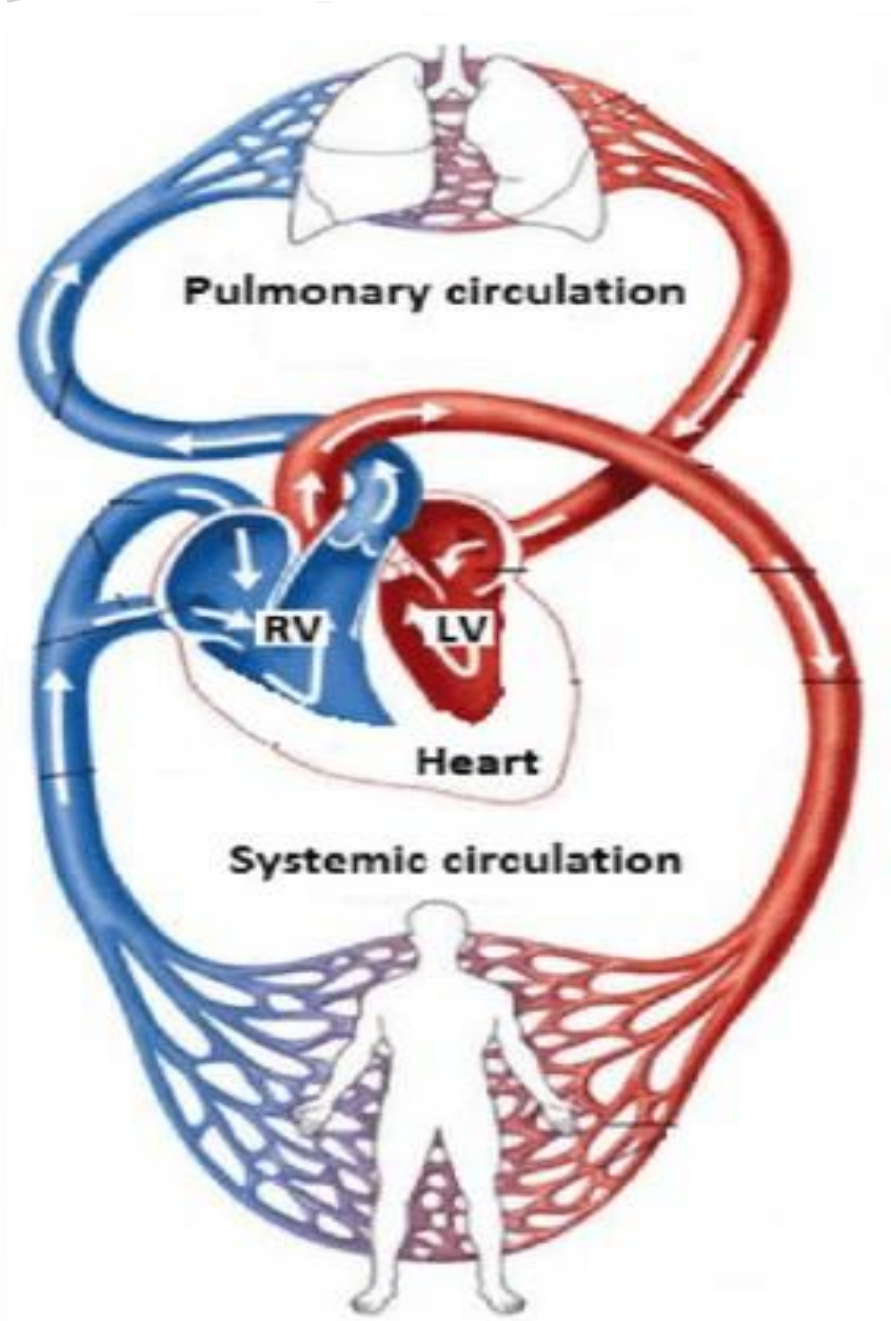
EVALUATION AND MANAGEMENT OF RIGHT HEART FAILURE

Presented by Laura Ferguson, DNP, FNP-BC
Kansas City Cardiology

Objectives

- Review normal cardiac function
- Identify patients at risk of right sided heart failure
- Recognize symptoms of right heart failure
- Understand pathophysiology and consequences of heart failure
- Identify diagnostic techniques to help differentiate etiology of heart failure
- Discuss treatment strategies for management of right heart failure

Normal cardiac physiology



Cardiac Structure

- Left ventricle is larger and has thicker walls.
- Right ventricle is smaller and thin walled.
- Septum serves both the right and left ventricle to provide counter-pressure and assist with systole.

