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FACULTY OF NURSING SCIENCES

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B.Sc. Nursing

MEDICAL SURGICAL NURSING

UNIT: V NURSING MANAGEMENT
OF
PATIENT WITH BLOOD AND CARDIO VASCULAR PROBLEMS

VALVULAR HEART DISEASE

OBJECTIVES

At the end of the this class student will be able to

- ✓Define the valvular stenosis
- ✓Enumerate the Etio-pathophysiology,
- ✓Discuss the clinical manifestation of valvular stenosis
- ✓Explain in detail about medical, surgical, Nursing management of valvular stenosis

INTRODUCTION

Structural disorders of the heart preset many challenges for patient, family and health care team. according to the valve or valves affected and the type of functional alteration Includes

- Stenosis, regurgitation

The session will discuss the heart valves disorders like stenosis of the heart valves like Mitral stenosis, Aortic stenosis, tricuspid stenosis and pulmonic stenosis.

MITRAL VALVE STENOSIS

MEANING

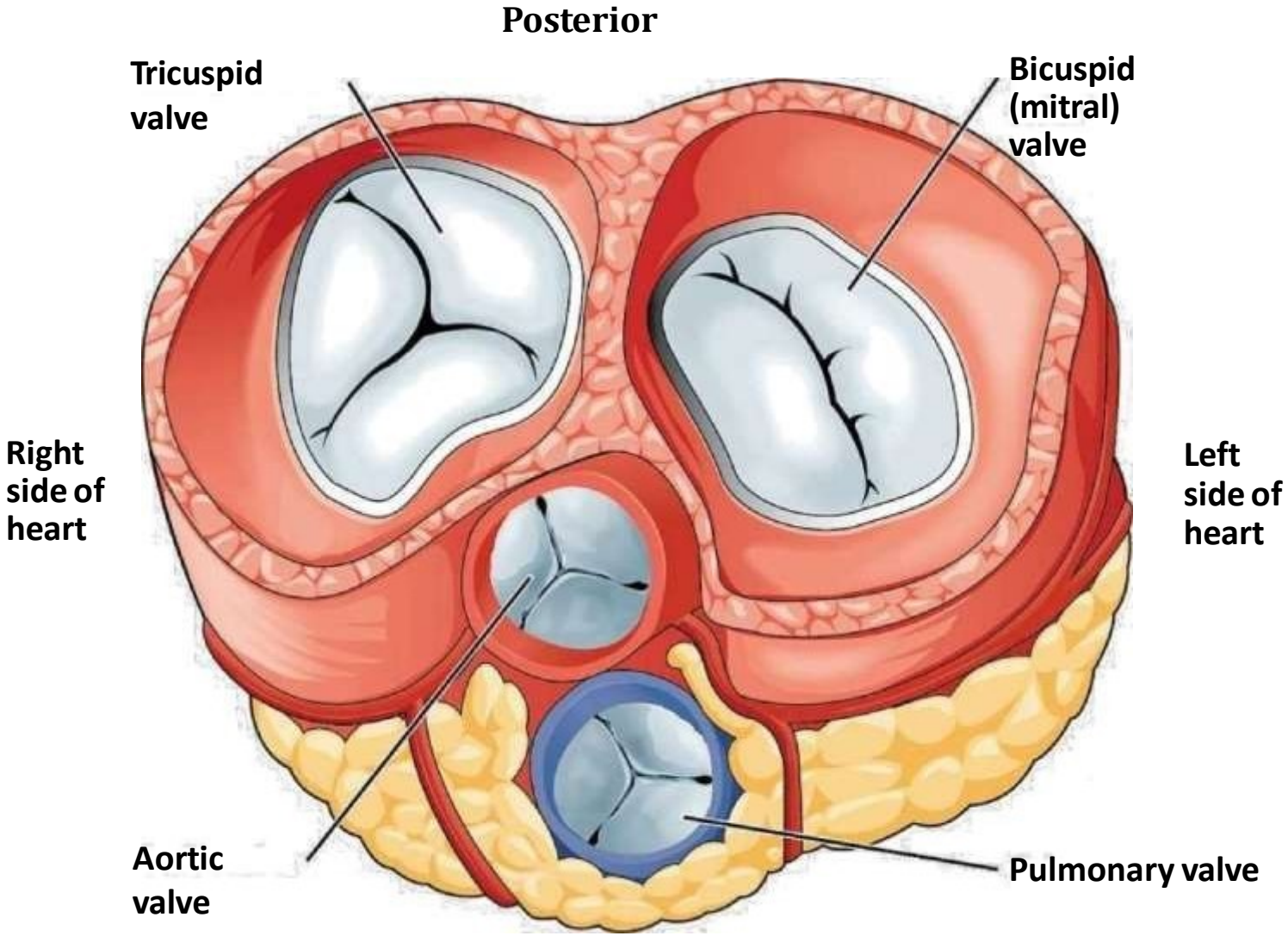
Stenosis is the term for a valve that doesn't open properly. The flaps of a valve thicken, stiffen, or fuse together. As a result, the valve can't completely open. Thus, the heart has to work harder to pump blood through the valve, and the body may suffer from a reduced supply of oxygen

MITRAL STENOSIS

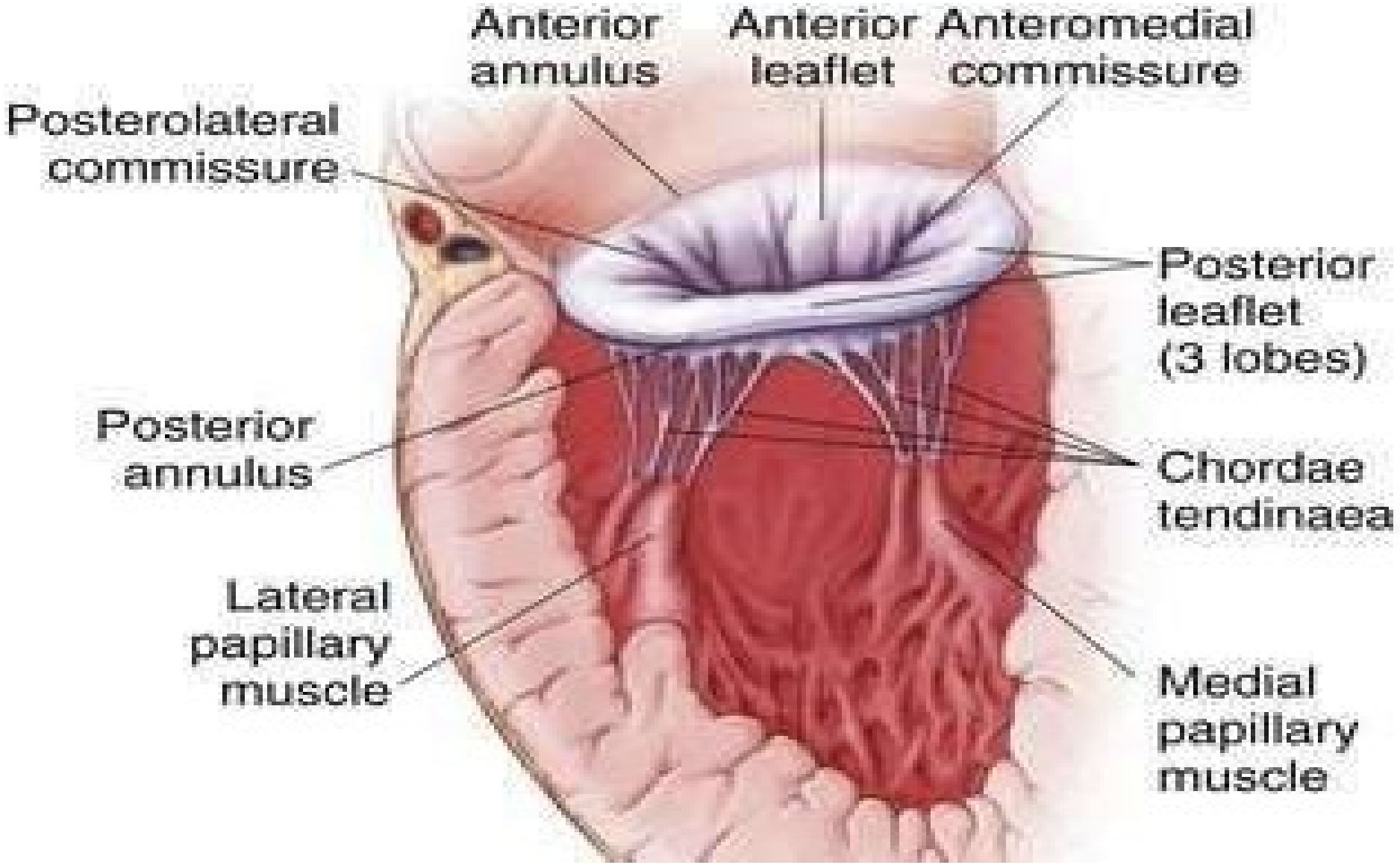
DEFINITION

Mitral stenosis: Mitral stenosis is a narrowing of the mitral valve opening. Mitral stenosis restricts blood flow from the left atrium (lower right chamber) to the left ventricle (lower left chamber).

