

Ehokardiogrāfijas izmeklējuma, arhivācijas un slēdziena standartizācija. Jaunās rekomendācijas.



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European Association of Echocardiography recommendations for standardization of performance, digital storage and reporting of echocardiographic studies

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2008 gads.

MĒRĶIS

- izveidot vienotu Eiropas dokumentu ar minimālām prasībām šībrīža ehokardiogrāfijas klīniskajā praksē
- uzlabot **kvalitāti** Eiropas ehokardiogrāfijas praksē.

NB! Working Group of Echocardiography no 1978 g.

The European Association of Echocardiography (**EAE**) no 2003 g.

50 valstis.

Ehokardiogrāfijas aparatūras, prasības:

- 1
2D-režīms
M-režīms
PW, CW, CF, TDI
- 2
protokolu, bilžu ierakstīšana
CD vai DVD formātā, vai
digitāla pārvešana un saglabāšana datu bāzē
- 3
ērti lietojams aprīkojums

1. Ehokardiogrāfiska izmeklēšana:

#1

2D

#2

M-režīms

#3 Doplers:

CW, PW, CF, TDI

NB! 30 minūtes - izmeklēšanas laiks + 10 minūtes - protokola rakstīšana !!!

2. Ehokardiogrāfiskā izmeklēšana ietver:

- sirds morfoloģisko izmeklēšanu,
- visu sirds kambaru funkcijas,
- visu sirds vārstuļu funkcijas,
- visu lielo asinsvadu funkcijas izvērtēšanu.

Table 1 Cardiac and vascular structures routinely evaluated as part of a complete adult echocardiographic report

1.	Left ventricle
2.	Mitral valve
3.	Left atrium
4.	Aortic valve
5.	Aorta
6.	Right ventricle
7.	Tricuspid valve
8.	Right atrium
9.	Pulmonary valve
10.	Pulmonary artery
11.	Pericardium
12.	Inferior vena cava
13.	Pulmonary veins

3. Ehokardiogrāfiskā izmeklēšana ietver:

Arhivāciju

EKG

Table 2. Minimal standard digital acquisition protocol for transthoracic echocardiography

View	Data type
Parasternal long-axis view of the LV (2D + colour Doppler + M-mode) ^a	Loop
Parasternal short-axis view at aortic valve level (2D + colour Doppler + M-mode) ^a	Loop
Parasternal short-axis view at mitral valve level (2D) ^a	Loop
Parasternal short-axis view at mid-papillary level (2D)	Loop
Parasternal RV inflow-tract view (2D + colour Doppler) ^a	Loop
Parasternal RV outflow-tract view (2D + colour Doppler) ^a	Loop
Apical four-chamber view (2D + colour Doppler) ^a	Loop
Apical five-chamber view (2D + colour Doppler) ^a	Loop
Apical two-chamber view (2D + colour Doppler) ^a	Loop
Apical long-axis view (2D + colour Doppler) ^a	Loop
Subcostal four-chamber view (2D + colour Doppler) ^a -atrial septum	Loop
Subcostal-inferior vena cava collapse during inspiration or sniff (+M-mode)	Loop
Suprasternal long-axis view of the aortic arch (2D + colour Doppler) ^{a,b}	Loop
Transmitral velocities (PW Doppler)	Spectral Doppler (still frame)
LV outflow tract velocities (PW Doppler)	Spectral Doppler (still frame)
Transaortic/outflow tract velocities (CW Doppler)	Spectral Doppler (still frame)
Tricuspid regurgitant velocities (CW Doppler)	Spectral Doppler (still frame)
Transpulmonary velocities (PW Doppler)	Spectral Doppler (still frame)
Tissue Doppler on mitral annulus (septal, lateral velocities)	Spectral Doppler (still frame)

NB!

- 1-3 cikli
- bez ES

Ehokardiogrāfiskā izmeklēšana

Complete
(pilna)
Eho-kg

1+2+3

Limited or Focused
(limitējošā vai fokusējošā)
Eho-kg

1. Mērījumi un reproducēšana (reproducibility)

3 problēmas, kas ietekmē rezultātu
variācijas
(variability)

1. aparātūra

2. metodoloģija

3. rezultātu interpretācija

2.Mērījumi un reproducēšana (reproducibility)



- attēla kvalitāte
- ehokardiogrāfista pieredze un iemaņas:



Standarta protokols #1

■ PROTOKOLA SĀKUMS:

Iestādes nosaukums

1. Pacinta dati: vārds, uzvārds; personas kods.
2. Dzimums
3. Indikācijas eho-kg
4. BSA*
5. Ritms, frekvence*
6. AS*
7. Ehokardiogrāfa nosaukums*
8. US logs kvalitāte*

Standarta protokols #2

- Pamatdaļa:

- Mērījumi un sirds morfoloģijas apraksts***

- 2D, 3D
- M-režīms
- Doplers: PW, CW, CF, TDI

Vairāk domāts priekš mums

Standarta protokols #3

- Slēdziens:

Skaidri un saprotami uzrakstīt pašu svarīgāko !!!

Vairāk domāts priekš ārstiem

Standarta protokols #4

- *Paraksts un datums*

1. Mērījumi

Table 3 Echocardiographic measurements at the echocardiographic report

	Normal values by 2D or M-mode
LV dimensions:	
2D or 3D volumes ^a	EDV: 35–75 mL/m ² ESV: 12–30 mL/m ²
M-mode diameters (end-diastolic–end-systolic) or 2D ‘guided’	EDD: 22–32 mm/m ² ESD: 14–21 mm/m ²
Septum and posterior wall thickness	IVS: 6–10 mm PW: 6–10 mm
LV ejection fraction: volume-based quantitation advisable	> 55%
LV regional wall motion abnormalities: from 1 (normal) to 4 (dyskinetic) ^b	
Left atrium: at least two orthogonal diameters, preferably volume ^a	27–40 mm <29 mL/m ²
Right ventricle: size (normal or dilated)	
Right ventricle systolic function: (normal, depressed: mild, moderate, severe)	
Right atrium: size (normal or dilated)	
Aortic root: maximum diameter at sinus level ^c	< 39 mm <21 mm/m ²
Inferior vena cava: diameters (inspiration–expiration)	< 17 mm
Mitral valvular area planimetry ^d	
Comments: open-text field	

^aPreferably indexed.
^bUsing the 16 or 17 segment models.
^cIf abnormal or suspected pathology: sinotubular junction and ascending aorta.
^dIn mitral stenosis.
Normal values from ASE recommendations.¹³
Abbreviations as in Table 2.