Points to remember about the RV

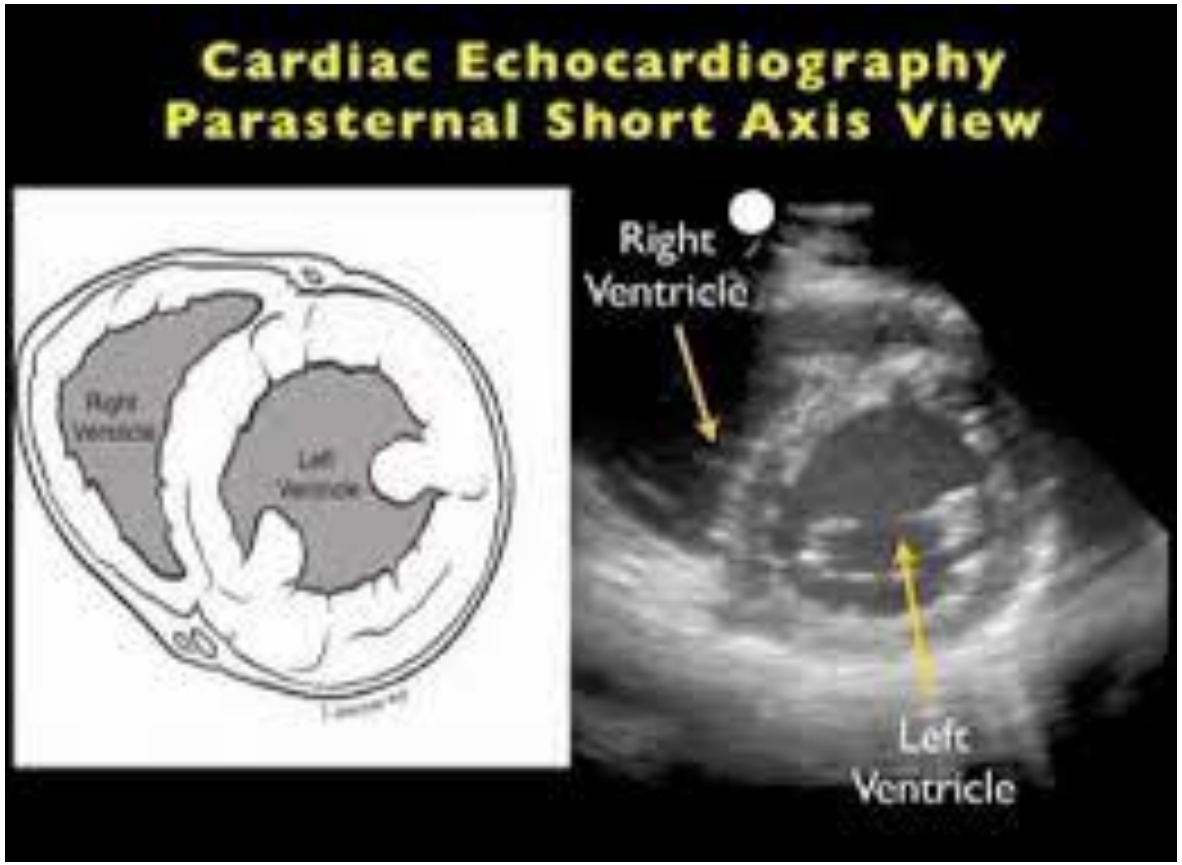
- The lungs and right heart are intended to be a low pressure system.
- Right ventricle has thin walls and smaller volme.
- Right ventricle function is dependent on preload, contractility, and afterload.
- Contactility is approximately 20-40% dependent on left ventricular contraction.
- Right ventricular coronary perfusion occurs during both systole and diastole.