MITRAL VALVE : ANATOMY



MITRAL VALVE : ANATOMY



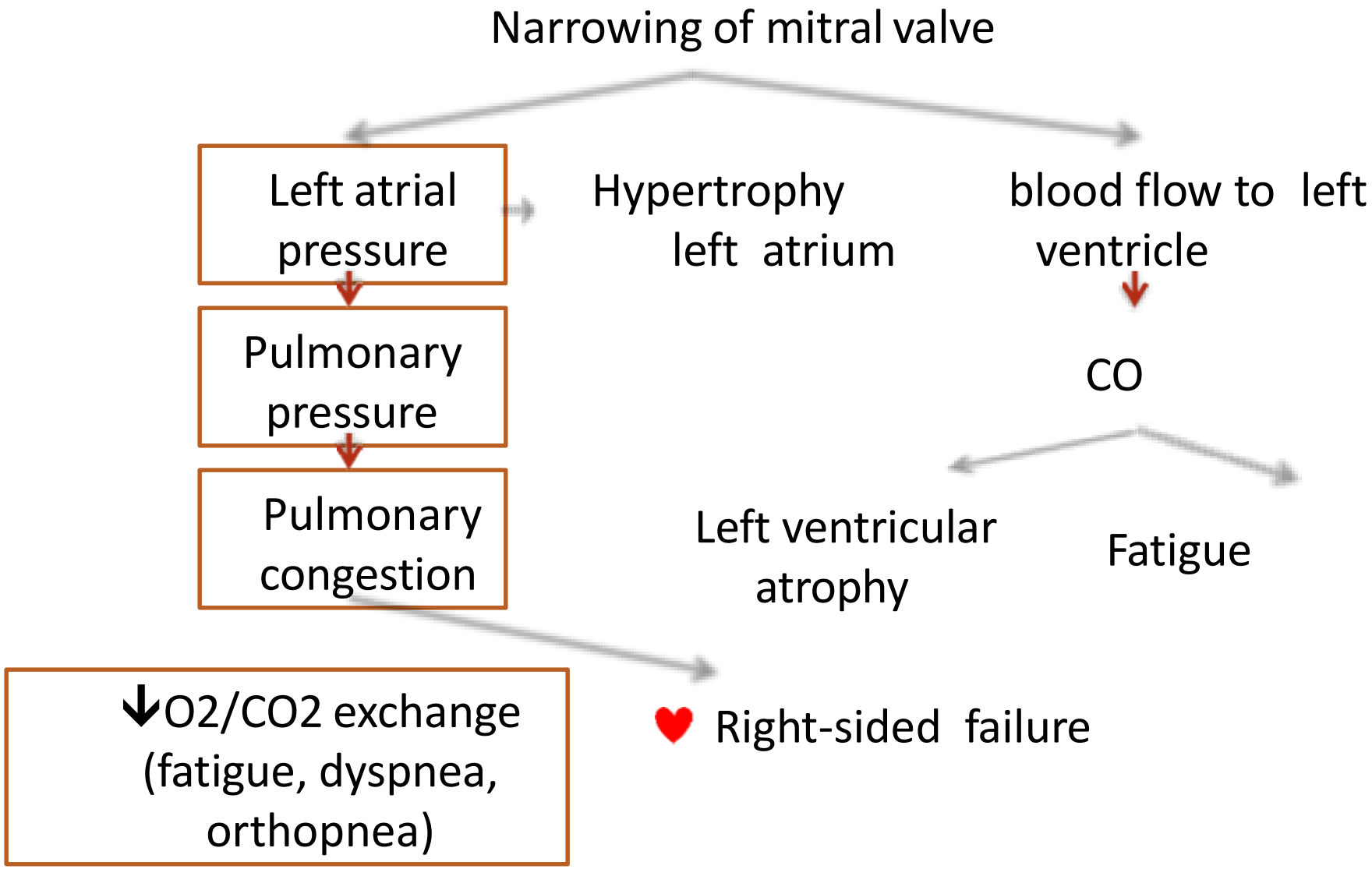
MITRAL STENOSIS

- In normal adults, the area of the mitral valve orifice is 4-6 cm^2.
- In mitral stenosis, the area of valve orifice decreases.
- Minimal MS - >2.5 cm^2
- Mild MS - 1.6- 2.5 cm^2
- Moderate MS – 1- 1.5 cm^2
- Severe MS(tight/critical) - <1 cm^2

ETIOLOGY

- Rheumatic fever (most common cause-40%).
- Congenital mitral valve stenosis，
- Cor triatriatum，
- Mitral annular calcification with extension onto the leaflets，
- Systemic lupus erythematosus，
- Rheumatoid arthritis，
- Left atrial myxoma， and
- Infective endocarditis with large vegetations

PATHOPHYSIOLOGY



CLINICAL MANIFESTATIONS

1. Dyspnoea, orthopnea, paroxysmal nocturnal dyspnoea
2. Recurrent pulmonary infections, i.e., bronchitis, bronchopneumonia and lobar pneumonia especially during the winter months.
3. Hemoptysis results from rupture of pulmonary-bronchial venous connections.
4. Cough. Fatigue

CLINICAL FEATURES

Symptoms

- Breathlessness, cough (pulmonary congestion)
- Chest pain (pulmonary hypertension)
- Hemoptysis (pulmonary congestion or hypertension)
- Fatigue (low cardiac output)

CLINICAL FEATURES

SIGNS

- Atrial fibrillation Mitral facies (abnormal flushing of the cheeks that occurs from cutaneous vasodilation in the setting of severe mitral valve stenosis)
- Auscultation - Loud first heart sound, opening snap-Mid-diastolic murmur **(apex)**
- Crepitations, pulmonary edema, effusions

(raised pulmonary capillary pressure)

- RV heave, loud P_2 (pulmonary hypertension)

ASSESSMENT AND DIAGNOSTIC FINDINGS

- History collection
- Physical examination

On observation:

- Mitral facies:
- pinkish purple patches on cheeks, tip of nose and lips bilaterally.
- If RV failure develops, jugular veins will be distended

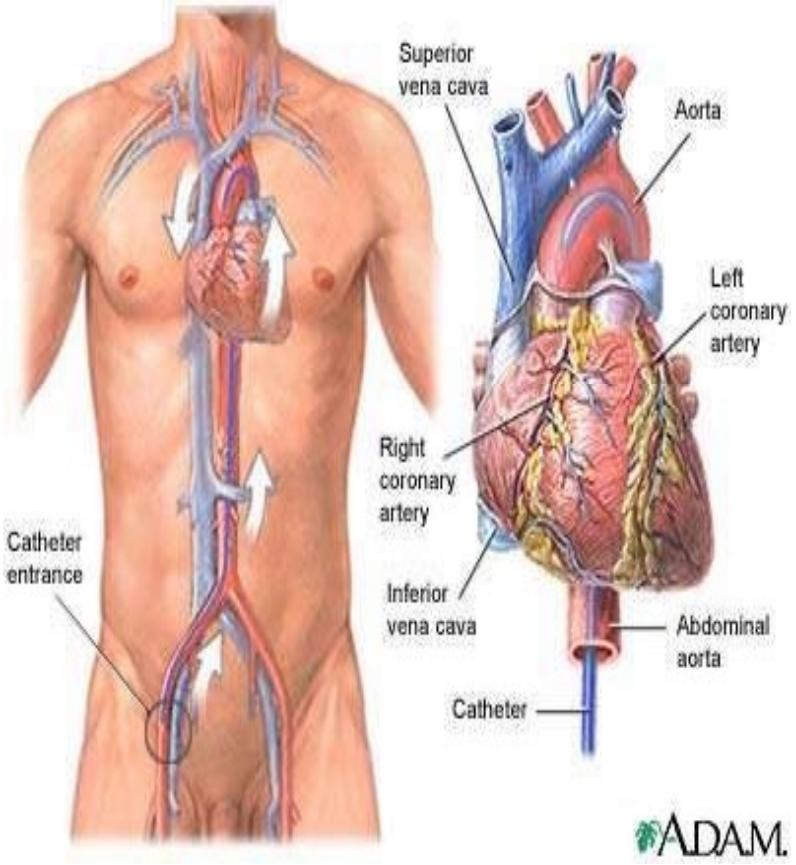
On palpation:

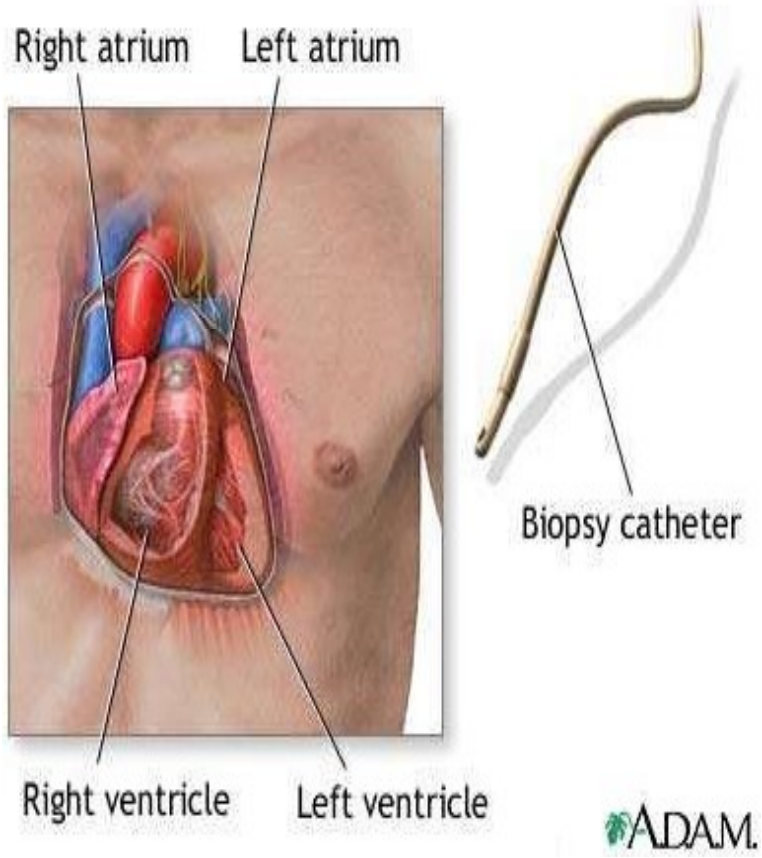
- Pulse - irregularly irregular if AF is present.

