Stress echo:
Beyond the obvious

Kalliopi Keramida,
Cardiologist, MD, PhD
Locum Consultant at Watford Hospital London and
Clinical Fellow at 2nd Cardiology Department,
University Hospital ATTIKON

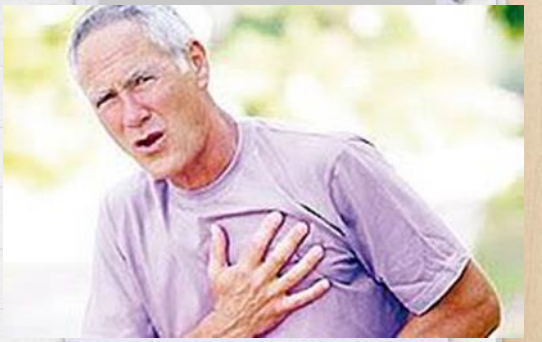
1st case

- Hypertension
- Type 2 diabetes
- Dyslipidemia
- HIV (+)
- Parkinson's disease
- Depression

Hb = 114gr/dl
MCV = 84,5fL

- 2012 PCI: LCx and OM1
- 3/2013: chest pain on exertion => patent stents, non-obstructive lesion at the ostium of LCx
- 15/8/2017: chest pain, syncope, melena

Male 64 years old



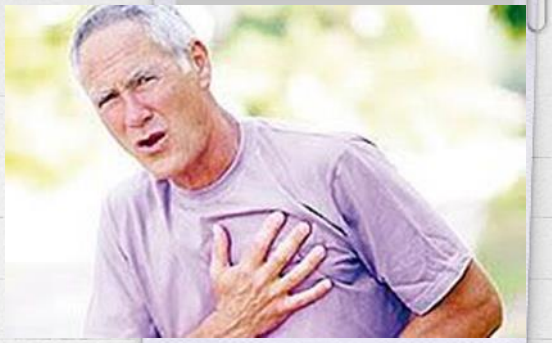
West Hertfordshire Cardiology

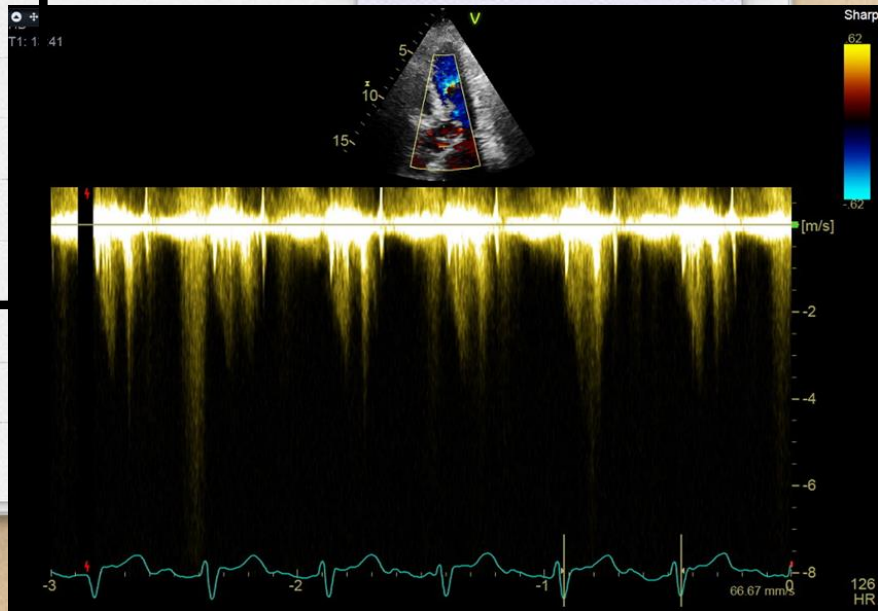
West Hertfordshire Hospitals NHS
NHS Trust

