The General Organization For
Teaching Hospitals and Institutes
Technical Affairs

الهيئة العامة للمعاهد
والمستشفيات التعليمية
الأمانة الفنية

Cardiothoracic Protocol

2024

Practical application of knowledge:

It is evidenced through clinical and technical skills. Each topic has a competence level ascribed to it in the areas of clinical and technical skills ranging from 1 to 4:

1. observation at this level the trainee:

- has adequate knowledge of the steps through direct observation
- can handle instruments relevant to the procedure appropriately and safely
- can perform some parts of the procedure with reasonable fluency.

2.Assistance ; at this level the trainee:

- knows all the steps - and the reasons that lie behind the methodology
- can carry out a straightforward procedure fluently from start to finish.
- knows and demonstrates when to call for assistance/advice from the supervisor (knows personal limitations).

3. Can do whole but may need assistance; at this level the trainee:

Recognizes and makes a correct assessment of common problems that are encountered.

4. Competent to do without assistance, including complications.

General Principles

Cardiopulmonary bypass

A day per week, outside operative days, all the period of his residency

Cardiac Surgery ICU; management of post cardiac surgery patients,

12 hours on a weekly basis, outside operative days, all the period of his residency

Research

Contribute in an annual research work for publishing, not related to his master degree study or related research

Trauma

During his training as a part of the trauma team in all his rotations.

Rotation (Alphabetical)

Adult Cardiac Surgery (3 yearsmonths 3 &)

Cardiology (6 months)

Congenital Cardiac Surgery (6 months)

Thoracic Surgery (6 months)

Vascular Surgery (3 months)

Required Basic Knowledge

- Anatomy
- Physiology
- Pharmacology
- Clinical skills and judgement
- Examinations
- Hand skills
- Investigations
- Decision Making
- Communication skills.

Vascular Surgery

Duration; 3 months

Training Place; Governmental specialized center

Required Knowledge.

Anatomy of the blood vessels

carotid arteries ,axillary vessels ,subclavian vessels ,thoracic aorta ,abdominal aorta ,illiac vessels ,femoral vessels.

Physiology :

arterial circulation ,venous circulation and capillary circulation.

Pharmacology :

vasopressor medications and vasodilator agents

Clinical; History and examination

Investigations:

Arterial Doppler and duplex reading and performing

ReadingCT arteriography.

Operative skills :

Management of various vascular injuries.

Femoral and axillary exposure.

EVAR ,TEVAR

Diseases:

Peripheral vascular disease.s

Cardiology

Duration; 6 months

Training Place: cardiology department.

Required Knowledge:

Anatomy:

Chest , heart and blood vessels

Physiology:

Action potential ,Cardiac cycle ,arterial blood pressure, arterial ,venous and capillary circulation.

Pharmacology:

Anti-hypertensive medications ,anti-ischemic agents ,anti-failure medications

Thrombolytic ,anti-platelets ,NOACS

Clinical; History and examination

Investigations:

ECG

Echo

TTE&TEE

CT coronary angiography &CT aortography &CT pulmonography

Basic angiography

Diseases:

Pulmonary edema ,Pulmonary embolism

Ischemic heart disease

Hypertension

Rheumatic fever

Infective endocarditis

Arrhythmia

Pericardial diseases

Wire based : techniques

- Femoral access
- Radial access
- Diagnosticcoronary .angiography
- TAVI
- TEVAR

- **Thoracic Surgery**

Duration; 6 months

Training Place; Governmental specialized center

Required Knowledge;

Anatomy:

- Thoracic cage
- Pleurae
- Lungs
- Mediastinum
- Pulmonary artery
- Pulmonary veins
- Thoracic duct
- Esophagus

Physiology:

.Respiratory function

Pharmacology:

Anti-tuberculous

Antibiotics

Mucolytics

Bronchodilators

Clinical:

History and examination)

Preoperative evaluation

Investigations:

- Plain X-ray interpretation
- CT interpretation
- Pulmonary Function Test
- Ventilator management
- Bronchoscopy
- Procedures and Operative skills
- ICT insertion
- Various thoracic incisions

Diseases

Pleural Diseases and Surgery

Lung diseases and surgery

: Techniques

- Thoracotomy
- Minimallyinvasiveincisions.
- Diagnostic&therapeuticrigid/fiberopticbrochoscopy(includingairwayFBremoval)
- Thoracotomyinanemergencysetting.
- Lungresections.
- Intercostal tube insertion and care indifferentage groups
- Bullectomy/blebectomy&pleurodesisforpneumothorax
- Pleuraleffusiondrainage
- Decorticationforempyema
- Mediastinalmassbiopsy
- Drainageofmediastinalinfections
- Rewiring& dewiringofthesternum
- Pectoralflap
- Omentalflap

Congenital cardiac Surgery

Duration; 6 months

Training Place; National Heart Institute

Required Knowledge;

Embryology

Anatomy

Physiology :foetal circulation.

Pharmacology

Nutrition ,intropic support

Clinical; History and examination)

Investigations

Operative skills

- ASD closure
- VSD closure
- PDAligation
- Pulmonaryarterybanding
- Cavopulmonaryshunt
- RepairofTOF
- Repairof SAM
- RepairofcoarctationoftheAorta

Adult cardiac surgery

Duration; 3 years

Required Knowledge;

Anatomy

Aorta, Heart, Saphenous vein, Thoracic duct, Femoral anatomy, Internal mammary artery, Radial artery, Phrenic nerve

Physiology

Heart lung machine

Myocardial protection.