INVESTIGATIONS

- ECG: - right ventricular hypertrophy tall R waves
- Chest x-ray: - enlarged LA & appendage
- Signs of pulmonary venous congestion
- ECHO: - thickened immobile cusps
- reduced valve area, enlarged LA, reduced rate of diastolic filling of LV
- Doppler: - pressure gradient across mitral valve
- Cardiac catheterization: - coronary artery disease
  - pulmonary artery pressure
  - mitral stenosis and regurgitation

CARDIAC CATHETERIZATION





- Chest X-ray: MITRALISATION of heart

  straightening of the left border of heart & is due

  to(from above downwards)

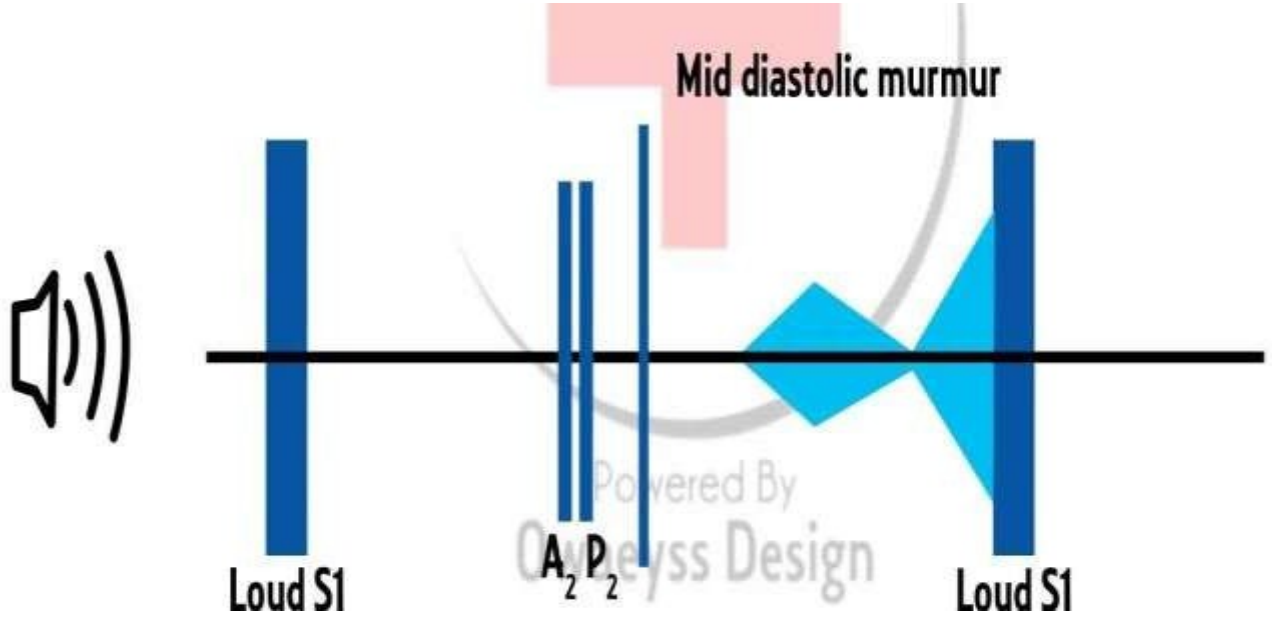
- Ch

  esc

  enl

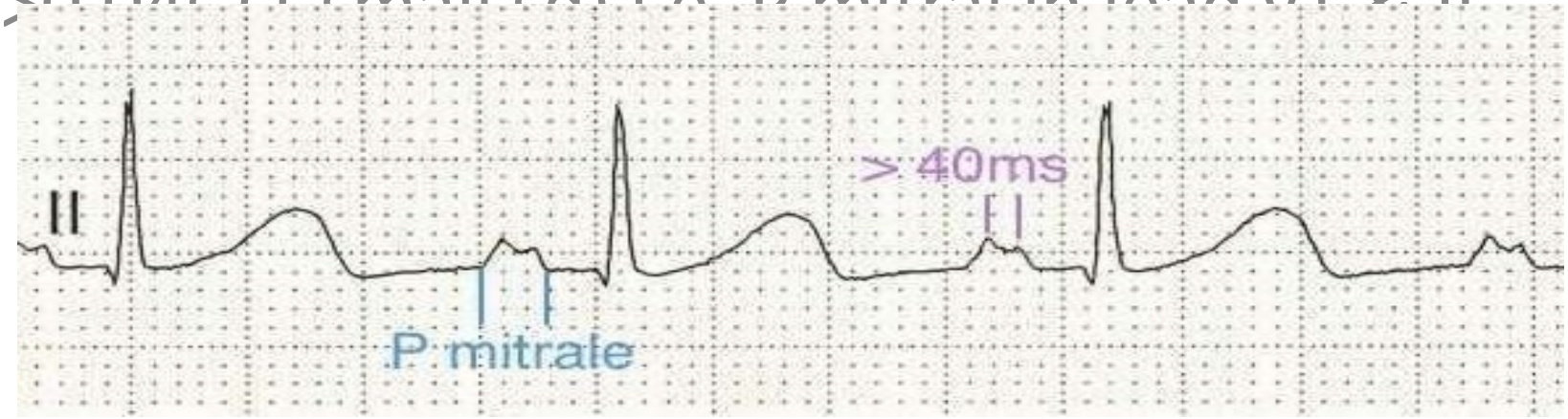
MURMUR OF MITRAL STENOSIS

- Low pitched, rumbling, diastolic murmur, following opening snap heard best at the apex with the patient in the left lateral recumbent position.
- Best heard with the bell of stethoscope.



Electrocardiogram: ECG IN MITRAL STENOSIS

LA enlargement – Wide i.e. >0.12s (3 small sq) and notched P wave with the interpeak duration of >0.04s (1 small sq) i.e. P mitral in lead v1 & II



COMPLICATIONS OF MITRAL STENOSIS

- Left atrial enlargement, acute left atrial failure and acute pulmonary edema
- Pulmonary hypertension
- Right ventricular failure
- A fib, A flutter, VPC or APCs
- Embolic manifestations
- Infective endocarditis
- Recurrent broncho-pulmonary infections
- Compression of RLN (Ortner's syndrome)
- Dysphagia

MEDICAL MANAGEMENT

- Anticoagulant:-To reduce the risk of systemic embolism
- Digoxin, beta blockers, or rate limiting calcium antagonists- To control ventricular rate in atrial fibrillation
- Diuretics- To control pulmonary congestion and to reduce fluid buildup through increased urine output

MEDICAL MANAGEMENT

- Antiarrhythmics to treat abnormal heart rhythms

- Beta-blockers to slow your heart rate
- Antibiotic prophylaxis against infective endocarditis and rheumatic fever
- Anticoagulation in presence of AF or LA clot
- Treatment of Atrial Fibrillation and Treatment of Congestive heart failure
- Management of complications

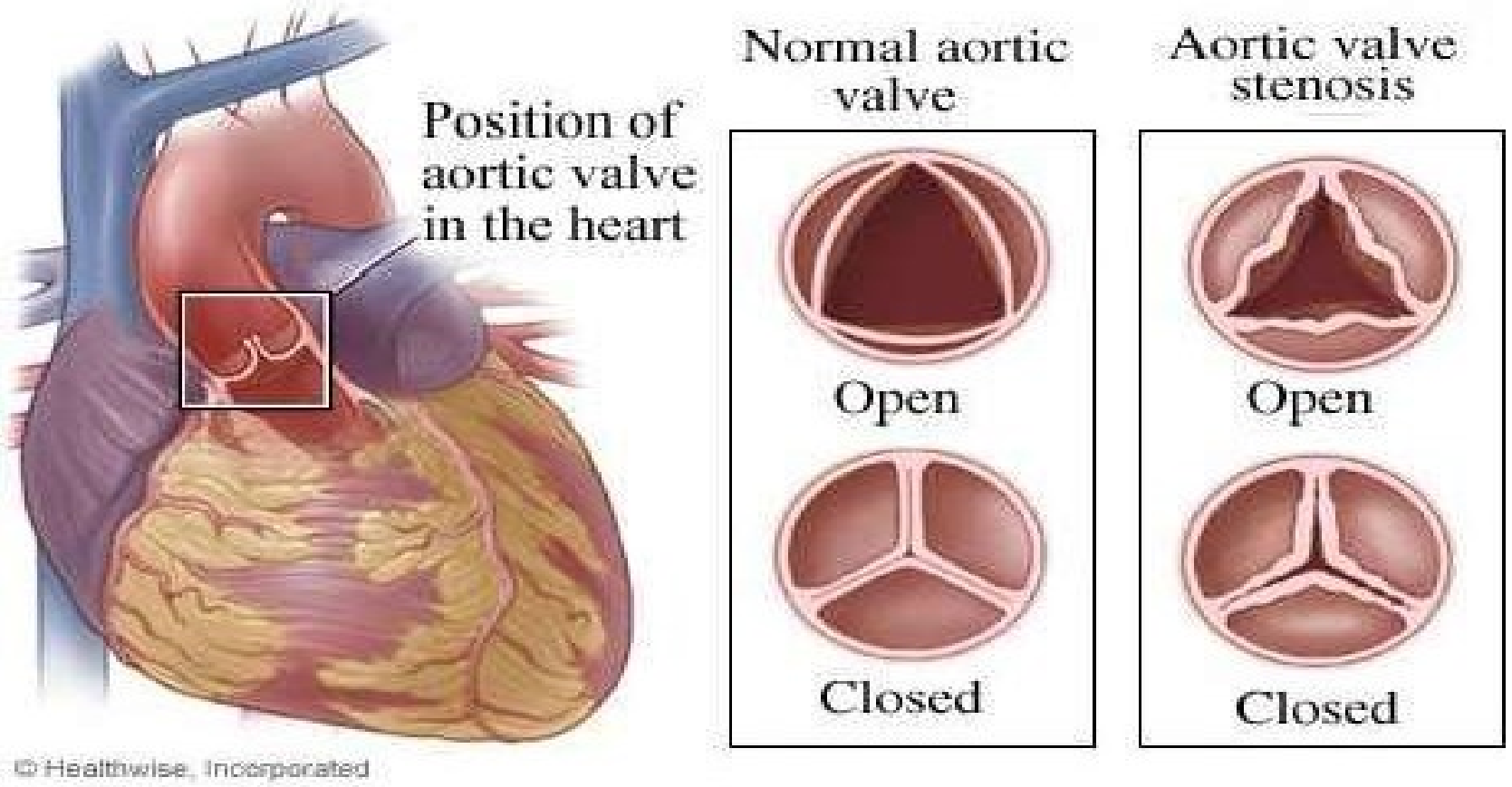
SURGICAL MANAGEMENT

1. Valvotomy or Commissurotomy (closed/open)
2. PMBV (Percutaneous Mitral Ballon Valvotomy)
3. Mitral valve replacement or prosthesis (starr-edwards ball valve or bjork shiley disc valve)

NURSING MANAGEMENT

- Obtain arterial blood gases
- Correlate pulse oxymeter and end – tidal co2 with arterial blood gas results
- Monitor ECG ,ST Segments , and arterial blood pressure continuously .
- Assess for neck distention , pulmonary edema , increased preload parameters .
- Prepare patient for intra aortic balloon pump assist if necessary .
- Monitor PT , PTT, CBC per protocol .