2. Mērījumi

■ normas rādītāji no ASE+EAE rekomendācijām

Recommendations for Chamber
Quantification: A Report from the American
Society of Echocardiography's Guidelines and
Standards Committee and the Chamber
Quantification Writing Group, Developed in
Conjunction with the European Association
of Echocardiography, a Branch of the
European Society of Cardiology

2005
gads

Members of the Chamber Quantification Writing Group are: Roberto M. Lang, MD, FASE,
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Elyse Foster, MD, Patricia A. Pellikka, MD, Michael H. Picard, MD, Mary J. Roman, MD,
James Seward, MD, Jack S. Shanewise, MD, FASE, Scott D. Solomon, MD,
Kirk T. Spencer, MD, FASE, Martin St John Sutton, MD, FASE,
and William J. Stewart, MD

3.Mērījumi

- **Indekss = rādītājs/BSA (.../m²)**

BSA - Body Surface Area

ķermeņa virsmas laukums:

augums un svars

Mosteller formula	$BSA (m^2) = ([augums(cm) \times svars(kg)]/ 3600)^{1/2}$
DuBois formula	$BSA (m^2) = 0.20247 \times augums(m)^{0.725} \times svars(kg)^{0.425}$
Haycock formul	$BSA (m^2) = 0.024265 \times augums(cm)^{0.3964} \times svars(kg)^{0.5378}$

- **Tilpums**
- **Obligātā kārtā (O) un rekomendētie (R)**

BSA

■ EDD	66 mm	ESD	50 mm
■ EDV	140 ml	ESV	68 ml
■ KĀ	42 mm		56 ml

BSA 2,6 m² 195 cm, 127 kg

- EDD 26 mm/m² ESD 19 mm/m
- EDV 54 ml/m² ESV 24 ml/m²
- KĀ indekss 22 ml/m²

BSA 1.8 m² 170 cm, 85 kg

- EDD 36 mm/m² ESD 28 mm/m²
- EDV 78 ml/m² ESV 38 ml/m²
- KĀ indekss 31 ml/m²

Kreisais kambaris:

Normal values by 2D or M-mode	
LV dimensions:	
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Septum and posterior wall thickness	EDD: 22–32 mm/m ²
	ESD: 14–21 mm/m ²
	IVS: 6–10 mm
	PW: 6–10 mm
	> 55%
EF > 55%	
<u>LV ejection fraction: volume-based quantitation advisable</u>	
LV regional wall motion abnormalities: from 1 (normal) to 4 (dyskinetic) ^b	

■ 2D, Tilpums = *ml*
Simpsona metode = disku metode.

NB! Bi-plane → 4CH + 2 CH

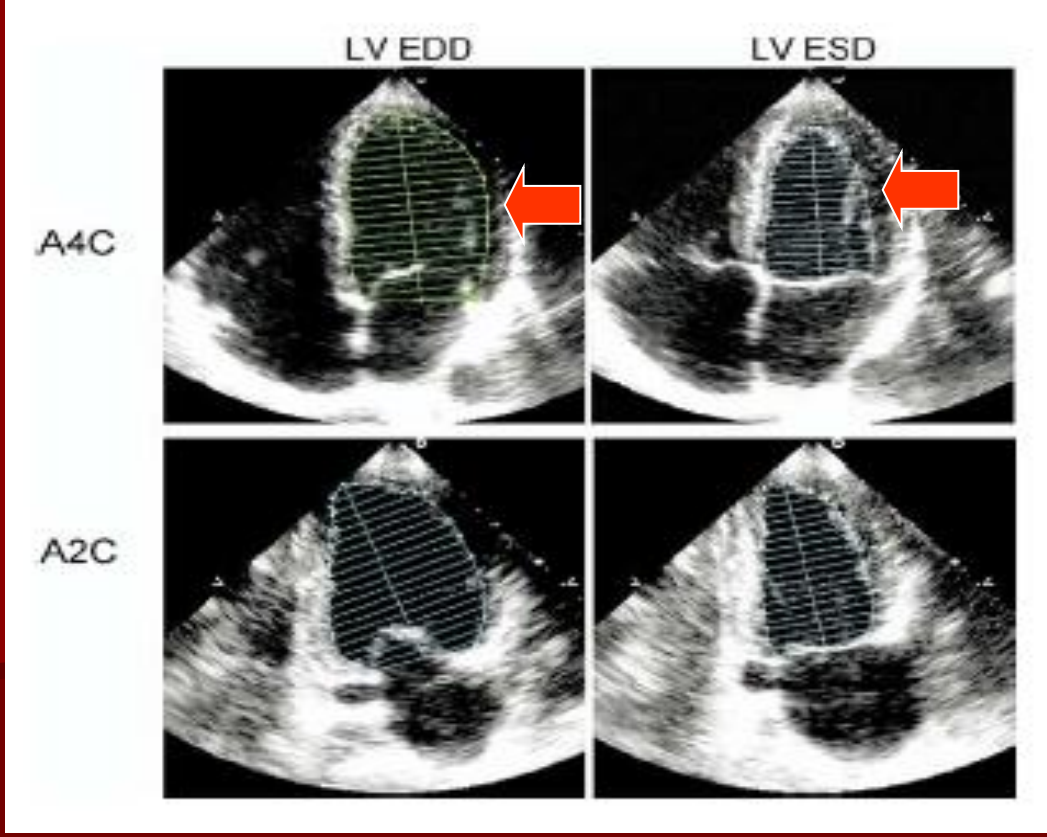
$$EF = (EDV - ESV) / EDV$$

EDV un EDD: diastoles beigas, QRS sākums.
ESV un ESD: sistoles beigas, pirms MV atvēršanās.