Etiology and pathology of right heart failure

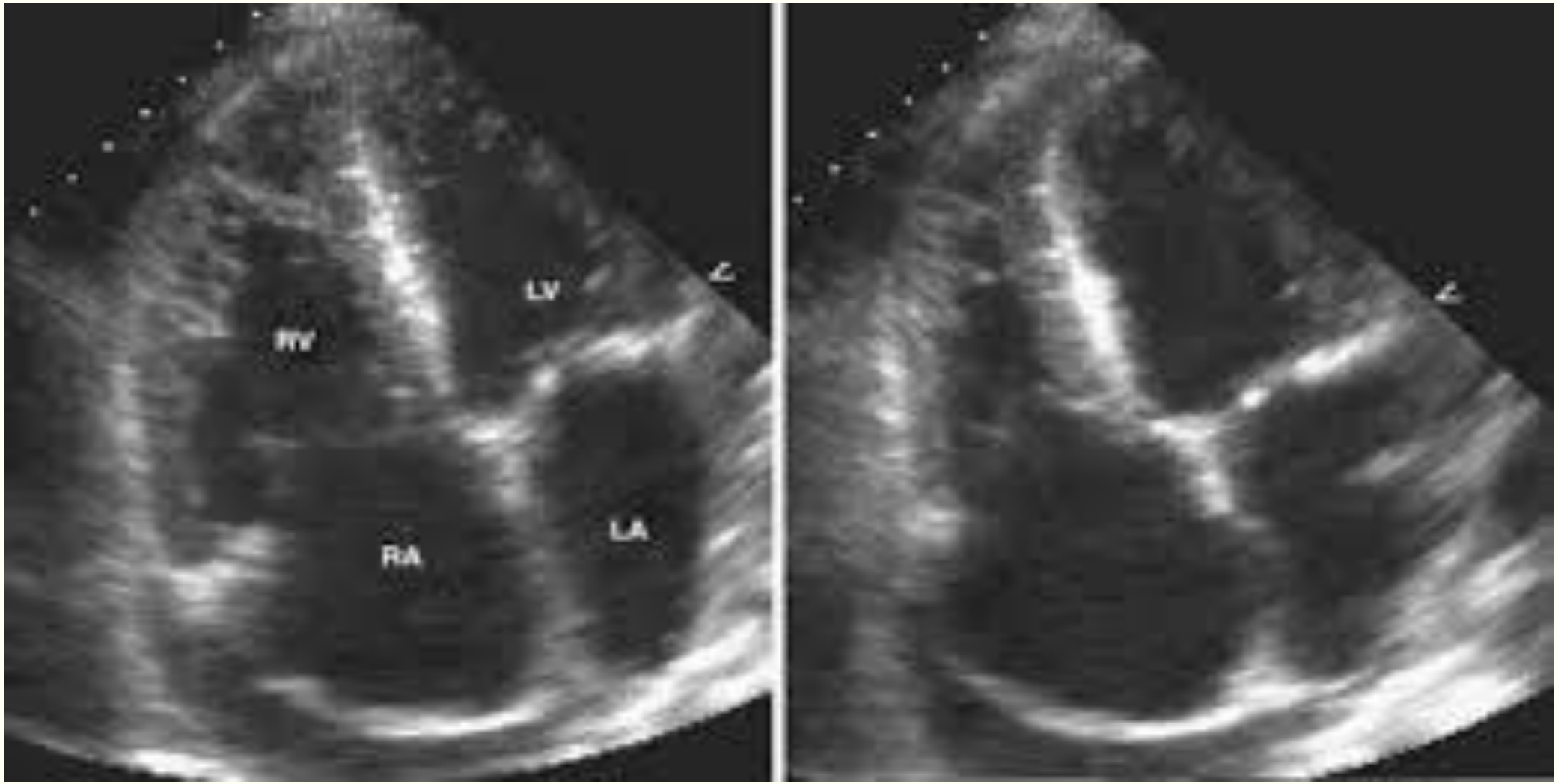
- Anything that affects the basis of RV function (preload, afterload, or contractility) can lead to right heart failure. Due to the thin RV walls and reliance on LV function, the RV is more vulnerable to adverse effects.