Cardioplegic solutions

Clinical; History and examination.

Investigations

- ECG,
- ECHO (Interpretation), echocardiography (transthoracic and transesophageal), including 2D, Doppler, 3D and stress echo
- Coronary angiography; Interpretation of Coronary Angiography (including invasive flow measures (FFR etc.) and Ultrasound (IVUS)
- CT
- MRI
- .Myocardial perfusion imaging (MPI)

: **Surgical techniques***Ordered according to the surgical progress of the resident.*

- .Saphenous venous graft harvesting
- Median Sternotomy
- .Radial artery harvesting
- .Sternal closure
- .Internal thoracic artery harvesting (pedicled then skeletonized)
- .Aortic valve replacement
- .Proximal coronary anastomosis
- .Mitral valve replacement
- Tricuspid valve repair
- .CABG surgery
- IABP insertion.
- Myexoma excesion
- Minimally invasive surgery
- Redo sternotomy.
- Pericardiectomy
- .Adult congenital surgeries
- .Mitral valve repair
- Off pump CABG.
- Operations for aortic anureysm.(Bental ,David procedure.....)
- Atrial fibrillation surgery
- Valve-sparing aortic root procedures.
- Transcatheter aortic valve replacement (TAVR)
- PacemakerInsertionandremoval
- ECMO

ResearchProject

The trainee should publish at least two papers either a prospective/retrospective research during the training program underthe guidance and supervision of his/her trainer.

educationalactivities:

a) Lectures
b) Morbidity-Mortality
c) Journalclub

Meetings:Clinicalmeetingswithcardiologydepartment(heart team meetings).

d) Researchactivities:includingthepreparationoftheallocatedresearchreportanddatacollection
e) Grandrounds once per week.

:Performance of the cardithoracic residents

InEmergencyroom

1- Thefirstoncall;conductsprimaryassessmentandmanagementofsurgicalpatientsinER
2- Suggestsadmissionofpatients andtakestheopinionofhisconsultant

Inwards&ICU

1- Clerkingofalladmissions(history,generalandcardiac/thoracicclinicalexamination)ands uggests basicinvestigations andplanof management
2- Performdailyrounds
3- Takes informed consent from patients
4- Writedetaileddailyprogressnotes
5- Arrangedischarge,homemedicationandfollowupappointmentsofinpatients
6- Assists in various bedside procedures and basic monitoring techniques; includingintubation, arterial line insertion, CVC insertion, wound dressing, skin stitches, bloodtransfusion,andphlebotomy,venisection,pericardiocentesisandICT insertion.
7- Assesspatientsforreopeningandcallforseniorstaff
8-Administrationofemergencydrugsafterconsultation.
9- Follow and obtains various results of investigations and reports abnormal results toseniors
10- Followupreferralofpatientstootherspecialties
11- Observesseniorsexplainingtopatientsthemethodsofmanagement,prognosisoftheirillne ss anddiscusses thisprocess with seniors
12- Checkscompletenessofmedicalreportsofpatients
13- Participatesinpreandpostoperativeassessmentofthepatient.

InOPD

1- Attends the surgical admission clinic with other senior staff
2-Attendstheoutpatientcardiacsurgical clinic
3- Completesvarioushospitalforms

InOR

1- Participatesinbasicoperativeplanning
2- Participatesinadultcardiacsurgicalproceduresandperformssomeundersupervision
3- PerformsindependentlyCPB.
4- Learnshowtowriteoperativenotesandpostoperativeorders

Learns the usage of various operative instruments and implants

Educationalactivities

1- Presentscasesinrounds

2- Participatesingrandroundsandjournalclubs

3- Attendsalleducationalactivitiesof thetrainingprogram

4- Attendslocaleducationcoursesandbasiccourses

5-Learnstoprepareaudiovisualmaterialsforpresentations

:Residents rotations

- .In the 1st years 1-9 month adult cardiac surgery and from month 10-12 vascular surgery
- .In the 2nd year 1-6 month adult cardiac surgery and from month 7-12 thoracic surgery
- .In the 3rd year 1-6 month adult cardiac surgery and from month 7-12 cardiology
- .In the 4th year 1-6 month adult cardiac surgery and from month 7-12 congenital cardiac surgery
- .In the 5th year adult cardiac surgery

The following table is theminimum requirement for the training program ;the resident should either perform or 1st assistant in the procedure:

Procedure	1st year With vascular surgery	2nd year With Thoracic Surgery	3rd year With cardiology Rotation	4th year With congenital	5th year
Saphenous venous graft harvesting	**20**	**15**	**20**	**5**	
Median Sternotomy	**30**	**20**	**20**	**20**	
Radial artery harvesting	**5**	**5**	**5**	**5**	
Sternal closure	**30**	**20**	**20**	**20**	
Internal mammary artery harvesting		**5**	**20**	**40**	**50**
Vascular access forremoval and axillary arteries	**5**				
Aortic valve replacement		**1**	**5**		
Proximal coronary .anastomosis		**5**	**10**		**30**
.Mitral valve replacement			**5**	**10**	**15**
Tricuspid valve repair			**2**	**4**	**8**
CABG surgery on pump				**1**	**5**
CABG surgery off pump					**1**
IABP insertion.				**1**	**1**
Myexomaexcision.			**1**	**1**	**2**
Combined surgical procedure				**1**	**3**
Minimally invasivesurgery .					**1**

