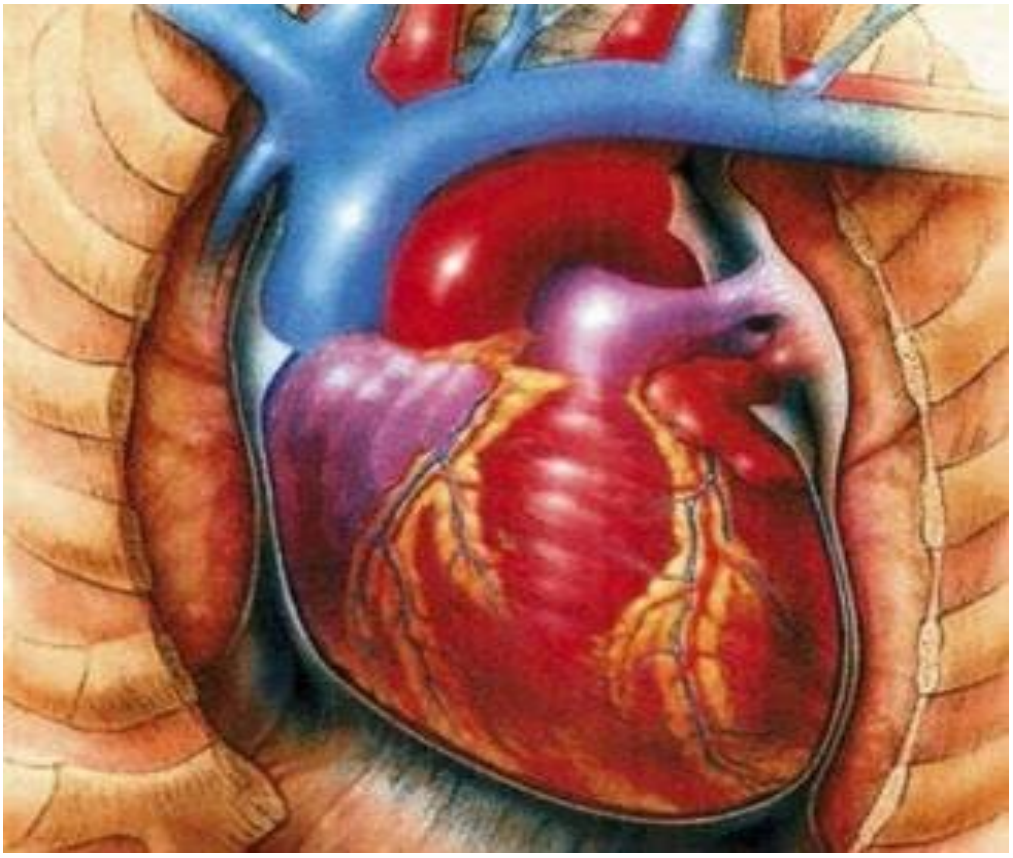
Cardiac surgery 1

5th stage

Introduction

The heart is a muscular organ which pumps the blood around the arterial system. It consist of four chambers: right & left atria, right & left ventricles.

When viewed from the front it has three surfaces & three borders.



1. The anterior surface consists almost entirely of the right atrium (RA) & right ventricle (RV) with a narrow strip of left ventricle (LV) on the left border & the auricle of the left atrium (LA) just appearing over the top of this. It lies just behind the sternum & costal cartilages.

2. The posterior surface consist of the LV & LA with four pulmonary veins.
3. The inferior or diaphragmatic surface consists of the RA with inferior vena cava entering it & lower part of the ventricles.
1.The right border is made up entirely of the RA with superior & inferior vena cava.
2.The inferior border consist of the RV & apex of the LV.
3.The left border extends from the apex up to the second left intercostals space.
The outline of the heart can seen clearly on a chest x-ray.
The apex of the heart is the lowest & most lateral point on the chest wall at which the cardiac impulse can felt.

Chambers of the heart:

The heart consists of a right side which pumps blood through the lungs & left side which pumps it through the systemic circulation,

Right atrium (RA) This receives blood from the superior & inferior vena cava & from the coronary sinus. it composed from smooth walled posterior part of the atrium & from rougher area due to the pectinate muscles derived from the true atrium.

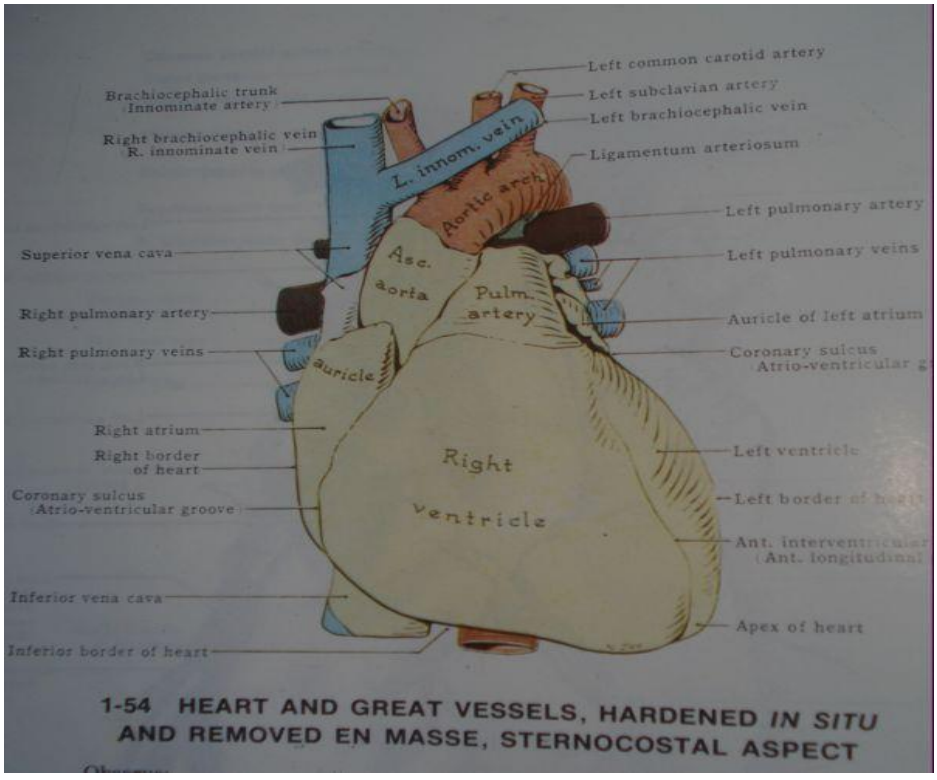
Right ventricle (RV)The walls are much thicker than those of the atrium. The tricuspid valve lies between the RA & RV and three valve cusps are referred to as septal,anterior & posterior. it composed smooth (atrial) surface & rougher (ventricular) surface have a number of fibrous cords, the corde tendineae , which attach them to the papillary muscles on the wall of ventricle. These prevent the valve cusps from being everted into the atrium when the ventricle contracts. the pulmonary valve lies just above the RV,& consists of three semilunar cusps.

Left atrium(LA)There are four pulmonary veins, two from each side.
On the interatrial surface there is impression representing the site of the fetal interatrial foramen.

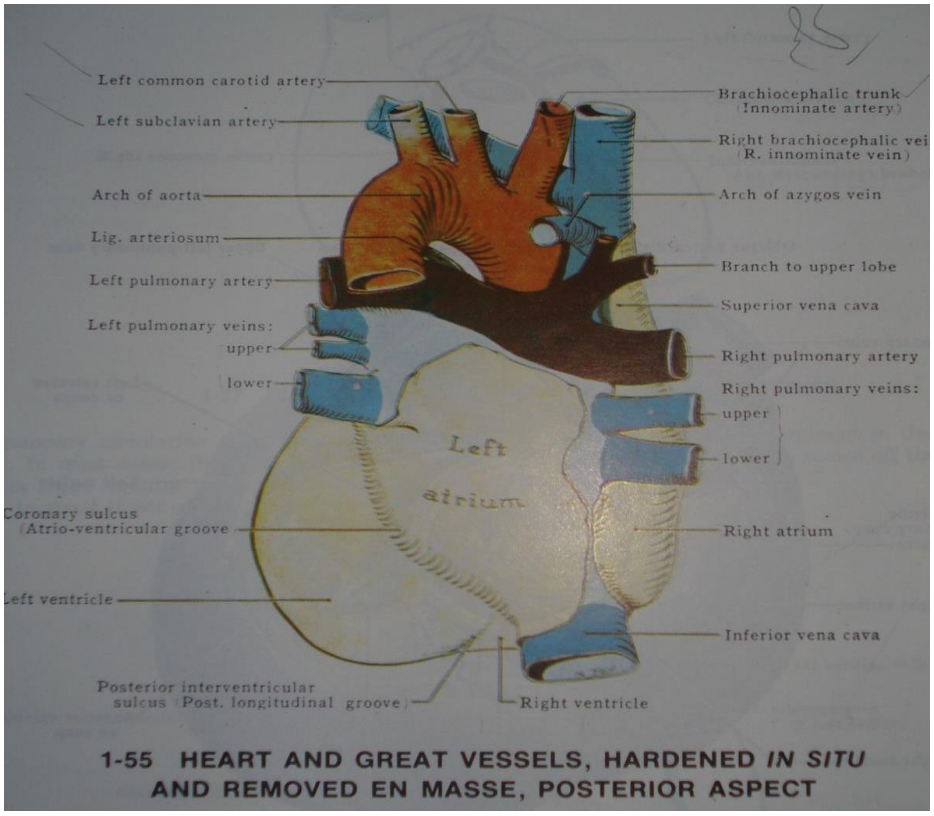
Left ventricle(LV) the wall of the LV are three times thicker than those of the RV,because the vascular resistance of the systemic circulation is so much greater than that of the pulmonary vasculature. The mitral vale lies between the atrium & ventricle & has two large cusps .

