

VALVULAR HEART DISEASE

RHEUMATIC AND NON-RHEUMATIC

PROF. E N OGOLA

LECTURE OBJECTIVES

At the end of the lecture the student should be able to:

- Describe the aetiology of VHD esp RHD
- Describe the pathology of valvular damage esp in RHD
- Describe the pathophysiological consequences of valvular disease
- Elicit the clinical features of VHD
- Carry out investigations in VHD
- Outline the management of a patient with VHD

PREAMBLE

- Predominantly rheumatic in this environment
- Most important cause of cardiac disease in teenagers, young adults
- Epidemiology reflects Rh. Fever: underprivilege, overcrowding, young age group
- Management unavailable, expensive, complex, risky
- Hence the significance of prevention – primary, secondary
- Other causes:
 - Congenital
 - Degenerative
 - Ischaemic, inflammatory etc

PREAMBLE 2

RHD

- Consequence of rheumatic endocarditis
- Only long term sequel of RF
- Fibrosis, distortion of valvular apparatus
- Stenosis, regurgitation or both
- Most often affects left heart valves
- Mitral > Aortic
- Tricuspid often functional
- Almost never pulmonic
- Involvement often multiple
- Rheumatic fever prophylaxis

Specific valvular lesions

MITRAL STENOSIS

- **FUNCTIONAL ANATOMY:**
 - Leaflets, commissures, chordae tendinae

 - MVA – Normal 4-6 cm²
 - 1-2cm² - significant stenosis
 - < 1cm² - critical stenosis

- **AETIOLOGY:**
 - Almost invariably rheumatic
 - Congenital, Calcification, Inflammatory

- **PATHOLOGY:**
 - Commissural fusion
 - Fibrosis, distortion of chordae, leaflets

MITRAL STENOSIS

PATHOPHYSIOLOGY

- **Impaired opening of MV**
 - Inadequate LA emptying:
 - Increased LA pressures
 - Pulmonary venous congestion
 - Pulmonary Hypertension > RV hypertrophy and failure
 - Increased LA size
 - LA thrombosis
 - Atrial fibrillation
 - Inadequate LV filling
 - Low cardiac output

MITRAL STENOSIS

- CLINICAL FEATURES – SYMPTOMS:
 - **Effort intolerance**: dyspnoea, easy fatiguability
 - **Palpitations**, may be at rest
 - **Cough, haemoptysis**
 - **Orthopnea, PND**
 - **Abdominal discomfort, swelling**

MITRAL STENOSIS

■ CLINICAL FEATURES – SIGNS:

- **Mitral facies** ☰
- **Low volume pulse, rapid, ± irregular**
- Apex NOT displaced, tapping (palpable S1)
- Palpable P2
- **Left parasternal heave** (RVH)
- Auscultation:
 - Loud S1, P₂.
 - **Opening snap** , **mid diastolic murmur** ,
presystolic accentuation - at the apex
 - Features of TR
 - Pulmonic EDM due to PR (Graham Steele) ☰
- Features of heart failure

MITRAL STENOSIS

- **COMPLICATIONS:**
 - Heart Failure
 - Atrial Fibrillation
 - Thromboembolism
 - Infective Endocarditis

MITRAL STENOSIS

■ INVESTIGATIONS:

- **CXR** – features of LA enlargement: double shadow, filling of pulmonary bay, widened carina
 - Pulmonary congestion
 - Normal cardio-thoracic ratio (CTR)
 - MV calcification
- **ECG** – LAE, RVH, RAD
 - Atrial Fibrillation
- **ECHO** – Morphology
 - Doppler – valve area, gradients, pulmonary pressures
 - Secondary changes – LAE, RVH

MITRAL STENOSIS

- MANAGEMENT – **PHARMACOLOGICAL**
 - Limited
 - **Diuretics**
 - HR slowing – **Beta blockers, digoxin**
 - No role for usual HF management
 - Management of **Complications**

MITRAL STENOSIS

■ MANAGEMENT – DEFINITIVE

- **Surgical:**

- **Valvotomy** – closed, open

- **Valve replacement/repair**

- **Interventional:**

- **Percutaneous balloon dilatation**

MITRAL REGURGITATION

- FUNCTIONAL ANATOMY:

- Leaflets, annulus, chordae, papillary muscles

- AETIOLOGY:

- **Predominantly rheumatic** locally
- Degenerative (MVP), Ischaemic, ventricular dilatation, inflammatory, endocarditis

- PATHOLOGY:

- **Fibrosis, distortion – leaflets, chordae (RHD)**
- Rupture – chordae, papillary muscles (Ischaemia, Inf. End.)
- Annular dilatation – ventricular dilatation
- Degenerative – leaflets (MVP)

MITRAL REGUGITATION

- PATHOPHYSIOLOGY:

- **Increased SV to accommodate regurgitant volume**
- Volume overload
- **Eccentric hypertrophy** (dilatation)
- **Enlarged LA**

MITRAL REGURGITATION

- CLINICAL FEATURES – SYMPTOMS:
 - Insidious and slowly progressing
 - **May be asymptomatic even in severe MR**
 - Onset often depends on complications e.g. PHT, A.fib or precipitating factors.
 - **Features of CCF**

MITRAL REGURGITATION

■ CLINICAL FEATURES – SIGNS:

- Pulse maybe **large volume**
- **Apex, displaced, heaving**
- Muffled S1, S3+
- **Apical pan systolic murmur, radiating to axilla**

MITRAL REGURGITATION

- COMPLICATIONS:
 - CCF
 - Infective endocarditis
 - A.Fib

MITRAL REGURGITATION

- INVESTIGATIONS:
 - **CXR**- cardiomegaly
 - pulmonary congestion
 - **ECG**- LAE, LVH, A.Fib
 - **ECHO**- Morphology
 - Quantification
 - LV size and function

MITRAL REGURGITATION

■ MANAGEMENT:

– **Pharmacological :**

- Management of CCF

- Complications

- **Definitive;**

- Surgery – valve replacement,
repair

AORTIC STENOSIS

- FUNCTIONAL ANATOMY – Cusps, commissures , (infra/supra valvular)
- AETIOLOGY
 - In young adults predominantly RHD,
usually with MVD
 - Children – congenital
 - Older adults - degenerative

AORTIC STENOSIS

■ PATHOPHYSIOLOGY:

- Obstruction to LV emptying
- **Pressure overload**
- Marked **concentric hypertrophy**
 - Increased oxygen demand(LV mass)
 - Elevated LV diastolic pressures (LV stiffness)

AORTIC STENOSIS

- CLINICAL FEATURES – SYMPTOMS:
 - Long latent period
 - Once symptoms supervene, rapid progression
 - **Classical triad** – exertional:
 - **Dyspnoea**
 - **Angina**
 - **Syncope**

AORTIC STENOSIS

- CLINICAL FEATURES – SIGNS:
 - Pulse – small volume, slow rising
 - Apex may not be displaced but heaving
 - Ejection click
 - **Ejection systolic murmur > carotids**
 - **S4**

AORTIC STENOSIS

■ COMPLICATIONS:

- LV failure – diastolic, systolic
- Arrhythmias – Atrial (A.fib),
Ventricular (sudden death)
- Infective endocarditis

AORTIC STENOSIS

■ INVESTIGATIONS:

- **CXR**- Maybe normal,
 - Normal CTR
 - Calcification
 - Post stenotic dilatation
- **ECG**- Marked LVH with ST depression, T wave inversion
- **ECHO**- Valve morphology
 - Doppler – valve area, gradient
 - LVH, LV function

AORTIC STENOSIS

- MANAGEMENT:
 - Medical – very limited
 - **Cautious diuresis**
 - “CCF” management only in systolic dysfunction
 - Complications
 - Definitive – Surgical (AVR)
 - **Balloon dilatation**
 - **Trans catheter aortic valve implantation (TAVI)**

AORTIC REGUGITATION

■ FUNCTIONAL ANATOMY

- Valve cusps – Main mechanism in rheumatic
- Root dilatation - degenerative, inflammatory

AORTIC REGURGITATION

- AETIOLOGY:

- Congenital

- Acquired:

- **Rheumatic**

- Syphilis

- Dissecting aneurysm

- Inflammatory disorders

- Degenerative

AORTIC REGURGITATION


■ PATHPHYSIOLOGY:

- Hyperdynamic circulation
- **Regurgitation > volume overload > eccentric LVH (dilatation)**
- Much severer than MR hence **very large hearts (Cor Bovis)**

AORTIC REGURGITATION

- CLINICAL FEATURE - SYMPTOMS:
 - Long latency
 - Features of hyperdynamic state:
 - Pounding in chest, head, palpitations
 - Features of heart failure - late

AORTIC REGURGITATION

- CLINICAL FEATURES – SIGNS:
 - Displaced ,hyperdynamic apex
 - Hyperdynamic signs; 
 - Large volume, collapsing pulse
 - Corrigan's sign
 - Wide pulse pressure
 - Pistol shots(Traube's), Duroziez's
 - Quincke's, de Musset's signs

AORTIC REGURGITATION

- SIGNS CONT:

- Soft S1, A2

- **Early diastolic murmur – LSE 3rd, 4th ICS**

- Ejection systolic murmur - aortic

- Apical mid diastolic murmur(**Austin Flint**)

AORTIC REGURGITATION

■ INVESTIGATIONS:

- **ECG** - LVH, marked ST segment, T wave changes
- **CXR** – Massive cardiomegaly
- ECHO – Morphology
 - Quantification
 - LV size, function

AORTIC REGURGITATION

MANAGEMENT

- Medical - Management of CCF
- Definitive – Surgical (aortic valve replacement)

TRICUSPID STENOSIS

- **Predominantly rheumatic**
- Usually occurs with **MS**, masks presentation
- Pathophysiology:
 - RV-RA gradient : - **elevated RA pressure**
> systemic venous congestion
 - Impaired RV filling > **low cardiac output**

TRICUSPID STENOSIS

■ Symptoms:

- Low output:- **fatigue**
- Systemic congestion:- **abd swelling and discomfort, leg swelling, fluttering in the neck**
- **Absence of chest symptoms**(even with MS)

TRICUSPID STENOSIS

■ Signs:

- **Prominent "a" waves on JVP**
- Low volume pulse
- **Negatives** – No PHT, RVH and clear lung fields even with MS
- LSE MDM- increased on inspiration

TRICUSPID STENOSIS

■ INVESTIGATIONS:

- CXR – **Marked "cardiomegaly"- RA enlargement ,with clear lung fields**
- ECG – RAH, ? Biatrial hypertrophy with NO RVH
- ECHO – Confirm stenosis, gradient
 - Coexistent MS

TRICUSPID STENOSIS

■ MANAGEMENT:

- Medical – Sodium restriction, diuresis
- Surgical – Valvotomy(open/closed), valve replacement

TRICUSPID REGURGITATION

- Aetiology – Often “functional” due to **RV annular dilatation**
 - ✓ PHT with RVH
 - ✓ Other causes of RV dilatation
 - Others – **Rheumatic**, cong, inflammatory, carcinoid syndrome
- Pathophysiology – **RV volume overload**
 - Primary pathology especially PHT

TRICUSPID REGURGITATION

CLINICAL

- ❑ Usually well tolerated in absence of PHT
- ❑ Features of RVF
 - ✓ Low output – Fatigue, Cachexia
 - ✓ Systemic congestion – Leg, Abdominal swelling, anorexia
- ❑ Signs
 - ✓ Elevated JVP with **prominent V waves**
 - ✓ Left parasternal heave (RVH)
 - ✓ Loud P2
 - ✓ LLSE pan systolic murmur
 - ✓ **Pulsatile hepatomegaly**
 - ✓ Ascites

TRICUSPID REGURGITATION

■ INVESTIGATIONS:

- ECG – RVH, primary pathology
- ECHO – Morphology
 - Quantification
 - Pulmonary pressures
 - RVH, primary pathology
- CXR – Cardiomegaly due to RVH

TRICUSPID REGURGITATION

■ MANAGEMENT:

- Surgical – annuloplasty, valve replacement
- Primary condition
- Diuresis

PULMONIC VALVE

- STENOSIS – Almost always **congenital**
- REGURGITATION – Secondary to **pulmonary hypertension**
 - Presentation, management is of primary disease

Questions??