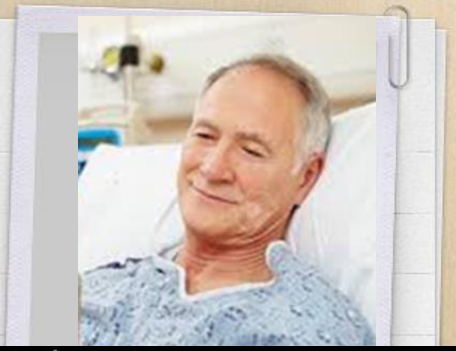
Report Status: Finalized

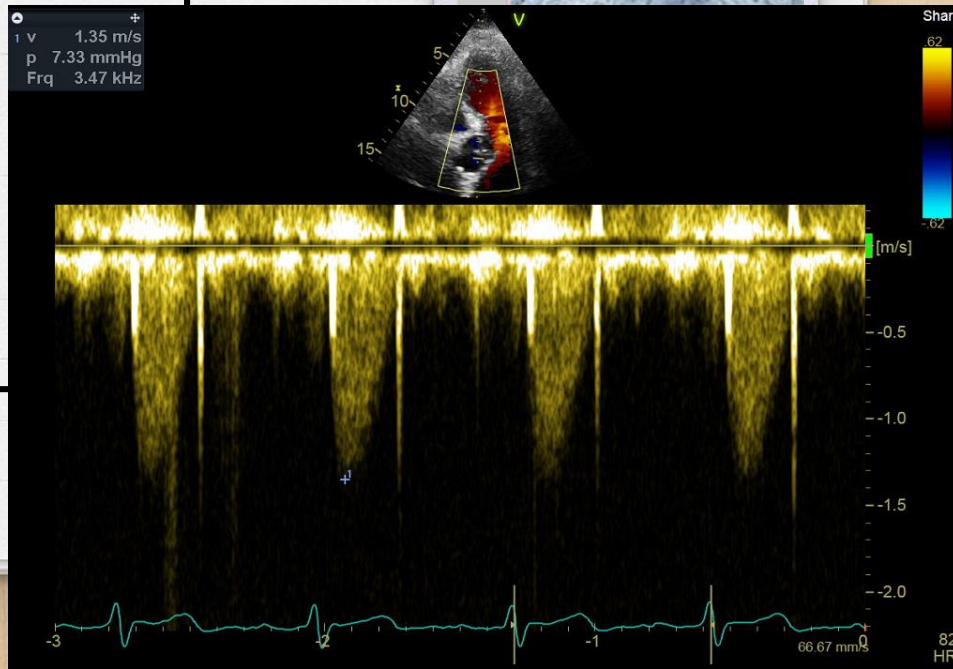
Stress Protocol:Pharmacologic - Dobutamine

Stage	Time	Dosage	Other Medication	Dosage	HR	BP	RPE	CP	Pain Location	Pain Type	Pain Action
	3	5.00			85	100\61					
	6	10.00			120	120\68					
	8	20.00			130	103\49					
Recovery					96	100\60					

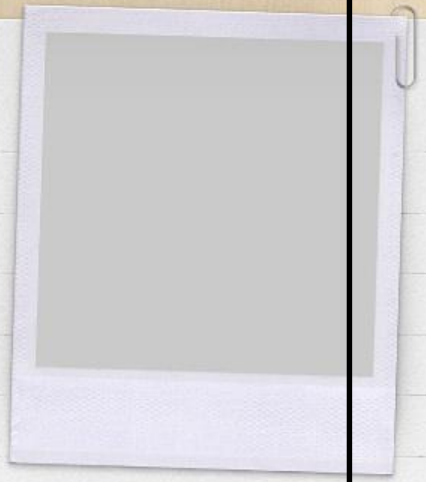



V
5
10
15
Sharp
62
-62
[m/s]
-2
-4
-6
-8
-3
-2
-1
0
66.67 mm/s
126
HR





Baseline

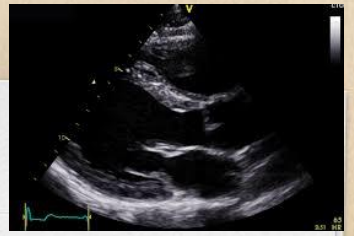


- Dynamic LVOTO takes place in 15-20% patients during DSE.[1]
- It is related to hypotension and decrease in HR in 50% of patients.[2]
- Dyspnea ± Chest pain.
- In rare occasions it can lead to RWMAs and finally even to acute myocardial infarction.[1]
- It is prognostic of chest pain, syncopal and presyncopal episodes.[3]

[1] *Makaryus AN Int J Cardiovasc Imaging 2006 Dec;22(6):763-9.*

[2] *Sorrentino MJ Clin Cardiol. 1996 Mar;19(3):225-30.*

[3] *Dawn B.* Am Heart J. 2005 May;149(5):908-16.



Predisposing factors for SAM:

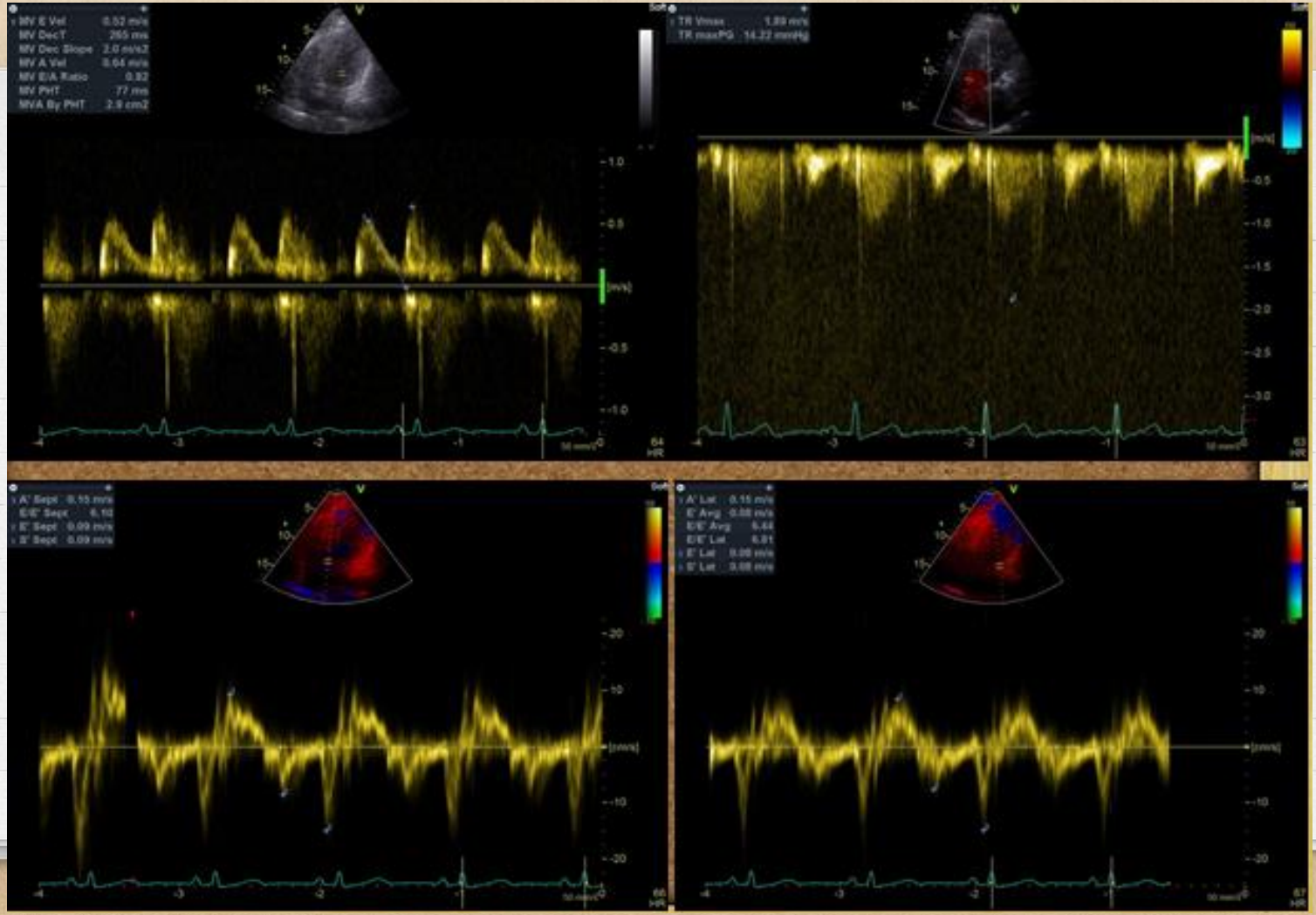
(1) excessive anterior or posterior leaflet tissue
(2) any anatomical or surgical translocation of the mitral valve anteriorly
(3) aortomitral angle <120°
(4) pathological or post-surgical correction elongation of the anterior leaflet
(5) annular undersizing in mitral valve repair
(6) chordal anoma-lies such as elongation and buckling
(7) surgical chordal interventions such as transection, translocation, and reimplantation
(8) anterior and medial displacement of the papillary muscles
(9) bulging subaortic septum
(10) absolute height of the posterior leaflet (>1.5 cm)
(11) anterior to posterior leaflet height ratio (<1.4)
(12) minimum distance from the coaptation point to the septum (C-Sept, <2.5cm).