The aortic valve is similar to pulmonary valve but stronger to cope with higher pressure .there are three cusps-right ,left & posterior. The left & right coronary arteries open from the left & right cusps respectively.

In about 1% of the population the aortic valve is bicuspid ,and more likely to develop calcification & stenosis in later life.



1-54 HEART AND GREAT VESSELS, HARDENED *IN SITU* AND REMOVED EN MASSE, STERNOCOSTAL ASPECT

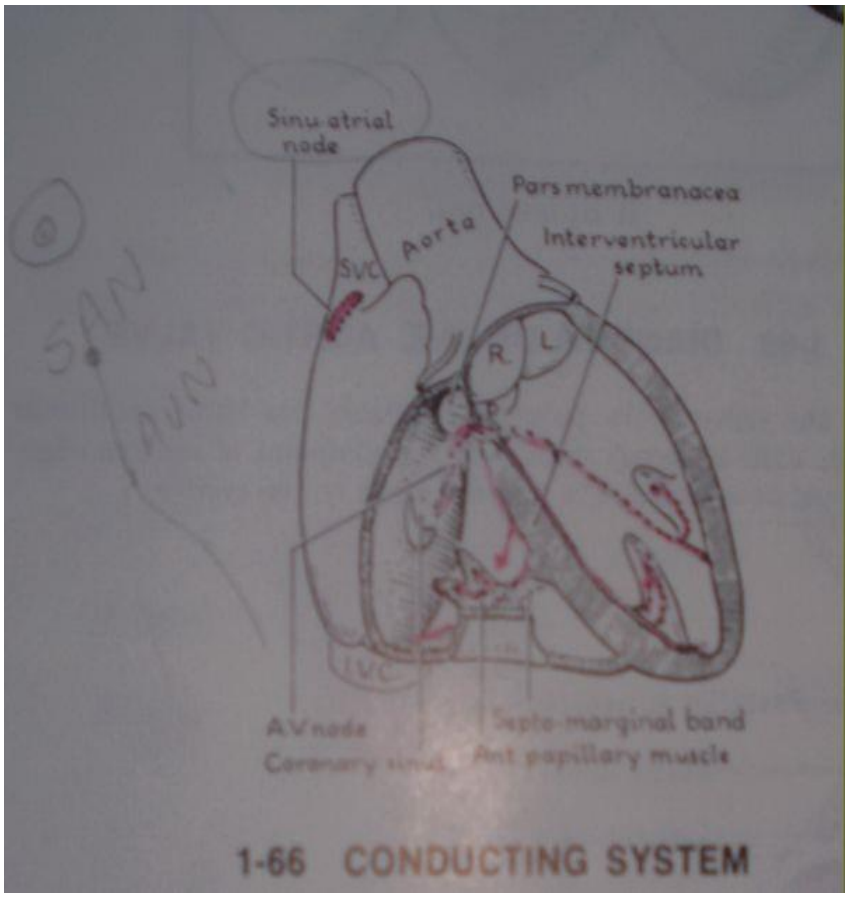


1-55 HEART AND GREAT VESSELS, HARDENED *IN SITU* AND REMOVED EN MASSE, POSTERIOR ASPECT

Fibrous skeleton:

The two atrioventricular orifices are bound together by a conjoined fibrous ring in the form of figure of eight which acts as a fibrous skeleton to which the valves are attached & muscles of both atria & the ventricles .This help to maintain the shape & position of the heart.

Conducting system:

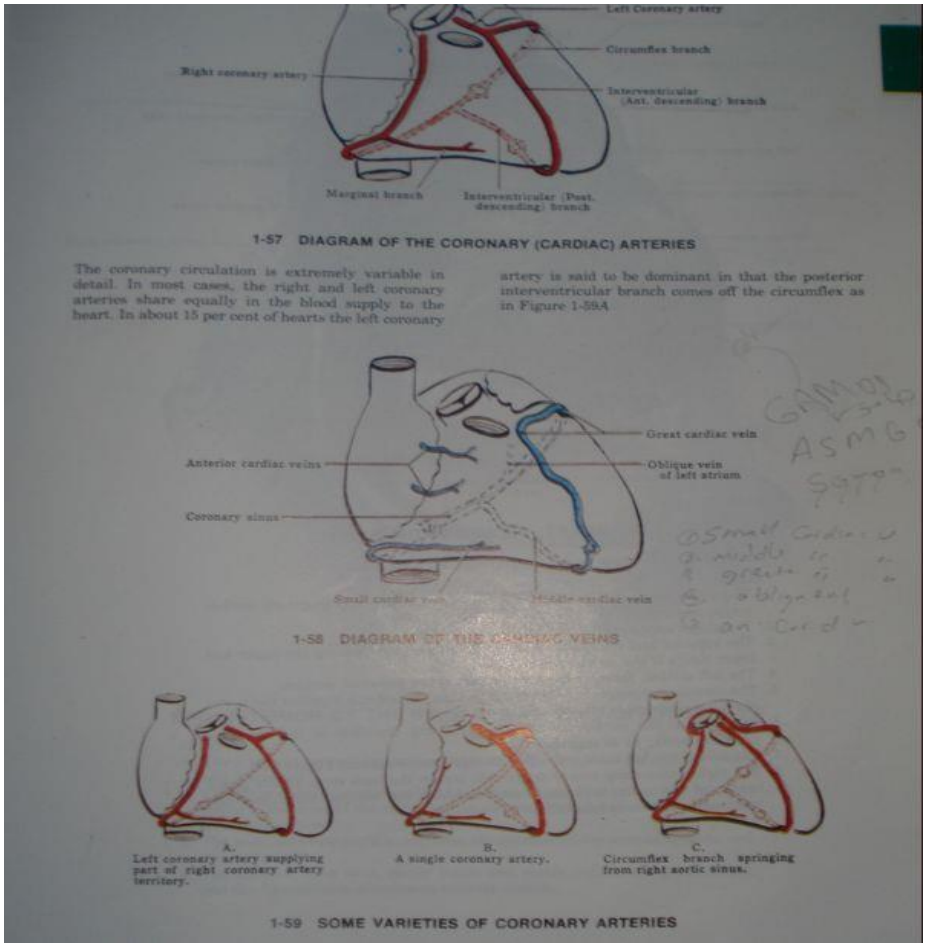


Cardiac muscle cells are able to contract both spontaneously & rhythmically.

The faster cells are situated in the wall of the RA at the junction between SVC & RA & are termed the sinoatrial node (SA node or pacemaker of the heart).cardiac impulse spreads through the atrial muscles to reach atrioventricular node , which lines the atrial septum close the to opening of the coronary sinus .The atrioventricular bundle (of His)pass through a channel in the fibrous skeleton of the heart to the membranous part of the interventricular septum, where divides into a right & left bundle branch. The left bundle is larger than the right & divides into an anterior & posterior fascicle .These run underneath the endocardium to activate all parts of the ventricular musculature.

The atrioventricular bundle is normally the only pathway through which impulses can reach the ventricles.

Blood supply to the heart:



The right & left coronary arteries arise from the anterior & the left aortic sinuses,respectively,just above the aortic valve & the main branches lie in the interventricular & the atrioventricular grooves.

Right coronary artery(RCA):

This passes between the pulmonary trunk & the right atrium & runs along the atrioventricular groove .it ends by anastomosing with terminal branch of the LCA.

The main branches are :

1.Artery to the SA node.
2.Right marginal artery.
3. Posterior interventricular, & called (posterior descending artery PDA).

Left coronary artery (LCA):Arising from the left aortic sinus the LCA(the left main stem).from 4 to 10 mm in length & is the most important artery in the human body (occlusion lead to rapid demise & stenosis need urgent operation bypass it) ,divided into two branches of equal size :

1. anterior interventricular (left anterior descending) .gives diagonal branch & goes on to anastomose with the posterior interventricular artery.
2.Circumflex artery.continuse around the left surface of the heart to anastomose with the terminal branches of the RCA.