Redo sternotomy.	**2**	**5**	**10**
Pericardiectomy.	**1**	**2**	**5**
.Adult congenital surgeries			**2**
.Mitral valve repair			**2**
Operations for aortic aneurysmBental ,David). (.....procedure			**2**
Atrial fibrillation surgery.			**1**
Valve-sparing aortic root procedures.			**1**
PacemakerInsertionandremoval.			**1**
ECMO			**1**

In the 1st year plus doing the procedure mentioned in the previous table the candidate should perform or participate as a first assistant in the following procedure during the vascular rotation:

Vascular access forremoval(5).and axillary arteries cases

In the 2nd year plus doing the procedure mentioned in the previous table the candidate perform or participate as a first assistant in the following procedure during the thoracic surgery rotation:

Thoracic surgery

- Intercostaltubeinsertion 30
- Thoracotomy10
- Minimallyinvasiveincisions5
- Diagnostic&therapeuticrigid/fiber-optic brochoscopy(includingairway
- FBremoval)10
- Thoracotomyinanemergencysetting2
- Lungresections 20
- Bullectomy/blebectomy&pleurodesisforpneumothorax5
- Pleuraleffusiondrainage 20
- Decorticationforempyema 10
- Mediastinalmassbiopsy5
- Drainageofmediastinalinfections10
- Rewiring& dewiringofthesternum10
- Pectoralflap5
- Omentalflap2

In the 3rd year plus doing the procedure mentioned in the previous table the candidate perform or participate as a first assistant in the following procedure during cardiology rotation:

:**Cardiology rotation**

Diagnosticcoronary(10) .angiography

.(10) TAVI

.(5) TEVAR

In the 4th year plus doing the procedure mentioned in the previous table the candidate perform or participate as a first assistant in the following procedure during congenital rotation:

Congenital :

- ASD closure 10
- VSD closure5
- PDAligation5
- Pulmonaryarterybanding5
- Cavopulmonaryshunt5
- RepairofTOF5
- Repairof SAM5
- RepairofcoarctationoftheAorta5

In the 5th year the candidate should perform or 1st assistant in all the cardiac surgery procedure in the table with the minimum number mentioned.

Curriculum of cardio-thoracic surgery:

Alltraineesmustbeable tocompetentlyapplytheknowledgeofbasicsciencewheninterpretingclinical investigations andin thepractice ofCTS.

CARDIACANATOMY&HISTOLOGY

All trainees must be able to describe the anatomical & histological basis of cardiac andvascular structures.They must apply this knowledge when interpreting clinical symptoms,signs and investigations in the practice of CTS with special emphasis on applied anatomyrelevant to clinical methods of assessment, surgical approach and management in cardiacsurgery.

Overview:Heart,Pericardiumandmediastinum
CardiacChambers
ValvularAnatomy
Anatomyoftheconductionsystem
Coronaryarteries& veins
Anatomyof vascularsystem
Histologicalstructureoftheheartandbloodvessels
Anatomicalbasisof Cardio-Surgicalincisions
Mediansternotomy
Thoracosternotomy
Thoracotomy
Minimallyinvasiveincisions

CARDIACPHYISIOLOGY

Alltraineesmustbeabletodiscussphysiologicalbasisofcardiacactionandthatofsystemic and pulmonary circulation. They must apply this knowledge when interpretingclinicalsymptoms, signs andinvestigationsinthepracticeofCTS.

Physiologicalpropertiesofcardiaccells
Cardiaccycle
Thepumpenergetic
Coronaryblood flow
JVPandarterialpulseandheartsounds
Bloodpressureindifferentclinicalsettings
Electrophysiologicalbasisof ECG

PHARMACOLOGY

All trainees should demonstrate deep understanding of the classification, pharmacokineticsandpharmacodynamicsofdrugsusedinthefieldofCTS.Theymustapplythisknowledgeinpatientmanagement.

Drugspharmacokinetics.
Modeofaction,indications,contraindications,interactionsand adversereactionsandadequatedosingof cardiovasculardrugs.
Effectsofage,bodysize,organdysfunctionandconcurrent illnessondrugdistribution andmetabolism.
MonitoringdifferentdrugsusedinCTS (e.g.anticoagulants).
Selection,timinganduseofantibiotics

CARDIACPATHOLOGY

All trainees should be able to discuss the pathological basis of different forms of CVdiseases. They must apply this knowledge when interpreting clinical symptoms, signs andinvestigations.

General
Responsetoinflammation
Blood-surfaceinteractions
Tissue-Surfaceinteractions
Vasculargrafthealing
Ischemicheartdisease
Atherosclerosis
Ischemicmyocardialinjury
MyocardialInfarctionandcomplications
Valvularheartdisease
DegenerativeAorticcalcification
Mitralannularcalcification
Rheumaticheartdisease
Infectiveendocarditis
Myxomatousdegenerationofmitralvalve
Myocardialdisease
DilatedCardiomyopathy
HypertrophicCardiomyopathy
Restrictivecardiomyopathy
Myocarditis
Neoplasticheartdisease
Myxoma&Primarycardiactumors

PERIOPERATIVE MANAGEMENT OF CARDIOSURGICALPATIENTS

Alltraineesshoulddemonstratecompetenceinassessingandmanagingpatientseligibleforcardiac surgerypre,intra &postoperatively.

