

Evaluation of Diastolic Dysfunction
with TEE

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Diastolic Function

- As many as 30 to 50 percent of patients with symptomatic HF exhibit diastolic rather than systolic dysfunction.
- Diastolic dysfunction is more common in women and the elderly, and in the latter it may be the dominant form of HF.
- Additional risk factors for diastolic dysfunction include a history of hypertension and diabetes mellitus.

- Systolic heart failure (SHF), is characterized by progressive chamber dilation, eccentric remodeling, and abnormalities in systolic function.
- Diastolic heart failure (DHF), is characterized by normal LV volume, concentric remodeling, normal LV systolic properties, and abnormalities in diastolic properties.

- SHF and DHF are distinct syndromes, not a continuous spectrum of disorders.

Kitzman, DW, et al. JAMA 2002; 288:2144.

- Patients with SHF may have evidence of diastolic dysfunction, particularly during periods of symptomatic decompensation.
- However, such patients have predominant abnormalities in systolic properties, with secondary abnormalities in diastolic function.

- Similarly, patients with DHF may have subtle abnormalities in systolic function, but they have predominant abnormalities in diastolic properties and concentric remodeling.

Baicu, CF, et al. Circulation 2005; 111:2306.

• Diastolic dysfunction indicates a functional abnormality of diastolic relaxation, filling, or distensibility of the left ventricle, regardless of whether the EF is normal or abnormal and whether the patient is asymptomatic or has symptoms and signs of HF.

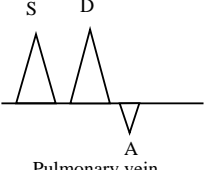
• DHF denotes the signs and symptoms of clinical HF in a patient with a normal EF and LV diastolic dysfunction.

Evaluation of LV Diastolic Function

- Mitral Valve PW Doppler Tracing
- Pulmonary Venous Inflow PW Doppler Tracing
- Tissue Doppler
- Velocity Propagation

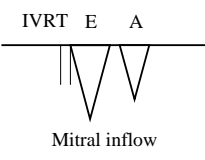
Normal

S/D Ratio: 0.86 ± 0.28
 Reversal: 0.17 ± 0.03 m/s



Pulmonary vein

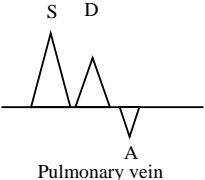
E: 0.7-1.2 m/s
 A: 0.42-0.7 m/s
 E/A ratio: 1-2.0
 Deceleration time: 150-200 s
 IVRT: 50-100 ms



Mitral inflow

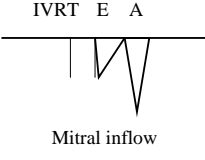
Impaired Relaxation

S/D Ratio: 1.63 ± 0.41
 Reversal: 0.21 ± 0.03 m/s

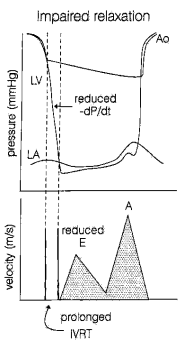


Pulmonary vein

E: < 0.7 m/s
 A: > 0.7 m/s
 E/A ratio: < 1
 Deceleration time: > 200 s
 IVRT: > 100 ms



Mitral inflow



Impaired relaxation

pressure (mmHg)

LV

LA

reduced $-dp/dt$

velocity (m/s)

reduced E

prolonged IVRT

Ao

Restrictive Pattern

S/D Ratio: 0.40 ± 0.18
 Reversal: > 0.35 m/s

E: > 1.2 m/s
 A: < 0.42 m/s
 E/A ratio: > 2.0
 Deceleration time: < 150 s
 IVRT: < 50 ms

Pulmonary vein

Mitral inflow

Decreased compliance

pressure (mmHg)

volume

velocity (m/s)

reduced compliance
 normal compliance
 reduced systolic fx
 nl systolic fx

increased E
 steep deceleration slope
 reduced A
 decreased IVRT

Pseudonormal

S/D Ratio: < 1
 Reversal: > 0.35 m/s

E: $0.7-1.2$ m/s
 A: $0.42-0.7$ m/s
 E/A ratio: $1-2.0$
 Deceleration time: $150-200$ s
 IVRT: $50-100$ ms

Pulmonary vein

Mitral inflow