Venous drainage:

There are three groups of veins of the heart:

1.Tiny veins that drain directly into the champers of the heart(thebasen vein).
2.Anterior cardiac veins, small & open direct to RA.
3.Coronary sinus, main venous drainage, it lies in the posterior atrioventricular groove & open into RA ,near the IVC.it has three main tributaries:

aThe greater cardiac vein.
b.The middle cardiac vein.
c.The small cardiac vein.

Nerve supply to the heart:

The sympathetic supply (cardio-accelerator) from upper thoracic segment of the spinal cord through the sympathetic trunk.

The parasympathetic supply is from the vagus(cardio-inhibitor).

Pericardium:

It divided into two parts:

1.Fibrous pericardium that contained the heart & root of great vessels. can stretch very gradually ,but not sudden.

2. Serous pericardium, this covers the heart & the origin of the great vessels & fuses with the fibrous pericardium at the sites around the great vessels. This space called pericardial cavity.

The scope of cardiac surgery:

The procedures of cardiac operation can be ,placed in one of three groups:

1.Extracardiac operation :

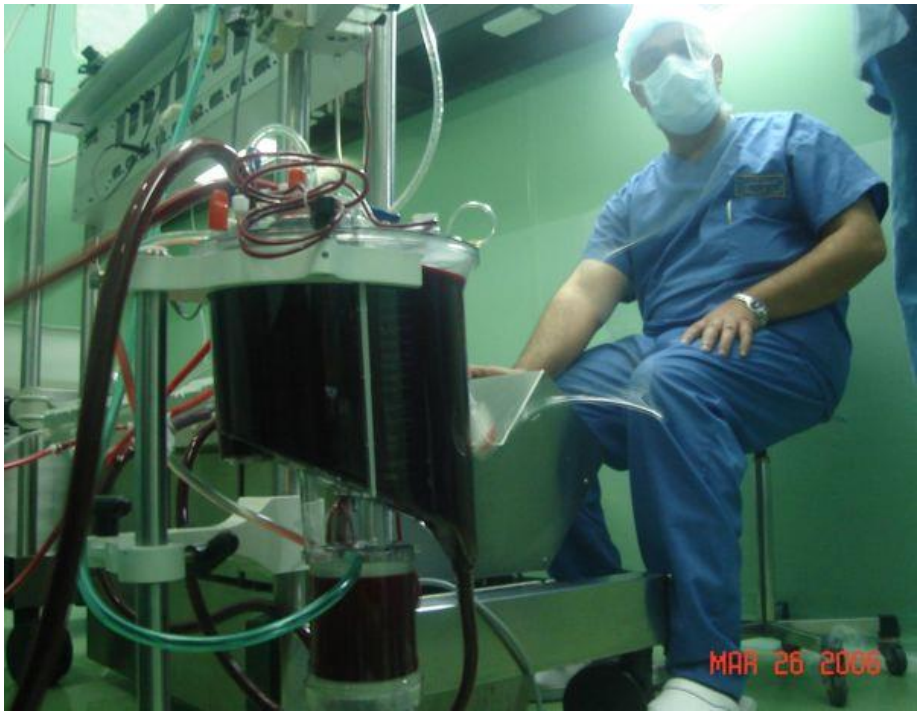
These are carried out on the main vessels outside the heart or on the pericardium. the ventricles or atria are not directly interfered ,so that cardiac function is not disturbed.e.g. Ligation of a patent ductus arteriosus,excision of coarctation of aorta, systemic pulmonary anastomoses,pericardectomy & resection of some thoracic aortic aneurysms.

2.closed intracardiac operation:

These are blind intracardiac procedures performed by an instrument or a finger & guided by touch ,access through either ventricular or atrial walls or through the base of one of the great vessels. Cardiac action is interfered .Mitral valvotomy is the only closed procedure still used by surgeon. Many new techniques have been developed like percutaneouse angioplasty introduced transvenous or transarterial balloon tipped catheters ,it now possible to close atrial septal defects by occludar .

3. Open cardiac operation: the desire of every cardiac surgeon is to operate with safety under direct vision on open & motionless heart. The following techniques have allowed this goal to be achieved:

1.Extracorporeal circulation (cardiopulmonary bypass CPB).



was the first used successfully in 1953 by Gibbon & has revolutionized cardiac surgical practice. Basically each consists of a pump & an oxygenator. Blood is withdrawn from the caval veins, passed through the oxygenator & returned to the arterial circulation through the ascending aorta or femoral artery .Heart –lung machines provide the surgeon with periods of between 2 & 3 hours for intracardiac surgery with safety .

By the use of an extracorporeal circulation many complicated congenital & acquired cardiac anomalies can be corrected.

2.hypothermia.

The metabolic needs of the body can be reduced by cooling the tissues .Surface cooling of the body to 28-30 C gave a surgeon about 10 minutes of circulatory arrest before damage the brain, the body temperature can be reduced to 15-18 C & periods of up to 45 minutes or more of circulatory arrest can be tolerated .This technigue is now widely used in the surgery of congenital heart disease in infants.

3.Left heart bypass.

Left atriofemoral or left heart bypass is a useful technique which facilitates operations on the thoracic aorta. The LA is cannulated & blood diverted with a pump into the femoral artery.

4.Femorofemoral bypass.

The femoral artery & vein are each cannulated & the blood is passed through an oxygenator before return to the body via the femoral artery .Indications for its use calcified aorta small LA not easily accessible & in previous operation with adhesion in site of operation.

5.vascular shunts.

Aortic anomalies such as aneurysms or coarctation can be bypassed by shunting blood from the aortic arch or left subclavian to the femoral artery.

Myocardial preservation :

For most operations on the heart today, the surgeon prefers a motionless ,relaxed heart for an appreciable length of time .This achieved with myocardial cooling & cardioplegic arrest .The infusion of a cold solution contaning an elevated concentration of potassium will cause the heart to arrest in diastole. Because the heart is not beating ,its consumption of oxygen is dramatically reduced .this with effect of cooling protect the myocardium for between 2& 4 hours.

Cardiac surgery 2

5th stage (1 hr)

Heart surgical disease can be divided into two main groups: congenital & acquired disease .

I. Congenital heart disease , can divided into :

A. Lesions resulting in increased pulmonary blood flow: Increasing pulmonary blood flow , particularly at high pressure , decrease lung compliance, pulmonary congestion can be added when there is increased resistance to adequate pulmonary venous outflow. may described as acynotic heart disease .

1.Patent ductus arteriosus (PDA) :

PDA is a common isolated defect affecting 1 in 2000 births, with increased incidence in premature neonates. in complex lesions , the PDA may be the only source of pulmonary blood supply .

Anatomy & path physiology :

The ductus arteriosus is a fetal structure that allows blood to divert away from the lungs & into the descending aorta .

The PDA arises from the junction between the left & the main pulmonary artery & joins the underside of the distal aortic arch beyond the origin of the left subclavian artery .

Right –sided , bilateral PDAs & connections to the subclavian artery have been described .

After birth , closure of the ductus is an important transition .Functional closure occurs first , mediated by the removal of the placental source of prostaglandin & its metabolism in the lungs. functional closure is due to muscular contraction& is reversible Anatomical closure is irreversible & develops over weeks , involving degenerative changes.

A ductus that fails to close after 3 months of age is considered pathologic. Any PDA causing congestive cardiac failure or preventing ventilator weaning is also pathologic .

The physiology of a PDA is a left-to-right shunting & increased pulmonary blood flow with left atrial & ventricular volume overload .

Complication of a PDA in older patients include :

1.Aneurysm formation .

2.Infective endocarditis .

3.Calcification.

4.Risk of pulmonary vascular obstructive disease.

Diagnosis & intervention :

The typical machinery murmur is heard in older children.

In neonates & infants, pulmonary congestion & failure to thrive .in premature infants difficulty in weaning from ventilatory support should prompt echocardiographic examination that is diagnostic .

Cardiac catheterization need in irreversible pulmonary hypertension is suspected .

Treatment :

1.Medical by injection indomethacin to inhibition of prostaglandin synthesis in the premature infants .

2. Intervention by transcutaneous catheter in the older children using coils & occluder devices.

3.Surgery is through a left posterolateral thoracotomy the duct is ligated either clipped with a metal clip or ligated by silk .

Division & suture directly or used patch .

4. Video-assisted thoracoscopic closure of PDA has been described.

2.Aorticopulmonary window.

Aorticopulmonary window , a rare defect , is a conotruncal anomaly , producing a window or communication between the aorta & the pulmonary artery.