Kreisais kambaris: Simpsona metode

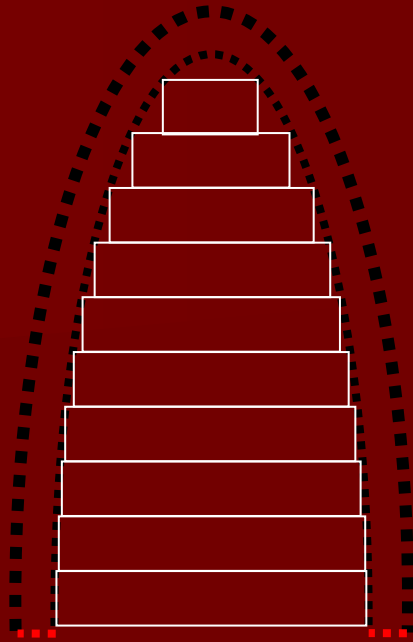
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	> 55%
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LV regional wall motion abnormalities: from 1 (normal) to 4 (dyskinetic) ^b	



EDV: 35–75 mL/m²

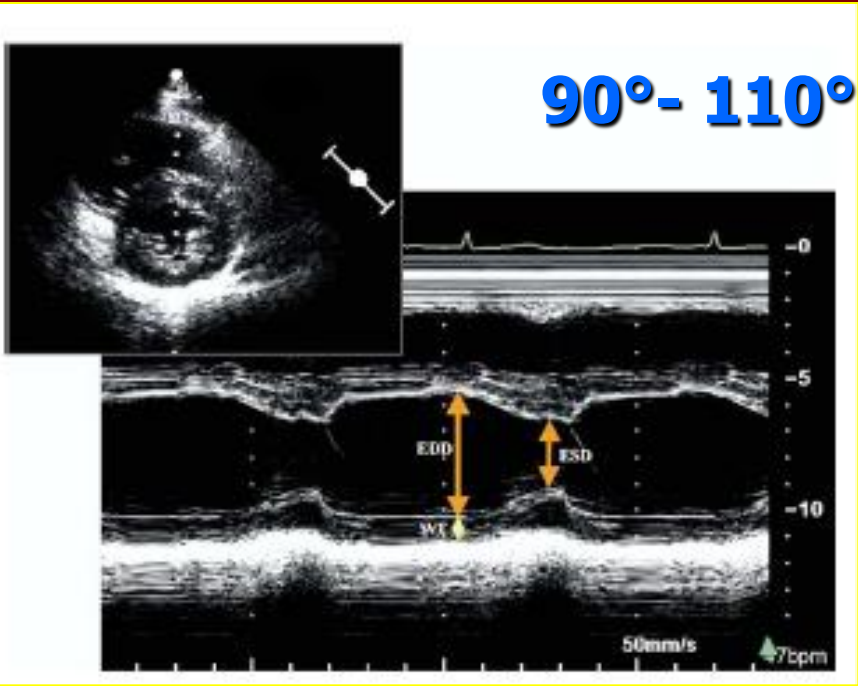
ESV: 12–30 mL/m²



Kreisais kambaris:

Normal values by 2D or M-mode	
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LV regional wall motion abnormalities: from 1 (normal) to 4 (dyskinetic) ^b	