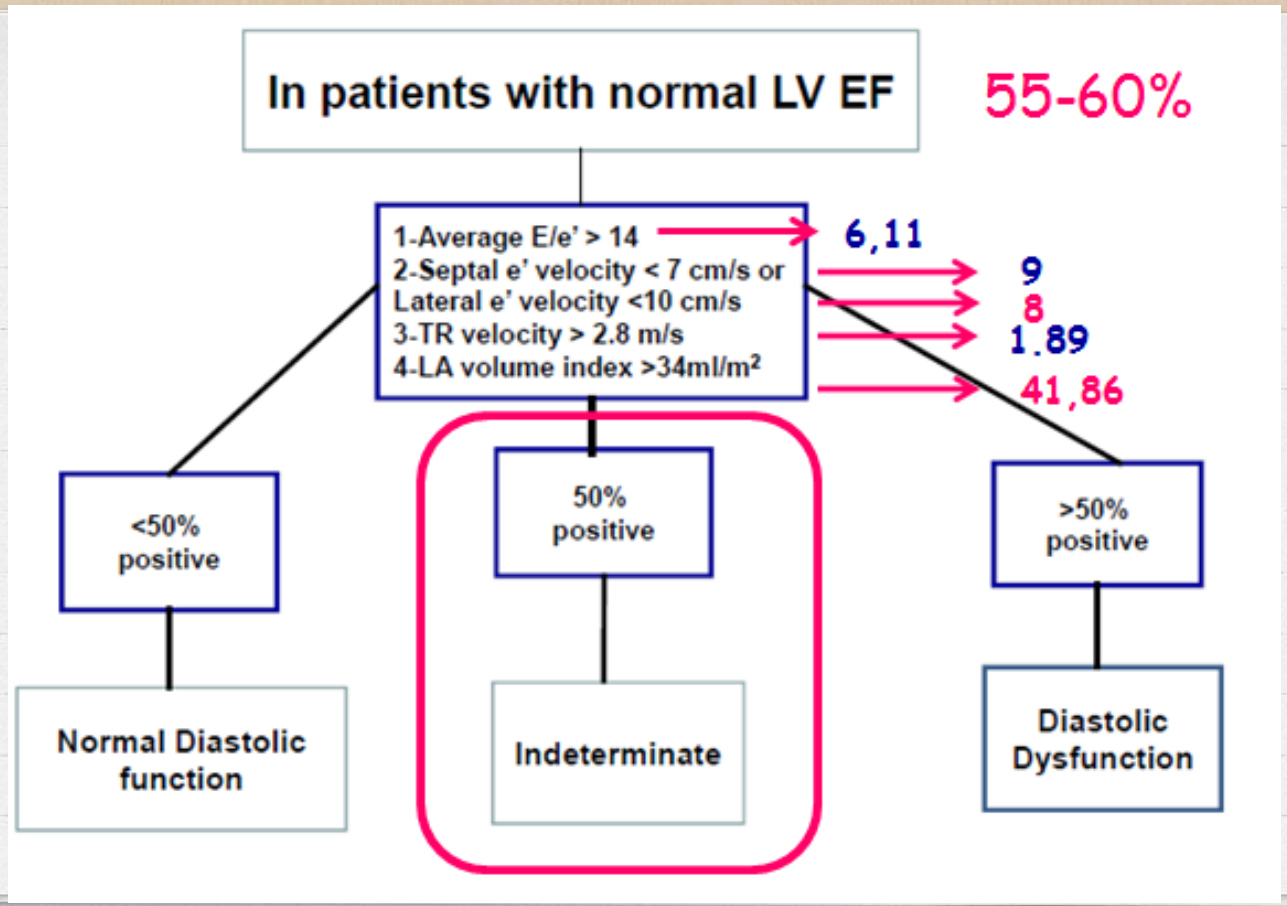
Raut M. Clin Med Insights Cardiol. 2018 Jan 10;12:1179546817751921.