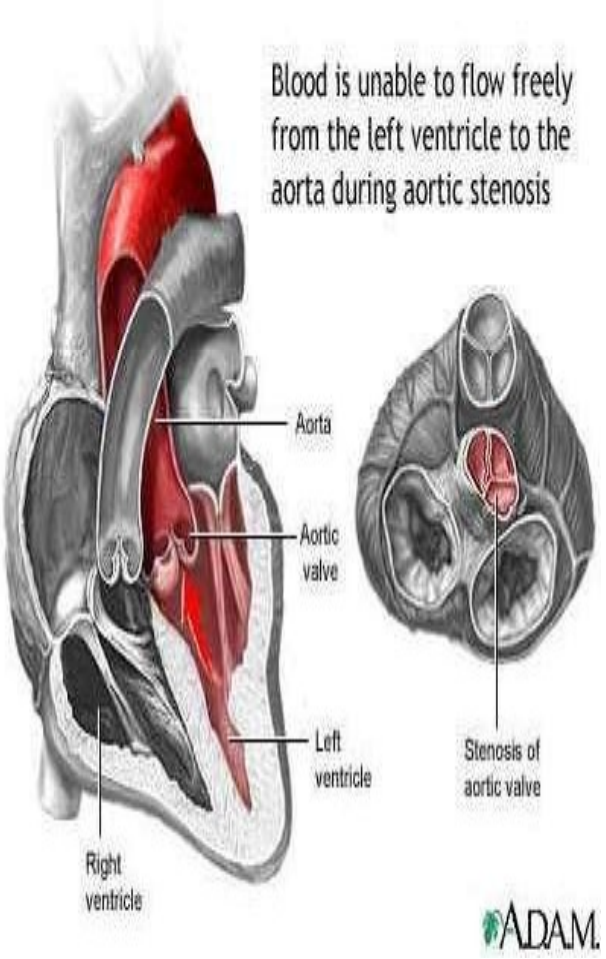
AORTIC STENOSIS



DEFINITION

Aortic valve stenosis is the narrowing of the aortic valve. The aortic valve allows blood to flow from the heart's lower left chamber (ventricle) into the aorta and to the body.

Stenosis keeps the valve from opening appropriately, forcing the heart to work harder to pump blood through the valve. This causes pressure to build up in the left ventricle and thickens the heart muscle.



ETIOLOGY

- Congenital leaflet malformations
- Abnormal number of leaflets (i.e., One or two rather than three)
- Rheumatic endocarditis
- Rheumatic fever
- Cusp calcification of unknown cause

PATHOPYHSIOLOGY

Etiological factors causes stiffening and retract results in regurgitation

Obstruction of flow from left ventricle to the aorta during systole

Left ventricular hypertrophy and increased oxygen consumption due to increased myocardial mass

Progresses and compensattory mechanism fails , reduced CO leads to pulmonary hypertension

PATHOPHYSIOLOGY

Narrowed aortic orifice

↓

Increased back flow of blood to left ventricle during systole

↓

Increased LV pressure

↓

LVH

↓

Increased LA pressure

↓

LAH

Syncope

↓

Decreased blood flow to aorta

↓

Decrease CO

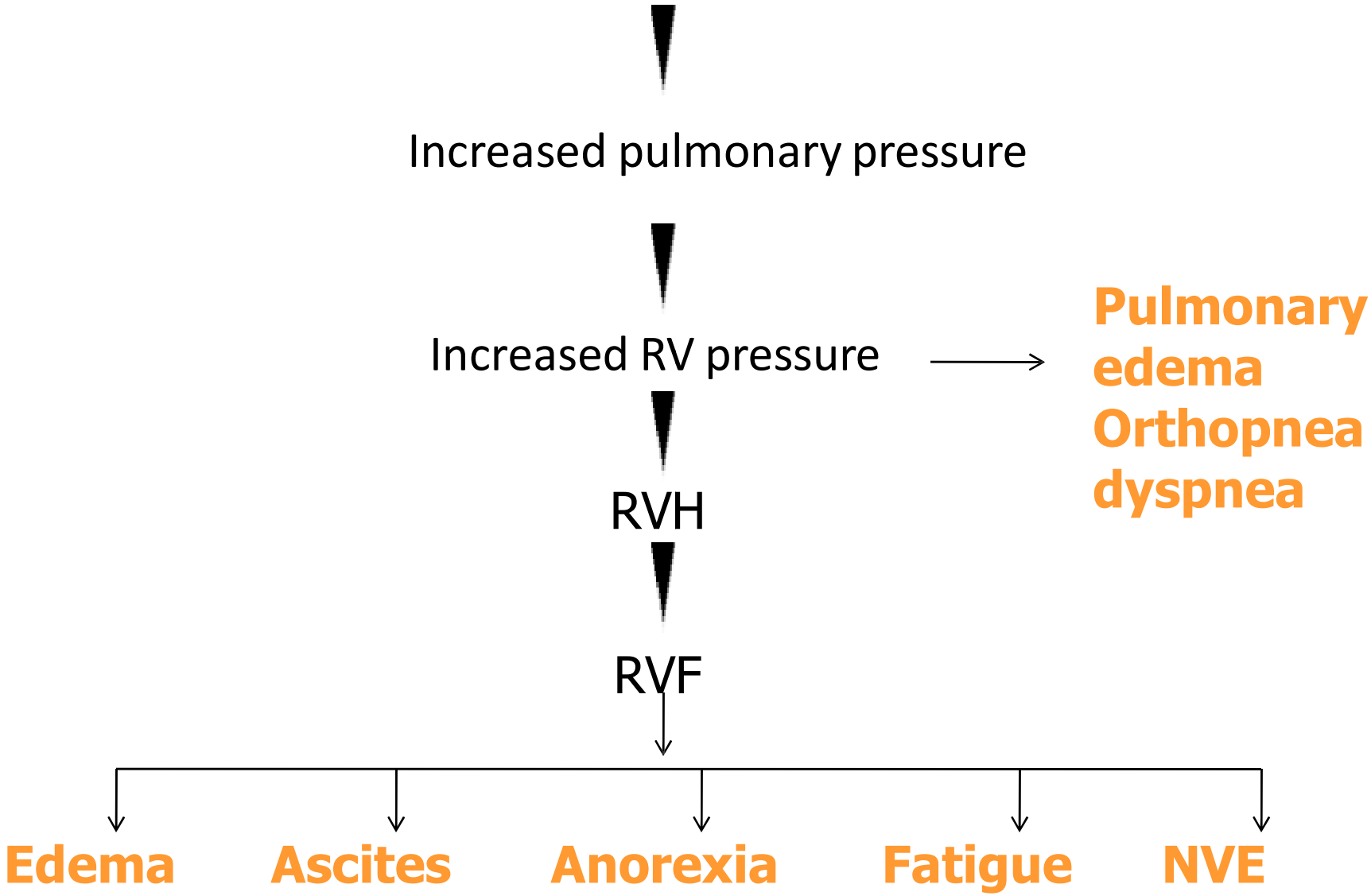
↓

Decreased coronary blood flow

↓

Angina

PATHOPHYSIOLOGY cont....



PATHOPHYSIOLOGY

- Progressive narrowing of the valve orifice,
- LV overcomes the obstruction to circulation by contracting more slowly but with greater energy than normal, forcibly squeezing the blood through the very small orifice.
- Obstruction to LV outflow increases pressure on the

CLINICAL MANIFESTATIONS

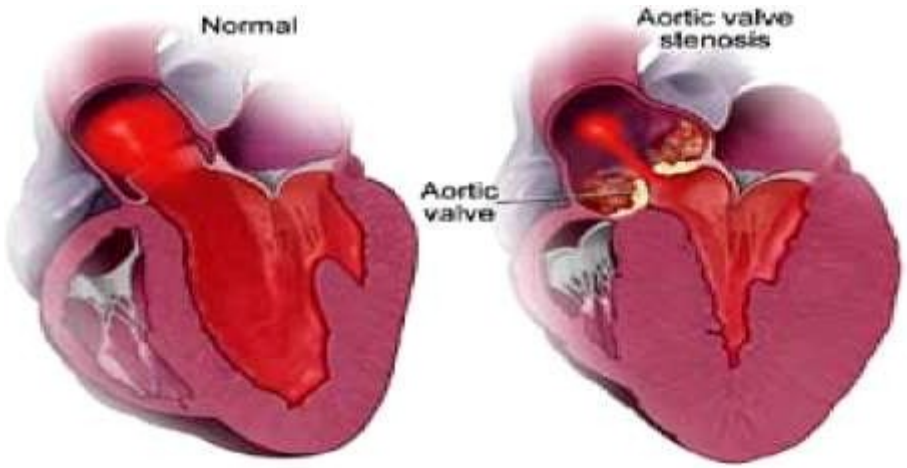
- Many asymptomatic
- Exertional dyspnea
  - Caused by LVF
  - Other signs are dizziness and syncope because of reduced blood flow to the brain.
- Angina pectoris -A frequent symptom results from the increased oxygen demands of the hypertrophied left ventricle, the decreased time in diastole for myocardial perfusion, and the decreased blood flow into the coronary arteries.