■ M-režīms, Diametrs (lineāri) = *mm* vai *cm*

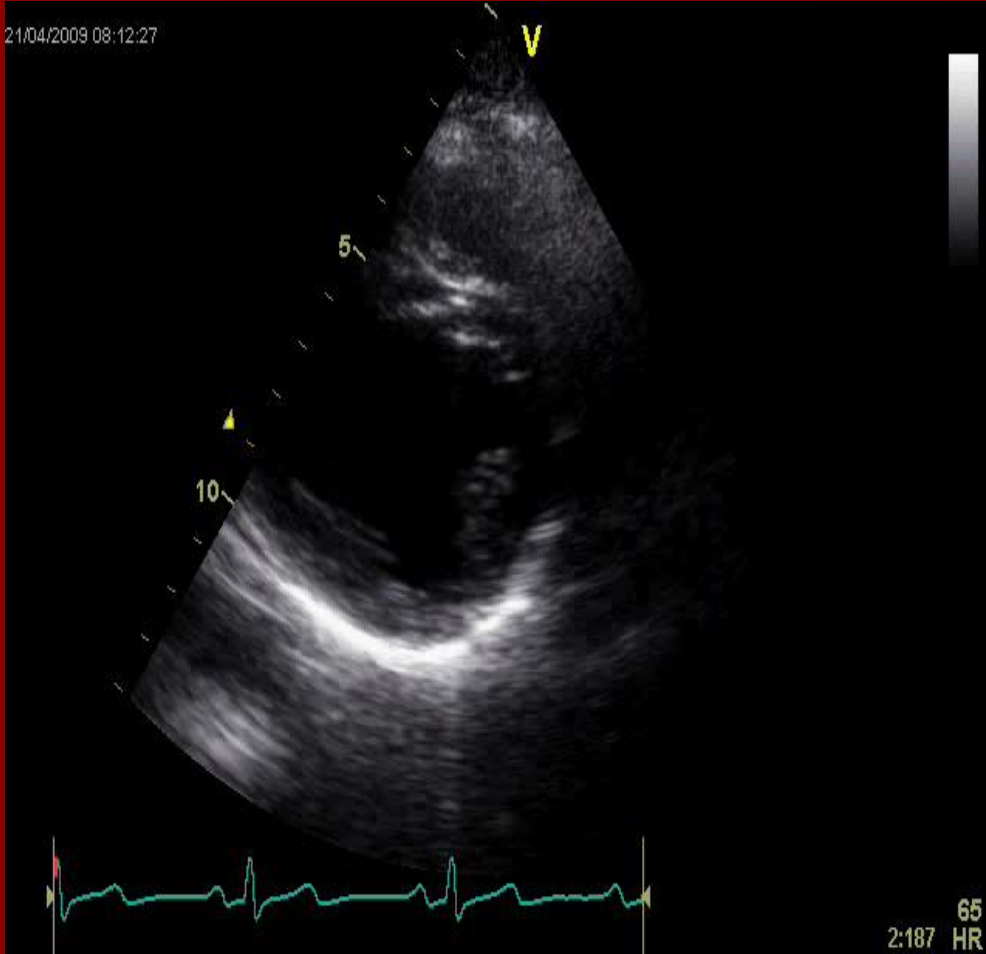


EDD: 22–32 mm/m2

ESD: 14–21 mm/m2

starp Siena
↕
mugurējā Siena

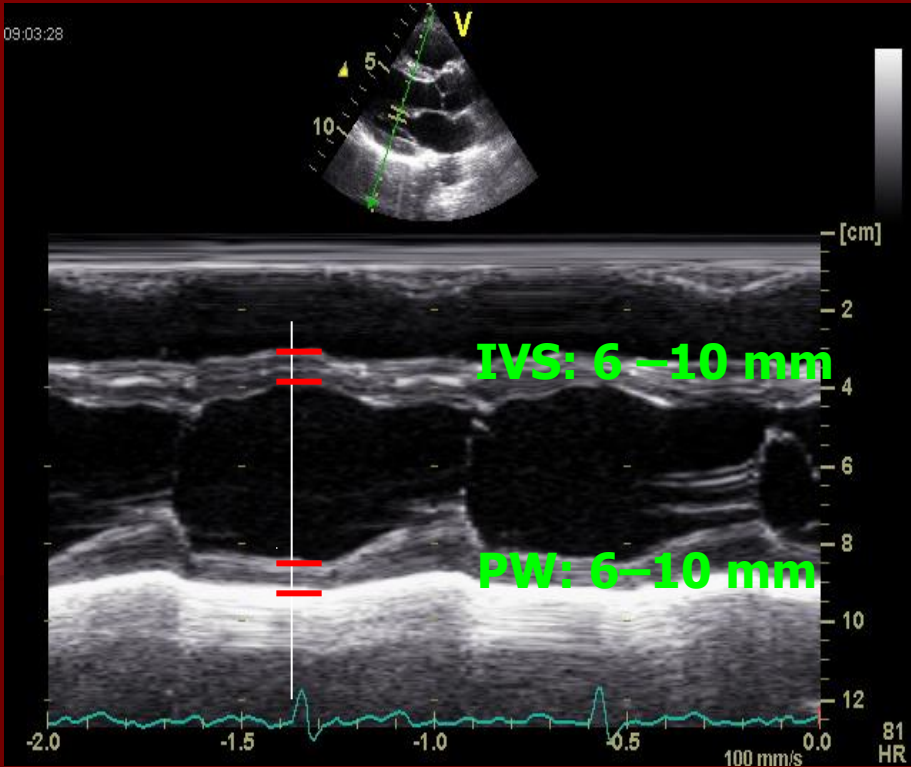
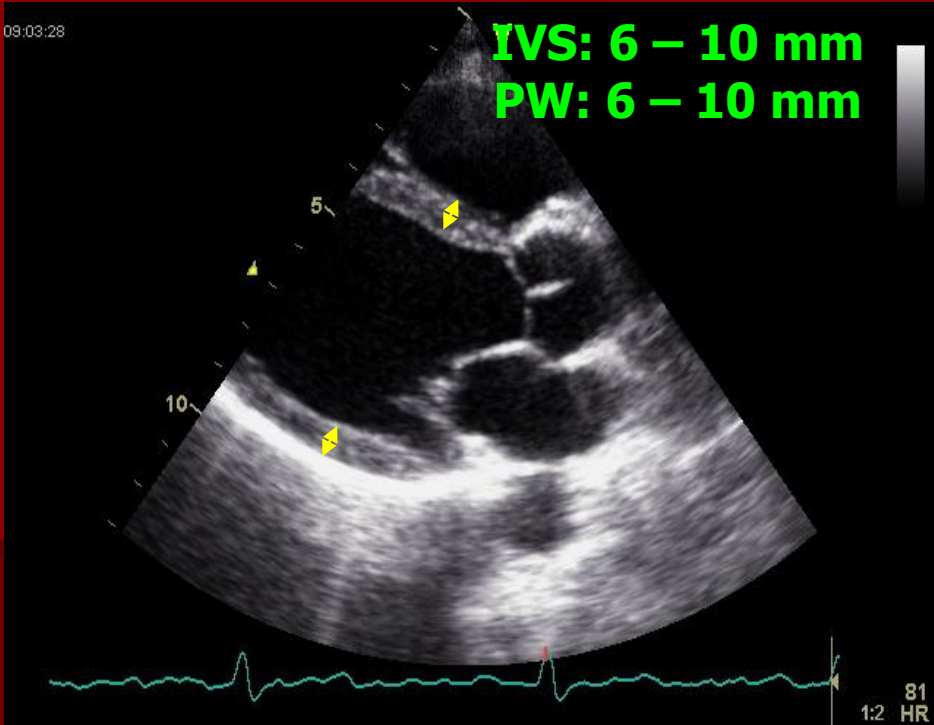
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Kreisais kambaris:

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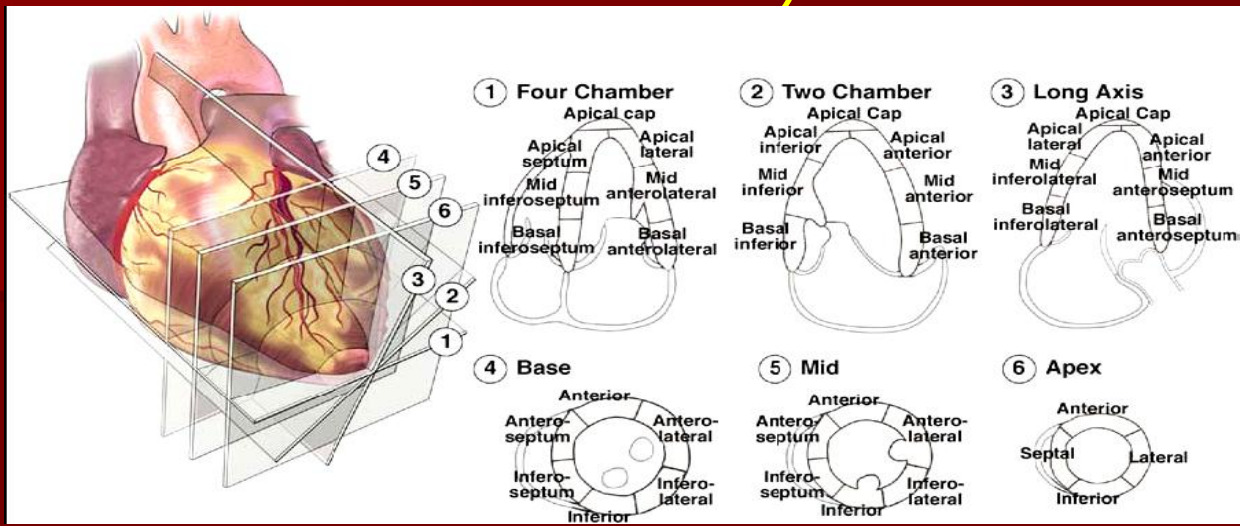
■ M-režīms vai 2D:



KK reģionālā funkcija:

LV ejection fraction: volume-based quantitation advisable >55%
LV regional wall motion abnormalities: from 1 (normal) to 4 (dyskinetic)^b