PREORERATIVEMANAGEMENT

HistoryTaking

Differentelementsofhistory • Ischemicsymptoms • Leftsidedheartsymptoms • Rightsidedheartsymptoms • Symptomsofinfections • Embolicsymptoms

Clinical Examination & Assessment

The basis and relevance of physical signs • Vitalsigns • General physical signs relevant to cardiac diseases • Local signs of cardiac diseases

Pre-Operative laboratory evaluation

Basicroutinepreoperativelabstudies
Diseasespecificlabstudiese.g.Inflammatorybiomarkers, acutephasereactants,.....etc

Pre-Operative Imaging

Echocardiography;indications,patternindifferentdiseasesand advancedechocardiographye.g.TEE,DSE
Cardiac catheterization; indications, limitations and complications
Multi-slice-CT(MSCT);indicationsand limitations
Nuclearimaging;methodstoassessmyocardialviabilityand theirlimitations
CardiacMRI;indicationsandlimitations

Exercise ECG Test

Indications&contraindicationsforexercise ECGtesting

Mortalityand morbidityrisk assessment

Euroscoreforassessmentofoperativeriskinadultcardiacsurgery
Aristotlescoreforassessmentofoperativeriskincongenitalheartsurgery

NONSURGICALINTRA-OPERATIVEMANAGEMENT

Anesthesiaincardiacpatients
Intraoperativeechocardiographyassessment
ExtracorporealCirculation
Perfusionsystemscomponents
Perfusionteam
Assembly of heart lung machine (HLM) &Priming
Deephypothermiccirculatoryarrest
Ante-gradeandretrogradecerebralperfusion
Complicationsandriskmanagement:Massiveairembolism Thrombosisandbleeding
Acuteinflammatoryresponsetocardiopulmonary bypass
Transfusiontherapyandbloodconservation
Autologousblooddonation
Pharmacological strategies for blood conservation
Topicalhemostaticagents
Plateletinhibitorsandtheireffectonblood usage
MYOCARDIALPROTECTION
Ischemicandreperfusioninjury
Cardioplegictechniques
Systemichypothermiaandelectivefibrillatory arrest
NonCardioplegictechniques

Myocardial protection during beating heartsurgery
Temporarycirculatorysupport:Intra-Aorticballoondevice&Ventricularassistdevices

Cardiacprocedures

SURGICALINCISIONSINDIFFERENT AGEGROUPS	
Mediansternotomy	
Thoracotomy	
Minimallyinvasiveincisions	
EXTRACORPOREALCIRCULATION	
Cannulationandbypass	
Weaningfrom bypass	
Intra-Aorticballoondevice	
MYOCARDIALPROTECTION&BODYORGANPRESERVATION	
MyocardialprotectionduringCABG	
Myocardialprotectionforvalvularsurgery	
Myocardial protection for congenital heart surgery	
Myocardial protection during beating heart surgery	

.POSTOPERATIVECAREOFCARDIACSURGICALPATIENTS

CardiacComplicationanticipationandtreatment
Supportofcardiacperformance;pharmacological mechanical
Postoperativebleeding;causes&mechanisms
Postoperativemajororgandysfunction;pathogenesis and management (lungs & pleura, kidney, liver, nervoussystem,GIT&blood)

CORONARYARTERYDISEASE(CAD)

All trainees should demonstrate deep understanding of the pathophysiologic causes andderangement of ischemic heart disease that enable them to carry out assessment andmanagement of patients with ischemic heart diseases and anticipate the sequel of coronaryevents with consequentapplicationofthe appropriateprocedure

PreoperativeEvaluation

Symptomsofcardiacischemia&ACS(acutecoronarysyndromes)
Risk stratificationforCAD;SYNTAXscore&Euroscore
Noninvasivetestingforischemicpatients
Invasivetesting
Coronaryangiography
Multi-sliceCTcoronaryscan
Guidelinesof coronaryrevascularization
Medicalmanagement
PercutaneousCoronaryIntervention(PCI)

CoronaryArteryBypassGrafting(CABG)

RationaleandhistoryofCABG
Indications
Conduitchoice
Conventionaltechniques
NewTechniquesinCoronarySurgery
OPCAB
Minimallyinvasivecoronarysurgery and robotic surgery

PostoperativeComplications;Early& Late
OutcomeandLongterm results
Longtermmanagement
Redo CABG; indications , preoperativeworkup,inoperativetechniques &outcomes
Combinedvalve/CABG
CombinedCABG&aortic valvesurgery
CombinedCABG &mitralvalvesurgery
Saphenousveinharvest
Harvestingof Mammaryartery
Radialarteryharvest
Proximalcoronaryanastomosis
Distalcoronaryanastomosis
On-pumpCABG
Off-pumpCABG
CABGwithValvesurgery

MechanicalComplicationsofCAD

Ischemicmitralinsufficiency
PostinfarctionVSD/VSR
Freewallventricularrupture
Leftventricularaneurysms

Combinedcoronaryandcarotidarterydiseases

Guidelinesofcombinedcoronaryandcarotidarterydisease

STRUCTURALHEARTDISEASES

Learningobjective

Alltraineesshoulddemonstrateadequateknowledgeanddeepunderstandingoftheepidemiology, pathophysiology and clinical presentations of valvular heart diseases thatenable them to carry out pre-operative risk assessment and management of these patientsandassesstheoutcomes.