CLINICAL MANIFESTATIONS

- BP - can be low but usually normal
- Low pulse pressure (30 mm hg or less)
  - Because of diminished blood flow

ASSESSMENT

- **Systolic Murmur**
  - Loud, rough systolic murmur
  - Low-pitched, rough, rasping, and vibrating
  - Heard over the aortic area (R upper sternal border)
  - May radiate into the carotid arteries and to the apex of left ventricle



ASSESSMENT

- Thrill/ vibration
  - Palpated over base of heart/ 2nd RICS
  - Caused by turbulent blood flow across the narrowed valve orifice.
- Gallavardin phenomenon
  - Murmur also reflected to mitral area which may give a false impression of a mitral regurgitation

DIAGNOSTIC FINDINGS

- 12-leadECG and echocardiogram
  - Evidence of LV hypertrophy may be seen
- Echocardiography (2D echo)
  - used to diagnose and monitor the progression of aortic stenosis.
- left-sided heart catheterization
  - measure the severity of the aortic stenosis and evaluate the coronary arteries.
  - Pressure tracings are taken from LV and base of aorta.
  - systolic pressure in LV is considerably higher than that in the aorta during systole.

DIAGNOSTIC FINDINGS

- **Left-sided heart catheterization**
  - Measure the severity of the aortic stenosis and evaluate the coronary arteries.
  - Pressure tracings are taken from lv and base of aorta.
  - Systolic pressure in lv is considerably higher than that in the aorta during systole.

MANAGEMENT

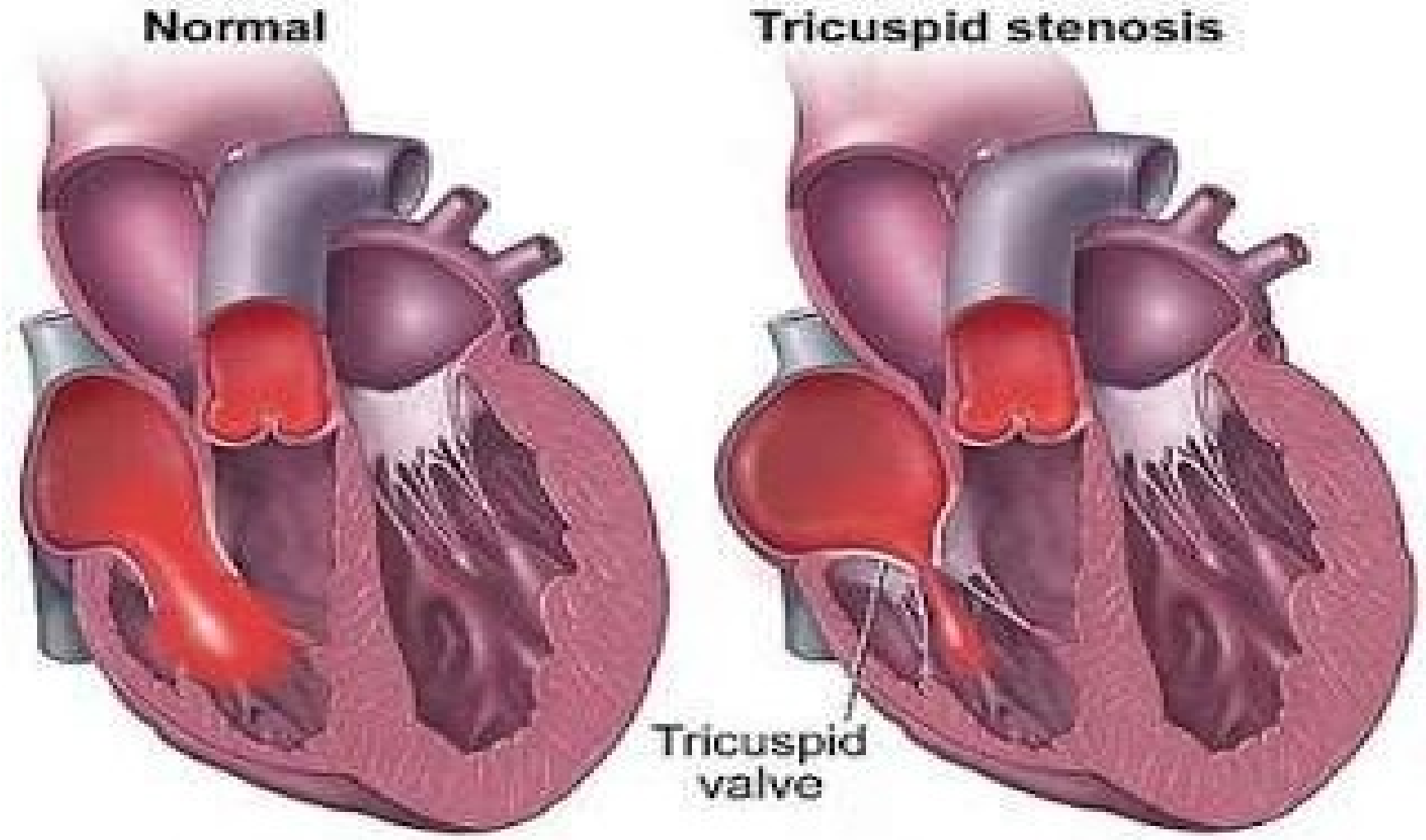
- **Antibiotic Prophylaxis**
  - Before the patient undergoes invasive or dental procedures
  - to prevent endocarditis
- Treat heart failure and dysrhythmias

SURGICAL MANAGEMENT

- **Aortic valve replacement**
  - treatment of choice
- **One- or two-balloon percutaneous aortic valvuloplasty**
  - For symptomatic and not surgical candidates

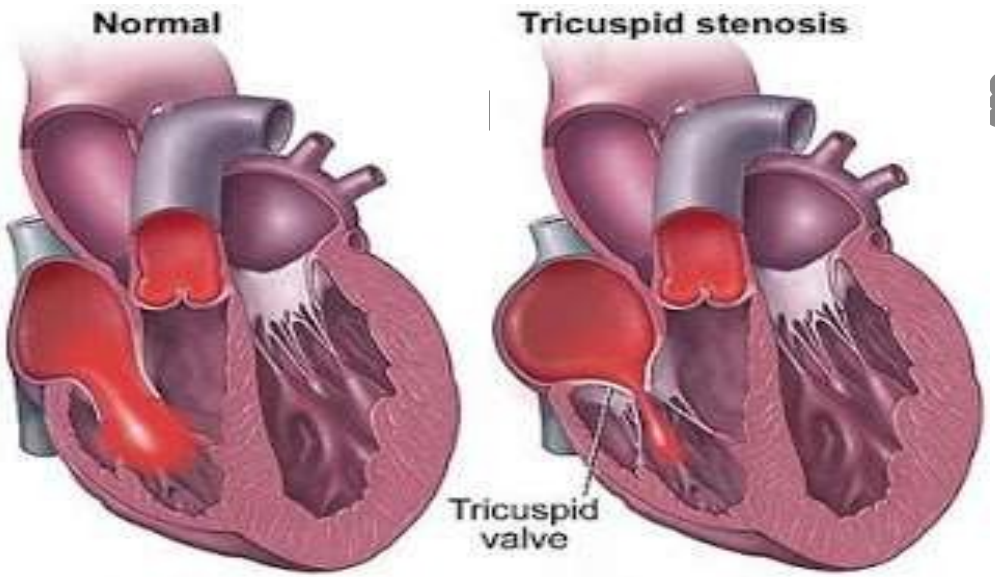
Note: surgery is recommended for any patient with left ventricular hypertrophy, regardless of the presence or absence of symptoms.

TRICUSPID STENOSIS



DEFINITION

Tricuspid stenosis is a narrowing of the tricuspid valve opening. Tricuspid stenosis confines blood flow between the upper and lower part of the right side of the heart, or from the right atrium (hig ght ventricle (higher left



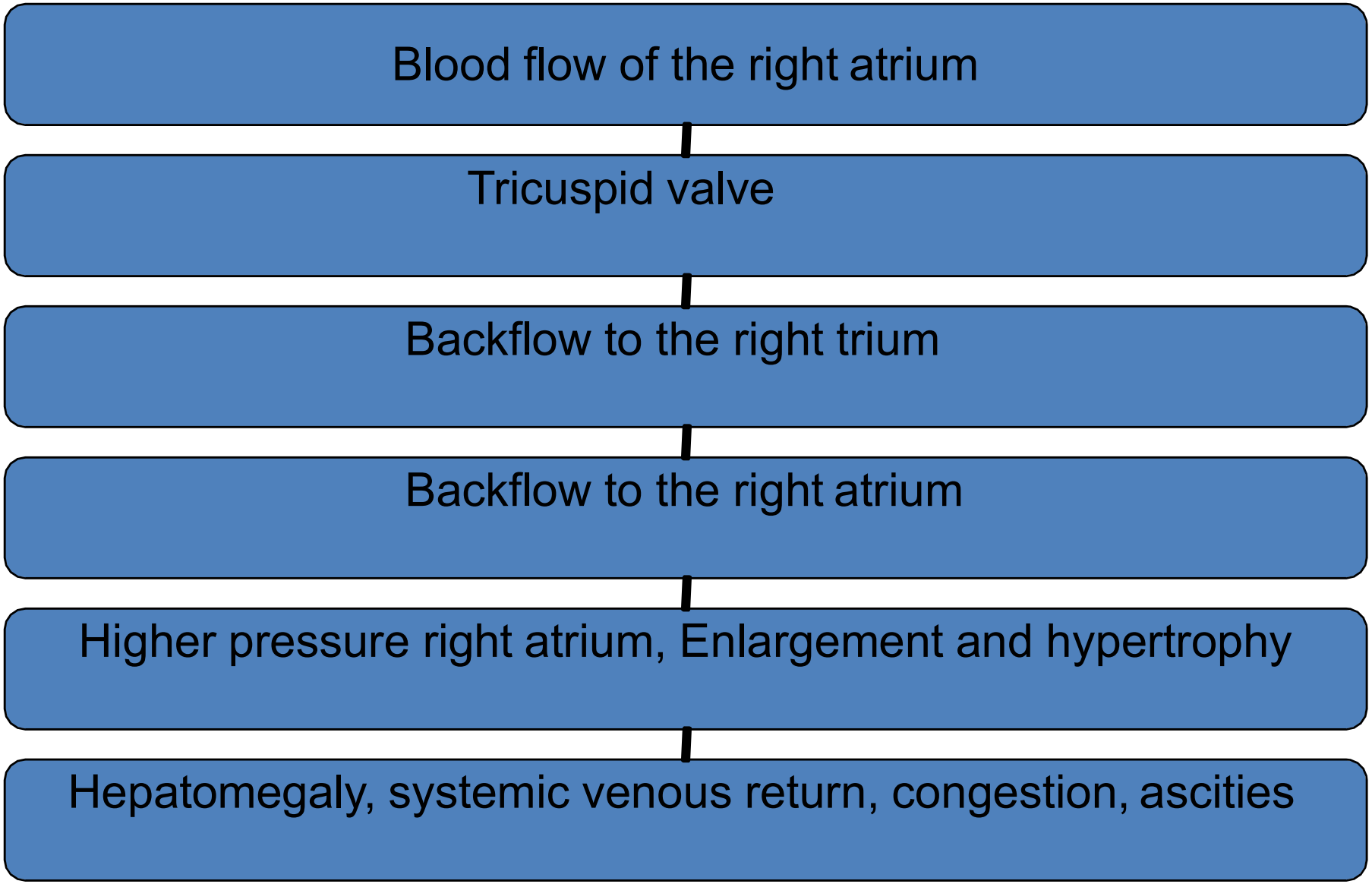
ETIOLOGOY

- Uncommon valve lesion
- More common in female than in males
- Usually due to rheumatic heart disease
- Frequently associated with mitral and/or aortic valve disea
- Tricuspid Stenosis is also seen in carcinoid syndrome
- Commonly assoc with diseases of mitral valve

