Ekodiagnos av HFpEF

hos äldre med hypertoni

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HFpEF

Kan eko användas för diagnos av HFpEF?

Vilka parametrar är tillförlitliga?

Vilka cut off gränser är optimala hos äldre med hypertoni?

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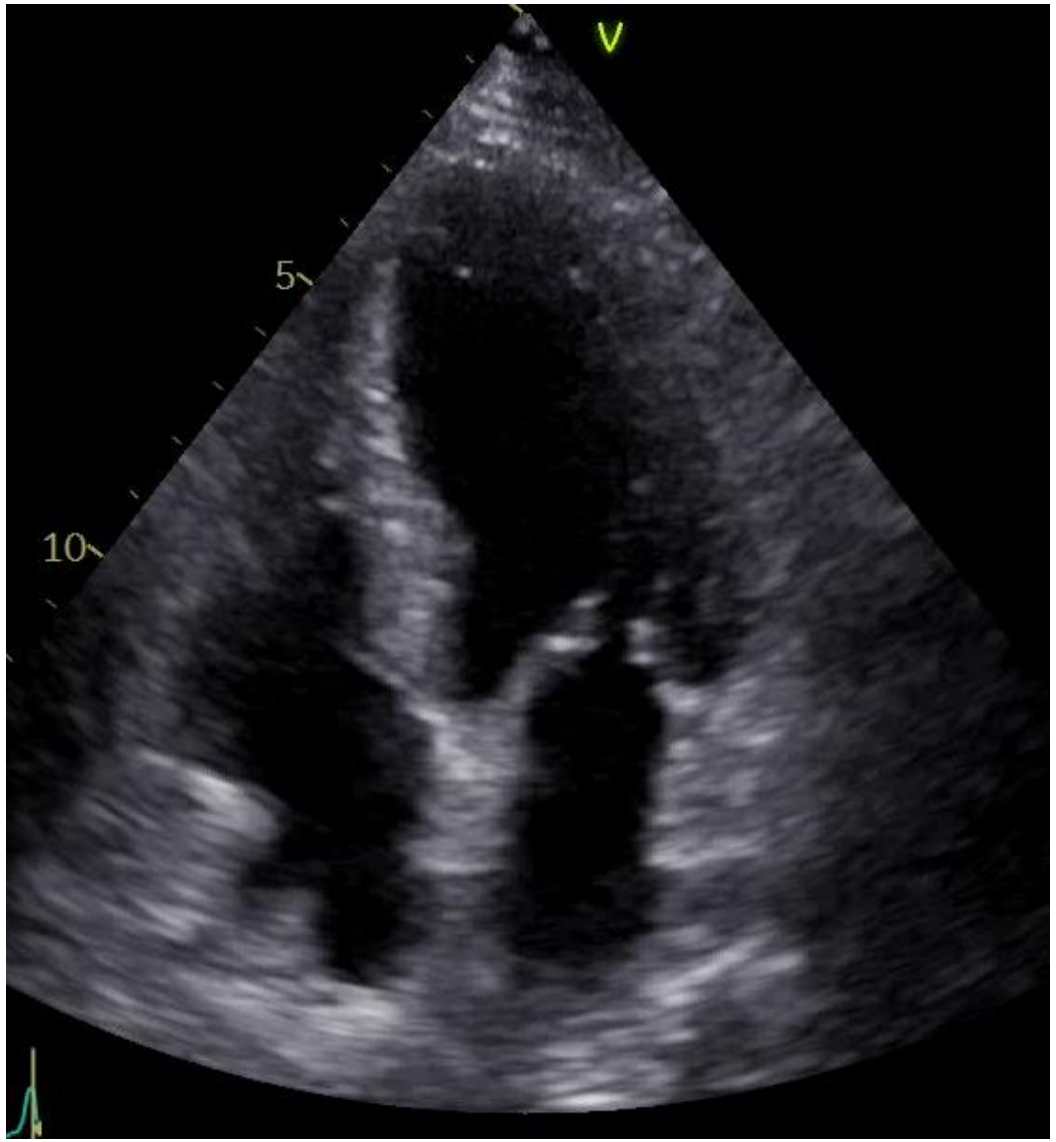
RESEARCH ARTICLE

Echocardiographic diagnosis of heart failure with preserved ejection fraction in elderly patients with hypertension

Vilken bild är från frisk kontroll och vilken från HFpEF patient?



HFpEF diagnos
Guidelines kräver 3 faktorer

1. Symtom + kliniska tecken på svikt
2. Eko: uteslut EF < 50%, klaffel, HCM, amyloidos, förhöjd CO
   Diastolisk störning
   (Guidelines 2012: e´sept < 8 cm/s eller e´lat < 10 cm/s)
3. NT-proBNP högt

Säkrast diagnos: invasiv tryckmätning

Högt PCWP i vila (> 12-15 mmHg)
Eller högt PCWP i arbete (> 25 mmHg)

PCWP= pulmonary capillary wedge pressure, fyllnadstryck

Kontroller n=16

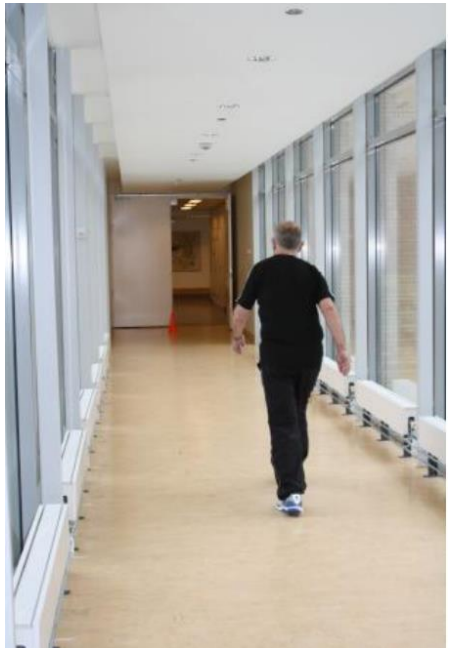
- Befolkningstudie Pure-Adonix
- 65- 90 år
- Hypertoni
- Kan gå utan hjälpmedel
- Utan svikt
- Sinusrytm

HFpEF n=17

- Från optimize studien
  inneliggande pga svikt eller
  ökad loop-diuretika > 80 mg
- 65-90 år
- Sinusrytm
- Kallades till nytt eko

