

# PRESENTATION AND MANAGEMENT OF CARDIAC SURGICAL DISEASES

● **Important**

● Notes (Doctors'/students')

## 431

## SURGERY TEAM

*Done By:*

Raghdah Alamri

*Revised By:*

Nasser Alsaleh



*Leaders*

Abeer Al-Suwailem

Mohammed Alshammari

Disease	ISCHEMIC HEART DISEASE	VALVULAR HEART DISEASES
<b>Clinical manifestations/ Etiology</b>	<ul style="list-style-type: none"> <li>• Asymptomatic</li> <li>• Symptomatic:               <ul style="list-style-type: none"> <li>○ Angina pectoris: stable-unstable</li> <li>○ Myocardial infarction</li> <li>○ V.S.D., Ischemic mitral regurgitation, Ventricular aneurysm, Heart failure, Conduction defects.</li> </ul> </li> </ul>	<p><b>Mitral Valve:</b></p> <p>1-<b>Stenosis:</b> Rheumatic, Congenital</p> <p>2-<b>Regurgitation:</b> Rheumatic, Degenerative, Endocarditis, Ischemic, Traumatic.</p> <p><b>Aortic Valve:</b></p> <p>1-<b>Stenosis:</b> Rheumatic, Congenital, Degenerative.</p> <p>2-<b>Regurgitation:</b> Rheumatic, Endocarditis, Connective tissue disorders, Aortic dissection.</p>
<b>Laboratory investigation</b>	Coronary angiography – Gold standard	-
<b>Indication of the surgery (IMP)</b>	<p>1-Left main coronary artery disease. (&gt;50% stenosis)</p> <p>2-Three Vessels with left ventricular dysfunction.</p> <p>3-IHD Associated with Valve disease.</p> <p>4-Failure of Medical therapy</p> <p>5-Mechanical complications of myocardial infarction:</p> <ul style="list-style-type: none"> <li>❖ Acute: V.S.D, mitral regurgitation, heart wall rupture.</li> <li>❖ Chronic: ventricular aneurysm.</li> </ul> <p><b>-Coronary Conduit:</b></p> <p><b>Arterial:</b></p> <p>1-Arterial: Internal thoracic (mammary) artery. The best artery used in CABG!</p> <p>2-Radia artery: may undergo spasm because of its muscular wall.</p> <p>3- right gastroepiploic artery</p> <p><b>Venous:</b></p> <p>Long saphenous vein</p> <p>-Arterial grafts are better than venous; they have longer patency (In 10 years, 95% arterial grafts are patent, but only 50% of veins remain patent.</p> <p>-Veins are normally under low pressure, so if they are used as coronary grafts, they are prone to high pressure from the aorta and atherosclerosis. LAD artery is the most commonly involved in ischemic heart disease.</p>	<p><b>Mitral Valve:</b></p> <p>1-<b>Stenosis:</b></p> <ul style="list-style-type: none"> <li>○ Symptoms: exertional dyspnea, pulmonary hypertension, hemoptysis</li> <li>○ Severe mitral stenosis: area less than 1 cm. The normal area of the mitral valve orifice is about 4 to 6 cm<sup>2</sup>.</li> <li>○ Left atrial thrombus.</li> </ul> <p>• <b>Treatment:</b></p> <ul style="list-style-type: none"> <li>▪ Medical</li> <li>▪ If there is no LA thrombus:           <ul style="list-style-type: none"> <li>-Balloon valvuloplasty, if it is not feasible or the patient has left atrial thrombus; you can subject the patient to open mitral commissurotomy (needs heart-lung machine).</li> </ul> </li> </ul> <p>2-<b>Regurgitation:</b></p> <ul style="list-style-type: none"> <li>○ Symptomatic</li> <li>○ Dilated left ventricle</li> <li>○ Diminished ejection fraction</li> </ul> <p>• <b>Treatment:</b> Medical, mitral valve repair or replacement.</p> <hr/> <p><b>Aortic Valve:</b></p> <p>1-<b>Stenosis:</b></p> <ul style="list-style-type: none"> <li>○ Symptoms (angina, shortness of breath, syncopal attacks)</li> <li>○ Severe aortic stenosis (normal 2.5to 3.5 cm<sup>2</sup>)</li> </ul> <p>• <b>Treatment:</b>1-Medical 2-Aortic valve replacement</p> <p>Percutaneous aortic valve replacement has been established and used in elderly with multiple risk factors while young patients with no risk factors undergo an open surgery.</p> <p>2- <b>Regurgitation:</b></p> <ul style="list-style-type: none"> <li>○ Symptomatic patients.</li> <li>○ Progressive left ventricular dilatation.</li> </ul> <p>• <b>Treatment:</b> Aortic valve replacement</p>
<b>Types of surgery</b>	<p>1-Conventional; using the heart lung machine</p> <p>2-Off-pump (beating heart surgery); you must stabilize the area.</p>	

