, prolonged standing)
  + Posture immediately before LOC (held up/allowed to fall)
  + Prodromal symptoms (sweating, feel warm/hot)
  + Appearance (eyes open/shut, colour-white/red suggests arrhythmia; blue-epilepsy)
  + Presence/absence movement e.g. limb jerking & duration (how fell-stiff/floppy)
  + Tongue-biting
  + Injury
  + Duration
  + Presence/absence confusion during recovery (how long to recover)
  + Weakness on one side during recovery
  + Number/frequency previous TLoC
* PMH (DM, PD, PD+, alcohol, renal replacement, HTN, cardiac)
* FH esp heart disease, sudden cardiac death
* Meds esp diuretics, antihypertensives, prolong QT, antiarrhythmics, vasodilators etc
* CVS and neuro examinations
* Vital signs incl signs shock, pulse-rhythm/rate
  + CVS syncope always assoc hypotension
  + If normal BP during syncope likely neuro/cerebrovascular/metabolic
* BP L&S
  + If history suggestive OH
  + Orthostatic hypotension: drop systolic ≥20mmHg or diastolic ≥10mmHg after 3mins standing
  + Clinically important if ↓BP sustained beyond 3mins and original symptoms reproduced during standing
  + Excessive ↑HR ≥30bpm or to ≥120bpm is diagnostic of postural orthostatic tachycardia syndrome
  + Lack of HR response (should ↑) suggests autonomic failure, rate limiting drugs or chonotropic incompetence
* Blood glucose!
* ECG (see 3a MOP for referral/abnormalities)
* Social circumstances
* Whilst awaiting assessment/diagnosis: information about what to do if another episode and driving
* Neuro investigation if prolonged LOC, confusion after event, neuro signs, lateral tongue biting
* If indicated: FBC (anaemia, acute illness), U&E (esp K+), calcium (↓ in long QT), cardiac enzymes (MI), CXR (resp)
* Consider carotid sinus massage (esp if unexplained >60yrs)

Refer within 24hrs for specialist CVS assessment if any of:

* ECG abnormality
* HF
* TLoC on exertion
* FH sudden cardiac death <40yr and/or inherited cardiac condition
* New/unexplained breathlessness
* Heart murmur
* Consider if ≥65 and TLoC with no prodromal symptoms
* Other suggestive features: no warning (stokes adams), exercise-induced, palpitations preceding, syncope when supine (all require investigation by specialist), history cardiac disease, CP

# Oedema

↑ R heart pressure→↑systemic venous pressure in SVC/IVC→greatest in most dependent parts of body

Plasma oncotic pressure < intravascular pressure (exacerbated by hypoalbuminaemia)

Causes:

1. HF
   1. Sodium & water retention 2°to activation RAS
   2. 2° to LVF, aortic/mitral valve disease, MI, recurrent tachycarrhythmias esp AF, HTN, myocarditis, cardiomyopathy (drugs/toxins), valve disease
   3. RHF: pul htn (cor pulmonale-chronic lung disease), RV disease, constrictive pericardial disease (tamponade)
2. Hypoalbuminaemia
   1. Nephrotic syndrome
   2. Extensive burns
   3. Protein-losing enteropathy
   4. Liver failure
   5. Protein-energy malnutrition (Kwashiorkor, IBD)
   6. Test urine for protein
3. Renal impairment (e.g. HTN, DM, autoimmune, infection)
4. Hepatic cirrhosis (alcohol, hep, autoimmune, biliary cirrhosis, Wilson’s, haemochromatosis, drugs)
5. Drugs (steroids-Cushingoid, CCBs e.g. amlodipine, nifedipine, fludrocortisone)
6. Venous disease
   1. Chronic venous insufficiency
   2. Itching, varicose veins, ulcers, haemosiderin, pigmentation, eczematous?
7. Lymphatic obstruction
   1. Pelvic tumour, filariasis, lymphoedema
   2. May be non-pitting when advanced/severe
   3. Milroy’s disease
8. Thiamine deficiency (wet beri beri)
9. Pregnancy
10. Immobility
11. Pelvic mass
12. Unilateral oedema of limb
    1. Local vascular/lymphatic obstruction
    2. DVT
    3. Soft tissue infection (cellulitis, insect bites)
    4. Bone/muscle tumours
    5. Necrotising fasciitis
    6. Trauma (incl compartment syndrome)
    7. Immobility (hemiplegia)
    8. Post-thrombotic syndrome
    9. Rupture Baker’s cyst
13. Specific sites/types
    1. SVC obstruction (usually malignant)-head, neck & arms
    2. IVC obstruction
    3. Periorbital (renal disease: nephrotic)
    4. Perimenstrual cyclical oedema
    5. Angioneurotic oedema (allergy)

Assessment:

* Breathlessness
  + Pul oedema (cardial/renal failure)
  + Chronic lung disease
  + Primary & thromboembolic pul htn
* CP & palpitations (cardiac ischaemia/arrhythmia)
* Alcohol/drug abuse, liver disease (hepatic)
* Diarrhoea (protein-losing enteropathy)
* PMH esp cardiac, hepatic, renal
* DH
  + Renotoxic e.g. NSAIDs, ACE-I
  + Hepatoxic (methotrexate)
  + Dihydropyridine CCBs (ankle oedema in 8%)-don’t treat with diuretics; due to disturbance Starling’s forces not fluid retention
* SH: smoking, IVDU (hepatitis), alcohol (hepatic)
* Examination
  + Oedema
    - Uni/bilateral
    - Evidence trauma
    - Pitting? (press ≥15s)
    - Skin changes
    - How far up leg is oedema?
    - Oedema elsewhere
  + HR (fast in HF), BP (may be low; high in chronic renal disease)
  + JVP, other signs HF (heave, apex displacement, gallop rhythm), murmurs
    - Nb. Can’t diagnose HF from raised JVP in presence oedema; only where JVP raised when oedema absent/removed (salt/water retention causes oedema→raised JVP)
  + Resp (RR, cyanosis, auscultation-resp disease/HF)
  + GI (signs liver disease, encephalopathy-flap, confusion), RHF
  + Cushingoid features
  + Renal (signs uraemia, anaemia, dialysis)
  + Dipstick urine (proteinuria in nephrotic, haematuria in renal)
  + Is patient mobile?