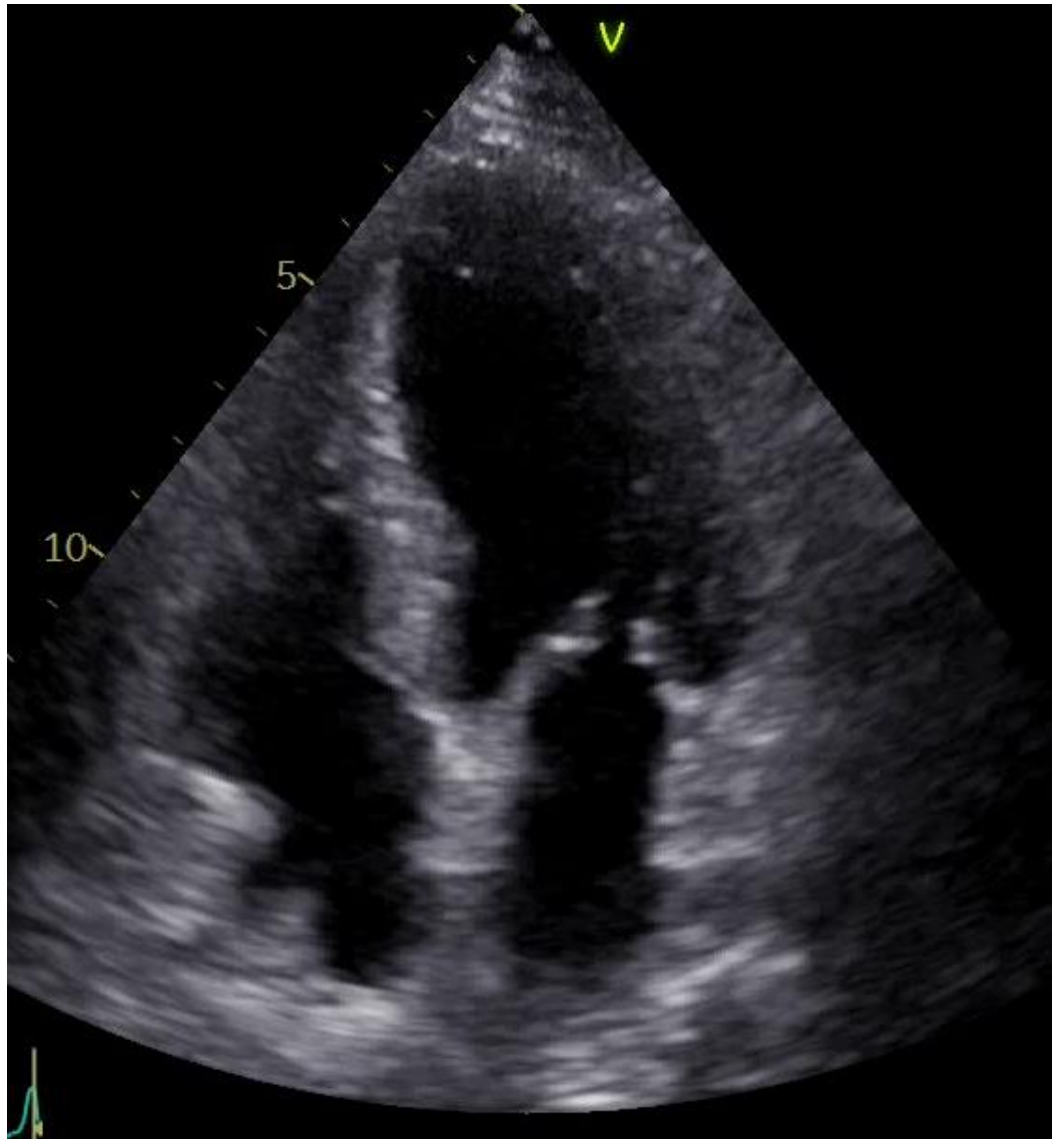
Eko + 6 minuters gångtest

Mean age 78 år



Population	Controls (n=16)	HFpEF (n=17)	P
Male n (%)	5 (31)	7 (41)	0.55
Age (year)	77.3 ± 3.8	79.3 ± 6.4	0.29
Heart rate (n/min)	69.0 ± 6.7	62.5 ± 10.5	0.04
SBP (mmHg)	145 (132–155)	149 (136–171)	0.32
DBP (mmHg)	76 ± 10	72 ± 9	0.22
Pulse pressure (mmHg)	68 (60–81)	80 (70–88)	0.029
NYHA I/II/III n (%)	16 (100) /0/0	0 / 4 (24) /13 (76)	
BMI (kg/m²)	25.3 ± 3.4	27.6 ± 2.9	0.04
Obesity, n (%)	1 (6)	4 (24)	0.34
Hypertension, n (%)	16 (100)	17 (100)	
Diabetes, n (%)	1 (7)	6 (35)	0.09
History of CAD, n (%)	0	7 (41)	0.007
GFR (ml/min/1.73m²)	74±16	51±22	0.001
Six-MWT (m)	477 ± 60	275 ± 92	<0.0001
NT-proBNP (ng/l)	79 (17–111)	1530 (1110–1905)	<0.0001

