

" Valvular Heart Disease "

✓ It's good to know :

- ❖ 1st heart sound is due to closure of AV valves (mitral & tricuspid) .
 - ✚ It indicates the beginning of the ventricular systole.
- ❖ 2nd heart sound is due to closure of semilunar valves (aortic & pulmonary).
 - ✚ At the very end of systole.
- ❖ 3rd heart sound is due to inrushing of the blood from the atria to the ventricles in the middle 1/3 of diastole.
- ❖ 4th heart sound is due to atrial contraction in the last 1/3 of the diastole. (by knowing the causes of heart sounds, you can detect if there is any abnormality and what causes it)

✓ Lecture notes :

- ❖ Rheumatic heart disease is common cause of valvular heart disease in KSA.
- ❖ What are the differences between hypertrophy and dilatation ?
 - ✚ **Hypertrophy** : mainly in case of stenosis >> the heart muscle produces an extra effort to push the blood through the stenosed valve.
 - ✚ **Dilatation** : mainly in case of regurgitation >> no extra effort needs to be produced by the muscle, but the blood comes back after being pumped, which causes an increase in the blood volume inside the chamber >>> dilatation.
- ❖ **Lt ventricular hypertrophy can lead to :**
 - 1) **Diastolic heart failure** : hypertrophic heart can't relax properly , so no more blood comes inside the ventricle.
 - 2) **Ischemia** : because the bigger cell size → increases demand of O₂ & nutrients.
- ❖ Symptoms & sign of VHD :
 - 1) **Dyspnea** : mitral stenosis → ↑ Lt atrial pressure → ↑ pulmonary circulation → edema & congestions.
 - 2) **Chest pain** : aortic stenosis → Lt ventricular hypertrophy → increase O₂ demand → ischemia → pain.
 - 3) **Fatigue** : in MS blood doesn't go to Lt ventricle in adequate amount → reduced cardiac output → reduced muscle perfusion → fatigue.

- 4) **Dizziness** : in AS , blood doesn't go to the brain in adequate amount → dizziness.
- 5) **Symptoms of congestive heart failure** :
- ✚ TS : blood stasis in general veins (e.g. SVC , IVC , Hepatic veins & so on) .
 - ✚ MS: blood stasis in pulmonary circulation , then in the Rt side of the heart , then in the general circulation.
- 6) **Hemoptysis** : in MS , due to pulmonary congestion.
- 7) **Thromboembolic complication** : in MS & MR, due to turbulent blood flow.
- 8) **Apex beat abnormality** :
- ✚ Apex beat normally palpable in the mid-clavicular line / Lt 5th intercostal space.
 - ✚ Apex beat displacement occurs in ventricular dilatation (BUT not hypertrophy).
- 9) **Sternal & parasternal heave** :
- ✚ Heave : when you put your hand over the sternum , your hand moves up with every heart beat.
 - ✚ It's due to Rt ventricle hypertrophy (like in MS & pulmonary valve stenosis).
- 10) **Thrill : palpable murmur.**
- 11) **Abnormal heart sound** :
- ✚ Loud S1 : in MS , TS. >> extras: thin people, hyperdynamic circulation, tachycardia (reduced diastolic filling time) . تالي الكبير ص ٦٣ شارحها بطريقة بطلّة
 - ✚ Soft S1 : in MR and sever calcific stenosis , TR. >> extras: obesity, bradycardia, emphysema, pericardial effusion, heart failure and 1st degree heart block .
 - ✚ Loud S2 : loud P2(pulmonary component of S2) in patient with mitral stenosis due pulmonary hypertension & loud A2 (aortic component of S2) due to systemic hypertension & aortic stenosis causes that , too.
 - ✚ Soft S2 : soft A2 in AS.
 - ✚ S3 : high atrial pressure
 - ✚ S4 : high pressure in the ventricles , high atrial pressure , hypertension&MS.
(S3 and S4 either present singly or together, will produce a gallop rhythm =>) جري الحصان

❖ **Notes of Investigation :**

- ✚ Chest X-ray : for hypertrophy , dilatation & pulmonary congestion.
- ✚ Echocardiology : for cardiac structure (e.g. valves)

❖ **MS :**

- ✚ Rheumatic fever is a common cause of MS (90% in 8-15 years age group).
- ✚ Changes in the mitral valve can be : thickening , adhesion or calcification
- ✚ Increase Lt atrium size (hypertrophy or dilatation) → electric signals from SA node take longer time to depolarize the whole atrium → chance of atrial fibrillation .
- ✚ Pulmonary symptoms doesn't occur unless the pressure in the Lt atrium raised 25 – 40 mmHg.
- ✚ In chest X-ray : Lt side of the heart become striat → Lt atrium hypertrophy.
- ✚ If the mitral valve is calcified → No mitral valve – related sound can be heard.
- ✚ ECG : Rt axis due to Rt ventricular hypertrophy
 - ❖ In lead V1: if $R > S$ → Diagnostic sign
 - ❖ In lead V2 : 2 phasic P wave → mitral stenosis
 - ❖ Rt atrial enlargement → prolonged P wave
- ✚ Complication : Calcification

Esophageal compression by Lt atrium enlargement

❖ **Treatment :** Digoxin → increase heart contractility , decrease HR
 β -blocker & Ca-channel blockers → decrease AV node conduction

penicillin ejection every 3 weeks for Rheumatic fever
 2g Amoxicillin for IE

Balloon valvuloplasty → for non-calcified valve

Valve replacement : old patient → tissue valve

Young patient → mechanical valve + anticoagulant

✓ Valve area & pressure should be assess before & after the operation

❖ MR :

- + Apex beat displacement due to dilatation.
- + S3 : due to pliable valve.

❖ Mitral prolapsed :

- + In young female , female to male ratio is 7:1
- + More arrhythmia & chest pain : the leaflets move backward → over stretch of papillary muscle → rupture → acute MR → acute increase pulmonary hypertension → Heart failure.
- + Marfan's syndrome : Collagen disease due to structural proteins deficiency (characterized by valvular prolapse , Aortic dissection & high arched palate .
- + Atypical chest pain → due to ischemia.

❖ AS :

- + Disease of elderly patients (70 years & above) .
- + In AS & AR → reduced stroke volume → reduced cardiac output.
- + High pressure in Lt ventricle → hypertrophy → the ventricle can't relax properly & high filling pressure → Diastolic heart failure.
- + Sustained apex beat → due to Lt ventricle hypertrophy.
- + Hypertrophy can cause ischemia & arrhythmia.
- + If symptoms occur → bad prognosis.
- + Angina → 5 years survival.
- + Syncope → 3 years survival.
- + Congestive heart failure → 2 years survival.
- + Investigation : ECG Lt axis → Lt ventricle hypertrophy.
- + Surgical replacement if symptoms occur.

Aortic stenosis characteristics :**SAD:**

Syncope.

Angina.

Dyspnoea.

❖ **AR :**

+ Austin Flint murmur with severe cases.



Causes of Aortic regurgitation :

MARRIS:

Marfans.

Ankylosing spondylitis.

Rheumatic fever.

Rheumatoid arthritis.

Infective endocarditis.

Syphilis.

❖ **Pulmonary & Tricuspid valvular diseases :**

+ In pediatric age (pulmonary valve).

+ Pulmonary stenosis is treated by balloon.

+ IE of tricuspid valve in IV drug abusers → لأنهم يحقنون في الأوردة اللي ترجع إلى القلب الأيمن

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