

Cardiovascular/Thoracic Surgery CAQ Blueprint

Content Area	Percentage
1. Cardiac	40
2. Thoracic	15
3. Vascular	5
4. Assist Devices	5
5. ICU Management	15
6. Clinical Skill Requirements	5
7. Pharmacotherapy	10
8. Quality Metrics	5

The following clinical tasks apply to all categories below:

- Patient presentation
- Anatomy and physiology
- Preoperative evaluation and management
- Invasive and noninvasive imaging
- Operative and non-operative intervention
- Postoperative management

1. CARDIAC (40%)

A. Aortic disease

- Aneurysm
 - Root
 - Arch
 - Ascending
 - Pseudoaneurysm
- Aortic root disorders
- Connective tissue disorders
- Dissection

B. Congenital conditions

- Anomalous origin of the coronary artery
- Atrial septal defect
- Coarctation of the aorta
- Patent ductus arteriosus
- Patent foramen ovale
- Persistent left superior vena cava
- Tetralogy of Fallot
- Ventricular septal defect

C. Coronary artery disease

- Acute coronary syndrome
 - Stable angina
 - Unstable angina
 - ST-segment elevation myocardial infarction

- Non-ST-segment elevation myocardial infarction

- Incomplete revascularization
- Prinzmetal variant angina
- Post infarct complications
 - Dressler syndrome
 - Left ventricular aneurysm
 - Left ventricular wall rupture
 - Papillary muscle rupture
 - Ventricular septal defect
- Revascularization techniques and conduits

D. Electrophysiologic disorders

- Atrial fibrillation/flutter
- Blocks (atrioventricular, bundle branch, complete)
- Bradycardia
- Device-related infection
- Intraventricular conduction delay
- Paroxysmal supraventricular tachycardia
- Tachycardia-bradycardia syndrome
- Torsades de pointes
- Ventricular tachycardia/fibrillation
- Wolff-Parkinson-White syndrome

E. Pericardial conditions

- Cardiac tamponade

- Constrictive pericarditis
 - Iatrogenic
 - Idiopathic
 - Infectious
 - Pericardial effusion
 - Hemorrhagic
 - Infectious
 - Neoplastic
 - Postcardiotomy
 - Radiation-induced
 - Traumatic
 - Uremic
 - Restrictive pericarditis
- F. Structural heart disease
- Acute heart failure (systolic and diastolic)
 - Ischemic disease
 - Myocarditis
 - Postpartum
 - Sepsis
 - Takotsubo
 - Valvular disease
 - Chronic heart failure (systolic and diastolic)
 - Alcohol-induced
 - Dilated
 - Drug-induced
 - Hypertrophic (subaortic stenosis)
 - Idiopathic
 - Infectious
 - Infiltrative
 - Ischemic
 - Restrictive
 - Rheumatic
 - Tachycardia-induced
 - Valvular
 - Right ventricular heart failure
- G. Trauma
- Aortic: transection, dissection
 - Cardiac: contusion, penetrating, iatrogenic
 - Pericardial: pericarditis, effusion
- H. Tumors
- Fibroelastoma
 - Left atrial myxoma
 - Right atrial myxoma
- I. Valvular disease
- Aortic valve disease
 - Aortic insufficiency (regurgitation)

- Aortic stenosis
- Bicuspid aortic valve
- Endocarditis
 - Acute/subacute/chronic infective
 - Annular abscess
 - Heart block
 - Leaflet perforation
 - Native valve
 - Noninfective
 - Prosthetic valves
- Mitral valve disease
 - Mitral regurgitation
 - Mitral stenosis
 - Mitral valve prolapse
 - Papillary muscle rupture
 - Systolic anterior motion
- Tricuspid valve disease
 - Tricuspid regurgitation

2. THORACIC (15%)

A. Esophageal disease

- Achalasia
- Barrett esophagus
- Diverticula
- Dysmotility
- Esophageal ring (Schatzki); esophageal stricture
- Esophageal tumors
 - Benign neoplasm
 - Leiomyoma
 - Carcinoma
 - Staging, treatment, and prognosis
 - Adenocarcinoma
 - Squamous cell
- Esophageal ulcer
- Gastroesophageal reflux disease
- Hiatal hernia
- Paraesophageal hernia
- Rupture, esophagus
 - Tears and perforations