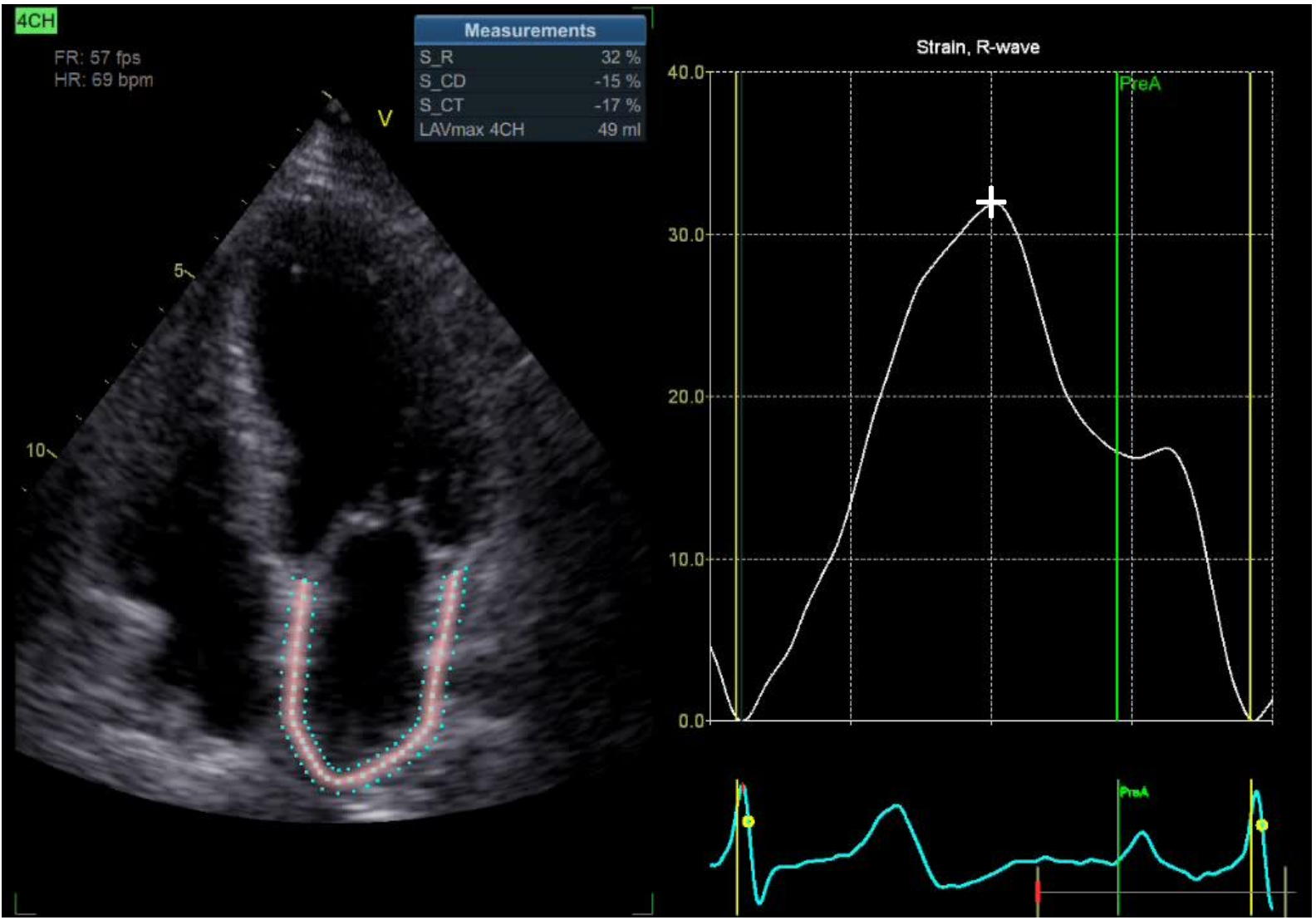
Vilken bild är från frisk kontroll och vilken från HFpEF patient?

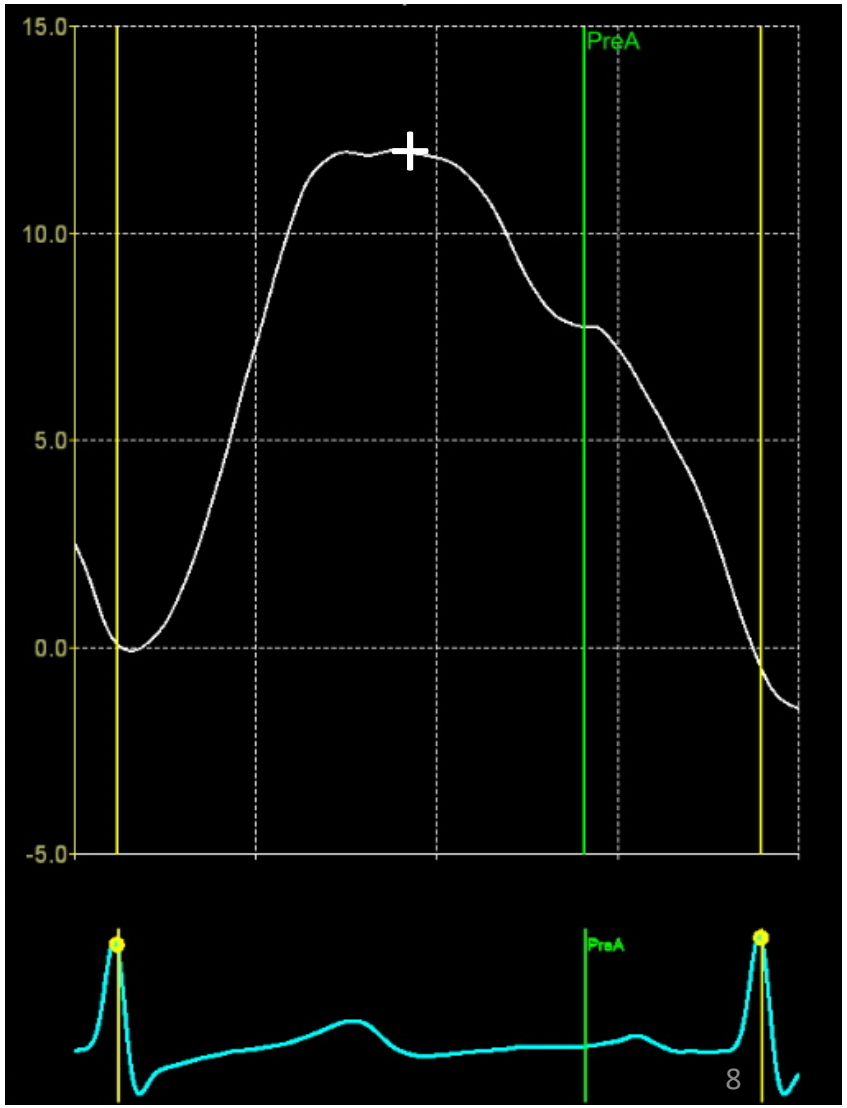


Left atrial reservoar strain (LASr)

Kontroll 32%

HFpEF 12 %





LA reservoar strain (LASr)