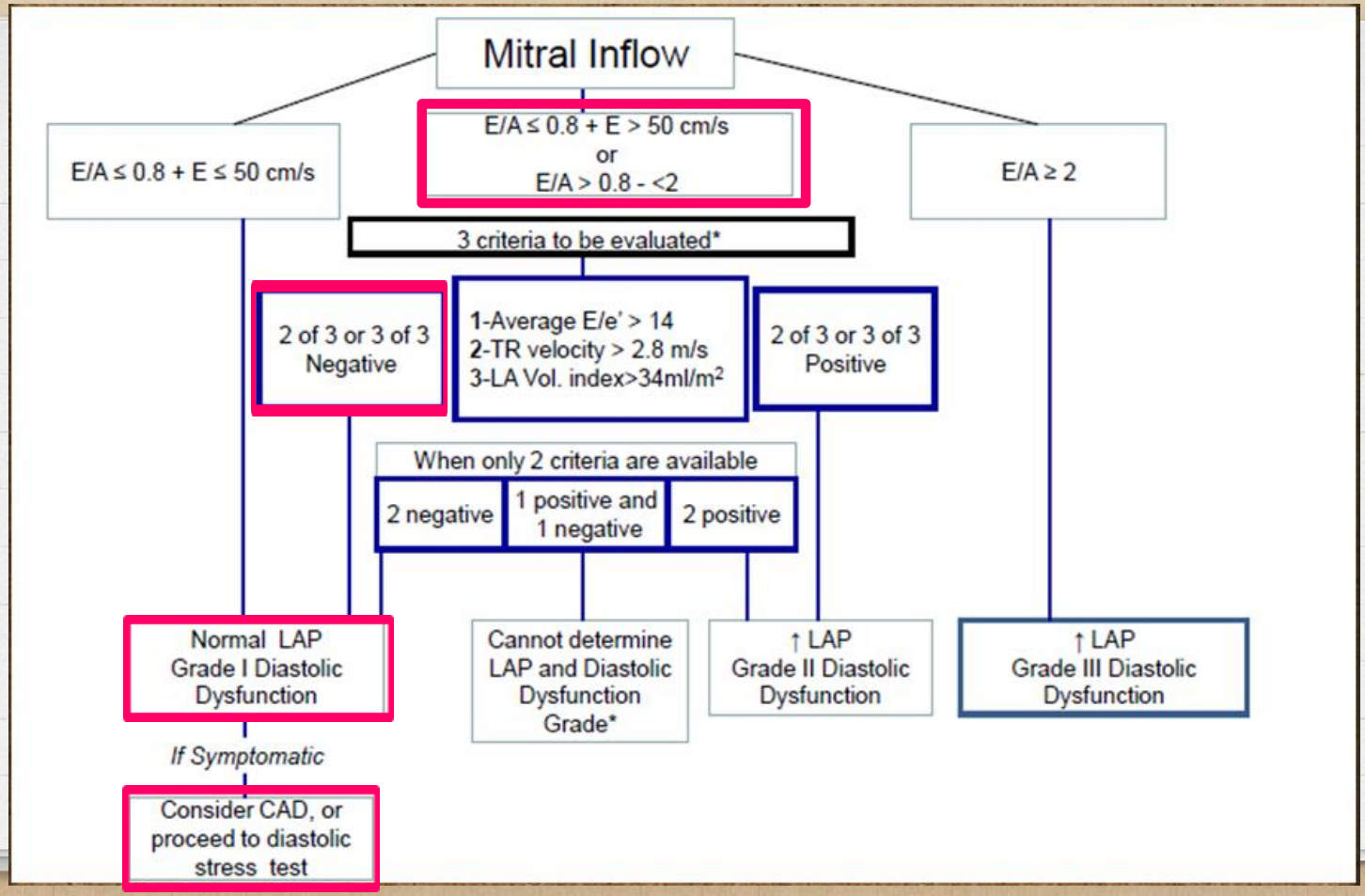
2nd case

Beyond diastology

60 years old female
Hypertensive
SOBOE

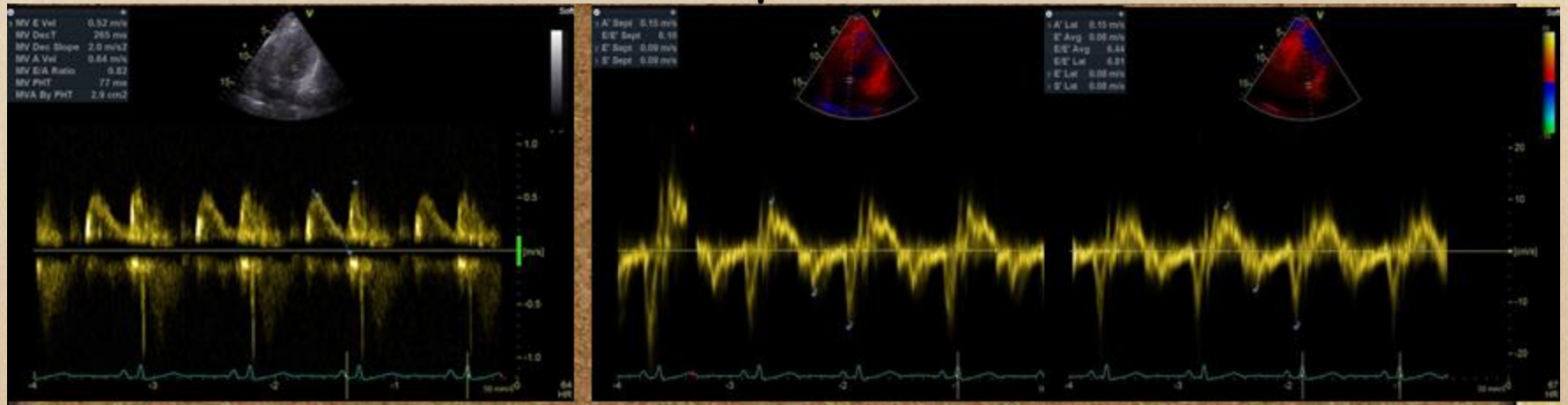



In patients with normal LV EF
55-60%
1-Average E/e' > 14
2-Septal e' velocity < 7 cm/s or Lateral e' velocity <10 cm/s
3-TR velocity > 2.8 m/s
4-LA volume index >34ml/m²
6,11
9
8
1.89
41,86
<50% positive
50% positive
>50% positive
Normal Diastolic function
Indeterminate
Diastolic Dysfunction

