        - Do when there is unexplained systolic murmur
    - Exercise testing- since one of the features is exertional dyspnoea and reduced exercise tolerance, this is good thing to do
- Management
    - Transcatheter valve implantation or surgical aortic valve replacement- the first one is for people with severe comorbidities and the other one is for people with fewer risks. There is a criteria for this
        - Symptomatic- all will need intervention
        - Reduced ventricular ejection fraction
    - If asymptomatic- they will need observation

Atrial Fibrillation

- When there is uncoordinated atrial contraction- there tends to be a delay at the AV node and this means that only some of the atrial impulses are conducted to the ventricles and this leads to an irregular ventricular response
- Pathophysiology- dilation of the atria through inflammation and fibrosis leads to discrepancies in the refractory periods within the atrial tissue and this means there is re-entry within the atria and recurrent uncoordinated atrial contraction
- Complications- heart failure, stroke, GI bleeding, intracranial bleeds,
- Causes:
    - Ischaemic heart disease, hypertension, rheumatic heart disease, peri and myocarditis
    - Dehydration
    - Endocrine causes- hyperthyroidism
    - Pulmonary causes- pneumonia and PE
- AF classification:
    - Acute- will last less than 48 hours
    - Paroxysmal- lasts less than 7 days and is intermittent
    - Persistent- lasts more than 7 days but is fine after cardioversion
    - Permanent- lasts more than 7 days and is not amenable to cardioversion
- Symptoms
    - Palpitations
    - Irregularly irregular pulse- key feature
    - SOB and dizziness
    - Single waveform on the JVP
    - Fatigue and anxiety
    - Chest pain, tightness and discomfort
- Investigations:

Infective Endocarditis

- This is caused by infection of the endovascular structures of the heart and
- It can be caused by:
    - Risk factors- increasing age, male sex, IV drug use or devices/ haemodialysis
    - IV Drug use greatly increases the risk since there is a predisposition to staph.aureus infections and this virus is the most common cause of infective endocarditis now
    - Prosthetic valve surgery- again, introduces bacteria into the system and this typically is caused by coagulase negative staphylococci such as staph epidermidis
    - Streptococcus viridians- this is also a common bacteria but staph aureus is the most common cause for the condition now. This will typically cause infection in people who have poor dental hygiene and potentially following a dental procedure
    - Co-morbid conditions- rheumatic heart disease, mitral valve prolapse, aortic valve disease, congenital heart disease, pulmonary stenosis, ventricular septal defect, Previous history of condition
    - HIV infection
- Clinical features
    - The symptoms present acutely or can then progress rapidly with symptoms of heart failure
    - Fever- this is the most common symptom
    - Fever + new murmur- always suspect infective endocarditis
        - Murmur can be anything
    - Anorexia and weight loss- this is also common
    - Myalgia and arthralgia
    - Night sweats
    - Abdominal pain
    - Cough with pleuritic pain- there may be PND or SOB if there are features of heart failure
    - Clinical signs:
        - Janeway lesions- non tender macules on the palms and soles
        - Osler nodes- tender subcutaneous nodules on the finger pads and toes
        - Splinter haemorrhages- essentially, anyone with fever and either of these three signs should always be suspected of having this condition
        - PR Prolongation with complete AV node block- suggests there is an abscess in the aortic root

    - SOB with exertional dyspnoea- this is a key feature for this condition
    - Reduced exercise tolerance
    - Lower extremity oedema
    - Fatigue and weakness
    - Typically there are signs of cardiogenic shock- pulmonary oedema, hypotension
    - Symptomatic AF in longer disease
    - A pansystolic/ holosystolic murmur is heard since this issue happens during systole
        - Loudest at apex, and it radiates to the axilla, it is louder on expiration and also louder on rolling to the right
        - S1 may be quiet
        - TRICUSPID REGURG CAN ALSO PRESENT WITH THIS MURMUR BUT IT WILL BE HEARD LOUDED ON INSPIRATION AND OVER THE LOWER LEFT STERNAL EDGE AND NOT THE APEX/ HEARD BEST ON EXHALATION
    - If there is heart failure as well- bilateral lung crepitations, raised JVP, S3/4 and peripheral/ sacral oedema
- Investigations
    - Echo to look at the valve and look at its size, lesions etc
        - The echo is transthoracic
    - ECG- will show left axis deviation, left ventricular hypertrophy and a broad notched P wave due to left atrial enlargement
    - CXR- may show pulmonary oedema and also left atrial enlargement- cardiomegaly
    - Essentially, this and aortic have the same symptoms and investigations and the key difference is the aortic has an early diastolic murmur and this has a pansystolic murmur
- Management
    - Treat the complications
        - AF- this will need anticoagulation and rate control
        - Thromboembolism- this will need anticoagulation
        - Heart failure- diuretics, ACE inhibitors and beta blockers
    - Diuretics- furosemide and indapamide can be used
    - Chronic MR: medical management can help but surgery will always be the first option
        - ACE Inhibitors- captopril, enalapril, lisinopril
        - Plus beta blockers- metoprolol, atenolol and nadolol
    - Surgery is the definitive management
        - Mitral valve repair is preferred over mechanical/ bioprosthetic mitral valve replacement