RISK FACTORS

- Rheumatic fever
- Infection (endocarditis)
- Congenital malformations
- Tumor (rare)
- Diet medication called “Fen-Phen (phentermine and fenfluramine) or dexfenfluramine

PATHOPHYSIOLOGY



CLINICAL MANIFESTATION

symptoms

- Symptoms of right-sided heart failur
- Abdominal pain (hepatomegaly)
- Swelling (ascites)
- Peripheral oedema (relatively severe when compared with the degree of dyspnea)
- Neck vein engorgement

CLINICAL MANIFESTATIONS

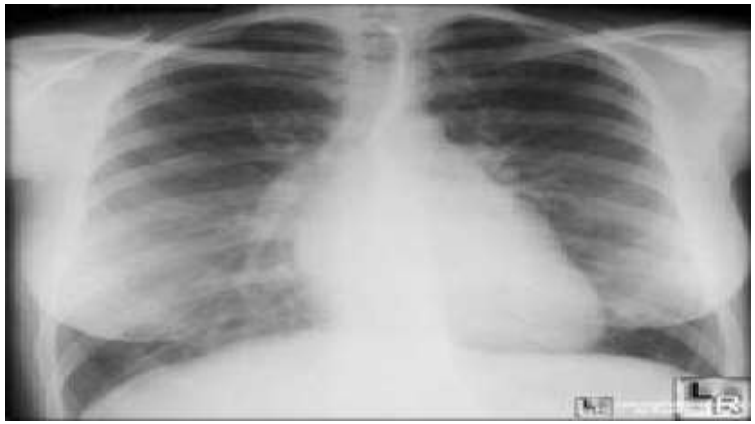
Signs

- If the patient is in sinus rhythm – Prominent jugular venous ‘a’ wave – Pre systolic pulsation may felt over liver
- Rumbling mid-diastolic murmur – Best heard at lower left sternal edge – Louder in inspiration – (may missed –murmur of MS)
- Tricuspid opening snap may heard
- Hepatomegaly, abdominal ascites, dependent oedema

DIAGNOSTIC FINDINGS

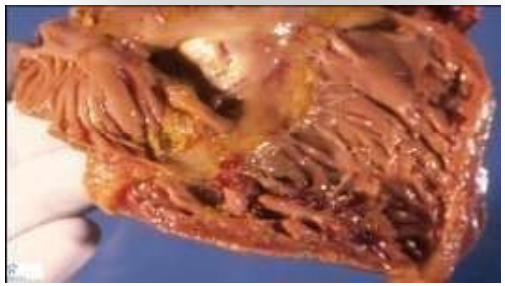
- Chest X-ray – Prominent R/ atrial bulge
- ECG – Enlarged r/ atrium
- Peaked, tall P waves (>3mm) in lead II
- Echocardiogram – May show thickened,

lve –

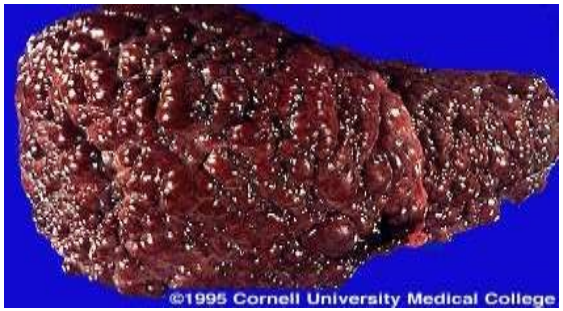


COMPLICATIONS

CHRONIC HEART FAILURE



ENDOCARDITIS



LIVER CIRRHOSIS

COMPLICATIONS

HEPATOMEGALY

ASCITES

MANAGEMENT

- Mild- no symptoms no require treatment.
- Medication as prescribed to relief the symptoms only .

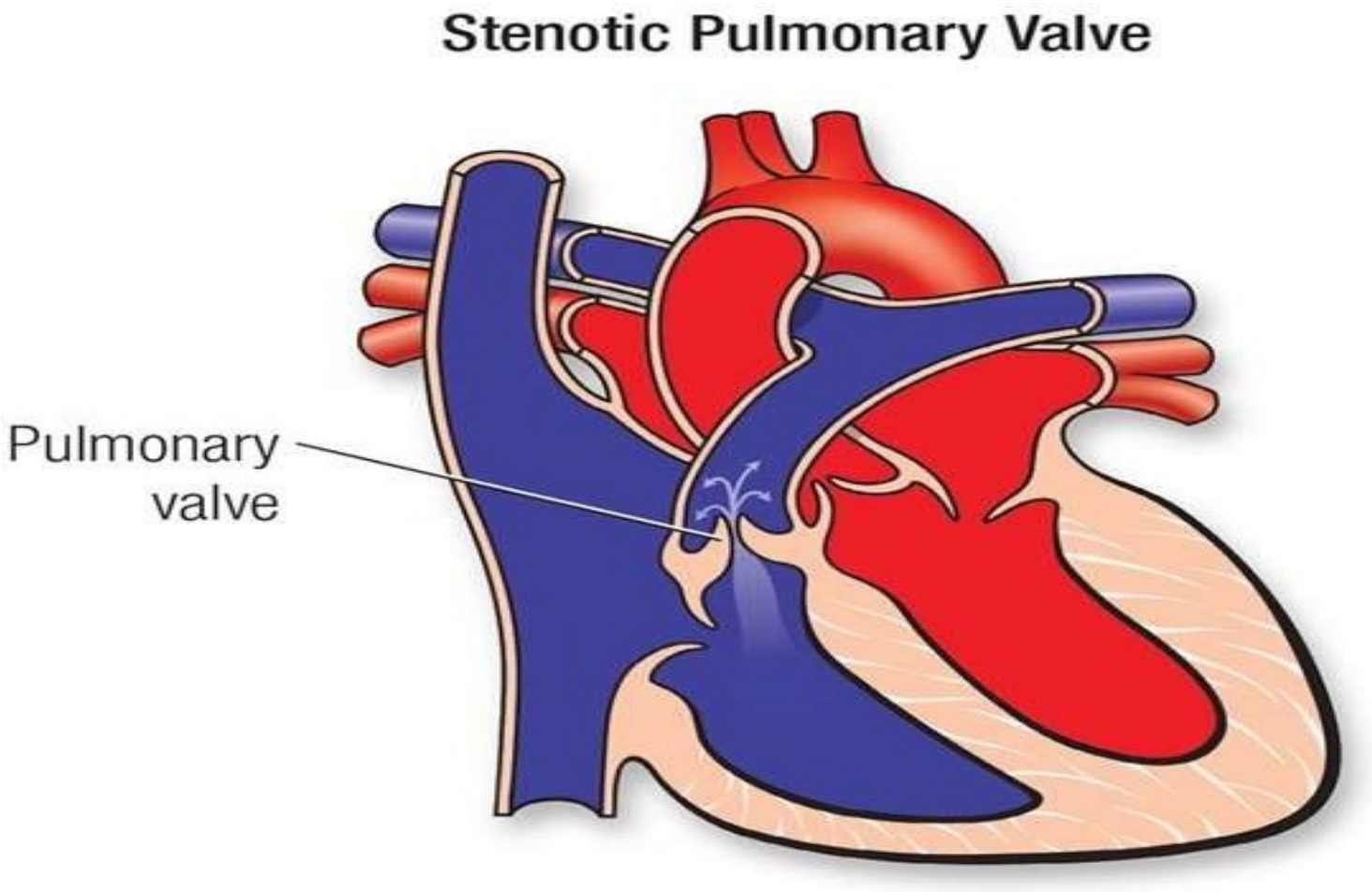
MANAGEMENT

- Types of medication prescribed depends on the condition of patient.
  - Antibiotics
  - Diuretics
  - Anticoagulants
  - Antiplatelets
  - Vasodilators
  - Cardiac glycosides