Physiology of the defect is similar to that of a large PDA with pulmonary overcirculation , pulmonary hypertension , left ventricular volume overload .

Diagnosis :

Echocardiography is diagnostic .

Cardiac catheterization indicated just in suspected high pulmonary vascular resistance .

Treatment :

1.Intervention is indicated at time of diagnosis unless irreversible pulmonary vascular obstruction disease is established .

2. Surgical intervention usually requires a median sternotomy & cardiopulmonary bypass CPB . after aortic cross-clamping & cardioplegic arrest , the defect is incised & exposed .direct suture closure or patch is performed.

3. Atrial septal defect:

Isolated atrial septal defects (ASDs) are the most commonly encountered congenital cardiac anomalies in the adult population , occurring in 10-15 % of patients. ASDs are also associated with complex congenital cardiac anomalies.

Anatomy & pathophysiology : the atrial septal consists of the septum primum , secundum , & sinus venous defects from inferior to superior .Sinus venous defects occur in association with partial anomalous pulmonary venous drainage .

The direction & amount of shunting depends on the size of the defect as well as the relative diastolic compliance of the ventricles .The shunt from left to right , resulting in increased flow to the right side of the heart & increased pulmonary blood flow .Congestive heart failure usually occurs after the second or third decade of life

The risk of ASD in older patients include paradoxical embolism & stroke ,atrial fibrillation & flutter ,sinus node dysfunction .as well as

pulmonary vascular obstructive disease .bacterial endocarditis is very rare.

Diagnosis :

Younger patients are asymptomatic , & the defect is found on routine physical examination .

Older patients tend to be symptomatic with either signs of heart failure , exercise intolerance , palpitations, & arrhythmias.

Transthoracic echocardiography is usually diagnostic .

Cardiac catheterization is needed to assess pulmonary pressure & pulmonary vascular resistance & to exclude coronary artery disease in older patients.

Treatment :

Spontaneous closure of small patent foramen ovales occurs in up to 80%.

Closure is indicated in all symptomatic patients & all children with a significant ASD.

An ASD may be closed surgically or by percutaneouse transcatheter device closure .The defect is closed by suture or pericardial or other prosthetic patch.

Postoperative complications include pericardial effusions ,postpericardiotomy syndrome , post operative dysrhythmias,& residual ASDs.

4. Ventricular septal defect (VSD):

Congenital defects of the interventricular septum may be single, multiple ,or part of more complex cardiac anomalies.VSD occur in 1 to 2 per 1000 live births.

Anatomy & pathophysiology :

The ventricular septum is divided into 4 parts :

1. Membranous septum .
2.The inlet.
3. The trabecular .
4.The outlet parts of the septum (also called the conal or infundibular septum) & can divided the VSD depend on it.

Diagnosis :

The clinical presentation depends on the size of the shunt & the pulmonary vascular resistance (PVR).The clinical picture varies from an asymptomatic patient with a murmur ,to a patient in fulminant heart failure ,to a cyanosed patient with irreversible pulmonary obstructive disease .

Echocardiogram is diagnostic .

Cardiac catheterization is indicated when reversibility of the PVR is questionable .

Treatment;

80% of VSDs seen at 1 month of age will close spontaneously ,in the perimembranous & muscular defects.

Surgery by direct closure or used prosthetic patch like Dacron .

5.Atrioventricular canal defects (AV canal defects):

AV canal defects are also known as endocardial cushion defects or AV septal defects.

6.Truncus arteriosus:

A single arterial trunk arises from both ventricles from ,which the coronary & pulmonary arteries originate .It usually associated with a conotruncal VSD.

7.abnormalities of venous return :

It divided into either systemic or pulmonary .

A. Abnormal systemic venous return is frequent finding in complexcongenital disease & in the normal population. A persistent left superior vena cava draining to the coronary sinus is harmless in isolation .
B. Anomalous pulmonary venous return, may be partial like right upper pulmonary veins draining to the vena cava or complete drainage of the right –sided pulmonary veins to the inferior vena cava .

B.Lesions resulting in decreased pulmonary blood flow.

This lesions reduce pulmonary blood flow by obstruction at below ,or above the pulmonary valve .The obstruction may be at a single level for example ,pulmonary valve stenosis –or may be a more complex , multilevel obstruction such as tetralogy of fallot (TOF). Previously called cyanotic heart disease.

1.Tetralogy of fallot TOF:

TOF is a conotruncal defect resulting from anterior malalignment of the infundibular septum , lead to four components of TOF:

1.VSD . 2,Aortic valve override 3.narrowing of the right ventricular outflow tract 4. resulting in secondary right ventricular hypertrophy.

Complex forms of TOF include TOF with pulmonary atresia .

Anatomy & pathophysiology :

The right ventricular outflow tract obstruction (RVOTO) may be at subpulmonary level ,pulmonary valve level ,main pulmonary artery level ,or pulmonary artery bifurcation level or may involve branch pulmonary arteries. May present at all level .

Preoperative physiology depends on the degree of RVOTO .

Patients with minimal obstruction present with a left –to-right shunt though the VSD , these patients have pulmonary overcirculation , this is called acynotic TOF. These patients present with congestive heart failure .at the other end of the spectrum .severe obstruction to pulmonary blood flow causes profound cyanosis.

Diagnoses :

History of cyanosis

CXR may be classic in terms of a boot-shaped heart .

Echocardiography is diagnostic & associated anomalies can be excluded .

Cardiac catheterization is indicted before repair of TOF with previous palliation .

Surgical treatment :

Palliation :

A systemic –to-pulmonary artery shunt

Complete repair :

Involve closure of the VSD ,relief of the RVOTO.

2.Transposition of the great arteries TGA:

TGA is defined as an aorta arising from anatomic right ventricle & the pulmonary artery rising from an anatomic left ventricle .

Associated abnormalities include VSD ,corcatation of aorta , left ventricular outflow obstruction & other abnormalities .

Classification of TGA is into simple & complex TGA

Diagnosis :

In neonatal period diagnosis is made with echocardiography .

Cardiac catheterization rarely needed ,but requesed in complex TGA.

Surgical treatment :

The current gold standard is the arterial switch operation .

Left ventricular outflow tract obstruction (LVOTO):

LVOTO can occur at any level from the subaortic area to the descending aorta .aortic stenosis either valvular aortic obstruction ,subaortic or supravalvular lead to left ventricular hypertrophy,if untreated lead to left ventricular failure or sudden death .

Coarcation of aorta:

Coarcatation of the aorta is a congenital narrowing of the thoracic aorta ,usually occurring distal to the left subclavian artery ,at the point of insertion of the ductus arteriosus.coarctation represents 5 to 8 % of all cases of congenital heart disease .it associated with other congenital heart defects like PDA ,VSD & valvular disease .

Diagnosis:

Physical findings of absent femoral pulses & poor distal perfusion are highly suspicious for the diagnosis in an infant.

Echocardiography is diagnostic

Cardiac catheterization may be required for associated cardiac anomalies.

Other useful diagnostic tools computed tomography & magnetic resonance imaging.

Treatment :

1.Intervention by balloon dilatation.

2.Surgical options include :

a. Resection & end to end anastomosis.

b.Prosthetic patch aortoplasty.

c.Subclavian flap aortoplasty.

Recorctation can occur after operation .

Cardiac surgery 3

5th stage (1 hr).

II.Acquired heart disease.

Mitral valve disease:

The normal mitral valve has two leaflets anterior & posterior leaflet .the disease of mitral valve either stenosis ,regurgitation or compound.

A.mitral valve stenosis:

etiology :

1.Rheumatic fever is the principal cause of mitral stenosis ,& about two thirds are female.

2.other causes of mitral stenosis that are far less common include : 1. Malignant characinoid .

2.systemic lupus erythematosus .

3.Rheumatoid arthritis.

4.Rarely ,congenital malformation of the valve may cause mitral stenosis , & congenital MS is almost never an isolated congenital cardiac lesion .

Pathophysiology :

The significance of the transvalvular gradient is that left atrial pressure progressively increase as the mitral valve become more stenotic ,the pressure is transmitted retrograde into pulmonary veins ,pulmonary capillaries & pulmonary arteries . A left atrial pressure of about 25 mm hg enough to produce pulmonary edema .

Diagnosis :

History of dyspnea is principal symptom of MS,with exertion .& atrial fibrillation .

Dysphagia or hoarseness if the left atrium enlargement due to compress surrounding structures /

Hemoptysis in marked elevation in left atrial pressure .

Physical examination ,low–pitched , rumbling diastolic murmur.

Distended neck veins ,hepatomegaly ,ascities & peripheral edema with a loud pulmonary component of the second heart sound ,all suggest significant pulmonary hypertension .

Chest X-ray may be normal , double density right atrium ,calcification of mitral leaflets & cephalization of pulmonary blood flow.

Echocardioggram it diagnostic.

