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Anesthetic Management of Patients with Heart Failure & Cardiomyopathy

Introduction:

- **Heart Failure (HF): A clinical syndrome of impaired ventricular filling or ejection.**
- **Cardiomyopathy: Myocardial disease causing structural/functional abnormality.**

a– Dilated (DCM): Systolic dysfunction, ↓contractility

b– Hypertrophic (HCM): Diastolic dysfunction, LV outflow obstruction

c – Restrictive (RCM): Stiff ventricles, impaired filling

- **Anesthetic significance: Marked sensitivity to volume, heart rate, and afterload changes.**

Preoperative Assessment:

Goals:

Evaluate severity, stability, and optimize before anesthesia.

- **History: Dyspnea, orthopnea, fatigue, exercise tolerance**
- **Medications: Continue β-blockers, ACE inhibitors, diuretics (unless severe hypovolemia)**
- **Investigations:**
  - **Echo → EF, LV function**
  - **ECG → arrhythmias, ischemia**
  - **CXR → cardiomegaly, congestion**
- **Optimize: Oxygenation, fluid balance, treat arrhythmias or infections before surgery.**

Intraoperative Management:

Monitoring: ECG, invasive BP, CVP

Goals:

- **Maintain adequate preload; avoid fluid overload**
- **Maintain afterload (avoid sudden ↓SVR)**
- **Avoid tachycardia & bradycardia (keep sinus rhythm)**
- **Avoid myocardial depression (use low doses, titrate slowly)**

Induction: Etomidate preferred; avoid high-dose propofol or thiopental.

Maintenance: Opioid-based or balanced anesthesia; avoid high volatile concentrations.

Specific Considerations by Type:

Dilated Cardiomyopathy (DCM):

- **↓Contractility → avoid myocardial depressants**
- **Maintain preload & afterload; vasopressors if hypotension (phenylephrine, norepinephrine)**

Hypertrophic Cardiomyopathy (HCM):

- **Avoid tachycardia & ↓preload → worsens LV obstruction**
- **Maintain SVR (phenylephrine best choice)**
- **Avoid inotropes & vasodilators**

Restrictive Cardiomyopathy (RCM):

- **Rigid ventricles → preload-dependent**
- **Maintain HR, avoid bradycardia or hypovolemia**

Post-op: Continue oxygen, monitor for pulmonary edema, gradual emergence.

References;

1. Morgan & Mikhail's Clinical Anesthesiology, 7th Edition (2022).

2. Miller's Anesthesia