Pathophysiology of Heart Failure

Keep the normal cardiac physiology in mind:

- SV depends on preload, afterload, and contractility
- Ventricular end-diastolic volume equates with preload and depends on chamber compliance
- Ventricular end-systolic volume depends on afterload and contractility, not preload.

Heart Failure Definition + Epidemiology:

- When heart 1) is unable to pump enough blood forward to meet metabolic demands, and/or 2) pumps blood only when filling pressure is abnormally high.
- The most severe manifestation of almost every form of heart-disease, often a combination of diastolic and systolic dysfunction.
- The most common “diagnosis” of hospital patients >65 yrs old
- Poor prognosis: 1-yr mortality of 33%

Left Heart Failure

- ↓ EF (↓ SV)
  - (Diastolic Dysfunction: ventricle doesn’t relax/fill well)

- ↑ Afterload (chronic pressure overload, resisting forward flow)

- ↓ contractility (abnormal, fibrotic, or dead myocytes)

- ↓ EF (↓ SV)
  - (Systolic dysfunction: ventricle can’t squeeze/empty well)

Right Heart Failure

- (Occurs when RV afterload ↑↑↑)

- Pulmonary Vasculature Disease
  - Acute pulmonary embolism
  - Primary pulmonary hypertension

Pulmonary Parenchymal Disease

- COPD
- Interstitial Lung Disease (i.e. Sarcoidosis)
- Acute Respiratory Distress Syndrome
- Chronic lung infection/bronchiectasis

- Isolated RH failure (resulting from a pulmonary process) is called “Cor Pulmonale”

Preserved EF (↓ EDV, so ↓ SV)

- (Diastolic Dysfunction: ventricle doesn’t relax/fill well)

- Advanced Aortic Stenosis

- CAD (MI, or transient myocardial ischemia)

- Severe Hypertension

- Dilated Cardiomyopathies

- Chronic Volume Overload (mitral + aortic regurge)

- Heart Failure Definition + Epidemiology:

  - When heart 1) is unable to pump enough blood forward to meet metabolic demands, and/or 2) pumps blood only when filling pressure is abnormally high.
  - The most severe manifestation of almost every form of heart-disease, often a combination of diastolic and systolic dysfunction.
  - The most common “diagnosis” of hospital patients >65 yrs old
  - Poor prognosis: 1-yr mortality of 33%

EF = Ejection Fraction = SV/EDV (normal = 55-75%)