- **16** vai **17** segmentu modelis
- Novērtējums:
 - normal or hyperkinesis - **1**
 - hypokinesis- **2**
 - akinesis – **3**
 - dyskinesis (paradoksāla sistoliska kustība)- **4**



KK miokarda masa/indekss

■ *Normāla KK ģeometrija:*

M-režīms (ASE)=lineāra metode

LV mass ind.= $0.8*\{1.04[(LVIDd +PWTd +SWTd)^3-(LVIDd)^3]\}+0.6$ g / BSA



LV mass/BSA, g/m2

siev. 43–95

vīr. 49–115

KK miokarda masa/indekss

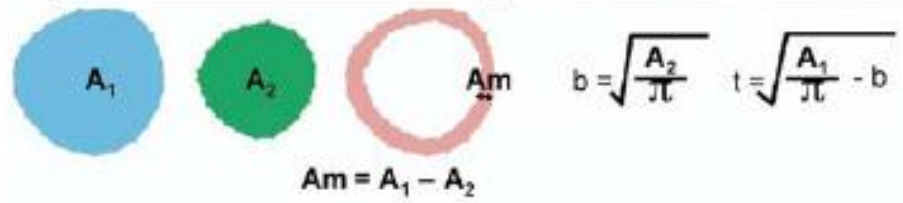
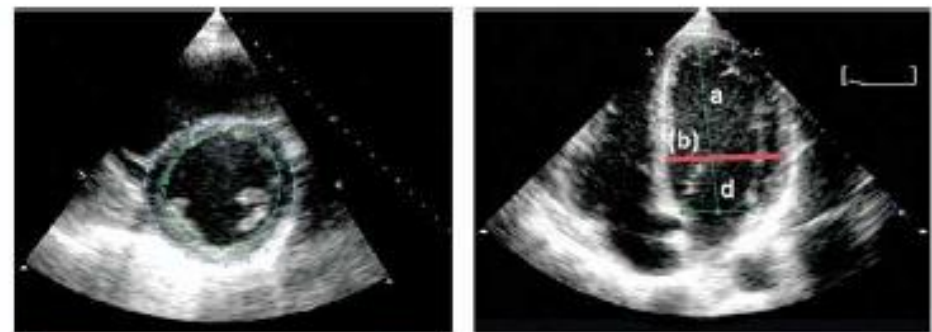
■ *Izmainīta KK ģeometrija:*

2D-režīms: TE , A-L metodes

A-L: **A** Area = laukums

L Length = garums

TE: **T**runcated **E**llipsoid
Nošķelta Elipse



$$LV\ Mass\ (AL) = 1.05 \left\{ \left[\frac{5}{6} A_1 (a+d+t) \right] - \left[\frac{5}{6} A_2 (a+d) \right] \right\}$$
$$LV\ Mass\ (TE) = 1.05 \times \left\{ (b+t)^2 \left[\frac{2}{3} (a+1) + d - \frac{d^3}{3(a+t)^2} \right] - b^2 \left[\frac{2}{3} a + d - \frac{d^3}{3a^2} \right] \right\}$$

Kreisais ātrijs:

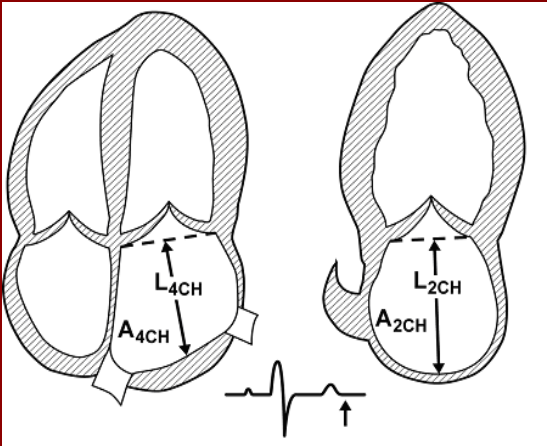
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Left atrium: at least two orthogonal diameters, preferably volume^a

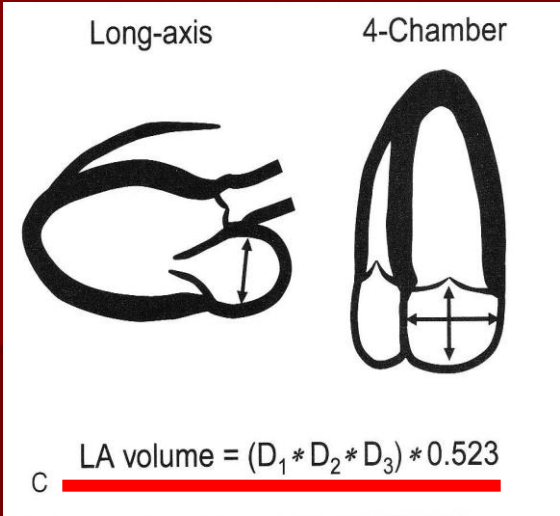
27-40 mm
<29 mL/m²

■ 2D, MAX tilpums = *ml, indekss ml/m²*

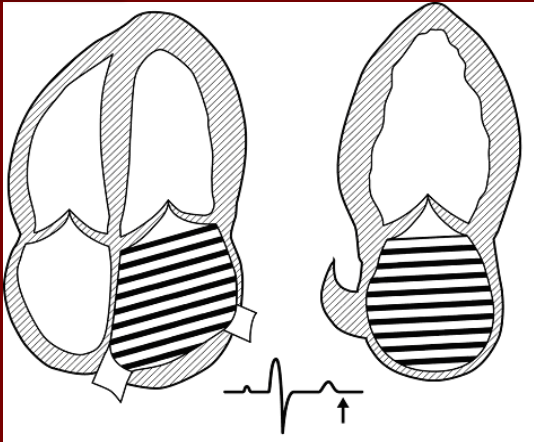
Pēc T zoba (EKG), pirms MV atvēršanās.