Cardiac catheterization is indication in patients with history of angina & in those older than 40 years to exclude coronary artery disease .

Treatment :

Depend on presentation of patients .

A.asymptomatic patient in sinus rhythm requires only prophylaxis against bacterial endocarditis .

B.symptomatic patient medical treatment includes diuretics,beta-blocking agents or calcium –channel blocking agents ,digoxin & anticoagulation in atrial fibrillation .

Mechanical relif of MS indicated in :

1.symptomatic patient.
2.evidence of pulmonary hypertention .
3.or when the mitral valve area is reduced to about 1 cm2 .

Mechanical relif of MS include:.

1.Ballon Mitral valvuloplasty .
2.Open Mitral commissurotomy .
3.Mitral valve replacement with a tissue or mechanical prosthesis.

B.Mitral vale regurgitation (MR):

etiology :

1.Rheumatic fever remains the most common cause of mitral regurgitation .
2.Trauma lead to perforated the leaflets.
3.Infective endocarditis.
4.Disease of collagen formation .
5.Postmyocardial infarction.

Pathophysiology :

In the MR the blood ejected from left ventricle into the low pressure left atrium ,the volume of the regurgitant flow is dependent on the size of the regurgitant orifice & the pressure gradiant between the left ventricle & left atrium .volume overload leads to cardiac dilatation as well as left ventricular hypertrophy.

Diagnosis:

Symptoms of the MR are those of heart failure : shortness of breath ,dyspnea on exertion ,orthopnea ,pulmonary edema, & diminished exercise tolerance .

Physical examination a holosystolic murmur is heard best at the apex & radiates to the axilla & left scapular region .

The pulmonary examination may be significant for rales & bronchospasm caused by increased pulmonary interstitial fluid.(as differential diagnosis of patients with aduld –onset asthma).

Electrocardiogram , left atrial enlargement or atrial fibrillation .

Chest X –ray ,cardiomegaly ,left atrial enlargement ,cephalization of pulmonary blood flow & pulmonary edema.

Echocardiogram is diagnostic.

Natural history of MR about 80 % of patients with severe MR survived 5 years & 60 % survived 10 years .

Treatment :

1.medical treatment , diuresis & afterload reduction with angiotensin –converting enzyme inhibitors.

2.surgical treatment indications include :

1. symptoms despite medical management .

2.severe MR in the presence of a structural abnormality ,such as a ruptured chorda tendinea ,pulmonary hypertention or evidence of deteriorating left ventricular contractile function as determined by echocardiography.

Surgical options are either 1.Mitral valve repair .

2.Mitral valve replacement .

Mitral valve repair has several advantages over replacement :

1.left ventricular function is better preserved after repair .

2. avoid risks of thromboembolism & the risk for prosthetic valve endocarditis .

3.operative mortality less than replacement .

Aortic valve disease:

The normal aortic valve is composed of three thin ,pliable leaflets ,or cusps ,attached at the junction of the aorta & the left ventricle , & because the coronary arteries arise from two of the three sinuses of Valsalva the aortic leaflets are named left coronary leaflet ,the right coronary leaflet ,& the noncoronary leaflet.

A. aortic valve stenosis:

Etiology :

Acquired aortic stenosis usually results from :

1.calcification of the aortic valve with advanced age ,idiopathic.

2.Rheumatic fever.

Congenital valvular abnormalities ,bicuspid valve lead to AS.

Pathophysiology :

In the acquired AS ,there is a chronic ,progressive narrowing of the aortic valve ,lead to left ventricular hypertrophy ,it becomes stiffer as its compliance decreases.

Diagnosis:

Symptoms the classic symptoms of AS are angina syncope & left failure ,or sudden death .

Physical examination : systolic murmur at base of the heart radiates into the carotid arteries .

The murmur associated with a slow .prolonged rise in the arterial pulse called pulsus parvus .

Echocardiogram : it diagnostic .

Cardiac catheterization ; the most accurate measure of AS is determined by cardiac catheterization .

Patient older than 40years of age should have coronary angiography before aortic valve surgery to exclude coronary artery disease.

Natural history :patient survival is not diminished until patients develop symptoms ,after symptoms develop ,patient survival is limited .

The principal symptoms of AS are angina , syncope & congestive heart failure .

Treatment :

AS is a mechanical obstruction to flow from the left ventricle .the only effective therapy is aortic valve replacement (AVR) .

Angina & syncope warrant elective surgical therapy ,whereas congestive heart failure mandates urgent intervention .

For patients with severe AS who are not candidates for AVR ,percutaneous aortic ballon valvuloplasty may provide some palliation of AS ,but associated with recurrencesymptomes within 6 months.

B.aortic valve regurgitation or insufficiency (AR):

Etiology ;

AR may result from disease of the valve leaflets or of the aortic root

1.Rheumatic fever

2.Congenital bicuspid aortic valves .

3.endocarditis .

4.myxoid degeneration of the aortic root ,as seen in Marfan s syndrome.

5.trauma or dissection of the aortic wall produce AR.

Pathophysiology :

The aortic valve leaks during diastole ,which lowers diastolic pressure & widens the pulse pressure .because coronary blood flow occurs primarily in diastole the lower diastolic blood pressure lowers coronary perfusion pressure .unlike AS in which the pathologic process is left ventricle pressure overload ,the pathophysiology of AR derives from left ventricular volume overload .

Diagnosis :

Sign of heart failure ,dyspnea on exertion ,orthopnea & paroxysmal nocturnal dyspnea .

Physical examination ,wide pulse pressure , the peripheral pulses rise & fall abruptly (water-hammer pulse).

CXR enlarged cardiac silhouette .

Echocardiography ,most accurate non invasive to confirm the diagnosis of AR.

Treatment :

1.medical therapy for AR is based on a combination of afterload reduction & diuretics .
2. surgical therapy in patients with symptomatic aortic insufficiency .
AVR should be performed before yhe left ventricle has irreversibly dilated .

Types of prosthetic valve:

Several types of prosthetic heart valves are clinically available; they are classified as mechanical or biologic valves. Mechanical valves are manufactured entirely from manmade materials. These valves have the advantage of long-term durability and the disadvantage of requiring long-term warfarin therapy to prevent valve thrombosis and systemic thromboembolism. Biological valves are composed primarily of material that originated as living tissue, including porcine aortic valves, valves manufactured from bovine pericardium, valves transplanted from other human beings (homografts), and autografts from the patient. These valves have the advantage of not requiring long-term warfarin therapy and the disadvantage of a higher rate of structural failure

There are two principal choices of cardiac valve prostheses ,mechanical & bioprosthetic valves .

A.Mechanical valves:

*Mechanical valves have excellent durability than biological valve .
*mechanical valves obligate the patient to lifelong anticoagulation therapy (warfarin).
* risk for bleeding complications.

B.Biological valves:

* Most bioprosthetic valves are either porcine valves or bovine pericardial valves .
*do not require chronic anticoagulation .

The choice of prosthetic valve must therefore consider the risks of anticoagulation (mechanical valve) & the risks of reoperation (bioprosthetic valve).

Bioprosthetic valves are indicated in patients with contraindications to anticoagulation .

THORACIC SURGERY

5th stage (1 hr)

INTRODUCTION:-

Thoracic surgery focuses primerly on the organs that

support the delicate consequince of events that move air to blood and blood to tissues.

The cardio-respiratory system functions to ensure that those events occur

dependably.the margins of errors being extremly small.The analysis and management

of surgical problems involving the chest and its contents wether relating to congenital anomalies,tumors,trauma or infection.

Air pass through upper air way , trachea , and the bronchi to reach the alveoli , the

alveolar membrane must allow efficient diffusion of oxygen and carbon dioxide .

Blood with sufficient oxygen carrying capacity (RBC) must circulate through the

alveolar capillaries in adequate volumes and at proper speed to take up O2 and discharge CO2.

THE early history of thoracic surgery was limited to the management of trauma and

was closely related to the history of weaponry.

The development of ellective thoracic surgery closely followed the history of air way

management particularly the TRACHEAL intubation and MECHNICALventilation..

ANATOMY OF THORAX AND PLEURA:-

Thoracic diseases often can be localized by physical examination to underlying anatomy because the bony parts of the thorax are palpable and cardiac and breath sounds are transmitted through the chest wall.

Chest wall is conical in shape tapering sharply in the upper chest.

The lung apices rise well above the clavicle anteriorly and scapula posteriorly,the diaphragm rises as high as the level of the nipple , and the upper part of abdomen including the liver,spleen,stomach,distal pancreaseand kidneys is overlaped by 6-10 anterior ribs and the lower four posterior ribs, these easely overlooked facts can lead to serious errors in patient management regarding penetrating trauma..