Rule in<21 %

Sensitivity 88 %

Specificity 93%

Rule out >23%

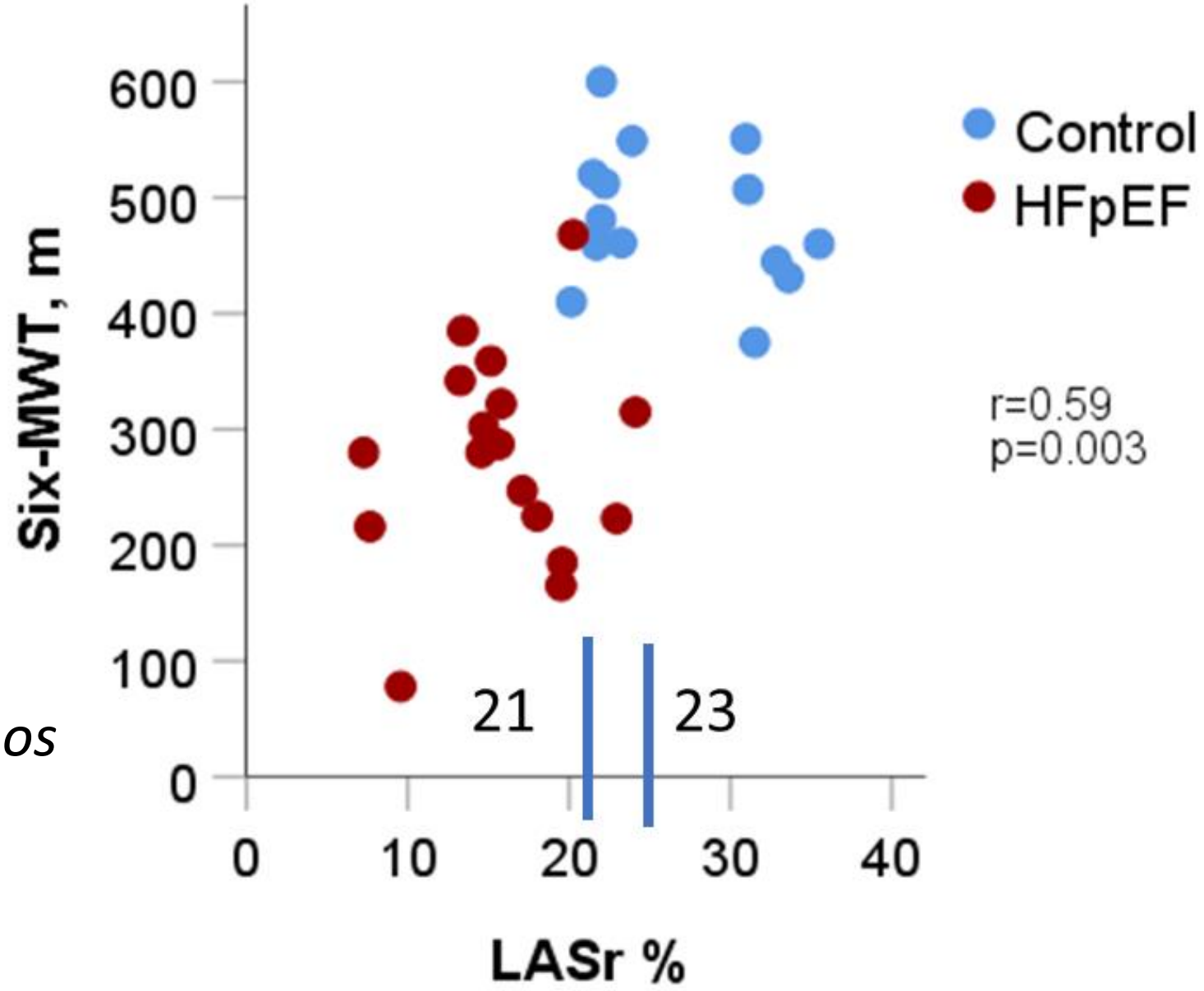
Sensitivity 94 %

Specificity 69 %

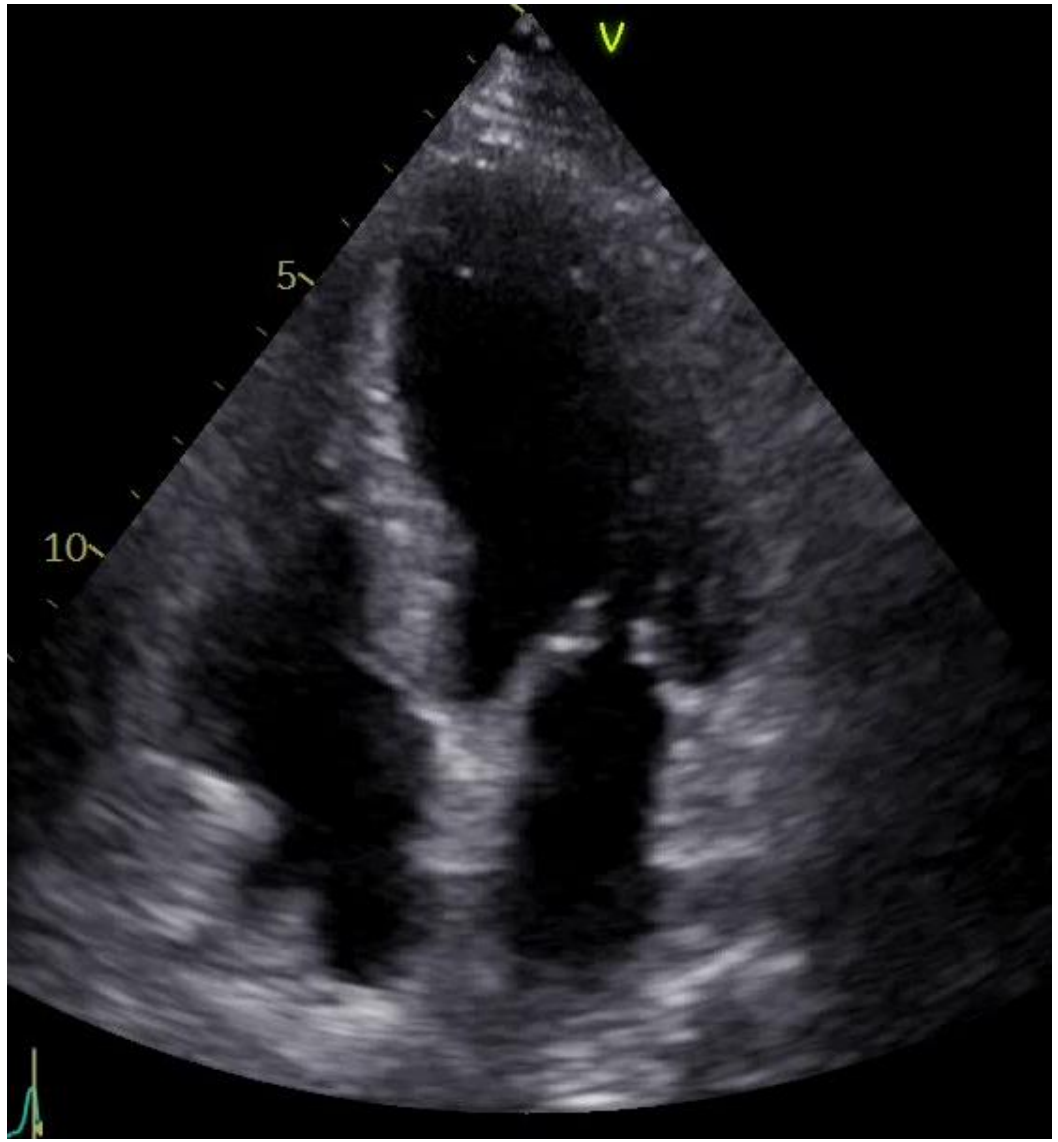