SURGICAL MANAGEMENT

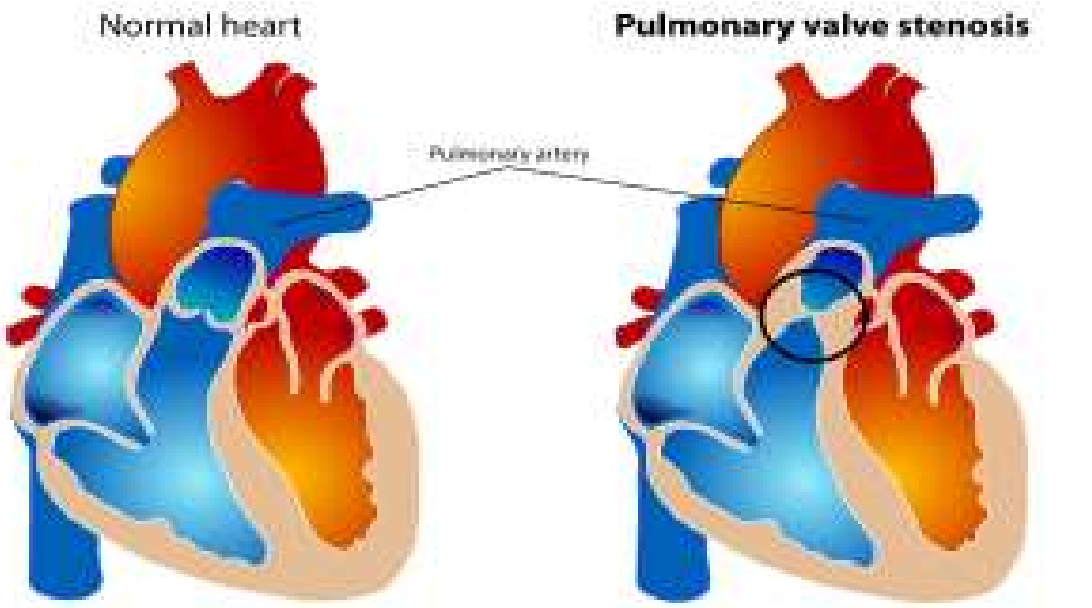
- Balloon Valvuloplasty
- Valve replacement
- Valvotomy

PULMONIC STENOSIS



DEFINITION

Pulmonary stenosis is a condition caused by a narrowing of the pulmonary valve opening. Pulmonary stenosis restricts blood flow from the lower right chamber (right ventricle) to the pulmonary arteries,



CLINICAL MANIFESTATIONS

SYMPTOMS

- Fatigue, dyspnea on exertion, cyanosis
- Poor weight gain or failure to thrive in infants
- Hepatomegaly,
- ascites, edema
- Chest pain
- Loss of consciousness (fainting)

CLINICAL MANIFESTATIONS

SIGNS

- Ejection systolic murmur (loudest at the left upper sternum & radiating towards the left shoulder)
- Murmur often preceded by an ejection sound (click)
- May be wide splitting of second heart sound (delay in ventricular ejection
- May be a thrill (best felt when patient leans forward and breathes out)

RISK FACTORS

- Carcinoid syndrome
- Rheumatic fever
- Noonan syndrome
- Pulmonary valve replacement

DIAGNOSTIC FINDINGS

ECG: - right ventricular hypertrophy

Chest x-ray: - post-stenotic dilatation in the pulmonary artery

Doppler echocardiography is the definitive investigation

COMPLICATION

- Infection
- Heart-pumping problems
- Heart failure
- Irregular heartbeat (arrhythmia

MANAGEMENT

- Mild to modearate isolated pulmonary stenosis is relatively common and does not usually progress or require treatment

Severe pulmonary stenosis

SURGICAL MANAGEMENT

- ❖ percutaneous pulmonary
- ❖ balloon valvuloplasty

or

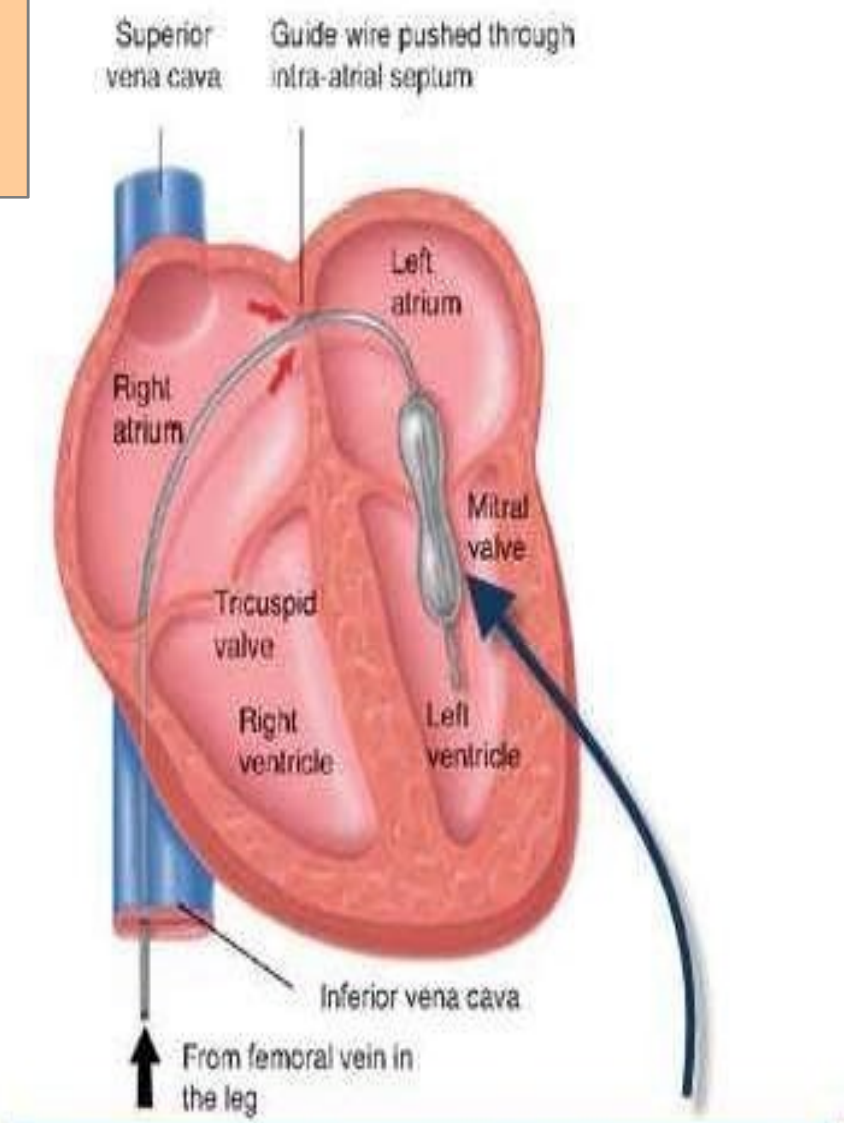
- ❖ surgical valvotomy

VALVE REPAIR AND REPLACEMENT PROCEDURES

Percutaneous trans luminal balloon valvoloplasty:

Splits open the fused commissures

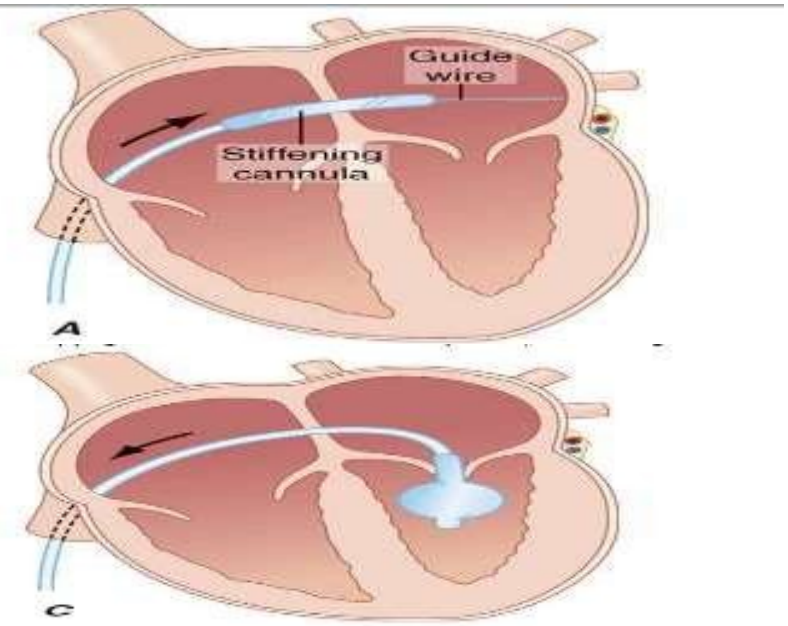
Threading a balloon tipped catheter from the femoral artery or vein to the stenotic valve so that the balloon may be inflated in an attempt to separate the valve leaflets



Balloon valvuloplasty: Balloon is inflated to widen the narrowed mitral valve

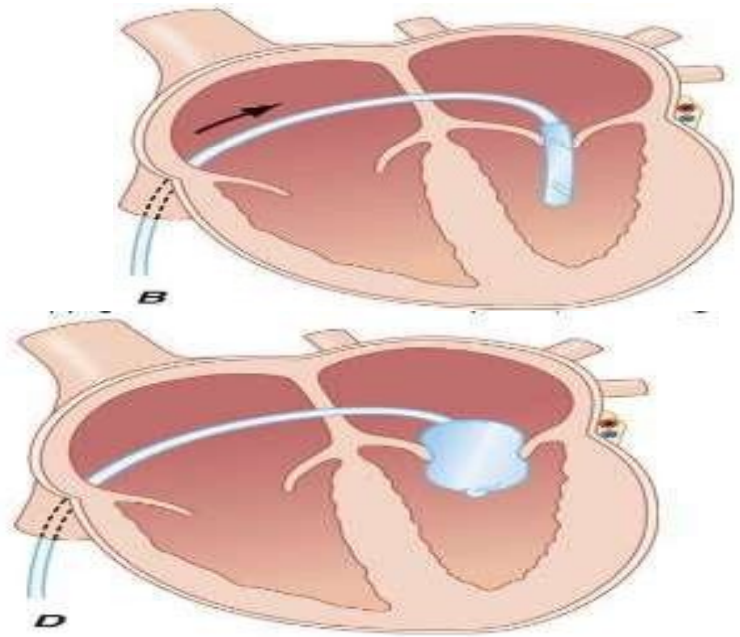
Inoue Balloon Technique for Percutaneo Mitral Balloon Valvotomy.

*A.*After transseptal puncture, the deflated balloon catheter is advanced across the interatrial septum, then across the mitral valve and into the left ventricle.



Inoue Balloon Technique for Percutaneo Mitral Balloon Valvotomy.

. *B.-D.* The balloon is inflated stepwise within the mitral orifice.



SURGICAL MANAGEMENT

1. Valvuloplasty - is repair of cardiac valve

- pt. does not require continuous anti-coagulant medication, usually require cardiopulmonary bypass machine.