Investigations:

* FBC (anaemia-common in renal; can ppt HF)
* U&E (renal function-abnormal in renal/liver/cardiac)
* LFT (HF/hepatic)
* Albumin conc
* TFT (hypo-oedema; hyper-HF)
* Urine: 24hr protein excretion/ACR
* ABG (hypoxia, CO2 retention in COPD, met acidosis in liver/renal failure)
* ECG (old MI, AF)
* CXR (cardiomegaly, pul oedema, effusions, overexpansion)
* Echo for structural
* US if no evidence cardiac/renal/liver (exclude venous obstruction or external compression)→Doppler US & US of pelvis (mass lesion)-Wells score if suspected DVT

# Cyanosis

Increased deoxygenated Hb in blood perfusing tissues; when SATS <85%

1. Peripheral
   1. Usually cutaneous vasoconstriction
   2. Exposure to cold or Raynaud’s
   3. Most readily seen when CO reduced (shock)
   4. Usually unchanged with exercise
   5. May improve with reflex vasodilatation with exercise
2. Central
   1. Decreased arterial oxygen saturation due to central venous-arterial admixture blood in conditions causing R→L shunting or due to pulmonary disease causing impaired arterial oxygen uptake
   2. Causes R→L shunt
      1. Cyanotic congenital HD involving (VSD, ASD)
      2. Pulmonary AVM
   3. Clinically apparent when >40g/L deoxygenated Hb (oral mucous membranes) (may not be seen if darker skin)
   4. Not usually improved by inspired oxygen
   5. Worse with exercise
   6. Peripheral cyanosis must also be present

# Fever assoc with cardiac symptom/sign

Differentials:

* IE
* Myocarditis (usually infective)
* Paricarditis (infective, post-MI, autoimmune)
* Rheumatic fever (rare, group A strep, mitral valve)
* Vasculitis (Kawasaki)
* Cardiac malignancy
* Myxoma (wide variety symptoms incl dyspnoea, fever, wt loss, syncope, thromboembolism, sudden death)
* Non-cardiac origin of fever (sepsis is common cause AF & flutter)

Assessment:

* History of fever incl ppt factors
* CP (ischaemic/pericarditic)
* Palpitations, dizziness, angina, dyspnoea
* Recent dental work
* Recent sx (transient bacteraemia)
* Rheumatic fever (rare)
* Previous MI (pericarditis, Dressler syndrome)
* Recent viral infection (myocarditis, pericarditis)
* DH: recent abx (details), drugs causing pericarditis (penicillin, hydralazine, procainamide, isoniazid)
* IVDU (IE)
* Risk factors HIV
* Examination
  + Temp (trends/cyclical)
  + Hands: clubbing, Osler nodes, Janeway lesions, splinter haemorrhages (IE but also vasculitis)
  + COnjunctival haemorrhages, roth spots (IE)
  + Central cyanosis (chest infection, HF)
  + Vasculitic rash (SLE)
  + Pulse (AF, sinus tachy, valve disease)
  + BP (hypotension in septic shock or HF); pulsus paradoxus (BP fall during inspiration >10-pericardial effusion causing tamponade)
  + JVP: Kussmaul sign (↑ with inspiration-tamponade); Friedreich sign (rapid collapse in diastole-AR), ↑ in HF
  + Scars from valve replacement (IE), murmurs, pericardial rub (pericarditis)
  + Resp for signs infection (pleural rub, effusion, bronchial breathing)
  + Splenomegaly (IE)
  + Hepatomegaly (CCF, infection e.g. EBV)
  + Petechial rash (IE, viral infection)

Investigations:

≥3 sets blood cultures if possible 1hr apart from different sites before abx

FBC (anaemia chronic disease in IE), leucocytosis (infection), thrombocytopenia (DIC in severe sepsis)

Urinalysis: microscopic haematuria (sensitive for IE)

ECG: ST elevation in pericarditis (concave, all leads, upright T waves); myocarditis may be assoc atrial arrhythmias or conduction defects and rarely complete heart block

CXR: pneumonia (cause of AF), lung tumour (causing pericardial effusion), HF (valve disease, myocarditis), globular heart shadow (pericardial effusion), calcified valves (rheumatic fever)

TTO: assess LV function & valve lesions (TOE more sensitive esp for prosthetic valves and localisation of vegetations); can’t exclude IE based on –ve echo

Other possible tests:

* Antistreptolysin O titres (rheumatic fever)
* Monospot (EBV as cause myocarditis)
* Clotting screen (DIC in sepsis)
* Renal function (may be abnormal in IE due to glomerulonephritis; autoimmune disease may cause renal dysfunction, pericarditis/myocarditis)
* LFT (viral infections)
* ESR/CRP (infection/inflammation; good markers of response; CRP may be more sensitive as shorter half life 8hrs)
* Viral titres in acute/convalescent phase (cause peri/myocarditis e.g. coxsackie); if viral illness suspected also do throat swab & faecal culture

May need pericardiocentesis if pericardial effusion on echo (therapeutic/diagnostic-culture)