

Epidemiology

- Approximately a 1:1000 incidence per y, increasing with age.
- M:F incidence ratio: 2:1.
- Most common cause of heart failure; accounts for 40% of all cases.

Perioperative Risks

- CHF exacerbation
- Hypotension
- Pulmonary edema
- Myocardial ischemia/infarction
- Acute renal failure
- Malignant arrhythmias/pacemaker management with electrocautery
- LVEF, which is important for prognosis and periop complications but may not correlate with symptoms or exercise tolerance

Worry About

- Acute heart failure (hypoventilation → hypercarbia → increased PVR → right heart failure)
- Inability to extubate (cardiac instability, pulmonary edema)
- Periop cardiac event (MI)
- Fluid management (balance optimizing preload with volume overload, minimizing fluid shifts)

- High risk for arrhythmia (PAC, PVC, AFIB, Vtach, VFIB)
- Postop ICU care (CCU versus SICU [severity of heart disease versus magnitude of surgery])

Overview

- Severe impairment of LVEF leading to CHF; instances arising from myocardial ischemia and infarction have extremely poor prognoses, with a 30–50% 2-y mortality.
- Pts will benefit from optimization of medical therapy for underlying ischemia (nitrates, beta-blockers, calcium antagonists, aspirin), CHF (ACE inhibitors/angiotensin-II receptor blockers, hydralazine, digoxin, aldosterone antagonists, loop diuretics), prevention of cardiac thrombus formation (warfarin), and HR control for atrial fibrillation (digoxin, beta-blockers).
- An ICD for secondary prevention of SCD is likely. A mortality benefit exists, especially if LVEF <35%.
- CRT with biventricular pacing improves symptoms in pts with prolonged QRS duration with low LVEF.

Etiology

- Acquired disease with genetic predisposition.

- Risk factors include hypertension, diabetes, hyperlipidemia, tobacco, advanced age, obesity, and peripheral vascular disease.

Usual Treatment

- Medical therapy: ACE inhibitors, beta-blockers, aldosterone antagonists, and continuous IV infusions (end-stage only → milrinone, dobutamine)
- Cardiac rehabilitation: Improved symptoms and functional capacity
- Electrophysiology optimization: AICD insertion and CRT with biventricular pacing
- Associated cardiac surgery: Valvular surgeries, LV aneurysmectomy, and CABG.
- PCI: Only in cases of (1) severe symptoms, (2) exacerbation, (3) failed medical therapy, (4) high risk coronary anatomy, and (5) worsening LV dysfunction
- LVAD: Destination therapy or a bridge to transplantation
- Cardiac transplantation
- Other interventions: Transmyocardial laser revascularization if angina after all of the above
- Possible future therapy: Stem cell and autologous myoblast transplantation

Assessment Points

System	Effect	Assessment by Hx	PE	Test
CV	Myocardial ischemia Arrhythmias CHF	Angina Dyspnea, PND palpitations	S ₃ , S ₄ , loud P ₂ Narrow pulse pressure Displaced point maximal impulse	ECG Stress testing ECHO Stress ECHO MRI Myocardial contrast ECHO Cardiac catheterization
RESP	Pulm congestion/edema	Dyspnea on exertion Orthopnea Cough	Rales Wheezes	CXR
GI	Ascites	Abdominal distention	Shifting dullness Fluid wave Hepatomegaly	Liver function tests PT Albumin
CNS	Embolic stroke due to thrombus or atheroembolism	Weakness Vision problems Confusion	Altered mental status Focal deficits	CT (early → rule out SAH) MRI (late → confirm ischemia)
MS	Peripheral edema	Swollen ankles Weakness	Pitting edema	
RENAL	Insufficiency (prerenal)	Oliguria		Cr, BUN Excreted fraction of filtered sodium

Key References: Fihn SD, Blankenship JC, Alexander KP, et al.: 2014 ACCF/AHA/ACP/AATS/PCNA/SCAI/STS focused update of the guideline for the diagnosis and management of patients with stable ischemic heart disease: executive summary, *J Am Coll Cardiol* 64(18):1929–1949, 2014; Hensley NB, Hogue CW: *Anesthesia for non-cardiac surgery in patients with ischemic heart disease*, Waltham, MA, 2015, UpToDate.

Perioperative Implications

Preoperative Preparation

- Pharmacologic control of myocardial ischemia and CHF

Monitoring

- ECG (V₅ or multilead) with ST-segment analysis
- Arterial catheter (close BP monitoring, ABGs) → possibly preinduction
- PA catheter or TEE for major operations and/or poor medical condition

Airway

- None

Preinduction/Induction

- Avoid tachycardia and increased afterload to minimize myocardial oxygen demand.

- Greatest stress for developing myocardial ischemia or LV dysfunction, especially if hypoventilation occurs.
- Relative hypovolemia may result from diuretic therapy.

Maintenance

- Limited ability to increase cardiac output in response to stress; this may require exogenous catecholamines.
- Attention to fluid balance; monitor PAWP to avoid pulmonary edema or low cardiac output.
- Avoid cardiac depressants, including high-dose inhaled anesthetics, high-dose opiates, and alpha-2 agonists.

Extubation

- Another time of significant stress for developing myocardial ischemia or LV dysfunction.
- Consider postop mechanical ventilation if a large fluid resuscitation was required intraop.

Adjuvants

- Extensive preop medical therapy may have circulatory consequences.
- Preop anticoagulation (for CAD or AFIB) may preclude regional anesthesia.

Postoperative Period

- When possible, epidural pain management techniques may minimize sympathetic tone.
- Intensive care and invasive hemodynamic monitoring for major procedures.

Anticipated Problems/Concerns

- Periop myocardial ischemia, arrhythmia, and CHF exacerbation remain paramount concerns.