2. Annuloplasty- is repair of valve annulus (junction of the valve leaflet and the muscular heart wall) narrows the diameter of the valve's orifice, useful for valvular regurgitation

SURGICAL MANAGEMENT Cont..

3. Chordoplasty- is repair of chordae tendineae

- done for mitral valve regurgitation – caused by stretched or shortened chordae tendineae

4. Valvulotomy (commissurotomy)

it is an old surgical method for pure mitral stenosis

ANNULOPLASTY

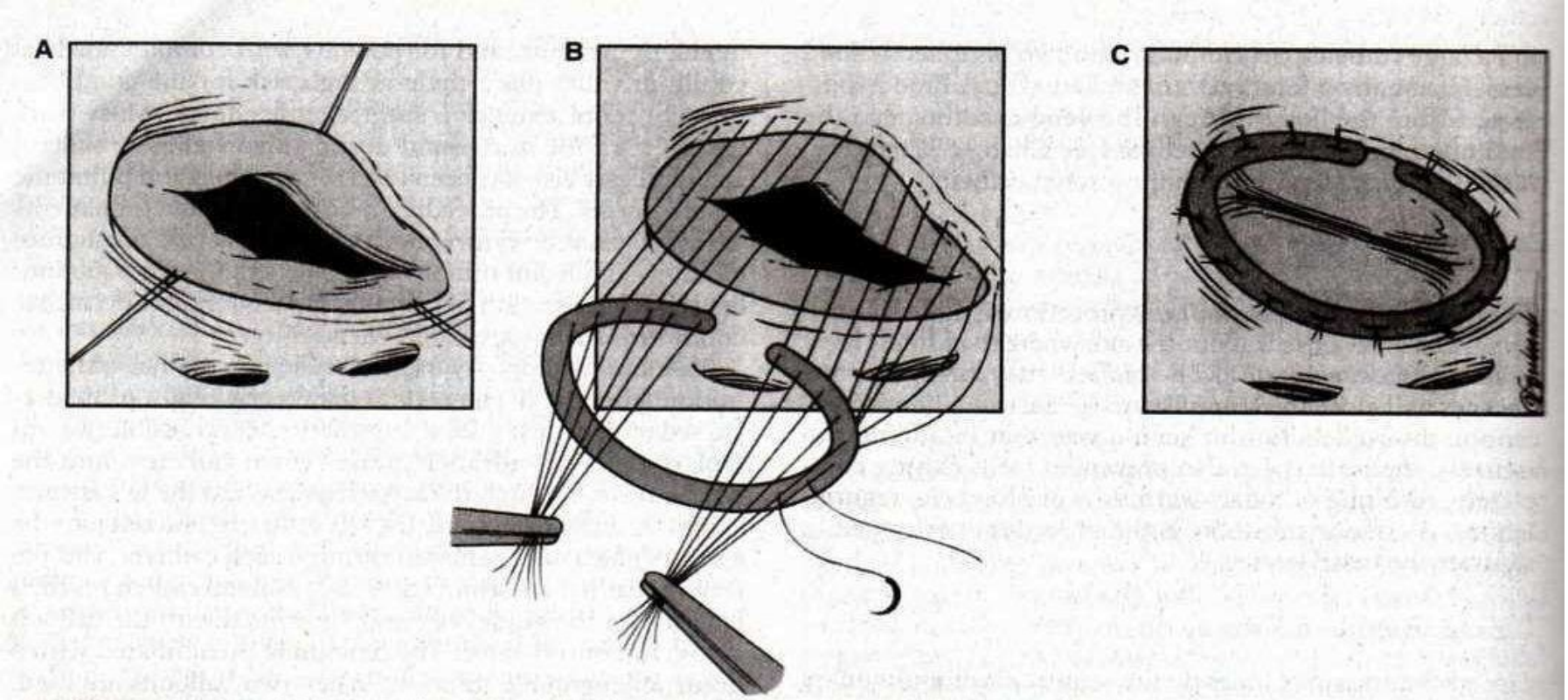


FIGURE 29-4. Annuloplasty ring insertion. (A) Mitral valve regurgitation; leaflets do not close. (B) Insertion of an annuloplasty ring. (C) Completed valvuloplasty; leaflets close.

ANNULOPLASTY (CONT.)

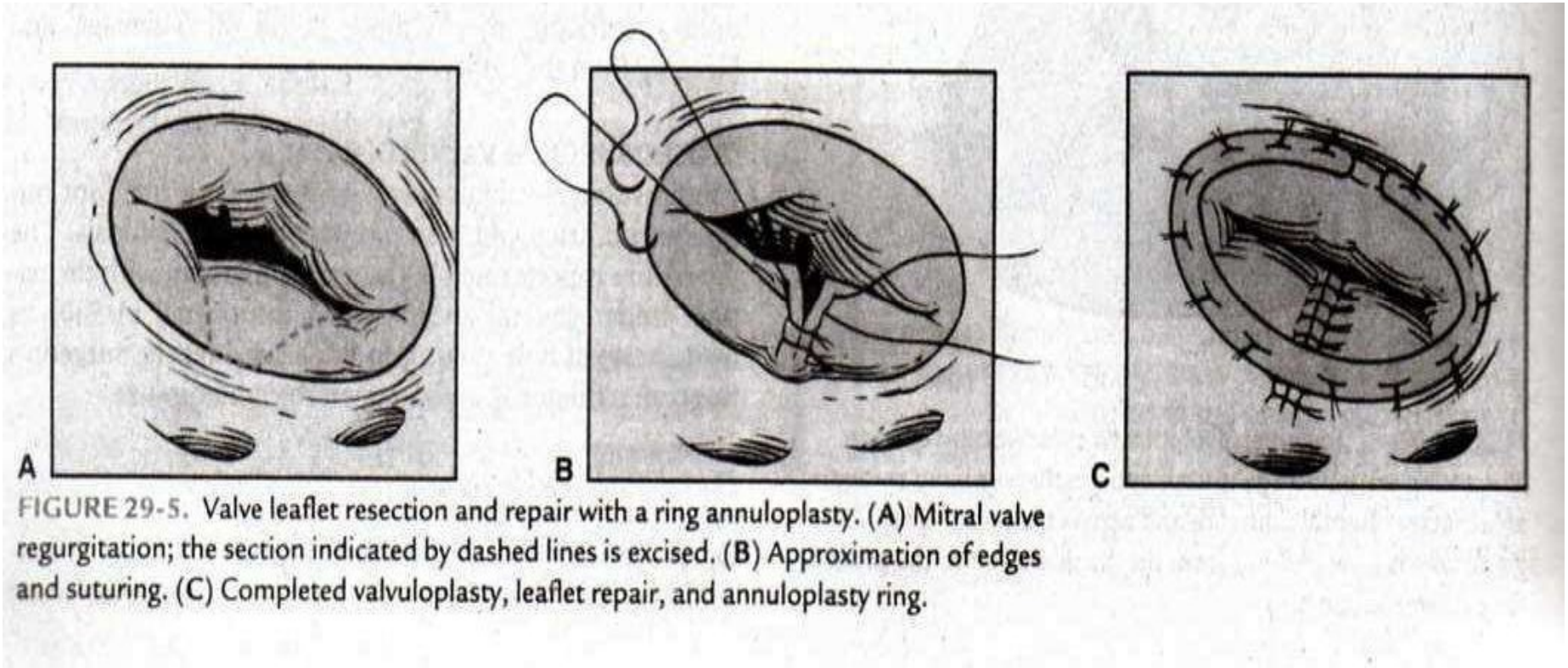


FIGURE 29-5. Valve leaflet resection and repair with a ring annuloplasty. (A) Mitral valve regurgitation; the section indicated by dashed lines is excised. (B) Approximation of edges and suturing. (C) Completed valvuloplasty, leaflet repair, and annuloplasty ring.

VALVULOPLASTY

- Involves direct repair to torn leaflets by open surgery.

5. PROSTHETIC VALVES

Mechanical valves

Biologic valves

DIFFERENCE BETWEEN MECHANICAL AND BIOLOGIC VALVE

MECHANICAL VALVUE	BIOLOGICAL VALUE
Manufactured from man made materials and consists of combinations of metal alloys, pyrolite carbon and dacron	Constructed from porine and human cardiac tissue and usually contain some man made materials
More durable	Less durable
Increased risk of thromboembolism	Low thrombogenicity
Need long term anticoagulation therapy	No need of anticoagulation therapy

TYPES OF MECHANICAL VALVES

Caged ball valve

Tilting disk valve

Bi- laeflet valve

TYPES OF BIOLOGIC VALVE

Porcine heterograft

Pericardial heterograft

homograft

NURSING MANAGEMENT

1. Assess the high risk patients
2. Monitor ECG of the patient
3. Assess the family history of heart disease
4. Assess the history of smoking and alcoholism
5. Monitor lab values frequently especially serum cholesterol levels.
6. Assess for CAD
7. Monitor vital signs
8. Instruct to avoid high fat and oil rich diet

NURSING DIAGNOSIS

- Activity intolerance related to insufficient oxygenation as evidenced by weakness, fatigue, shortness of breath, BP changes

- Excess fluid volume related to heart failure as evidenced by peripheral edema, weight gain, adventitious breath sounds, neck vein distention

NURSING DIAGNOSIS

- Decreased cardiac output related to valvular incompetence as evidenced by murmurs, dyspnea, peripheral edema
- Deficient knowledge related to lack of experience and exposure to information about disease and treatment process as evidenced by verbalization of misconception about measures to prevent complications

SUMMARY

Valvular stenosis is a narrowing of the heart valve which restricts blood flow from one place to another which leads major pathophysicological changes, and complication.Early identification, promt treatment like Valve repair and valve replacement with quality nursing care makes the patients condition stable and comfortable.

REFERENCES

1. Davidson's Principles and practice of Medicine, 21st edition.
2. Smeltzer, Bare (2004)Brunnder & suddarth,s Text boook of medical surgical nursing. LWW publication 10th edition 2004, page no: 763-786
3. Lewis et all, (2010), Medical surgical nursing, Mosby publication, 7th edition, Page no : 879-891.


Thank You!