PerioperativeManagement

RiskAssessmentAndStratification
GuidelinesandtimingforSurgicalIntervention
ValveDesign(Configuration,Materials&Biomechanics)&typesofProsthesis
ComplicationsOfSurgery
Valverelatedcomplications
Bleedingandredosurgery

AorticValveDisease

Etiology& pathologicAnatomy
Pathophysiologyandhemodynamic
Naturalhistory& Complications
TAVI; (indications, contraindications, multidisciplinary team,technique,complications,andoutcome)
OperativeManagement
Indications,contraindications,riskstratificationand guidelines.
TechniquesofValveReplacement
ManagementOfSmallAorticRoot
Homograftandauto-graftvalveReplacement
Management of Complications

Outcomes;Early& Late
Aortic valve replacement - Aortic valve repair

MITRALVALVEDISEASE

EtiologyAndPathologicAnatomy
Naturalhistoryandcomplications
NonSurgicalManagement
GuidelinesofMedicaltherapy
BalloonValveDilatation
SurgicalManagement
TechniquesOfMitralValveReplacement
TechniquesOfMitralValveRepair.
Managementofcomplications
Outcomes;earlyand late
Mitralvalvereplacement
Mitralvalverepair.
Removalofleftatrialthrombus

TricuspidValveDisease

EtiologyAndPathologicAnatomy
Naturalhistory& complications

NonSurgicalmanagement
Medicaltherapy
Balloonvalvuloplasty
SurgicalManagement
Guidelinesforsurgicalmanagement
Tricuspidvalverepair(indications,contraindications, technique,complications& outcomes)
Tricuspid valve replacement (indications, contraindications, technique, complications & outcomes)
Tricuspidvalverepair
Tricuspidvalvereplacement

ENDOCARDITIS

Etiology&Causativeorganisms
NaturalHistory&Complications
Native&prostheticvalveinfectiveendocarditis
Non-SurgicalManagement
SurgicalManagement
Indicationsforsurgeryandguidelines
Techniquesofvalverepairandreplacement;(aorticroot abscess
Outcomes;Early& Late

COMBINEDVALVELESIONS

Multi-valvularLesions
CongenitalHeartDisease&ValveLesion

REDOSURGERY

Techniques,indications,contraindications,complications,andoutcomes
Redovalvesurgery
SurgeryForEmergency/StuckValve

DISEASESOFAORTA&GREATVESSELS

LearningObjective

Alltraineesshoulddemonstrateadequateknowledgeanddeepunderstandingoftheepidemiology, pathophysiology, classifications and clinical presentations of aortic dissection,aortic aneurysmand pulmonary embolism that enablethemto carry outrisk assessmentandmanagementofpatientspresentingwiththesediseasesandassesstheoutcomes.

AorticDissection

Epidemiology&definitions
Pathophysiology
Atheroma,medialnecrosisandarteritis
Inheriteddisordersofvascularbiology
Naturalhistory,Classifications&ClinicalPresentation
Diagnosis&Management
Outcomes

AorticAneurysms

EpidemiologyandNaturalhistory
Pathophysiology
Medialdegeneration
Infections
Inflammations
Bicuspidaorticvalve
ClassificationsandClinicalpresentation
Nonsurgicalmanagementandoutcomes

Surgicalmanagementandoutcomes
Bentaloperation
Valvesparingoperations

PulmonaryEmbolism(Acute &Chronic)

Epidemiology&Pathophysiology
Clinicalpresentation&Diagnosis
Management&Outcomes
Surgeryforpulmonaryembolism

SURGERYFORCARDIACARRHYTHMIAS

Alltraineesshouldbeabletodecidewhentoresorttosurgicalmanagementforcardiacarrhythmiaand applythebasis of mainoperations in thisfield

Cardiacarrhythmia

Tacky/Bradyarrhythmia
ECGdiagnosisforarrhythmia

SurgicalManagementofAtrialFibrillation

Anatomical/ElectrophysiologicalbasisofAtrialFibrillation(AF)
TheMazeprocedure
TechniquesforAFAblationduringMitralvalvesurgery
AblationforAF

SurgicalManagementofVentricularArrhythmias

Typesandinitialmanagement

RevascularizationintreatmentofventricularArrhythmias
Leftventricularreconstruction

Pacemakers

TypesofPace-Makers
Indications&TechniquesofPace-Makersinsertion
Complications&follow-upofPace-Makerinsertion
PacemakerInsertion andremoval

ImplantableAutomaticdefibrillators

Indicationsandtypes
Deviceimplantationtechniques

CARDIAC NEOPLASMSANDPERICARDIALDISEASES

Learning objective: All trainees should be able to differentiate between different types ofprimary and secondary cardiac neoplasms and apply that to the management of patients.They should demonstrate adequate knowledge and deep understanding that enable them tocarryout assessmentandtreatmentofpatientswith pericardialdisease.

Cardiactumors
Cardiacmyxomaandmanagement
Primarycardiactumorsotherthanmyxoma
Secondarycardiactumors
Surgicalresectionof cardiacmyxoma
Pericarditis
Acutepericarditis(infective,idiopathicormalignant)
Chronicpericarditis
Constrictivepericarditis
Pericardiectomyforconstrictivepericarditis
Pericardialeffusion

Typesandclassifications
Postoperativepericardialeffusion
Malignantpericardialeffusion
Cardiactamponade
Pericardialdrainage
Pleuro-pericardialwindow
Pericardialtumors
Typesofpericardialtumours

SURGERYFORHEARTFAILURE

LearningObjective

All trainees must be able to discuss hemodynamics related to heart failure (HF). They mustapply this knowledge in diagnosis and management of patient with heart failure and decidewhento resortto surgical management.