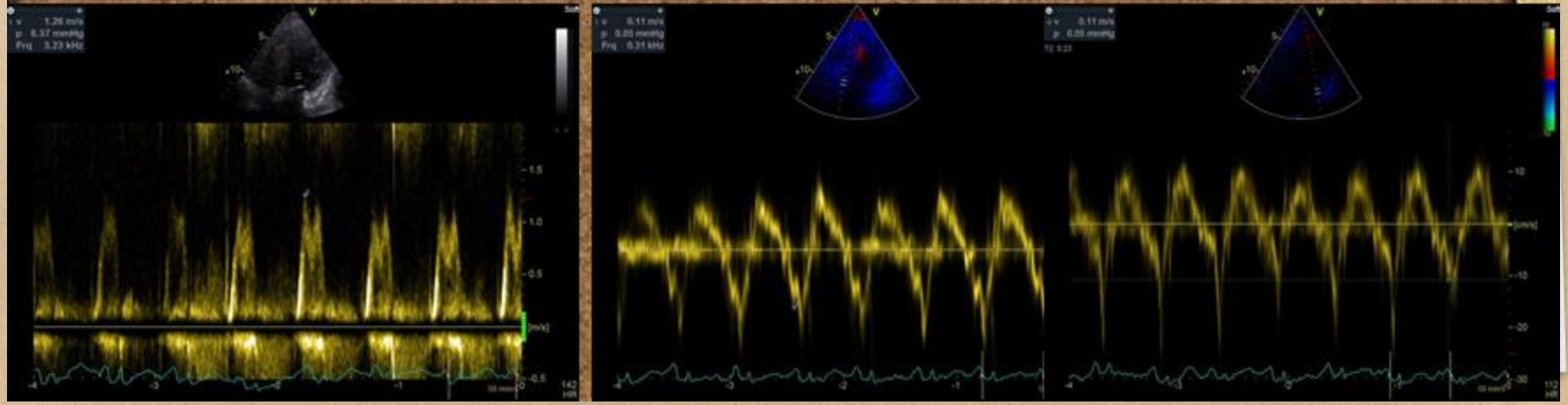

Mitral Inflow
E/A ≤ 0.8 + E ≤ 50 cm/s
E/A ≤ 0.8 + E > 50 cm/s
or
E/A > 0.8 - <2
E/A ≥ 2
3 criteria to be evaluated*
2 of 3 or 3 of 3
Negative
1-Average E/e' > 14
2-TR velocity > 2.8 m/s
3-LA Vol. index>34ml/m²
2 of 3 or 3 of 3
Positive
When only 2 criteria are available
2 negative
1 positive and
1 negative
2 positive
Normal LAP
Grade I Diastolic
Dysfunction
Cannot determine
LAP and Diastolic
Dysfunction
Grade*
↑ LAP
Grade II Diastolic
Dysfunction
↑ LAP
Grade III Diastolic
Dysfunction
If Symptomatic
Consider CAD, or
proceed to diastolic
stress test

E = 0.52m/s E/e' = 6.11 e'sept= 0.09m/s e' lat= 0.08m/s

Rest



Peak stress



E = 1.26m/s E/e' = 11.45 e' sept= 0.11 m/s e' lat= 0.11m/s

Diastolic stress echo results

Grey zone

Peak average E/e' 10-14 ???
or
Peak septal E/e' 10-15 ???

INDETERMINATE

Exercise right heart catheterization

Coronary angiogram

JOURNAL OF
Cardiovascular Echography

J Cardiovasc Echogr. 2017 Apr-Jun; 27(2): 45–51.
doi: 10.4103/jcecho.jcecho_44_16

PMCID: PMC5412746

Stress-induced Worsening of Left Ventricular Diastolic Function as a Marker of Myocardial Ischemia

Mohamad Jihad Mansour,[1,2,*] Wael Aljaroudi,[2,*] Ali Mroueh,[1] Omar Hamoui,[2] Walid Honeine,[2] Nada Khoury,[2] Jinane Abi Nassif,[2] and Elie Chammas[1,2]

