

Dr. Alaa

Valvular Heart D.

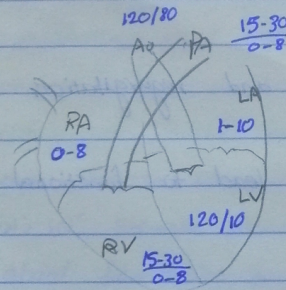
lec. 5

turbulence of flow $\rightarrow$ stenosis $\rightarrow$ laminar flow $\rightarrow$ PDA, ASD $\rightarrow$ connection bet. 2 chambers $\rightarrow$ murmur

resistance $\rightarrow$ 120 = aorta $\rightarrow$ lt. ventricle $\rightarrow$ aortic stenosis $\rightarrow$ smooth $\rightarrow$ flow $\rightarrow$ resistance $\rightarrow$ pressure gradient $\rightarrow$ severe stenosis

* pressure gradient (ΔP) = $\frac{4v_{max}^2}{R}$ $\rightarrow$ Bernolli equation

* Ohm's law for blood flow (Q) = $\frac{\Delta P}{R}$ $\rightarrow$ pressure gradient $\rightarrow$ resistance

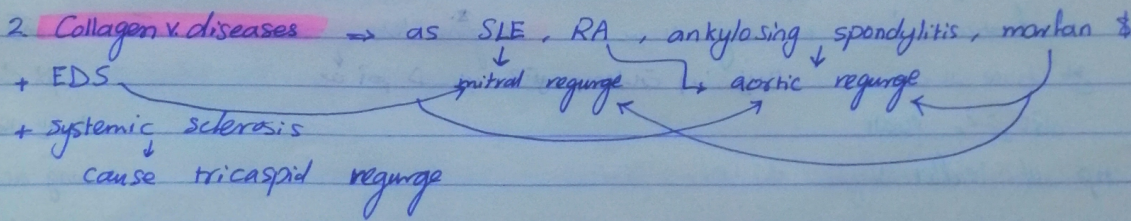


valvular heart d. $\rightarrow$ 1. Rheumatic heart d.

1. Rheumatic heart d.

Jones criteria $\rightarrow$ RF $\rightarrow$ B. hemolytic group A streptococcus

deposition $\rightarrow$ Ag-Ab complex $\rightarrow$ basement membrane $\rightarrow$ Aschoff Nodules $\rightarrow$ complement $\rightarrow$ 15-10 $\rightarrow$ mitral stenosis



3. Ischemic heart d. → dysfunction / destruction of papillary muscles
 ↓
 mitral regurg → inferior MI or anterior MI
 → 2 types of m. → antero-lateral + posteromedial
 ↓
 LAD → 2 bld supply
 + circumflex
 ↓
 1. supply
 2. circumflex or RCA

4. Congenital → as congenital aortic stenosis
 pulmonary stenosis → congenital

5. inflammatory → as infective endocarditis
 ↓
 vegetation
 regurg → stenosis

6. uncontrolled HTN lead to aortic aneurysm and regurgitation

7. Secondary → as in dilated cardiomyopathy lead to functional regurg

MS: mitral stenosis → normal mitral area = 2-4 sq cm
 ↓
 chordae tendineae → 2 leaflets
 regurg → rupture of subvalvular apparatus → papillary m.

⇒ most common cause is rheumatic heart d. → RF
 ↓
 thickening of the leaflets → aschoff bodies
 ↓
 calcification → age
 ↓
 base of leaflet
 ↓
 tip of leaflet

long acting penicillin
 free of symptom 5-20 years

aortic

rare ← mitral st. li. 6 valve 11 degenerative
 rare ← Luteimbacher syndrome CSI congenital
 congenital ASD complicated by MS
 inflammatory a.
 gram -ve bacteria HACEK group
 Hemophilus species, Aggregatibacter, Cardiobacterium hominis, Eikenella
 corrodens, and Kingella species.
 vancomycin
 fungal infections staph.
 stenosis a? regurg

* لا تغير ال mitral area ال left atrium & ventricle

⇒ Pathophysiology → diastole ال
 ال atrium & diastole ال 5-7 ال ventricle ال 10
 atrial contraction ال passive
 mitral stenosis ال resistance

⇒ Indication of mitral valve replacement → $\Delta p > 10 \text{ mmHg}$

Stenosis ال passively
 Strong contraction ← atrium ال

atrial fibrillation ← atrium ال

loss of atrial kick ← cardiac output ال

low CO symptoms

pulmonary v. ال atrium ال

PCWP ال

pulmonary capillary wedge pressure → normally = 8-12 mmHg

Pulmonary a. ال

rt. atrium + vent. ال

→ Pulmonary HTN

→ rt.-sided HF + tricuspid regurge

Pulmonary edema ال dyspnea ال

NYHA class. 1 -> dyspnea only when PCWP is 12 or less
 25 or more -> pulmonary edema -> fluid in alveoli & alveoli