The framework of the thoracic cage composed of sternum, 12 pairs of ribs ,12 thracic vertibrae. The thoracic inlet has arigid structural ring formed by the sternal manubrium ,the short semicircular first rib and the vertibral columnas aresukt of its articulation with the manubrium and the attachment of the costoclavicular ligament,the clavicle helps to protect the subclavian vessels and brachial plexus which traverse the thoracic inlet .
the same rigidity that provides protection from trauma leaves littele room for pathologic sweeling ,enlarging masses ,or age related postural adjustment.

The cartilage of the first six ribs have separate articulation with the sternum (true ribs) the cartilage of the seventh through the tenth ribs fused to form the costal margin before attaching to the lower margin of the sternum

.
Since there is significant flexibility of the chest wall in children ,serious trauma can be transmitted to intra thoracic structures with little injury to the body framework.

Although this flexibility decrease with age surprising damage can occur occasionaly in the chest of adults without evidence of skeletal injury.

The pectoralis major and minor muscles are the princible muscles of the anterior thorax. The lower margin of pectoralis fold forms the anterior axillary fold.

Auscultation of the chest in the axilla often allows best determination of the breath sounds . the latissimus dorsi and teres major muscles form the posterior axillary fold.
the sternal angle is easily palpated and allows quik identification of second rib which articulate with the sternum at this angle.

In upright person this plane pass between 4^{th} to 5^{th} thoracic vertebra,tracheal bifurcation and the arch is higher to this plane.
The pleura is a serous membrane of flat mesothelial cells overlying a thin layer of connective tissue ,it is of two types that cover the lung refered as visceral pleura and it is continous over the pulmonary hilus and the the mediastinum with the parietal pleura which enclose the interior of the chest cavity.

The pleural space contain few amount of fluid which is acontious process of secretion and absorption ,it decrease the friction between the two surfaces ,the pleural space is in negative pressure, when any injury that disturb this closed sac air may enter leading to (pneumothorax).

there is no communication between the pleural cavities ,but the anteromedial borders of the two pleural sacs come nearly into apposition behind the sternum.

Parietal pleura is sensative to stretching (pain) while visceral pleura is insensative to pain.

The structures occupying the intercostal space include three layers of muscles ,intercostal neurovascular bundle which is located deep to the external and

internal muscles and these structures protected by the lower border of the ribs so during any procedure avoiding this area to avoid injury to these structures.

there is significant overlap of neural supply to each interspace and complete anaesthesia in an interspace will not occur unless the intercostal nerve above and below the space are anaesthitized.

To minimize the risk of lacerating intercostal artery athoracocentesis needle should be passed across of the top of the lower rib of selected space.

Amusculofibrous floor of the thorax provide by the diaphragm .periphral muscular portion of the diaphragm arise from the lower six ribs and costal cartilages,from lumber vertibrae and from lumbosacral arches and xiphisternum.

All muscle fibers converge into central tendon .of the three major openings of diaphragm the aortic hiatus located posteriorly and aorta ,azygus vien and thoracic duct pass.The esophagus hiatus carry esophgus and vagus nerves

Endoscopic procedures :-

Endoscopy is procedure used to visualized the internal organs through natural or artificial orifices.

ESOPHAGOSCOPY:-the first esophagoscopy procedure is done in 1868by Kassmaul using 13 mm metallic tube ,fiber optic esophagoscopy interduced in 1958.the indication are both diagnostic and therapeautic indication:-
1-Dysphagia &Odenophagia.
2-reflux esophagitis .
3-truama.
4-Tumor staging &screening .
5-Upper GIT bleeding.
6-Removal of foreign body in the esophagus.
7-Follow-up of previously found polyp,tumor or ulcer.

The flexible esophagoscopy (OGD)can be done under local anesthesia at the O.P department,left lateral position with the head flexed,bite block is placed in the mouth to protect the scope from the teeth.
During insertion of the OGD there are 4normal endo luminal landmarks:-

A-upper esophageal sophincter or crico-pharyngeal opening(15cm).

B-aortic arch indentation at the left antero-lateral wall.

C-left arium indentation is wave like pulsation anteriorly.

D-lower esophageal sphincter which is seen by ask the atient to do valsalva maneuver.

Rigid esophagoscopy is rarely used reserved now for three main condition these are trauma,F.Bremoval and food impaction removal ,placement of tubes and stents.

ENDOSCOPIC ACCESSORIES:- are tools used with the procedures to get maximum information :-

1-Brushing for cytological examination.

2-Biopsy for histopathological examination.

3-Endoscopic U/S.

4-LASER THERAPY ,CRYOTHERAPY.

BRONCHOSCOPY:-

An endoscopic procedure which provides direct access to the tracheo-bronchial tree ,and play essential role in diagnosis and treatment of chest conditions.

Two types of bronchoscopy are available (flexible and rigid),the procedure can be used for diagnostic and therapeutic purposes or both at the same section.

DIAGNOSTIC INDICATIONS:-

Persistant cough,Hemoptysis,localized lung lesion,Abnormal chest radiography,suspected tumor of the lung,follow-up of chest disease.

THERAPEUTIC INDICATIONS:-

Removal of foreign bodies of tracheo-bronchial tree,post operative atelectasis,transbronchial drainage of lung abscess, brachy therapy,placement of

endotracheal tubes,opening of narrowed tracheal stenosis and localized management of tumor with phototherpy,laser therapy or cryotherpy.

RIGID BRONCHOSCOPY

Done less frequently than flexible type ,it is a metal tube of different size introduced under GA ,need ventilator and muscle relaxant.It is more valuable in removal of FB ,secretions and control of bleeding but still needs GA ,It is disadvantages that also poor visualization of distal bronchi,in ability to instrumentation and vision at the same time with ventilation.

FLEXIBLE BRONCHSCOPY

COMPOSED OF fiber optic bundles which provides both illumination and visualization pathways.

Small channel with diameter 1-3mm traverses the fiber optic scope through which instrument or suction can be used.

Most of diagnostic procedures are done using this flexible type,it needs only topical anesthesia (awake patient) at O.P room which equipped by monitor for reading BP,PR,Pulse oxymeter.

Trans-nasal approach in awake patient commonly used viewing nasal and upper air way passages then pass through the vocal cords ,tracheal searching for luminal irregularity carina should be sharp bifurcation ,any fullness of carina should alert adenopathy or mass.

Systimatic examination of the tracheo-bronchial tree to segmental or subsegmental bronchioles and taking spacemens like wash, lavage,brush, biopsy..

CONTRA-INDICATION

NO ABSOLUTE CONTRA-INDICATIONS FOR BRONCHOSCOPY ONLY RELATIVE CONDITIOND LIKE:-

1-Bleeding disorders.

2- Patient on ventilator.

3-Sever tracheal obstruction .

4-Bronchial asthma.

5-Certain infections e.g. active TB ,HIV.

COMPLICATIOMS

Bronchoscopy in general considered as safe procedure ,most complications are preventable :-

A-anesthetic complications :due to medications can resukt in respiratory depression,hypotension and syncopal attacks.

B-techiqal difficulties can cause trauma and bleeding.

C-biopsy related complication :pneumothorax and bleeding.

OTHER TYPES OF THORACIC ENDOSCOPES

MEDIASTINOSCOPY

THORACOSCOPY

THORACIC SURGERY

Chest wall and pleura

5th stage (1 hr)

Chest wall deformities:-

Most common chest wall deformities occurs involving sternum and can be classified into inward plugging of the sternum ((pectus excavatum))or funnel chest in which there is inward depression of the sternum to ward the interior of the thoracic cage due to posterior ward overgrowth of the costal cartilages of the 2nd rib and below ,this posterior displacement of the sternum will push the mediastinal structures including the heart .

The lesion will be very clear by cx-ray on lateral view and CT-scan is very helpful in determine the degree of organs compression .

Indication of surgery is commonly due to cosmotic cuases (common occur in females) and cardio pulmonary compromise which may occur like excersional dyspnea or cardiac dysrhythmias.

Surgical correction involving subperichondral resection of deformed anterior cartilages and sternal transverse osteotomy .

The second condition where there is anterior protrusion of the sternum and costal cartilages (pigeon chest) and it is less common .

Other condition includes sternal cleft or splitting.

Chest wall tumors

tumors of the chest wall includes various boney and soft tissue origins. It is either primary or secondary from elsewhere and from adjacent structures like breast, lung, pleura and mediastinum.

Most boney chest wall tumors arise from the ribs 85% and the reminder arising from the scapula, sternum, and clavicle.

These tumors are presented as slowly growing tumor ,asymptomatic mass with more enlarging mass more pain invariably occurs .
Two thirds of the benign tumors are associated with pain while pain usually accompanied with all malignant tumors which either due to compression or invasion of the nerves.