  - Right ventricular MI
  - LV failure: systolic or diastolic (HFrEF or HFpEF)
  - Primary pulmonary hypertension
  - COPD or uncontrolled sleep apnea
  - Acute pulmonary embolism
  - Congenital defects such as septal defects
  - Myocarditis
  - Post-operative effects following cardiac surgery

Echo images of RV failure



Echo images of RV failure



SYMPTOMS

- When taking patient history, take into consideration physiology behind symptoms.
- Many symptoms will be the same as left heart failure
- Lower extremity edema
- Ascites, abdominal fullness, RUQ pain, weight loss
- Fatigue
- Shortness of breath: due to underlying etiology of RV failure and poor pulmonary perfusion

PHYSICAL EXAM AND ASSESSMENT

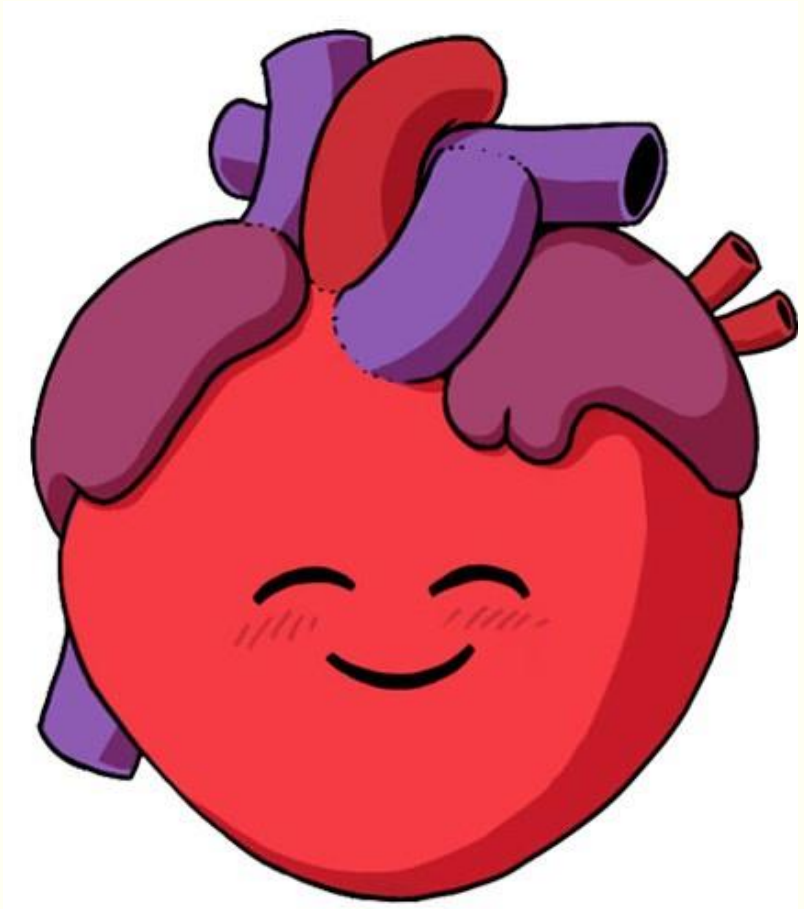
- Patient history
- Vital signs
- Breath sounds
- Lower extremity edema
- Jugular venous distention
- Heart tones
- Abdominal exam

DIAGNOSTICS

- Chest X-ray
- Labs: Troponin, BNP, CMP, D-dimer
- EKG
- Echocardiogram
  - Tricuspid regurgitation
  - RV and RA/IVC dilation
  - Pulm pressure
  - LV function
- Hemodynamic eval (PA catheter, R heart cath, CVP)

Strategies and Goals in Right Heart Failure Management

- Volume management
  - Diuretics
  - Dialysis, Ultrafiltration or CRRT
  - Paracentesis if indicated
  - Fluid intake restriction
- Optimize RV function
  - Treating the cause
  - Reducing afterload (nitrates, vasodilator)
  - Supporting contractility (dobutamine, milrinone)
- Long-term medical management of chronic RHF
  - Patient education
  - Medical therapy similar to recommendations for LHF except in the case of primary pulm HTN



In Summary

- Right heart failure is associated with higher incidence of poor outcomes, morbidity and mortality.
- Driving force behind cardiorenal syndrome and other syndromes of end-organ damage.
- Differntiating between left heart failure and right heart failure and its etiology is important for optimal treatment and recovery.
- Critical thinking regarding the phyiology behind the clinical evidence is the key to identifying and treating right heart failure.

References

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