Jfr Lundberg 2019

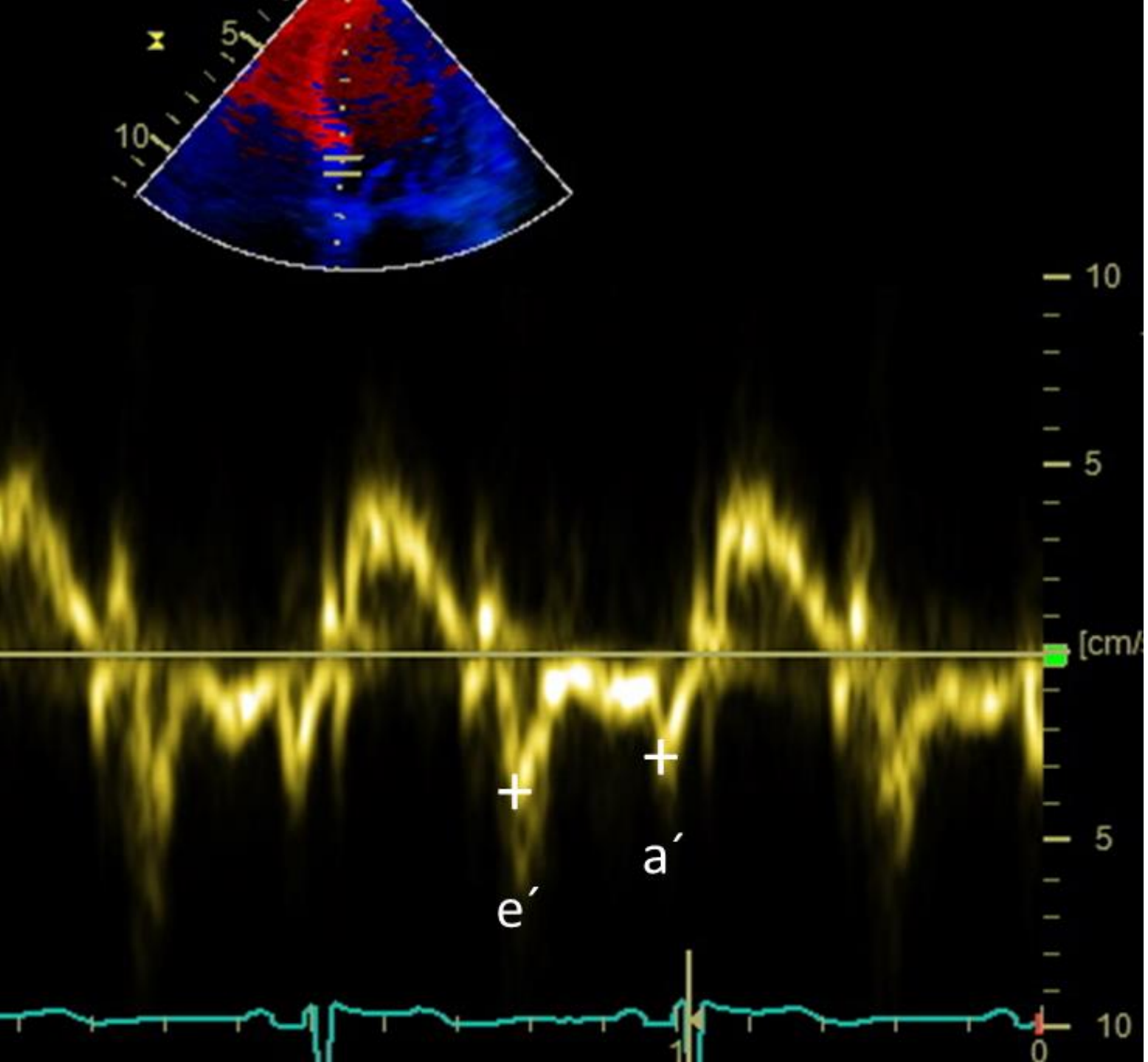
Cut off < 21% för HFpEF diagnos

LASr korrelerar mot PCWP i arbete



Vilken bild är från frisk kontroll och vilken från HFpEF patient?