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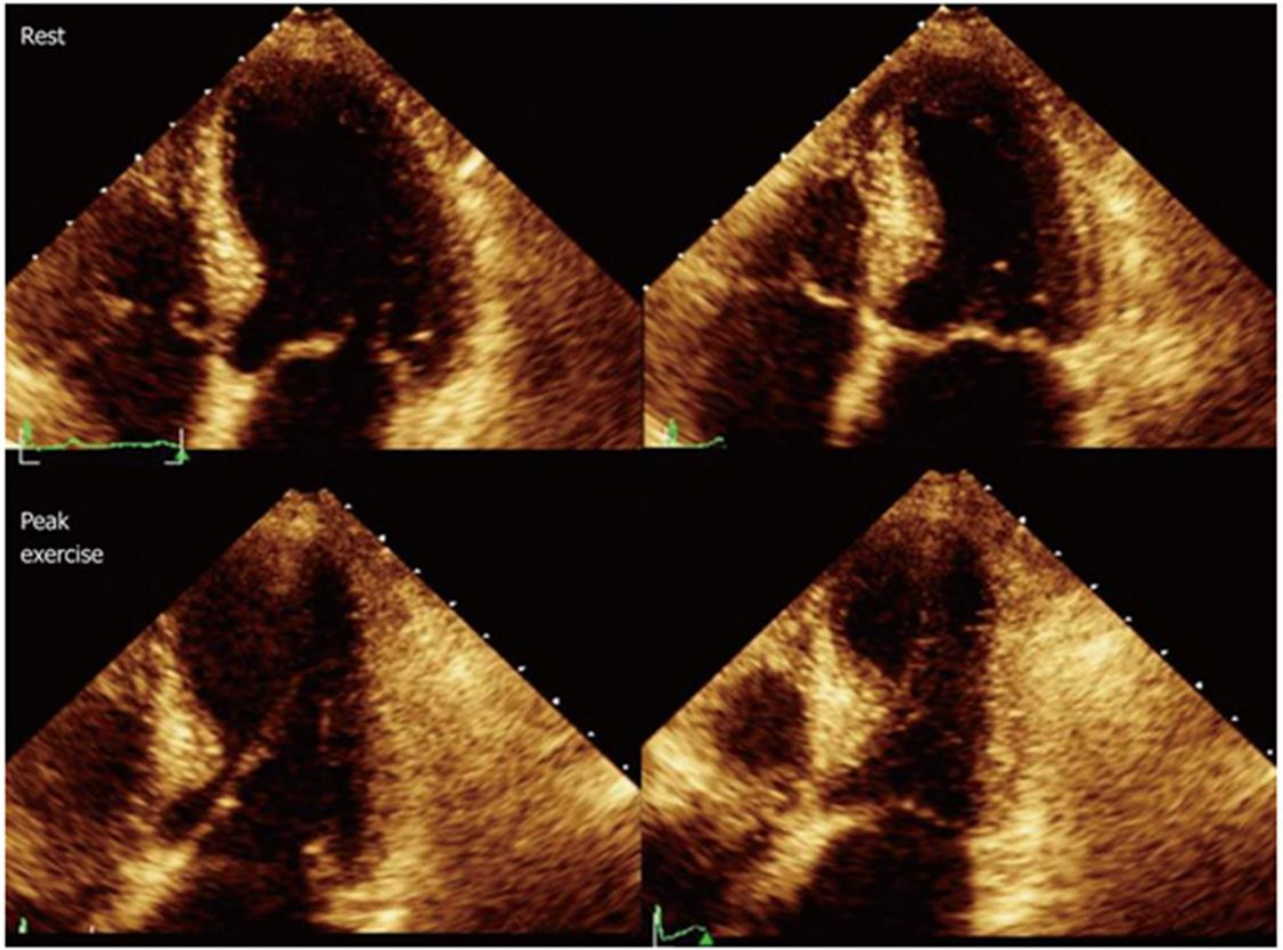
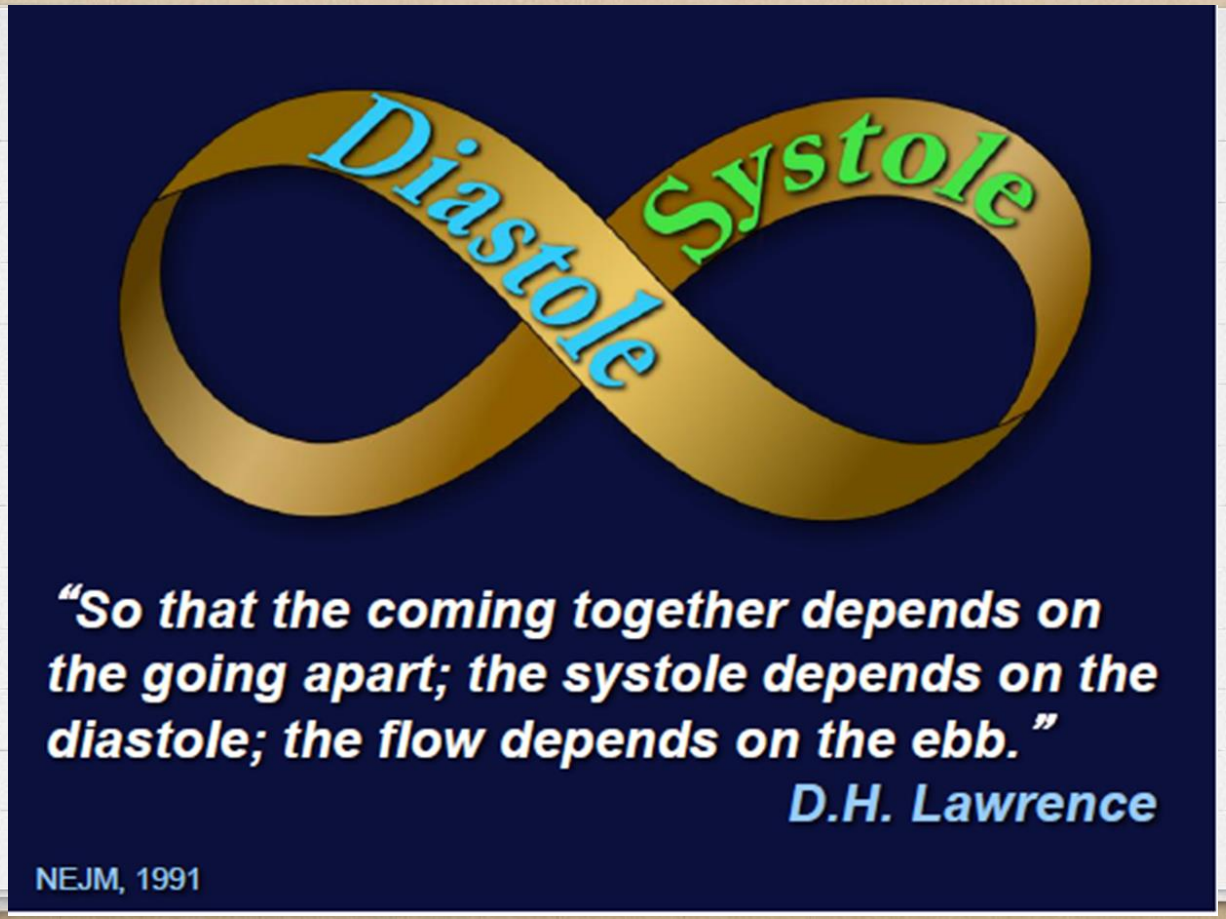
A change in E/e' >25% (stress-rest) was highly associated with a positive stress test and abnormal CCTA result