A-L



KĀ tilpums/BSA,



Simpson

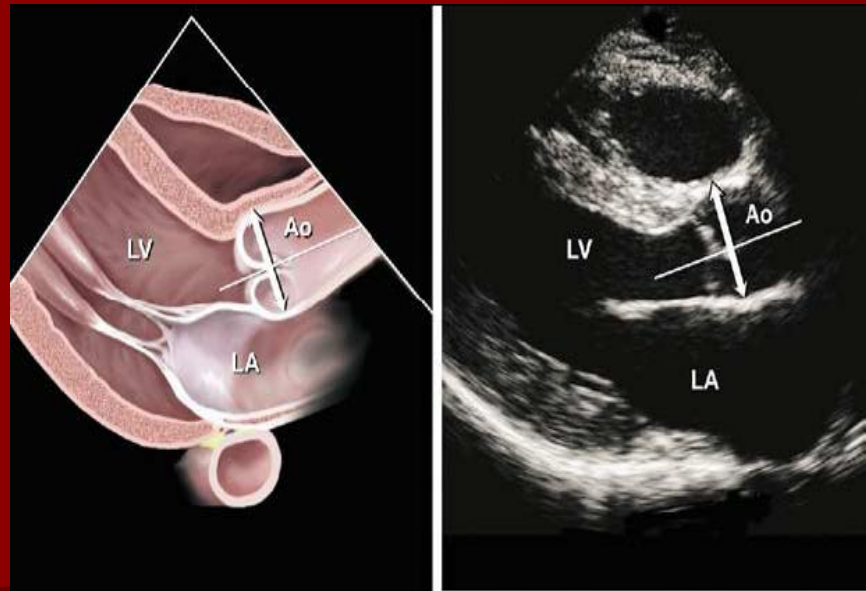
< 29 mL/m²

Aorta:

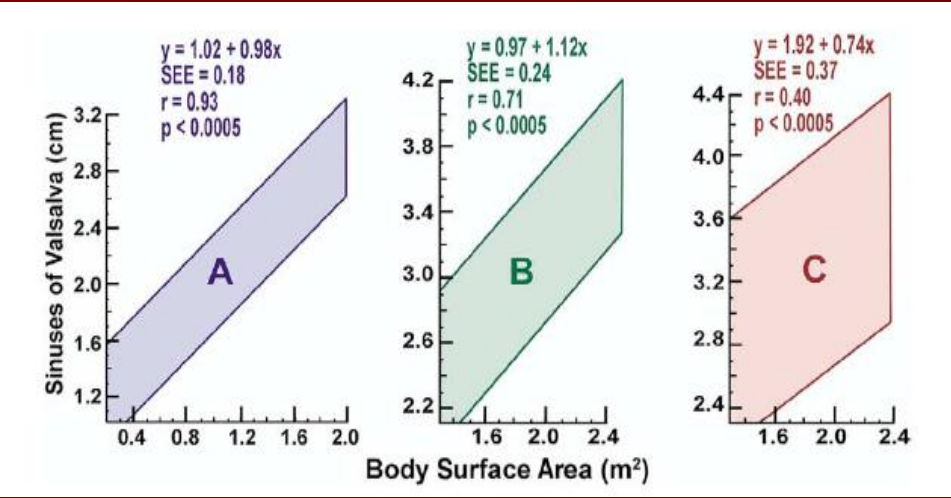
Aortic root: maximum diameter at sinus level^c

<39 mm
<21 mm/m²

- **Aorta:** jāmēra 2D-režīmā
- **NB!** AoV slēgta
- Ja ir patoloģija, tad jāmēra arī: - Ao ascendens proksimāli un - sinotubulārs savienojums



Ao V.sinusi <39 mm
<21 mm/m²



A 0-19 **B** 20-39 **C** >40

vecums

Labais kambaris, labais ātrijs, Vena Cava Inferior:

Right ventricle: size (normal or dilated)
Right ventricle systolic function: (normal, depressed: mild, moderate, severe)
Right atrium: size (normal or dilated)

VCI <17 mm , LĀ index ~21 mL/m2

Inferior vena cava: diameters (inspiration-expiration) <17 mm

■ IVC: 2D+M-režīms, obligāti jāskatās ieelpas laikā

NB! 1-2 cm attālumā savienojumu vieta IVC ar labo ātriju

		LĀ sp.
IVC <1.7 cm ieelpas laikā kolabē	↑ 50%, spiediens	0-5 mmHG
IVC >1.7 cm ieelpas laikā kolabē	↑ 50%, spiediens	6-10 mmHG
IVC >1.7 cm ieelpas laikā kolabē	↓ 50%, spiediens	10-15 mmHG
IVC >1.7 cm ieelpas laikā nekolabē	⊘ spiediens	>15 mmHG
IVC <1.2 cm ar spontānu kolapsu	hipovolēmija	
IVC >2.0 cm ieelpas laikā kolabē	↑ 50%, norma - sportisti !	

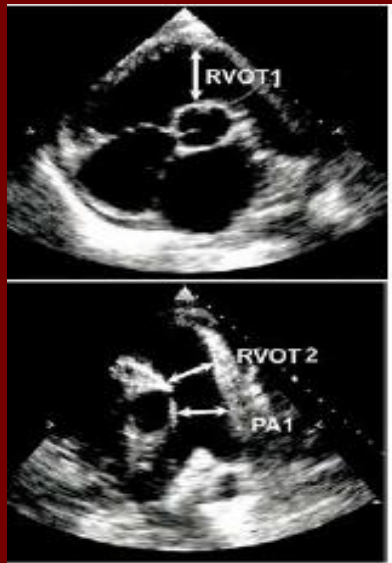
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Labais kambaris:

Right ventricle: size (normal or dilated)
Right ventricle systolic function: (normal, depressed: mild, moderate, severe)

■ RVOT: 2D NB!

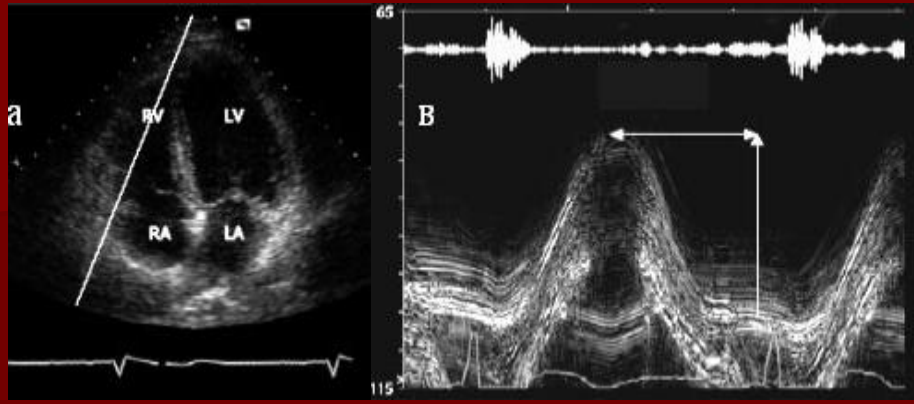
- RVOT 1 - virs AoV 2.5–2.9 cm
- RVOT 2 - virs PV 1.7-2.3 cm