a´ sept

Rule in < 6,1 cm/s

Sensitivitet 65 %

Specificitet 94%

Rule out 7,6 cm/s

Sensitivitet 94%

Specificitet 69%

a´< 7,25 cm/s

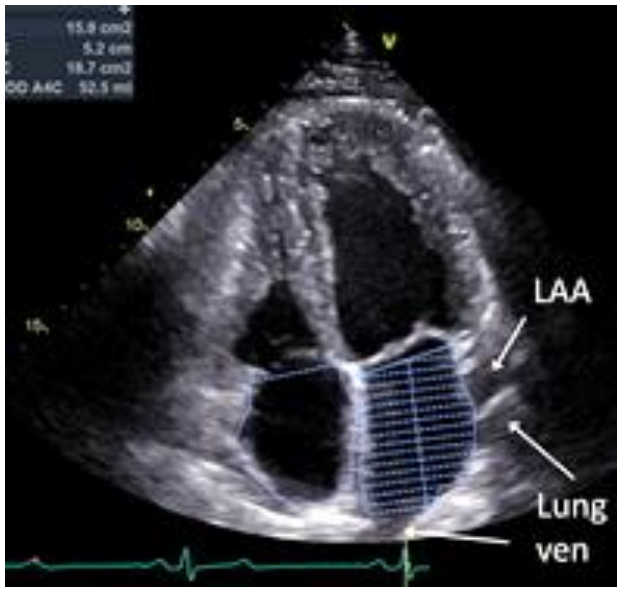
Högt mean LAP vila

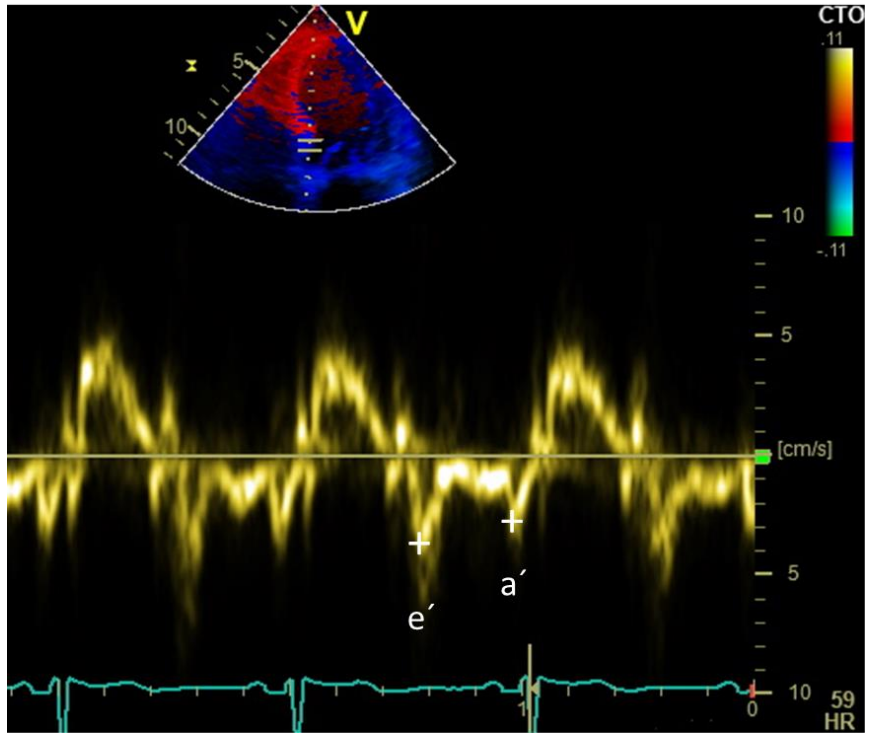
Sensitivitet 83%

Specificitet 77 %

Benny Johansson SCVJ 2022

LAVI / a´

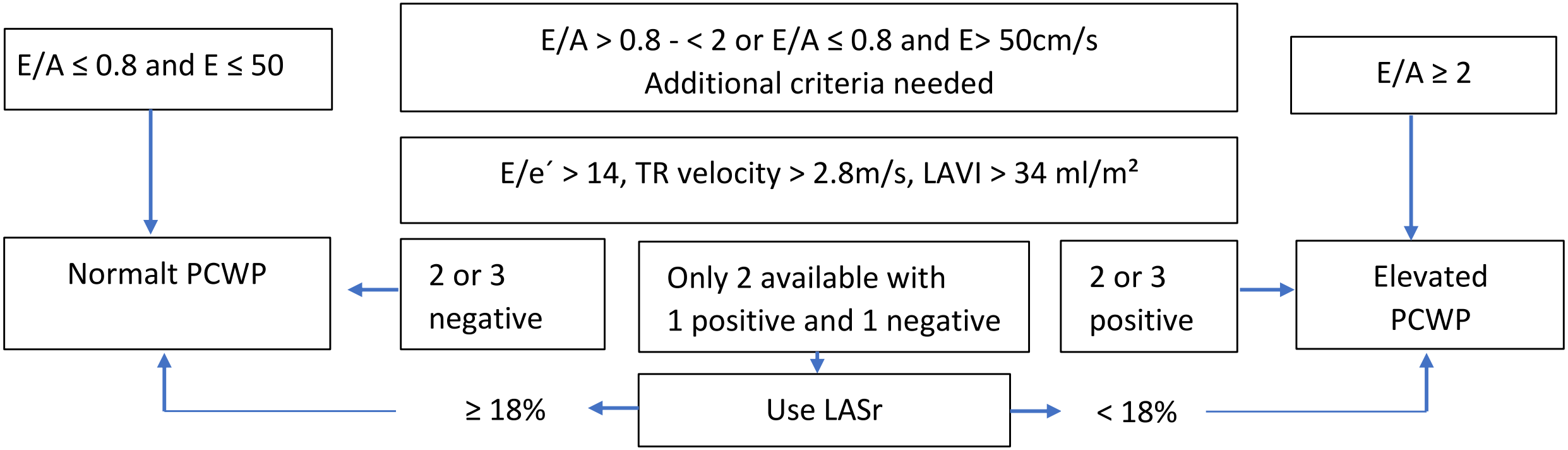




LAVI/a´> 5
HFpEF diagnos

sensitivitet 94%
specificitet 94%

The 2021 EACVI filling pressure algorithm, sinusrythm

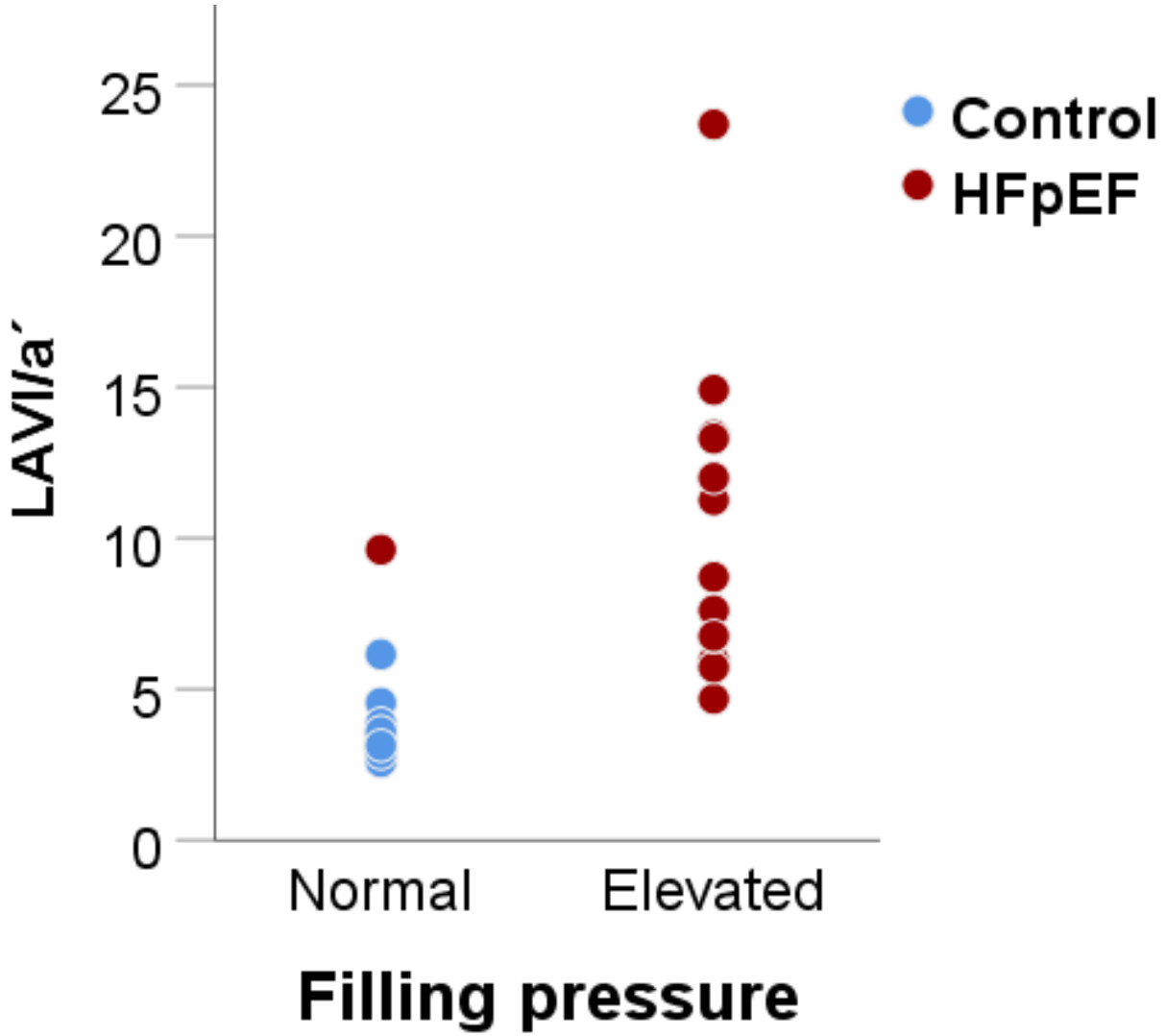


Resultat

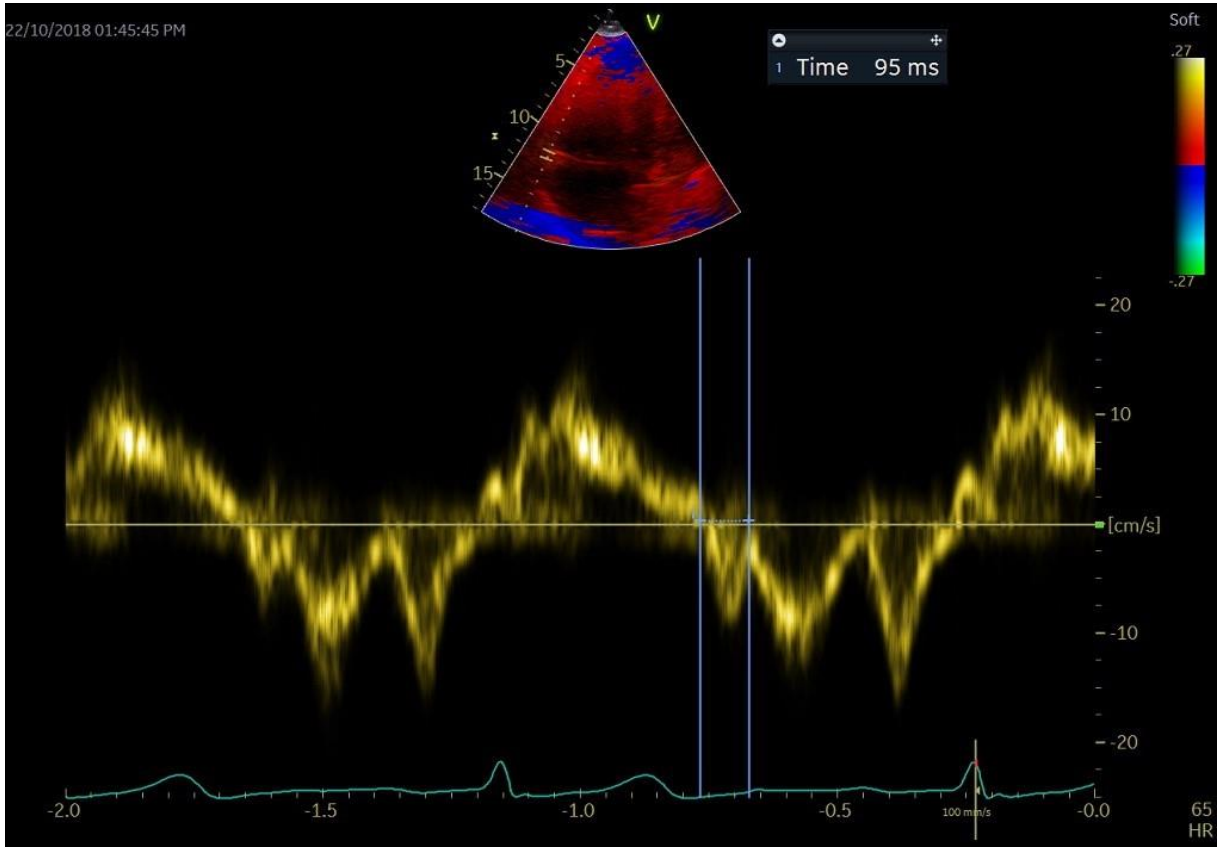
Alla kontroller normalt PCWP

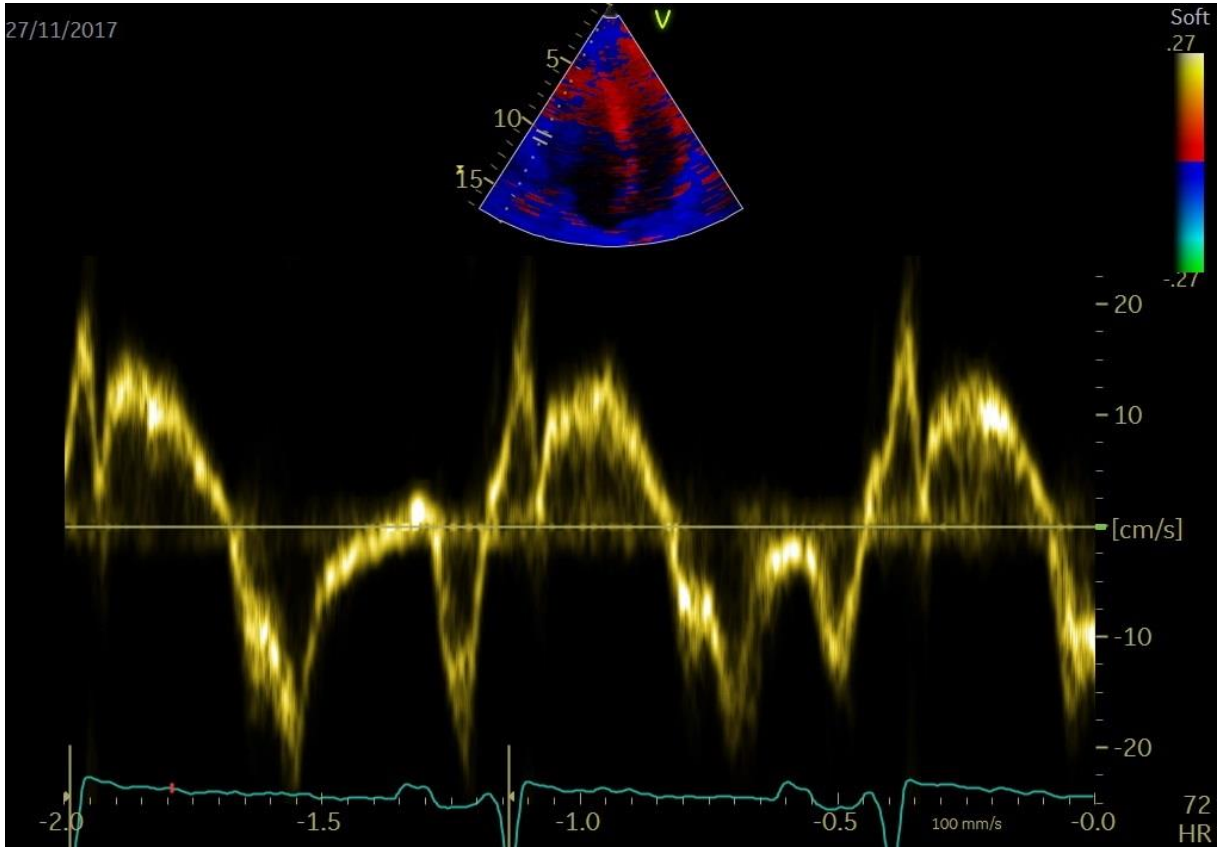
94% av HFpEF förhöjt PCWP

LAVI/a´ and 2021 EACVI filling pressure estimate



RVIVRT RV Isovolemic relaxation time tissue Doppler





IVRT > 70 ms

Sensitivitet 94%

Specificitet 75%

Normal IVRT < 40 ms

Resultat 1

Parameter	Rule in cut-off	Sens	Spec		Rule out cut-off	Sens	Spec
LVMI (g/m^2)	> 98	77%	93%		< 82	92%	40%
E/e' mean	> 16.0	73%	94%		< 12.0	93%	69%
LAVI (ml^2/m^2)	> 37.0	88%	94%		< 34.0	100%	81%
a' (cm/s)	< 6.1	65%	94%		> 7.6	94%	69%
LAVI/a´ ($ml/m^2/cm/s$)	> 5	94%	94%		< 5	94%	94%
LASr (%)	< 21.0	88%	93%		> 23.0	94%	53%

Resultat 2

