- **Chronic**  $\rightarrow$  may remain asymptomatic for decades 0
  - Valvular incompetence develops slowly
  - Regurgitation of blood during diastole  $\rightarrow$  increase in left ventricular end-diastolic volume (preload)
  - This leads to systolic and diastolic dysfunction .
  - Left ventricular dilatation develops with eccentric hypertrophy
  - Dilatation allows for an increase stroke volume compensating for regurgitant flow, supported by the ventricular hypertrophy
  - The changes maintain ejection fraction with a greater preload leading to greater contractility
  - Eventually, further increases in preload can't be met by greater contractility  $\rightarrow$  heart failure.

Risk factors  $\rightarrow$  age, enlarged aortic root diameter (Marfans, EDS, osteogenesis imperfecta, connective tissue disorder), bicuspid AV, atherosclerosis, infective endocarditis, rheumatic heart disease, connective tissue or inflammatory disease, antiphospholipid syndrome, trauma, ankylosing spondylitis.

# Investigation

The main investigation is an echocardiogram.

## ECG

May show left ventricular hypertrophy  $\rightarrow$  deep S-waves in V1 and V2, tall R waves in V5 and V6 (chronic).

#### Bloods

FBC, U&E, cholesterol, clotting.

## **Echocardiogram**

- Key investigation
- Direct visualisation of regurgitant jet
- Detect aortic valve pathology and compensatory changes (e.g. LV hypertrophy) Aim: look at anatomy of aortic valve leaflets and root, assess severity of AR graphy, busize and function Severity by jet width:  $\circ <25\% \rightarrow mild$   $\circ >65\% \rightarrow$  severe. Severe: CXR  $\rightarrow$  cardiomear by differentiation

#### Imaging

- CXR  $\rightarrow$  cardiomegal (v) later ascending acts (c) for c) pathology) CT/MRI  $\rightarrow$  can accept the fraction, u ed copectally in patients with a ortic dilatation
- Angiography  $\rightarrow$  in patients with chronic AR undergoing surgery to assess for concomitant coronary artery disease may requiring bypass.

# Management

The main treatment is surgical aortic valve replacement. This is indicated in severe disease, symptomatic disease or in presence of enlarged ascending aorta.

#### Acute AR

- Surgical emergency  $\rightarrow$  aortic valve replacement/repair
- Main causes are aortic dissection and infective endocarditis.

#### **Chronic AR**

- Surgical management indicated in patients with:
  - o Significant enlargement of ascending aorta
    - Symptomatically severe 0
    - $\circ$  Severe AR with LVEF <50% or LVEDD >70 mm or LVESD >50 mm
  - 0 Marfan's with aortic root disease with maximal ascending aorta diameter >50 mm
- Decision of mechanical vs bioprosthetic valve should take into account patient factors and wishes
  - Mechanical  $\rightarrow$  require long-term anticoagulation, long lifespan, suited to younger patients 0
  - Bioprosthetic  $\rightarrow$  no need for long-term anticoagulation, limited life span (10 years), suited to older patients
- TAVI used in patients who surgery is contraindicated in