■ TAPSE: 2D + M-režīms

Trikuspidālā fibrozā gredzena sistoliskās kustības amplitūda

↓ Pie LK disfunkcijas, <15 mm



TAPSE >15 mm

Doplera mērījumi

Table 4 Doppler measurements at the echocardiographic report

LV diastolic function
Normal or three degrees of dysfunction ^a
Velocity: E-wave, A-wave ^b
Deceleration time
Tissue Doppler PW Doppler at mitral annulus: e'-wave velocity ^c
Valvular heart disease: evaluation of corresponding affected valve
Mitral valve
Mean gradient ^d
PHT mitral valve area ^d
Regurgitation: none, mild, moderate, severe or 0–4 degrees ^f
Aortic valve
Maximum velocity
Mean gradient ^d
Area (continuity equation: VTI at LVOT) ^e
Regurgitation: none, mild, moderate, severe or 0–4 degrees ^f
Tricuspid valve
Mean diastolic gradient ^d
Regurgitation: none, mild, moderate, severe or 0–4 degrees ^f
Maximum RV–RA systolic gradient for PA systolic pressure estimation ^g .
Pulmonary valve
Maximum velocity
Mean gradient ^d
Regurgitation: none, mild, moderate, severe or 0–4 degrees ^f
Comments: open-text field

Diastoliskā funkcija:

- LV diastolic function
- Normal or three degrees of dysfunction^a
- Velocity: E-wave, A-wave^b
- Deceleration time
- Tissue Doppler PW Doppler at mitral annulus: e'-wave velocity^c

GUIDELINES AND STANDARDS

Recommendations for the Evaluation of Left Ventricular Diastolic Function by Echocardiography

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Barcelona, Spain*

Keywords: Diastole , Echocardiography, Doppler, Heart failure

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Diastoliskā funkcija:

LV diastolic function
Normal or three degrees of dysfunction^a
Velocity: E-wave, A-wave^b
Deceleration time
Tissue Doppler PW Doppler at mitral annulus: e'-wave velocity^c

Transmitrālā plūsma

- A-4K-pozīcija (4CH)
- PW doplers MV viru galu līmenī
- **1-3 mm !** "sample volume"
- **E_{max}**-pīķis, **A_{max}**-pīķis, **E/A**, **DT**, **A**-viļņa ilgums
- **IVRT** - PW starp KK izejas traktu un MV
- grūti analizēt:
 - mirdzaritmija
 - sinusa tahikardija
 - sirds aritmijas

Diastoliskā funkccija:

LV diastolic function

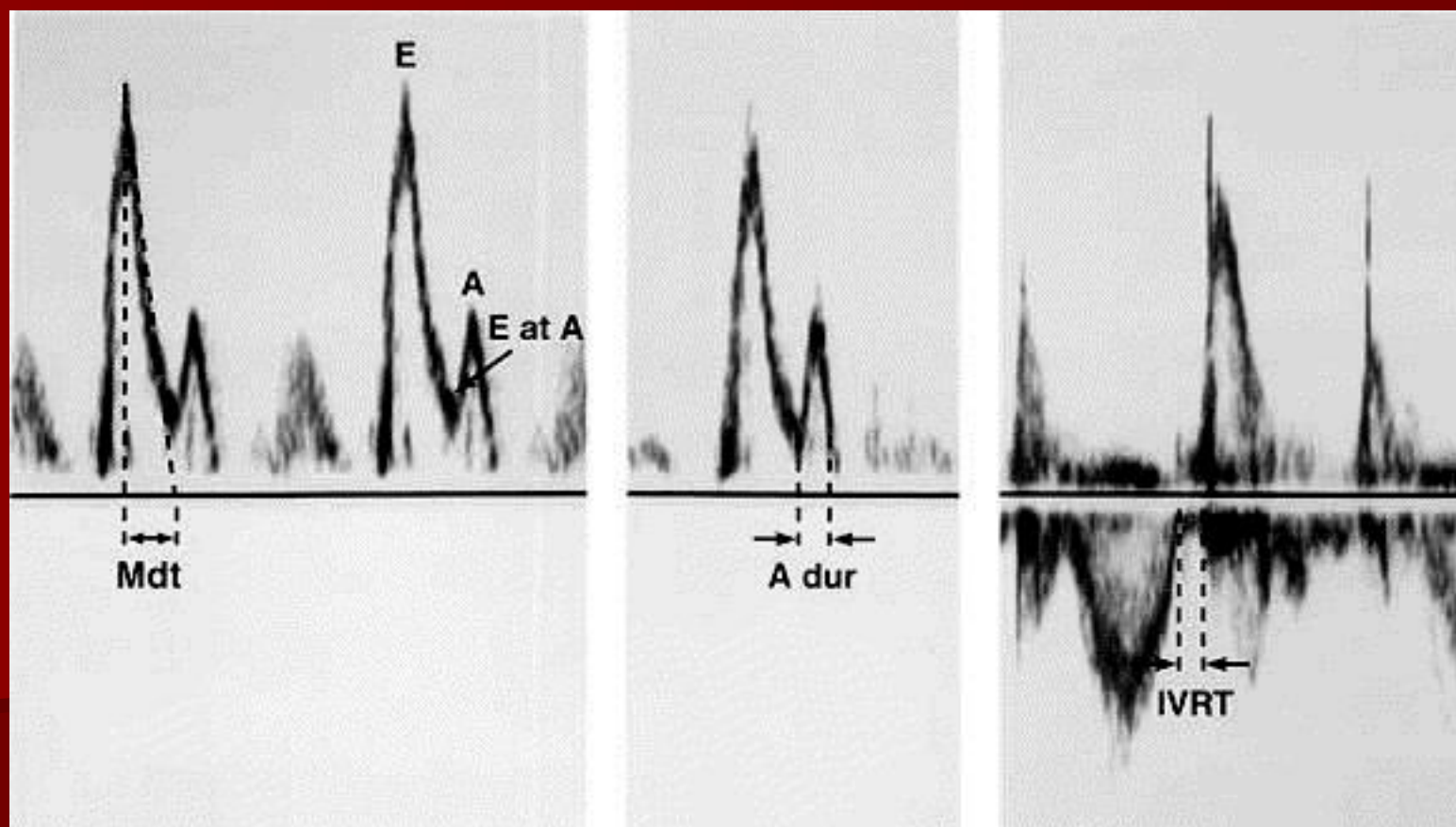
Normal or three degrees of dysfunction^a

