

Valvular heart disease

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Aortic stenosis

Characteristics

- Normal valve
- Tricuspid, area 2,5-4 cm²
- Symptoms when area less than 1 cm²

Increased afterload ... concentric hypertrophy of left ventricle...increased distance in between capillaries...diffuse ischemia of myocardial cells ...replacement of fibroblasts and collagen...diastolic dysfunction

Gradual decrease of heart output during exercise...symptoms

Gradual dilatation of left ventricle leads to systolic dysfunction...decreased CO at rest

Postcapillary passive pulmonary hypertension

Aortic stenosis

Causes

- Degeneration of cusps (similar to AS)
 - 60 – 80 years
- Congenital bicuspid aortic valve
- Rheumatic heart disease
 - Stenosis of cusps, associated mitral valve disease

Aortic stenosis

Clinical presentation

- Angina
 - Hypertrophic myocardium works against increased afterload, increased demand for oxygenated blood, decreased cardiac output at exercise
 - Half of patients have coronary artery disease

Aortic stenosis

Clinical presentation

- Syncopy
 - Exercise leads to decrease in peripheral vascular resistance ... hypotension

Aortic stenosis

Clinical presentation

- Heart failure
 - Most frequent symptom
 - Average survival 1 – 2 years
 - Decreased cardiac output
- Sudden death
 - 1% per year at significant AS
 - (re-entry VT fibrosis)

Aortic stenosis

Echocardiography

- Valve morphology, nb. Of cusps, calcification
- LV hypertrophy, dilatation, systolic function
- Pressure gradient
 - $PG = 4.v^2$
- Aortic valve area

- Severe aortic stenosis
 - $AVA \leq 0,5 \text{ cm}^2$
 - Systolic mean PG 40 mm hg
- SKG

Aortic stenosis treatment

- Surgical aortic valve replacement (SAVR)
 - Mechanical valve
 - » Long term anticoagulation
 - Biological valve
 - » Risk of degeneration
- Transthoracic aortic valve replacement (TAVR)
- CAVE ACEI, nitrates – risk of hypotension
- Slow down heart rate!

Aortic insufficiency

- Volume overload of left ventricle
- Long asymptomatic course

Aortic insufficiency Etiopathogenesis

- Annulo-aortic ectasia
 - Marfan syndrome, ankylosing spondylitis, syphilis
- Bicuspid aortic valve
- Infectious endocarditis

Aortic insufficiency

Clinical presentation

- Shortness of breath
- Tiredness/exercise intolerance

Aortic insufficiency

Echocardiography

- Aortic root, aortic annulus, cusps
- Color doppler
- Reverse diastolic flow in descending aorta
- Left ventricle size (end-diastolic, end-systolic diameter, EF)

Aortic insufficiency

Treatment

- Valve replacement
- Valve + root replacement
 - Bentall operation
- David/Yacoub operation
- Hypertension treatment as prevention of aortic dilatation
- ACE, Ca blockers, diuretics

Mitral stenosis

- Normal valve area 4 – 6 cm²
- Symptomatic valve stenosis $\leq 1,5$ cm²
- Severe valve stenosis $\leq 1,0$ cm²

- Rare

Mitral stenosis

Etiopathogenesis

- Rheumatic fever
 - Evolving for very long time
 - Long time asymptomatic
- Srůstání of cusps, calcification
- Dilatation of left atrium
- Increase of LA pressure, passive congestion in lung circulation, when pressure is higher than oncotic – water filtration, shortness of breath
- Atrial fibrillation leads decrease of cardiac output
- Tricuspid insufficiency

Mitral stenosis

Clinical presentation

- Shortness of breath
- Cough on exertion
- Hemoptysis (bronchial plethora)

Mitral stenosis

- Facies mitralis

Mitral stenosis

Echocardiography

- Mitral valve, calcification
- Left atrium dilatation
 - TEE – thrombi
- Pressure gradient diastolic
- Pulmonary hypertension

Mitral stenosis

Treatment

- PTMV – percutaneous mitral valvuloplasty
 - Risk of restenosis
- Surgical treatment
 - Valvulotomy (rare)
 - Mitral valve replacement
- Diuretics
- Anticoagulation
- Afib treatment/cardioversion

Mitral insufficiency

- Left ventricle dilatation and dysfunction
- Mitral valve apparatus:
 - Cusps
 - Papillary muscles
 - Chordae tendineae

Mitral insufficiency

Etiopathogenesis

- Annulus dilatation
 - Normal – circumference 10 cm, elastic; connected and moving with left ventricle
- Cusps
 - Prolaps
 - » Myxomatous degeneration,
 - Infectious endocarditis
- Primary versus secondary insufficiency

Mitral insufficiency

- ACUTE
- Papillary muscle ischemia, rupture
- Pulmonary oedema

- CHRONIC
- Slow progressive left ventricular dilatation
- Long term good tolerance, then shortness of breath, tiredness, palpitations

Mitral insufficiency Echocardiography

- Etiology
 - Determines type of surgical approach
- Severity
 - Collor doppler
- Left ventricle dilatation, dysfunction

Mitral insufficiency

Treatment

- IE prevention
- Afib treatment
- Heart failure treatment
 - Diuretics
 - ACEI
- Surgical treatment
 - Valvuloplasty
 - Mitral valve replacement

Pulmonary valve stenosis

- Rare in adults
- One of the most frequent congenital heart disease in children
- Systolic murmur
- Echo/right heart catheterisation
- Valvuloplasty

Pulmonary valve regurgitation

- Pulmonary hypertension is the most frequent cause
- Post valvuloplasty
- Diastolic murmur

Tricuspid stenosis

- Rare (RF)
- Often together with left sided disease
- Right side HF
- Diastolic murmur LLSB
- Echocardiography
- Surgical treatment – replacement by bioprosthesis

Tricuspid insufficiency

- Secondary
 - Pulmonary hypertension – dilatation of RV and TV annulus
- Infective endocarditis
 - Iv abusers
- Carcinoid
- Ebstein anomaly

Tricuspid insufficiency

- Right heart failure
- Systolic murmur EB
- Echocardiography
- Surgical treatment – severe symptoms
 - Annuloplasty
 - Replacement
- Diuretics