## PROSTHETIC VALVES

Tissue Valves (Biological prosthesis)	Mechanical Valves
No need to use long term anticoagulation	Anticoagulation for life
Limited and unpredictable durability	prolonged durability
<b>Complication: Degeneration of valves.</b> <b>Used in: elderly, pregnancy, coagulopathy.</b>	<b>Complication: 1. Thrombosis 2. Bleeding</b> (patient should be monitored monthly using INR)

## Basic Principles Of Cardiac Surgery

1. Adequate Exposure: Full or Partial Sternotomy (most commonly used) / Thoracotomy / Robotic or Endoscopic (rarely used)
2. Bloodless Operative Field
3. Static Operative Target: Cardiac Arrest / Ventricular Fibrillation / Mechanical Stabilizers

**Note: Mechanical stabilization used in off-pump coronary artery surgery, in other types of cardiac surgery heart lung machine is used.**

Limitation/Problems of heart lung machine :

- 1-Requires full anticoagulation
- 2-Can cause micro embolism
- 3-Initiates Systemic Inflammatory Response

## Preoperative Assessment

## Pre-Operative Investigations for Cardiac Surgery

Full Blood Count/ Blood Biochemistry/ ECG/ Chest X-ray/ Pulmonary Function Tests/ Echocardiography  
Other test according to systemic review of patient/ Angiography Carotid Duplex (to detect aortic stenosis if it's there)/ Scan Peripheral Duplex Scan

## Usual Duration of Stay in Hospital

One day before surgery/3-6 hours OR time/One day in ICU/4-5 Days in Ward/Total 5-7 days

Thoracic Aortic Disease	Pericardial Effusion	Congenital Heart Disease
<ol style="list-style-type: none"> <li>1. Thoracic aortic aneurysm: -Symptoms are usually due to pressure on surrounding structures.</li> <li>2. Aortic dissection: -Tear in the intima allowing blood to enter and flow in a false channel. -There are 2 lumens separated by the dissecting membrane. <b>Emergent cause for chest pain.</b></li> </ol>	<p>Progressive accumulation of fluid inside the pericardial cavity, may compress the cardiac chambers.</p> <p>• <b>Etiology:</b></p> <ol style="list-style-type: none"> <li>1-Traumatic</li> <li>2-Pericarditis</li> <li>3-Malignancy</li> <li>4-Uremia</li> <li>5-post irradiation</li> <li>6-Postoperative.</li> </ol> <p>• <b>Management:</b></p> <ul style="list-style-type: none"> <li>-Treat the cause</li> <li>-Aspiration</li> <li>-Pericardiostomy (if the fluid is not accessible)</li> </ul>	<p><b>-Acyanotic :</b></p> <ol style="list-style-type: none"> <li>1. Patent ductus-arteriosus</li> <li>2. Co-arctation of the aorta</li> <li>3. Pulmonary stenosis</li> <li>4-ASD or VSD</li> </ol> <p><b>-Cyanotic:</b></p> <ol style="list-style-type: none"> <li>1. Tetralogy of Fallot (VSD, overriding aorta, pulmonary stenosis, RV hypertrophy)</li> <li>2. Transposition of the great vessels</li> <li>3. Tricuspid atresia</li> <li>4. Total anomalous venous drainage</li> <li>5. Truncus arteriosus</li> </ol>

Not important

## Cardiothoracic Emergency

1. Chest pain (causes):
  - a. Myocardial ischemia
  - b. Pulmonary embolism
  - c. Aortic dissection
  - d. Tension pneumothorax
  - e. Rupture esophagus
2. Acute dyspnea (causes):
  - a. Myocardial infarction
  - b. Pulmonary embolism
  - c. Spontaneous pneumothorax
  - d. Bronchial asthma
  - e. F.B. (foreign body) aspiration
  - f. Stuck mechanical valve.
3. Chest trauma:
  - a. Flail chest
  - b. Traumatic hemo/pneumothorax
  - c. Hemopericardium

**Questions:**

1- What procedures are most often used in the treatment of coronary artery disease?

- A- Coronary artery bypass grafting using internal mammary pedicle graft and saphenous vein.
- B- heart transplant
- C- transmyocardial laser revascularization
- D- angioplasty.

2-What is the surgical treatment of aortic stenosis?

- A- Balloon valvuloplasty
- B- Coronary artery bypass surgery
- C- Valve replacement with tissue or mechanical prosthesis
- D- Amoxicillin

3-What are the indications for surgical repair in aortic stenosis?

- A-Valve cross-sectional area is 3 cm<sup>2</sup>
- B-Angina patient
- C-Unhealthy life style
- D- Patient in compliant to drugs

4-What are the advantages mechanical valves?

- A- No need to use anticoagulant for life
- B- It degenerates after 5 years
- C- Used safely in old patients
- D- Prolonged durability

Answers:

1-A

2-C

3-B

4-D