AORTIC STENOSIS

TRANSCATHETER AORTIC VALVE IMPLANTATION (TAVI) – DR J VORSTER



Valvular heart disease

• Accounts for 10% - 20% of all cardiac surgical cases

• Primary causes of valve disease

- Age-associated calcific valve changes
- Congenital:

- 1. Bicuspid aortic valve
- 2. Myxomatous mitral valve
- Rheumatic valve disease

• $\frac{2}{3}$ of valve procedures:

- Aortic valve replacement (AVR)
 - Most often for aortic stenosis (AS)

• $\frac{1}{3}$ of valve procedures:

- Mitral valve surgery:
 - Mitral regurgitation
 - (Mitral stenosis treated percutaneously)

Left ventricular outflow obstruction

• Valvular:

- Congenital aortic valve disease (e.g. bicuspid)
- Age-associated calcific (tricuspid)
- Rheumatic (tricuspid)

• Supravalvular:

- Williams syndrome

• Subvalvular:

- Discrete sub-aortic stenosis
- Hyperthrophic Cardiomyopathy (HOCM)

Valvular Aortic Stenosis



Calcific Aortic Valve Disease

Age-related calcific (degenerative) AS

- Most common cause of AS
 - 2% of persons \geq 65 years (Otto)
- Bicuspid / Tricuspid

- 50% of patients undergoing AVR for AS bicuspid valve was present
 - $\pm 60\%$ of those < 70 years
 - $\pm 40\%$ of those > 70 years

• Risk factors similar to those for vascular atherosclerosis:

- Initially theory: Mechanical stress
- Evolving concept: Proliferative & inflammatory process
 - Progressive calcification
 - Ultimately: Bone formation

Pathophysiology



Clinical Presentation

Exertional dyspnea

- Diastolic dysfunction $\rightarrow \uparrow$ LVEDP \rightarrow Pulmonary congestion
- Fixed cardiac output

• Angina (²/₃ of patients)

- 50% associated CAD
- Absence of CAD:
 - ↑ Myocardial O2 demand (LVH)
 - \downarrow Coronary perfusion

Syncope

- \downarrow Cerebral perfusion during exertion
- Transient AF (at rest)
- Transient AV block

• Heart failure

Physical Examination

- Pulses parvus et tardus
- Carotid shudder

- LV hypertrophy
- Presystolic distention of LV (precordial a wave)
- Systolic thrill
- Ejection systolic murmur
- Gallavardin phenomenon

<u>ECG</u>



Echocardiography

• Severe AS:

- 1. Mean gradient > 40mmHg (Max > 60)
- 2. Valve area < 1 cm^2 (or < $0.6 \text{ cm}^2/\text{m}^2$)
- 3. Jet velocity > 4.0m/sec



Catheterization



Natural history



Management

















Edwards Sapien



Medtronic CoreValve





- Symptomatic aortic stenosis:
 - Aortic valve area <0.8 cm2
 - High operative mortality risk / "non-operable"

(Logistic EuroSCORE >20% or STS Score>10)

Transfemoral or transapical

 Without cardiopulmonary bypass





TAVI Animation - Transfemoral