** كيف نقيس PCWP **

يُقاس الضغط في الوريد femoral vein أو في IVC أو في side of rt. vent.
 2nd مع الـ pulmonary a. catheter في طرف
 22/8 = rt. vent. cath. ، 3-5 = rt. atrium cath. ، IVC cath. = 12-15
 invasive pressure cath. ، 12-15 = rt. vent. cath.
 most resistant area في الأوعية capillaries ، في الـ pulmonary a. cath.
 من الـ PCWP نقيس الضغط في الـ pulmonary a. cath. ، 12-15 = diastole
 electrode في catheter ، 12-15 = diastole
 الـ tip في الـ pulmonary a. cath. ، 12-15 = diastole
 الـ PCWP = 12-15 mmHg
 represent lt. atrial p. = lt. vent. p. in diastole = 8-12 mmHg

* NYHA Classification :- when PCWP = 12-25

- NYHA class I -> No limitation of physical activity
 (dyspnea) only when exertion
- NYHA class II -> mild limitation with normal physical activity
 dyspnea only when exertion
- NYHA class III -> dyspnea with mild effort -> orthopnea
- NYHA class IV -> dyspnea at rest

orthopnea -> PND

PND = paroxysmal nocturnal dyspnea

crepitation & wheeze in chest

interstitial pulmonary edema

pulm. edema in alveoli

PCWP > 25

lt. vent. HT -> cardiogenic shock -> lead to pulmonary HTN (↑p in pulmonary a.)

100 J Hpa Pulm. a. st. lateral view 2018
 → Pulm. HTN lead to rt.-sided HF ⇒ hepatomegaly, hh edema, congested neck veins

→ Clinical picture :-
 dyspnea, abdominal pain (rt. hypochondrium) due to hepatomegaly
 low CO symptoms (NL CO = 3-5 L/day)
 ↓
 dizziness, vertigo, syncope (AS + AT)
 ↓
 sudden transient LOC and ^{loss of} postural tone (فقدان التوازن)
 with spontaneous recovery without any sequelae
 → Shock, post-ictal state as hemiplegia or while fainting attack or near-syncope → LOC + blurred vision, + blurred vision, tinnitus, easy fatigability, general weakness, intermittent claudication, chest pain (angina), dysuria, hyper sweating, palpitation

5 clinical syndromes :-

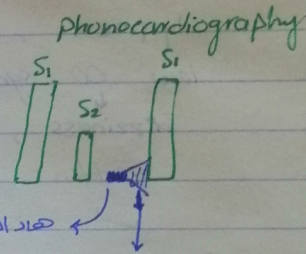
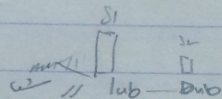
1. low CO symptoms
 2. dyspnea with its grades → NYHA
 3. arrhythmia → AF ⇒ mitral regurg, stenosis
 4. embolic manifestation ⇒ atrium fibrosis
 5. chest pain ⇒ 4.5 cm fibrosis
- Chronic AF

* Physical examination :-

- 28 - 32 beats per minute
- malar flush, irregular irregularity of pulse ⇒ by inspection
 - epigastric pulsation, tapping apex beat on palpation
 ↓
 pulm. HTN

thrill u s ues (lt. parasternal) rt. - sided HF qe, up a
 palpable murmur heave

auscultatory findings → ① accentuated 1st heart sound (س1 قوی lub)
 apex ← mitral area J1 &
 diastolic murmur



diastole J1 vau murmur J1 vau
 atrium contraction J1 vau murmur accentuation
 rumbling character

Mid-diastolic
 ② Diastolic murmur with pre-systolic accentuation
 cont. J1 vau atrium J1 vau AF J1 vau rumbling J1 vau

③ Added sounds ⇒ opening snap (س1 قوی)
 calcified pericardium (س1 قوی)
 severely calcified unipliable valve
 more severe calcification J1 vau S2 & J1 vau

* Investigations ⇒ Chest x-ray ⇒ loss of atrial waist
 atrium J1 vau mitralization
 → cardio thoracic ratio in normal = 50%
 cardiomegaly
 MR J1 vau MS J1 vau lt. vent. J1 vau
 → congestion + perihilar enlargement

chest J1 vau upper 1/3 + lat. 1/3 J1 vau bld vsls J1 vau X-ray J1 vau
 congestion ⇒ J1 vau J1 vau J1 vau

lobules in interstitial pulm. edema
 → later on → calcification of mitral valve
 → rt-sided HF → double rt. heart border = double contour
 rt. vent. is enlarged & atrial appendix is enlarged

On ECG → AF, rt. vent. hypertrophy, or nothing

→ ECG is the most standard to diagnose MS
 → calc. of lt. atrium + thickness + mobility

Indication for surgery ??

1 - severe symptoms despite Ht.

→ recurrent AF

2 - other cardiac surgery

3 - pulmonary HTN

(pressure > 50 mmHg)

PL ap is enlarged

mitral is specific

1. if mitral area < 1.5 sq cm

2. pressure gradient > 10 mmHg

just follow up
 if asymptomatic
 β-blocker, diuretic, dyspnea, etc.
 Symptoms of AF
 Stroke, embolism, anticoagulants
 AF is not warfarin
 while NOACs → class III

* surgical Ht → mitral valve replacement

severely calcified & regurgitant

unpliable

mitraloplasty is not possible

biological & artificial

or mitral valve plasty

opened

closed

mitral valve plasty

mitral valve plasty

opened

closed

(TEE) commissurotomy

pure

lt. atrial appendix is enlarged → transesophageal ECG

closed → thrombus → opened → thrombus

thrombus is not possible in opened