Parameter	Rule in cut off	Sens	Spec		Rule out cut off	Sens	Spec
RVSP (mmHg)	>30	90%	90%		<30	90%	90%
RVIVRT (ms)	>95	41%	94%		<70	94%	75%
Medial e´ (cm/s)	<4.0	47%	94%		>5.0	88%	50%
Lateral e´ (cm/s)	<5.0	29%	94%		>7.0	88%	20%
GLS (%)	<16.5	38%	94%		>22	94%	60

Resultat 3

Parameter	Rule in cut off	Sens	Spec		Rule out cut off	Sens	Spec
E/A	>1.1	65%	94%		<0.6	94%	13%
DT (ms)	<150	50%	94%		>210	94%	6%
E/DT (m/s^2)	>6.4	50%	94%		<4.4	94%	69%
S/D	<1.1	56%	94%		>1.4	94%	62%

Sammanfattning HFpEF
> 65 år med hypertoni i sinusrytm

	Rule in	Rule out
E/e´	> 16	< 12
a´ (cm/s)	< 6,1	> 7,6
LAVI/a´ (ml^2/cm/s)	> 5	< 5
LASr (%)	< 21	> 23
RVSP (mmHg)	> 30	< 30
EACVI diastole matris	Förhöjt LAP	

Frågor? kommentarer

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ORIGINAL RESEARCH

Incremental Diagnostic Value of LA Strain With Leg Lifts in Heart Failure With Preserved Ejection Fraction

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Table 2. Effects of Leg Lifts on Heart Rate, Left Ventricular Volumes, and Func

	At Rest		
	HFpEF	Controls	p Value Between Groups
Heart rate, beats/min	72 (61–82)	63 (56–70)	0.005
LV end-diastolic volume, ml	59 (47–79)	59 (54–73)	0.678