Some of the tumors in the ribs are unapparent by physical examination but can be detected by radiological examinations.
History and physical examination with X-ray ,CTscan, MRI are important modalities for diagnosis .
Histopathological examination usually needs excisional better than incisional biopsy with safety margins in cases of primary chest wall tumors.
Surgical excision is indicated when it is feasible.
Metastatic bone tumors may involve the chest wall by direct extension or by blood porn deposits which is most common .
Tumors that involve the chest wall by direct extension include breast and lung cancer .
Pan cost tumor is bronchogenic carcinoma involve the upper most of the apex of the lung with direct extension of the chest wall and ribs (erosion),arm pain due brachial plexus involvement and Horner's syndrome.

Pleural diseases

Pneumothorax:-

An accumulation of air in the pleural space leading to lung collapse .
This either due to primary (idiopathic) or secondary to other diseases of the chest or fellow trauma .

Primary spontaneous pneumothorax found to be due to congenital subpleural bleb or bulla rupture.
The patient is healthy and has no history of medical illness .
Secondary pneumothorax is due to asthma,lung abcess rupture ,thoracocentesis ,deep IVlines ,asthma and tumors.
Male to female ratio is 3:1 and smoking increase the risk by 20 folds.
Diagnosis achieved by clinical features and examination ,and confirmed with radiographic studies CXR commonly used and CTscan rarely needed.
TREATMENT:-
Non-surgical treatment with O2 therapy in high concentration.
Needle aspiration :- using small plastic needle catheter (50%)failure.
Tube thoracostomy by chest tube connected to underwater seal.

Surgical exploration and abolish the pleural space by pleuridesis and resection or suturing the affected area or by decortication.

Pleuridesis mean make adhesion between the visceral and parietal pleura by chemical or mechanical ways chemical pleuridesis like talk ,tetracycline ,bleomycin.
This pleuridesis will prevent recurrence of the attacks of pneumothorax.
Indication of surgery in primary pneumothorax :-
1-recurrence.
2- persistant air leake.
3- massive air leake.
4-Bilateral pneumothorax.
5-occupational hazards.
6-history of tension pneumothorax .
7-hemopneumothorax and persistant bleeding.

Surgery can be done by thoracotomy or using thoracoscopic surgical technique.
Secondary pneumothorax commonly occurs to COPD if the air leaks persist after two weeks of chest tube then surgery is the favored option.

Some patients presented with history consistent with SPN and on physical examination showing anxiety ,abscent breathing sound,tachycardia,cyanosis and hypotension with tracheal deviation .
In this case clinical diagnosis of tension pneumothorax suspected without radiological examination and should be treated by decompression of the pleural space by insertion of needle or chest tube is required to prevent circulatory collapse.

Pleural effusion:-

Is accumulation of free fluid in the pleural space which normally contains few CC of fluid.
The of fluid across the pleural membrane is a complex process but in general is governed by Starling low of capillary exchange.

This suggest that ((flux)) of fluid is controlled by the balance of both oncotic and hydrostatic pressure within the pleural capillaries and pleural space.

Any imbalance between accumulation and absorption of pleural fluid will lead to pleural effusion .

The mechanism of imbalance include the following :-
Increase in:-A-hydrostatic pressure, B-negative intrapleural pressure,C-capillary permeability…
Decrease in:-a-plasma oncotic pressure,b-lymphatic drainage….
Approximately 300ml of fluid required to abolish the costo-phrenic angle on upright position chest x-ray and at least 500ml of effusion needed to become detected by clinical examination.
Transudative effusion result from change in fluid balance in the pleural space and usually indicate systemic process e.g. hepatic failure, renal failure, heart failure and hypoprotienemia.

Exudative pleural effusion suggest disruption or loss the integrity of the pleura of lymphatic drainage ,it may be due to malignancy,infection,infarction of the lung,trauma,collagen-vascular disease and subphrenic abscess.
Pleural effusion considered exudative if meet any on of the following:-
A-protien content is more than 3 gm/dl or more than s.protien.
B- LDH/S.LDH is greater than 0.6.
C-pleural fluid LDH is 1.67 times than normal serum.

Clinically the patient is symptomatic and complains of dyspnea,cough,or chest pain in case of nerve invasion the physical finding includes decreased tactile fremitus with dullness on percussion .
Bronchial breathing hearted over the remained lung with tracheal deviation.
DIAGNOSIS:-

1-radiological diagnosis by CXR,CTscanning,Nuclear scan to detect malignancy.
2- thoracocentesis of the fluid and examination by lab. Studies .

3-pleural biopsy and send for cytological examination.

4-cytogenesis DNA study for malignancy detection.

TREATMENT;-

If the underlying condition is benign we treat the causative factor and aspirate the pleural fluid by needle aspiration or chest tube.
In cases of malignant pleural effusion symptomatic treatment by aspiration only usually associated with high percentage of failure and recurrence.
Pleuredesis mean abolishing the potential space to prevent recurrence ,this can be done by various agents

(tetracycline,talk,chemical,mechanical,thoracoscopic) are common types of pleuridesis.

EMPYEMA:-empyema is a suppurative infection of the pleural space .
it is of various causes like infection,trauma,pulmonary infarction,postoperative empyema and it may be due to spread from intra abdominal source.
This empyema will produce fibrinous adhesions in the pleural space initially then fibrinous adhesion over the visceral pleura lead to trapped lung (restricted lung expantion).
Empyema should be suspected in patient with febrile illness and pleural effusion.
Treatment options include antibiotics and thoracocentesis or chest tube drain connected to suction.
If this modality of management failed then convert to open drainage (by cutting the tube near the skin and then pull out gradually).
Other types of treatment like rib resection can be used.
Thoracotomy and decortication can used and some time we do thoracoplasty or myocutaneous flaps.
New less invasive techniques by thoracoscopy can be used.

PULMONARY HYDATD CYST

This is a public health hazard &hyper endemic in sheep raising areas. It is still endemic in Iraq &considered as common helminthes disease. The disease caused by adult &larval stage of *E. Granulosus. The adult warm is called cestode lives in dogs' intestine which considered the primary host it is 5mm in length and composed of scolex and body.*

The larval stage called metacestode present in sheeps,horse,camel,man is accidentally infected called (intermediate host) .The cyst contains outer laminated layer & inner germinal layer from which broad caosule develop which contains scolices and fluid which is highly anti genic reaction.

Adult worm lives in dogs intestine ,dogs pass ova with stool on the grass which later on eaten by sheeps and lead to formation by hydatid cyst in their viscera ,sheep will sloughtened and another dog will eat thier viscera and the cucle will be repeated.

If the ova come on the vegitable and eaten by man this result in H.C of the man,but the cycle is not continue here because the man body is un usually accessible by dogs.

When the man takes infected vegetable ,ova will pass to the stomach and hatches to embryo &through the portal circulation pass to the liver and form the H.C or larval stage.

Some time these embryos pass through thruogh the systmic circulation to the lung forming H.Cof the lung or any where.

In the H.C of the lung the first reaction is that paranchymal lungtissue will react by forming fibrous tissue around the cyst called(adventitia)so it is apart of the host not from the cyst .

H.Cis composed of two layers inner germinal layer secrete fleid inside the cyst which is highly antigenic ,and excrete outer white acellular membrane called laminated layer ,so the only living part is the germinal layer.

The adventitia is called pericyst,laminated membrane is called ectocyst and germinal layer is called endocyst.

Through the process of budding the germinal layer will have broad capsule containing fluid and scolicies called hydatid sand.

Simple H.C is intact cyst while ruptured or infected one called complicated cyst.Ruptured H.C to the pleura is rare while rupturing to the bronchus is common:-

1ladventitial rupture only and the H.C is intact will separate the cyst from the tissue called PERIVESICULAR PNEUMOCYST.

2lpartial rupture with leake of few amount of fluid lead to partial collapse of the cyst forming currugated appearance calledWATER LLILY appearanc,this may end into:-formation of duaghter cysts or may ended by secondary bacterial infection and abscess formation.

3/some time the whole amount of the cyst will coughed out leaving only empty space called RESIDUAL SPACE.

4l comp;icated cyst may undergo calcification and appeare on x-ray as calcified H.C.

Clinical presentation:-

1l ASYMPTOMATIC very common which discovered accidentally discovered by x-ray for other causes.

2lpatients may present with irritative cough and s.t. hemoptysis.

3l if ruptured during acute stage anaphylactic shock .

4l if complicated by abscess formation then fever, chest pain with cough of mucupurulant sputum.

5l rupture to the pleura cause hydro-pneumothorax with sever S.O.B.

DIAGNOSIS:-

1l X-RAY:-chest x-ray will show all the stages of the disease ,the intact cyst has circular sharp margines ,other complicated cysts may has different appearance.

2l UlS of abdomen and chest:-to see the cyst and differentiate it from other conditions.

3lblood picture:-will shows eosinophilia.

4lImmunological reaction:-these are academic tests Kasoni test,Winburg test (CFT),Latix slide agglutination test.