B. Congenital conditions

- Arteriovenous malformation
- Bronchogenic cyst
- Diaphragmatic hernia
- Esophageal duplication cyst
- Pulmonary sequestration
- Sternal deformities

C. Lung disease

- Cancer (non–small-cell and small-cell)
 - Cancer staging, treatment, and prognosis
 - Pancoast tumor
 - Metastatic
 - Carcinoid neoplasm
- Obstructive disease
 - Chronic obstructive pulmonary disease
- Parenchymal disease
 - Pneumoconiosis
 - Sarcoidosis
 - Tuberculosis/Ghon complex
- Pulmonary nodules
- Restrictive disease

D. Mediastinal disease

- Anterior neoplasms
 - Germ cell tumor
 - Lymphoma
 - Myasthenia gravis
 - Thymoma
- Posterior neoplasms
 - Neurogenic tumors

E. Pleural disease

- Effusions
 - Chylothorax
 - Exudates
 - Empyema
 - Malignant
 - Hemorrhagic
 - Transudative (hydrostatic leakage)
- Mesothelioma

F. Trauma

- Diaphragmatic injury
- Flail chest
- Hemopneumothorax
- Hemothorax
- Pneumothorax
 - Catamenial
 - Iatrogenic
 - Open, sucking wound
 - Spontaneous
 - Tension
- Sternal fractures

3. VASCULAR (5%)

A. Aortic disease

- Aneurysm

- Dissection

B. Carotid disease

- Hyperperfusion post carotid endarterectomy
- Stenosis, dissection, hyperplasia
- Symptomatic, asymptomatic

C. Peripheral artery disease

- Compartment syndrome
- Mesenteric disease
- Occlusive, dissection, aneurysms, pseudoaneurysms
- Renal artery stenosis
- Thoracic outlet syndrome

D. Peripheral venous disease

- Insufficiency
- Thrombosis

E. Trauma

- Aortic transection
- Penetrating injury
- Retroperitoneal hemorrhage

4. ASSIST DEVICES (5%)

Indications, contraindications, complications, management of:

A. Intra-aortic balloon pump

B. Extracorporeal membrane oxygenation

C. Left ventricular assist device

D. Percutaneous ventricular assist device

E. Right ventricular assist device

5. ICU MANAGEMENT (15%)

A. Cardiovascular

Disease states:

- Cardiac tamponade
- Heart failure
- Hypertension
- Hypotension
- Ischemic changes
- Pericarditis
- Shock
 - Cardiogenic
 - Distributive
 - Hypovolemic
 - Obstructive

Skills:

- Electrocardiographic interpretation
- Hemodynamic monitoring/management
- Pacing and rhythm management

- Resuscitation

B. Endocrine

Disease states:

- Adrenal disorders
- Endocrine neoplasms
- Hyperglycemia
- Hypoglycemia
- Thyroid disorders

C. Gastrointestinal

Disease states:

- Abdominal compartment syndrome
- Bowel obstruction
- Bowel perforation
- *Clostridium difficile* gastroenteritis
- Colitis
- Constipation
- Diarrhea
- Hemorrhage
- Ileus
- Malnutrition
- Mesenteric ischemia
- Postoperative nausea and vomiting
- Ulcers

Skills:

- Enteral support

D. Hematology

Disease states:

- Anemia
- Coagulopathy
- Heparin-induced thrombocytopenia
- Postoperative hemorrhage
- Thrombocytopenia

Skills:

- Anticoagulation therapy
- Blood component therapy
- Chest tube management
- Hemostasis monitoring
- Thromboelastography

E. Infectious disease

Disease states:

- Bloodstream infections
- Endocarditis
- Pneumonia
- Sepsis
- Systemic inflammatory response syndrome (SIRS)
- Urinary tract infection

- Wound infection

Skills:

- Incision and drainage
- Negative pressure wound therapy
- Wound debridement

F. Neurology

Disease states:

- Cerebral ischemia, transient
- Cerebrovascular accident
- Delirium
- Nerve injuries
 - Brachial plexus
 - Laryngeal
 - Phrenic
 - Radial
- Paraplegia
- Seizure disorders
- Substance withdrawal

Skills:

- Pain management
- Sedation

G. Pulmonary

Disease states:

- Acute lung injury/acute respiratory distress syndrome
- Atelectasis
- Barotrauma
- Chronic obstructive pulmonary disease
- Empyema
- Laryngeal/tracheal edema
- Pleural effusion
- Pneumonia
- Pneumothorax
- Pulmonary embolism
- Respiratory failure
- Subcutaneous emphysema

Skills:

- Arterial blood gas analysis
- Chest tube management
- High-flow oxygen therapy
- Noninvasive ventilation
- Pulmonary hygiene
- Tracheostomy
- Ventilator management

H. Renal

Disease states:

- Acid-base disorders
- Acute kidney injury

- Electrolyte abnormalities
- End-stage renal disease
- Oliguria

Skills:

- Bladder pressure monitoring
- Fluid and electrolyte management
- Renal replacement therapy
- Total parenteral nutrition support

6. CLINICAL SKILL REQUIREMENTS (5%)

Indications, contraindications, complications related to:

A. Imaging

- Arteriography
- Cardiac catheterization
- Cardiac stress testing
- CT angiography
- CT scan
- Echocardiography
- Electrocardiography
- Esophageal manometry
- Esophageal ultrasonography
- MR angiography
- MRI
- Myocardial perfusion imaging
- PET/CT scan
- Radionuclide studies
- Venous and arterial ultrasonography
- X-ray studies
 - Barium swallow x-ray study

B. Invasive/noninvasive procedures

- Arterial line placement
- Central venous access/Swan-Ganz catheterization
- Chest tube placement/thoracentesis
- Emergency re sternotomy
- Intra-aortic balloon pump placement/removal
- Peripheral vessel examination
 - Ankle-brachial index
 - Modified Allen test
 - Vein mapping
- Pulmonary function studies
- Transvenous pacing
- Wound management

C. Operative procedures

Cardiac:

- Ascending aortic replacement

- Atrial fibrillation correction
- Bentall procedure
- Closure of atrial and ventricular septal defects
- Conduit harvesting (endoscopic and open)
 - Arterial
 - Internal thoracic artery
 - Radial artery
 - Venous
 - Greater saphenous vein
 - Lesser saphenous vein
- Coronary artery bypass grafting
- David procedure
- Excision of cardiac tumors and aneurysms
- Mitral valve repair/replacement
- Pericardial window
- Pericardiectomy
- Pericardiocentesis
- Surgical aortic valve replacement
- Thrombectomy
- Transcatheter aortic valve replacement
- Transplantation
- Tricuspid valve repair/replacement

Thoracic:

- Bronchoscopy
- Cervical mediastinoscopy
- Chest wall reconstruction
- Clagett procedure
- Decortication
- Diverticulectomy
- Endobronchial ultrasonography
- Esophagectomy
- Esophagogastroduodenoscopy
- Navigation bronchoscopy
- Nissen fundoplication
- Parasternal mediastinotomy (Chamberlain)
- Pleurodesis
- Resection of benign and malignant lesions
- Sympathectomy
- Thoracotomy
- Transthoracic needle biopsy
- Video-assisted thorascopic surgery (VATS)

Vascular:

- Catheter-directed thrombolysis
- Fasciotomy
- Inferior vena cava filter placement and removal
- Open and endovascular techniques:
 - Aneurysm repair
 - Peripheral vessel revascularization
 - Varicose vein treatment
 - Repair of dissection
 - Carotid artery surgery
- Thrombectomy

- Corticosteroids
- Diuretics
- Glycemic control agents
- Inotropes
- Lipid-lowering agents
- Sedatives
- Thrombolytics
- Vasoactive agents
- B. Drug interactions
- C. Common adverse drug effects

7. PHARMACOTHERAPY (10%)

A. Drug classes

- Acid-suppressing agents
- Analgesics
- Anesthetic agents
- Anti-anginals
- Antiarrhythmics
- Anticoagulants
- Anti-infective agents
- Antiplatelet agents
- Antipsychotics
- Anxiolytics
- Bronchodilators

8. QUALITY METRICS (5%)

A. Prophylaxis

- Deep venous thrombosis
- Postoperative infection
- Stress ulcer
- Surgical Care Improvement Project (SCIP)

B. Core measures

- Acute myocardial infarction
- Anti-lipids
- Antiplatelets
- Cessation of tobacco use
- Glycemic control
- Heart failure
- Ventilator-associated pneumonia