HeartFailure

Etiologyandpathophysiologyof HF
RestrictiveanddilatedCardiomyopathy
Complicationsof HF
MedicalmanagementandoutcomeofHF

NontransplantSurgicalManagement

CABG
Valverepairandreplacement
Dynamicmyoplastye.g. latissmusdorsiflap
Ventricularreconstructione.g.Dorprocedure
Resynchronizationtherapy
Biomedicaldevices
Ventriculararassistingdevices
Totalartificialheart
StemcelltherapyandTissueengineering
Ventricularreconstructione.g.Dorprocedure
Ventriculararassistingdevices(VAD)

CARDIACTRANSPLANTION

Imunobiologyofhearttransplant
Indicationandcontraindicationforhearttransplant
Recipientselection
Donorselection
Organpreservation
Operativetechniquesforhearttransplant
Postoperativecomplicationsandmanagement
Xenotransplant
Retransplant
Operativetechniquesforhearttransplant

CONGENITALHEARTDISEASE

Learningobjective

Alltraineesshoulddiscussthepathophysiologyandhemodynamicchanges inCHDandapplythis knowledgein management ofthispatient population

BASICSCIENCE

Anatomyandembryology
Pathophysiology&hemodynamics
TypesofpatchesandconduitsusedinCHD

LEFTTORIGHTSHUNTLESIONS

Atrialseptaldefects(ASD)andpartialanomaliespulmonaryvenousdrainage (PAPVD)
Ventricularseptaldefects(VSD)
Atrioventricularseptaldefects
Patentductusarteriosus(PDA)
ASD closure
VSD closure
PDAligation
Pulmonaryarterybanding

CYANOTICCHD

TetralogyofFallot(TOF)
Ductdependentcirculation
Univentricularheart
Fontanoperation

Cavo-pulmonaryshunts
Palliative & definitivesurgery (indications, contraindications,complicationsandoutcomes)
Cavopulmonaryshunt
RepairofTOF

ObstructiveCHD

Aorticcoarctation
Pulmonarystenosis
Interruptedaorticarch
Subaorticmembrane(SAM)
Repairof SAM
Repairofcoarctation

Grownupcongenitalheartdisease(GUCH)

Latepresentationof CHD
Managementof surgicalsequelaeofCHD
Stagedmanagementof CHD

. THORACICSURGERY

Basicscience

All trainees should be able to discuss the anatomy of the lungs and their relationship toadjacent structures, the physiology of airway mechanics, gas exchange, and blood flow, andthebasicrespiratorypharmacologyandapplythisknowledgetoclinicalmethodsofassessmentand managementin thepracticeofthoracicsurgery.

Anatomy
AnatomyofLungs,pleuraandtracheobronchialtree
Anatomyof Chestwall
Anatomical basis of different types of thoracic incisions
Physiology
PhysiologyofRespiration
PhysiologyofPleuralfluidformation
Physiologicalbasisofpulmonaryfunctiontests
Pharmacology
Bronchodilators
Corticosteroids

PerioperativeManagementofPatientsUndergoingThoracicSurgery

Alltraineesshouldddemonstratecompetenceinassessingandmanagingpatientseligibleforthorac ic surgerypre, intra& postoperatively.

PREORERATIVEMANAGEMENT

HistoryTaking

Differentelementsofhistory • Local&Systemicsymptomsofmalignancy • Paraneoplasticsyndrome • Symptomsofpleuropulmonaryinfections
• Social&occupationalhistory

ClinicalExamination&Assessment

Thebasisandrelevanceofphysicalsigns • Vitalsigns • Generalphysicalsignsrelevantto chestdiseases • Localsignsofchestdiseases

Pre-Operativelaboratoryevaluation

Basicroutinepreoperativelabstudies

PerioperativeManagementofPatientsUndergoingThoracicSurgery

Alltraineesshoulddemonstratecompetenceinassessingandmanagingpatientseligibleforthoracic surgerypre, intra& postoperatively.

PREORERATIVEMANAGEMENT

HistoryTaking

Differentelementsofhistory • Local&Systemicsymptomsofmalignancy • Paraneoplasticsyndrome • Symptomsofpleuropulmonaryinfections
• Social&occupationalhistory

ClinicalExamination&Assessment

Thebasisandrelevanceofphysicalsigns • Vitalsigns • Generalphysicalsignsrelevantto chestdiseases • Localsignsofchestdiseases

Pre-Operativelaboratoryevaluation

Basicroutinepreoperativelabstudies
Diseasespecificlab studiese.g. tumormarkers,.....etc

Pre-OperativeImaging

CTchest;types,indicationsandlimitations
PET-scan;indications&limitations
ChestMRI;indicationsandlimitations
Bonescan;indications&limitations
Ventilationperfusionscan;indications&limitations

Mortalityand morbidityriskassessment

Thoracoscoreforassessmentofoperativeriskinthoracic surgery

NONSURGICALINTRA-OPERATIVEMANAGEMENT

Anesthesiainthoracicsurgerypatients
Doublelumenendotrachealtubes;indications&complications

Thoracicprocedures

SURGICALINCISIONSINDIFFERENT AGEGROUPS
Thoracotomy
Minimallyinvasiveincisions
Diagnostic&therapeuticrigid/fiberopticbrochoscopy(including airwayforeignbodyremoval)

PostoperativeManagement

Postoperativepleura-pulmonarycomplications;causesand management
Postoperativebleeding;causes&mechanisms
Postoperativemajororgandysfunction
Postoperativeairleaks;causesandmanagement
Postoperativepain;mechanismsandmanagement
Latepostoperativecomplications;stumpfailure&space problems

Cardiothoracictrauma

All trainees should be able to assess and manage the different types of cardiothoracictrauma. In addition they should be able to carry out and supervise advanced life supportmanagementof thesepatients.