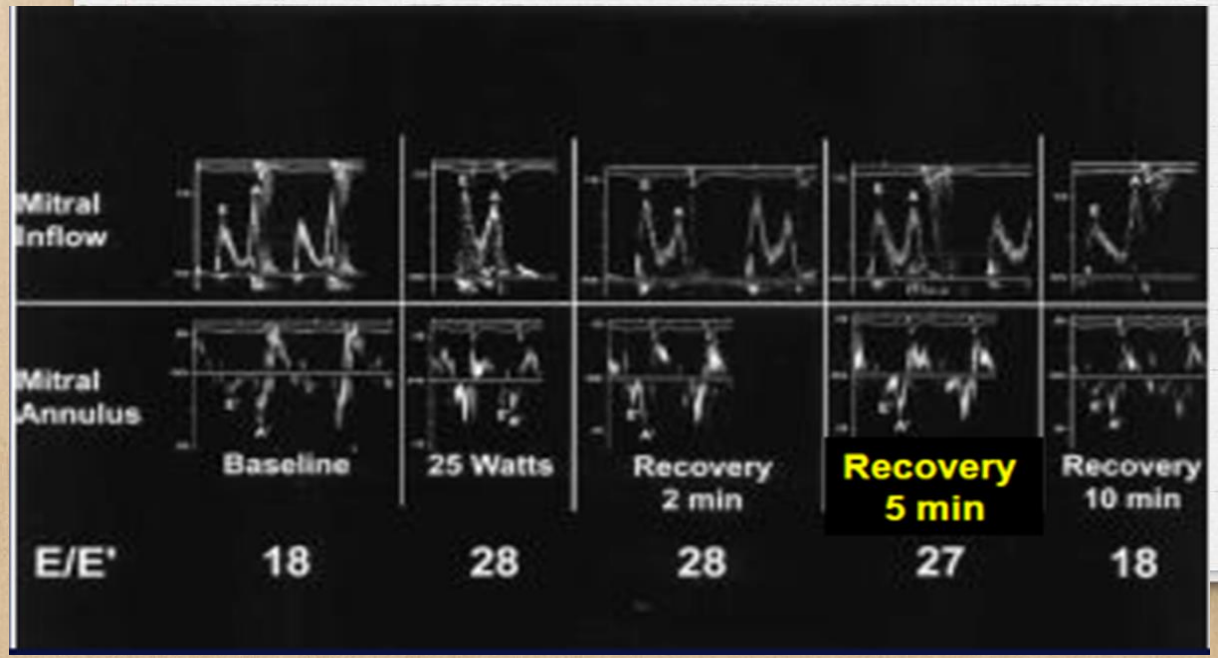
Diastole

Systole




Diastole
Systole
"So that the coming together depends on the going apart; the systole depends on the diastole; the flow depends on the ebb."
D.H. Lawrence
NEJM, 1991

- 1. At peak, first look for RWMAs
- 2. At recovery, look for diastolic parameters as increased E/e' persists in recovery



Helpful Tips

Ha et al. J Am Soc Echocardiol 2005;18:63-8.

Other findings during diastolic stress echo

- ✓ LV Outflow Track Obstruction
- ✓ New RWMAs
- ✓ Dynamic MR
- ✓ Chronotropic incompetence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