LV end-systolic volume, ml	22 (15–34)	23 (19–29)	0.924
LV ejection fraction, %	60 (51–69)	63 (59–68)	0.210
LV stroke volume, ml	35 (28–44)	39 (32–46)	0.172
E wave, cm/s	67 (44–86)	59 (52–71)	0.382
A wave, cm/s	84 (62–102)	86 (77–100)	0.280
E/A ratio	0.79 (0.60–1.01)	0.71 (0.59–0.78)	0.070
Deceleration time, ms	225 (187–286)	256 (208–282)	0.074
Isovolumic relaxation time, ms	92 (69–127)	86 (69–105)	0.133
E′, cm/s	3.4 (2.5–4.0)	4.8 (4.0–5.9)	<0.001
A′, cm/s	6.3 (5.0–7.5)	8.9 (8.0–10.6)	<0.001
S′, cm/s	4.5 (4.1–6.0)	6.3 (5.1–7.0)	<0.001
E/E′	18.9 (15.7–24.9)	12.1 (9.5–16.9)	<0.001
TAPSE, cm	13.9 (12.6–17.1)	17.6 (15.0–20.2)	0.001

Values are median (interquartile range).
A = late mitral diastolic inflow velocity; A′ = late diastolic mitral annular velocity; E = early mitral velocity; TAPSE = tricuspid annular plane systolic excursion; other abbreviations as in Table 1.

HFpEF diagnostik vid flimmer?

Studie: 429 Konsekutiva patienter effortdyspnea , EF> 50%
invasive exercise test

36 % noncardiac dyspnea

- 91% av paroxysmalt flimmer hade HFpEF
- 98% persistent/permanent flimmer hade HFpEF

Symtomatisk patient, EF > 50% + HT/DM har mycket ofta HFpEF

Reddy, Circulation 2018, 534-