Chestwalltrauma
TraumaticIntrathoraciccollections
Pulmonarytrauma
Tracheobronchialinjuries
Cardiacinjuries
Traumaofthethoracicaortaandgreatvessels
Diaphragmaticinjuries
Esophagealinjuries
Thoracotomyinanemergencysetting

NeoplasmsandInfectionsoftheLung

Alltraineesshouldhavedeepknowledgeandunderstandingthatenablethemtoassessandmanagepatients withlunginfectionsandprimaryLungtumors.

Pathologicalclassificationofmalignantlunglesions
Stagingsystemsforlungcancer
Multidisciplinarymanagementof lungcancer
BenignLungNeoplasms
Thesolitarypulmonarynodule
Secondarypulmonarytumors
DifferenttypesofLunginfection;assessment&management
Lungresections

Chest wall Anomalies

All trainees should understand and discuss common congenital chest wall abnormalities andtheirmanagement.

Pectusexcavatum
PectusCarnitaum

Diseases of the Pleura

All trainees should have deep knowledge and understanding of the pathophysiology ofdifferenttypesofpleuraldiseasesthatenablethemindiagnosisandmanagementofpatientspresentin gwith thesediseases

Pneumothorax
Benignandmalignantpleuraleffusions
Infectionsofthepleura
Pleuraltumors
SpontaneousandiatrogenicChylothorax
Intercostaltubeinsertionandcareindifferentagegroups
Bullectomy/blebectomy&pleurodesisforpneumothorax
Pleuraleffusiondrainage
Decorticationforempyema

DISORDERSOFTHEMEDIASTINUM

All trainees should have deep knowledge and understanding that enable them to diagnoseandmanagepatientswithMediastinallymphomaandinfectionsandurgentlymanagepatients with superior vena cavalsyndrome.

Mediastinallymphoma
OtherMediastinalmasses
Mediastinalinfections
Superiorvenacavalsyndrome
Mediastinalmassbiopsy
Drainageof Mediastinalinfections
Rewiring& dewiringofthesternum
Pectoralflap
Omentalflap

CORECOMPETENCIES

ClinicalAssessmentandManagement

Alltraineesshouldbe ableto:

Take a directed clinical history from a patient, (which is appropriate fortheclinicalproblemand the individualpatient's needs).
Examinethepatientbothgenerally&andregionally(heartandchest).

Formulateanevaluationplanforappropriatemedical,laboratory,andimaginge xaminations.
Prioritize,selectandinterpretrelevantinvestigation

- Laboratory tests
- ECG, exercise test
- Chestx-ray,CT&MRI
- Echocardiography;TTE, TEE& DSE
- Coronaryangiography
- Multislice CT,coronaryscan& cardiac MRI
- Nuclearimaging
- Pulmonaryfunctiontests

Constructadiagnosisanddifferentialdiagnosis.
Planfortreatment(surgicalornon-surgical)andwhethersurgeryispalliativeordefinitiveand identifytheneedof emergencysurgery.
Assessmorbidityandmortalityriskfactors

Decidesuitabilityforcardio-thoracicsurgery
Explaintheperioperativeprocessandlikelyoutcometothepatientand/orrelativesorcare givers and confirm understanding.
Takeaninformedconsent.

Preoperativeplanning

Alltraineesshouldbeableto

- Make asoundsurgicaldecision andselectappropriateoperativestrategies/techniquesto deal with thespecificcondition
- Choosewithreasoningappropriateequipment,materialsordevices(ifany)takingintoaccount appropriateinvestigations e.g.x-rays, ECG, ….etc.
- Checkmaterials,equipmentanddevicerequirementsandCBPmachinewithoperatingroo mstaff.

Intraoperativepreparation

Alltraineesshouldbeableto:

- Recheckintheatrethatconsenthasbeenobtained
- Ensure proper and safe positioning of the patient on the operating table
- Demonstratecareful skinpreparation
- Demonstratecarefuldrapingofthepatient'soperativefield
- Ensuregeneralequipmentandmaterialsaredeployedsafely(e.g.catheter,diathermy)

Exposureandclosure

Alltrainees shouldbeableto:

- Selecttheproperskinincision
- Completeasoundhemostasisandwoundclosureinlayersafterinsertingproperdrainagesystemas ICT.
- Protectthewoundwithdressings

IntraoperativeTechnique

Alltraineesshouldbeableto:

- Followanagreed,logicalsequenceorprotocolfortheprocedure Consistentlyhandletissue wellwith minimaldamage
- Control bleeding promptly by an appropriate method Demonstrate a sound technique of knots and sutures.
- Useinstrumentsappropriatelyandsafely
- IdentifyCBPtypes,cannulationsites,sizeandtypesaccordingtotypeoftheoperation
- Anticipate and respond appropriately to variation e.g. anatomy
- Dealcalmlyandeffectivelywithunexpectedevents/complications
- Useassistant(s)tothe bestadvantage atalltimes
- Communicateclearlyandconsistentlywiththescrubteam
- Communicateclearlyandconsistentlywiththeanesthetist

Postoperativemanagement

Alltraineesshould:

- Ensuresafepatienttransferfromtheoperatingtabletoicubed
- Constructa clear operativenote
- Managepatient inthepostoperativeICU,wardandoutpatientclinic
- Monitor&Supportcardiacperformance e.gusing inotropesandassisteddevices
- Monitor&supportvarious organperformance; lungs,kidneys,nervous system&Gastrointestinalsystem
- Anticipate and manage postoperative complications
- Cardiac tamponade
- Dehiscence of the sternum and surgical site complications
- Postoperativebleeding
- Pleuro-pulmonarycomplications
- PerformcompetentlyCardiopulmonaryresuscitation
- decidestheneedforre-explorationandcompetentlyperforms it.