5l SPUTUM examination:-for presence of scolices .

TREATMENT:-

Surgical treatment the treatment option if feasible.TWO surgical option:-
REMOVAL OF THE CYST:-
A-aspiration and evacuation technique,open the lung expose adventitia ,put syringe and aspirate the fluid the cyst will collapsethen remove the whole collapsed cyst.
B-Enucleation: remove the cyst completely intact after incision the adventitia.
C-Excision:remove the cyst with adventitia.
LUNG RESECTION:-
Surgical removal of the involved part of the lung ,this include segmental,lobar or total lung resection which is rarely done in cases of distructed lung ,lung abscess,or very big cyst destoy the lung.

MEDICAL THERAPY:-

Can kill small cysts indicated in:-

1lmultiple H.C all over the body.

2l the cyst is not accessible by surgery.

3l whene surgery is not feasible as in DM,very morbid patient.

Prevention

This is most important point.

Domestic dogs shoud treated with anti helmenthic drugs &srtay dogs should be kiled.

- *Farmed should be learned and educated to keep chlidren away from dogs and good cleaning of vegitable*

Thoracic surgery

Benign and malignant lung diseases

5th stage (1 hr)

Benign lung disease include a lot of condition which either due to congenital developmental condition that occurs during intrauterine period and appeared Shortly after birth which include tracheobronchial and parenchymal diseases. Tracheal stenosis, tracheo esophageal fistula, congenital bronchogenic cysts, congenital lobar emphysema are common recognized cases.

Benign lung tumors are also can be seen like hamartoma, lipoma, and firoma. Other tumors may arise from epithelial tissues like mucous gland adenoma, mucouscyst adenomas and pleomorphic adenoma.

Interstitial lung diseases include over 200 clinical entities that manifest by chronic progressive diffuse inflammation of the pulmonary interstitial like sarcoidosis and histoplasmosis-x.

Infectious lung diseases are common categories and the development of anti -biotic reduce the complication of infections that need surgical treatment the most common infections of concern with our entity includes:-

A Bacterial infection.

B mycobacterial pulmonary diseases.

C tuberculosis TB.

D hydatid disease of the lung H.C.

BRONCHIECTASIS

IS DEFINED AS permanent dilatation of the bronchi caused by recurrent process of transmural infection and inflammation.
The dilatation varies from cylindrical, tubular, varicose or saccular types.
The left lower lobe is the area mostly affected followed by lingual and the middle lobe, bronchiectasis can be caused by or associated with:-
A-infections of any types.
B-congenital cystic fibrosis, primary cilliary diskinesia.
C-immuno-difficiency (hypogammaglobulimemia).
D-sequel of toxic inhalation.
E-rheumatic conditions.
F-inflammatory bowel disease.

Patients presented with recurrent chest infections characterized by dyspnea and unremitting chronic cough productive of thick tenacious purulent sputum at morning commonly.
Hemoptysis is common and may be massive due to enlarged bronchial arteries.

Non productive cough indicative of upper lobe involvement auscultation reveals crackles, rhonchi in majority of cases.
Radiological findings is abnormal in most cases show focal areas of consolidation atelectasis and evidence of thickened bronchi classical appearance as (HONEY-COMB) or (TRAM LINE).
CT-scan is more sensitive and specific for the diagnosis.
TREATMENT:-
Non-surgical treatment should be the first choice directed toward treating the cause and long course of anti-biotic and postural drainage.
Surgical treatment indicated in cases of focal areas with recurrent symptoms, massive hemoptysis, in sever bilateral cases may mandate lung transplant.

LUNG ABCESS

LUNG ABCESS is well circumscribed cavity within the lung parenchyma filled with purulent material and air.
CAUSES OF LUNG ABCESS:-may be primary causes due to aspiration, necrotizing pneumonia and immuno-compromised infection.
Secondary causes:-bronchial obstruction by tumor or F.B inhalation.

Cavitating lesion such as neoplasm or pulmonary infarction.
Direct extension from neighbor organs from liver or gut.
Hematogenous spread from any where.

CLINICAL presentation first the constitutional symptoms, fever, rigor, sweating malaise and weight loss.

Cough, dyspnea, pleuritic chest pain. Productive cough of foul-smelling sputum, when the abscess ruptured to the tracheo bronchial tree.

Hemoptysis rarely complicating lung abscess of various degree.

The un involved lung can be soiled through a spill-over effect and produce respiratory failure.

Rupture into pleural space is UN common but can lead to empyema and fulminant sepsis.

Chest radiography shows cavitatory lesion within the lung with air fluid level.

CTscan is very helpful in delineating the exact anatomical lesion and the relation with the adjacent structure. In contrast to cavitations of the neoplasm (MALIGNANT ABSCESS) which has thick and irregular wall, lung abscess has thin and smooth outline.

In addition to standard lab tests all patients should undergo bronchoscope to asses' bronchial obstruction due to tumor or foreign body and possibility to obtain C/S.

TREATMENT OF LUNG ABSCESS:-

Medical treatment is successful in 85% of cases include prolonged antibiotic therapy for 6-8 weeks and resolution occurs within 4-5 months this accompanied by postural drainage and respiratory physiotherapy.

Transbronchoscopical drainage should be AVOIDED to protect contralateral lung from spillage of pus.

Percutaneous Trans thoracic needle aspiration can be done with excellent results.

Tube cavernostomy in which chest tube inserted in the abscess cavity directly after ensure pleural symphesis.

Surgical therapy directed toward resection of affected lobe and decortications with empyemectomy double lumen endo tracheal tube is preferred.

Pulmonary T.B

Annually 7- 8 million new cases of P.T.B with 2-3 million deaths per year.TB tend to occurs in the apical and posterior segments of the upper lobe and the superior segment of the lower lobe.
Medical therapy is the treatment of choice using multimodality therapy. surgery play important role in treating the complications related to TB and potential indication of surgery for pulmonary TB are:-
A –open positive cavity after 3-6 months of therapy.
B –persistent +ve sputum with local pathology.
C – (-ve) sputum with destroyed lung.
D –local infection with atypical micro organism.
E –recurrent or persistent hemoptysis.
F –thick wall cavity slow response and to exclude malignancy.

Bronchogenic carcinoma

Lung cancer is the most common cause of cancer death and it kills more than breast, prostate and colon cancers collectively.
Only 15% of bronchogenic carcinoma diagnosed in early stages and 5 years survival rate is only 14%.
ETIOLOGY:-
1-cigarette smoking.
2-enviromental factors.
3-genetic factors.

Lung cancer is very aggressive tumor and 80% are centrally located, for simplicity of treatment Options and prognosis bronchogenic carcinoma divided into to groups small cell lung cancer (SCLC) and nonsmall cell lung cancer (NSCLC) each of these two groups share a lot of prognosis and treatment modality.
SCLC considered as systemic disease and usually has distant metastases at the time of diagnosis making the surgery NOT the first line of treatment.

Clinically 10-20%of patients discovered accidentally while most patients seen have symptoms delayed and have stage 3 or 4 of the disease (advance).
THORACIC SYPMTOMS include cough, hemoptysis, chest pain, shoulder pain, hoarseness of voice, Horners syndrome.
EXTRA-THORACIC SYPTOMS these are findings that are related to primary or secondary tumor and some times are mediated by hormonal mediators presented as cachexia(loss of weight),loss of appetite parathyroid like hormones with concomitant

hypercalcaemia,hypertrophic osteoarthropathy(clubbing of fingers)and various neurological manifestations.

DIAGNOSIS:-

A –non invasive includes CXR, CTscan, sputum cytology,PET,bone scan,MRI and molecular tumor markers.

B –invasive techniques include

1- Bronchscopy: direct visualizing the tumor and taking samples for examinations.
2- PERCUTANEOUS TRANSTHORACIC NEEDLE ASPIRATION.
3-Mediastinoscopy.
4-Scalene L.N biopsy.
5-VATS.
6-Thoracotomy for direct exploration and excisional biopsy.

TREATMENT:-

Surgical treatment is the only therapy offers hope for survival when it is feasible.

Radiation therapy is local control treatment modality, it provide local control advantage but NO survival advantage.
Multi-agent chemotherapy is useful particularly in small cell lung cancer and metastatic tumor. IMMUNOTHERPY may be used in pulmonary malignancy.
Treatment of early stages of lung cancer (stage 1&2) may successfully be treated by surgery alone and yields long term survival.lobectomy and L.N dissection is the procedure of choice for tumor confined to one lobe.
In advance stages surgery may carries risk because of occult metastasis and multi-modality chemotherapy and radiotherapy improve the survival rate.
All these modalities considered as palliative therapies so the surgery is the only curable treatment when it is feasible.

Clinical

A. History

B. Examination
C. Investigation
1.Thoracic
2.Vascular
3.Cardiac.