

## **Cardiovascular Anesthesiology Rotation at Stanford University Hospital**

### ***Overview***

The CV anesthesia rotation provides the senior anesthesia resident the opportunity to care for patients with cardiopulmonary pathology requiring both cardiac and non-cardiac surgery. At the completion of the CV rotation, the resident is expected to be able to provide pre- and intra-operative care for patients requiring coronary and/or valvular heart surgery with cardiopulmonary bypass support, and patients undergoing thoraco-abdominal or peripheral vascular surgery.

### ***Basic Science Learning Objectives***

- Anatomy—structures of the heart and great vessels
- Coronary circulation and perfusion—determinants of myocardial oxygen supply/demand/delivery. Coronary anatomy—major vessels/branches/myocardial areas served
- Ventricular Function—Frank Starling law, determinants of pre-load, after-load, intracardiac pressures
- Myocardial function/protection—contractility, cardiac output determinations, preconditioning, stunned/hibernating myocardium, protection during ischemic arrest
- Electrophysiology—cardiac cycle-action potentials, impulse initiation/propagation, ion channels; cardiac conduction system, heart rate control
- Blood pressure—determinants of systolic, diastolic, mean and end-organ perfusion pressures. Systemic and pulmonary vascular resistance. Baro-receptor function
- Cardiovascular pharmacology—catecholamines, anti-arrhythmics, anti-hypertensive drugs---mechanisms of action, prescription, adverse affects
- Pathophysiology of valvular heart disease—classification, diagnosis
- Extracorporeal circulation and respiration—physical principles

- Physiology of profound hypothermic circulatory arrest
- Inflammatory and stress responses associated with cardiopulmonary bypass

***Clinical Learning Objectives***

- Preoperative assessment of patients with ischemic heart disease for cardiac and non-cardiac surgery—including interpretation of stress testing findings and coronary angiography; pre-operative risk paradigms for predicting adverse events
- Preoperative assessment of patients with valvular heart disease undergoing cardiac and non-cardiac surgery
- Placement and interpretation of invasive monitors for arterial BP, central venous pressure, pulmonary artery pressure and cardiac output
- Anesthetic management strategies for patients suffering ischemic heart disease, heart failure, stenotic and regurgitant valvular heart disease (aortic stenosis and regurgitation, mitral valve stenosis and regurgitation, tricuspid valve disease) cardiac tamponade, vascular aneurysmal and obstructive disease (ascending, arch and descending aortic disease, carotid artery stenosis, abdominal aortic disease)
- Management of patients requiring cardiopulmonary bypass—anticoagulation and antagonism, role and types of antifibrinolytics, acid-base management during hypothermia, anesthetic considerations, strategies to discontinue bypass support
- Placement and use of transesophageal echocardiography probe for the diagnosis of myocardial ischemia and monitoring of ventricular volumes
- Placement and use of sub-arachnoid catheters for cerebral-spinal fluid drainage
- Anesthetic care for patients requiring internal automatic defibrillator placement