ATTITUDES&BEHAVIOR

Goodclinicalcare

All trainees must maintain the centrality of the best interest of the patient through theconsistent application of ethical codes to all aspects of assessment, treatment and casemanagement.This applies in particular to:

Patient'smedicalHistory: Alltraineesmustshowempathywithpatients.Appreciate the importance of psychological factors for patients and relatives. Appreciate theinteractionof socialfactors and thepatient's illness.

Patient'sExamination: Alltraineesmustrespectpatients'dignityandconfidentiality,acknowledge culturalissues,appropriatelyinvolverelatives.Appreciatesituationswhere thereis theneedfor a chaperone.

Investigationsincludingimaging: Alltraineesmustuseawidelyacceptеddiagnostic system to assist in making the diagnosis and differential diagnosis in each case.They must be able to provide explanations to patients as to rationale for investigations,limitationsand possible

unwanted effects.

Treatment (Operative & Non-operative): All trainees must clearly and openlyexplaintreatments options,theirsideeffectsand complications.

Managementofchronicdisease: Alltraineesmusttreateachpatientasanindividual.Appreciatetheeffectsofthediseasestatesonpatientsandtheirrelatives.

Compassionate approaches to patient care: All trainees must be compassionateinhowtheymanagepatients.

Patient safety: All trainees must demonstrate awareness of patient safety in apracticalsituationandput safetyand careofpatientsfirst.

providing treatment in emergencies: All trainees must be able to carry out theirresponsibilities in a timely fashion. They must be able to deal with emergency and crisissituationsastheyariseandreviewand reschedulework planaccordingly.

All trainees must respond to any complaint about their own clinical practice in aprofessionalmannerandensurethattheclinicalcareofthepatientisnotcompromised

Theymustrespondtocomplaintsabouttheclinicalpracticeofotherhealthserviceprofessionalsina sensitive and professionalmanner.

maintaininggoodmedicalpractice

All trainees must recognize the limits of their competence and always work for maintainingandimprovingtheirprofessional competence.Theymust:

Keepup-to-date.

Maintainandimprovetheirpractice

TeachingandTraining, AppraisingandAssessing

All trainees must demonstrate a willingness, enthusiasm and ability to contribute totheteachingandtrainingofstudentsandotherhealthcare colleagues
Alltraineesmustbehonestandobjectivewhenappraisingorassessingtheperformanceofcolleagues.Theymustprovideonlyhonest,justifiableandaccuratecomments.

Relationshipwithpatients

Trainees should be able to establish a doctor/patient/relatives relationship characterized bygoodcommunication,understanding,trust,respect,empathyandconfidentiality.

Doctor-patient partnership: All trainees must adopt a non-discriminatory attitude toall patients and recognize their needs as individuals. They must involve patients in clinicaldecisionmaking.Theymustacceptthatapatientmaymakeadecisionabouttheirmanagement thatappears to contradict clinical advice.

Good communications: All trainees must be able to communicate effectively andsensitively.

Consent: Alltraineesmustbeabletoobtainvalidconsentfromthepatientaccording to national guidelines. They must be aware of, and be able to respond to, thepatient's level of understanding and mental state and how this may impair their capacity forinformedconsent.

Workingwithcolleagues

Traineesshouldrecognizetheirownlimitationsandunderstandtheimportanceofco-operationandteamworkingwithotherhealthcareprofessionalsinvolvedinpatientcare.
Work cooperatively as part of a multi-professional clinical team and accept, whereappropriate,theroleof the leader oftheteam.
Arrangecover

Shareinformationwithcolleagues

Probity

Beinghonestandtrustworthy.Alltraineesmustdemonstratehonestyandopenness in any financial arrangements with patients by not putting pressure on patients toaccept private treatment, providing information about fees and charges before obtainingpatients'consenttotreatment,notexploitingpatients'vulnerabilityorlackofmedicalknowledge when making charges for treatment or services and ensure that their practiceconformsto codes of practice.

Writing reports and CVs, giving evidence and signing documents: All traineesmustdemonstrateanappropriateknowledgeofgathering,organizingandprovidingevidence.
Demonstrate an understanding that the purpose of these reports is to inform thejudgesandfacilitatethemindecision-making.Useappropriatelanguage,forexampleavoidinguse ofmedical jargon andwriteconciseand precise reports.

Conflicts of interest: They should declare any relevant financial or commercialinterest.

Trainee Health

- All trainees must take appropriate steps to protect patients when their own health isaffectedbyillness or disability.
- All trainees must protect themselves, their colleagues and their patients by beingimmunizedagainstvaccine preventablediseases(HBV,influenza,...etc)
- Trainees must be able to recognize the manifestations of infectious diseases thatrequirework restriction.

Thank You

Good Luck