Velocity: E-wave, A-wave^b

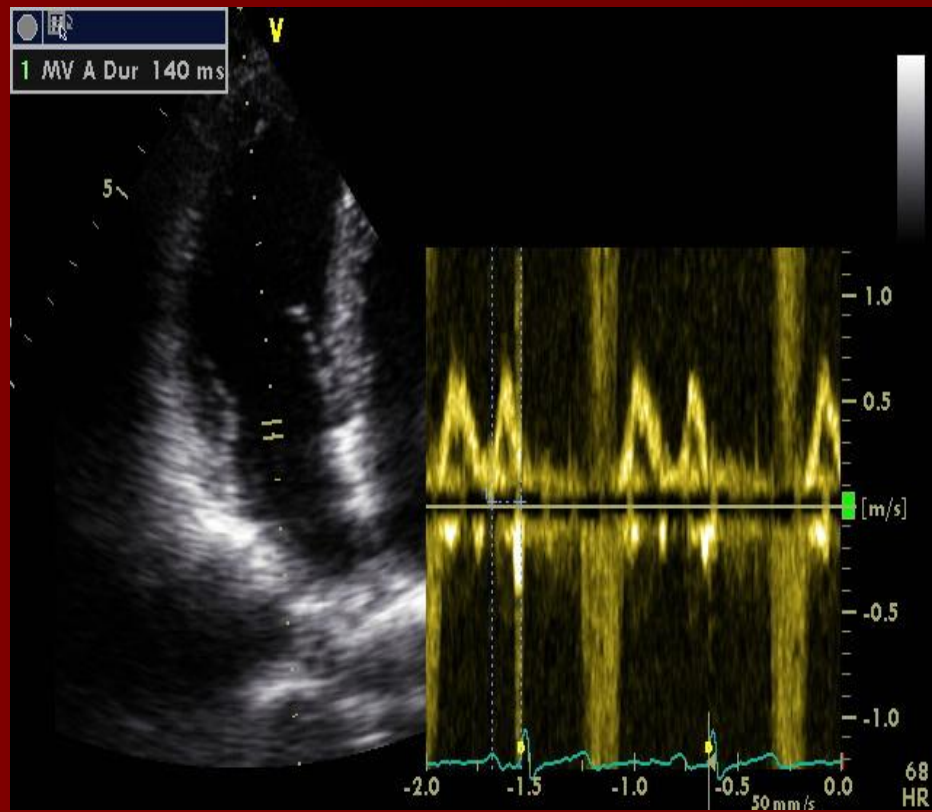
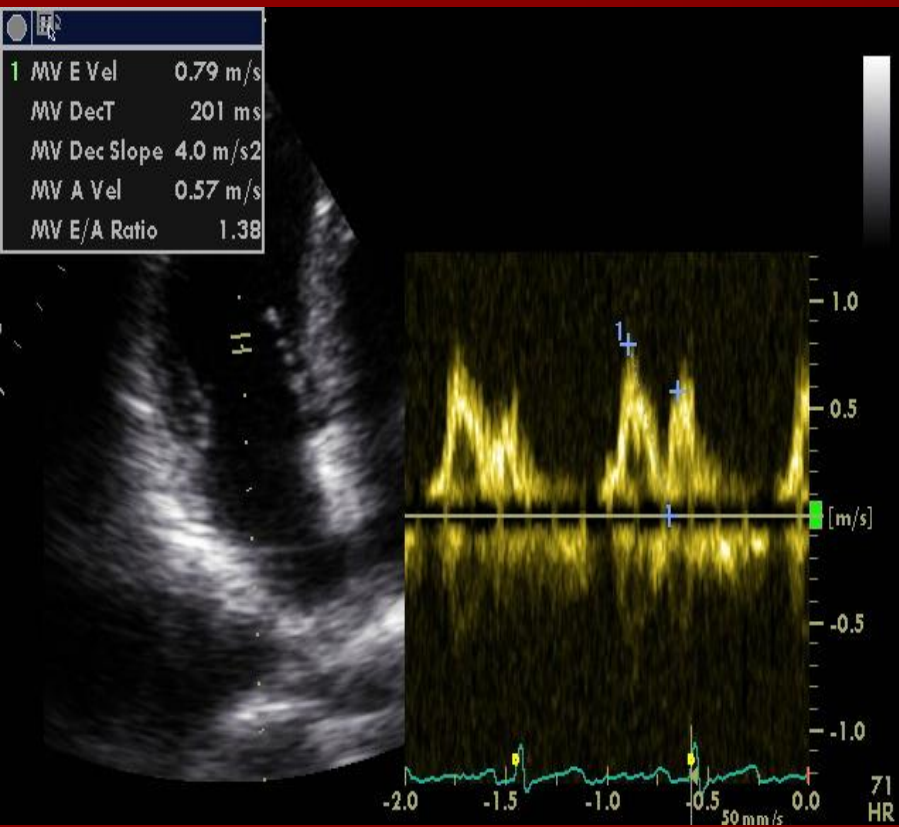
Deceleration time

Tissue Doppler PW Doppler at mitral annulus: e'-wave velocity^c

Transmitrālā plūsma



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Diastoliskā funkcija:

LV diastolic function

Normal or three degrees of dysfunction^a

Velocity: E-wave, A-wave^b

Deceleration time

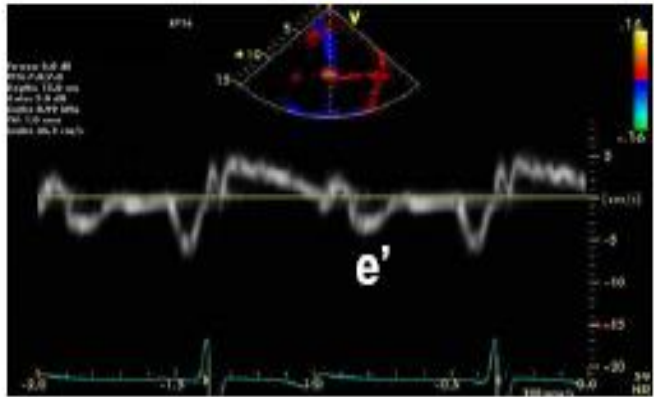
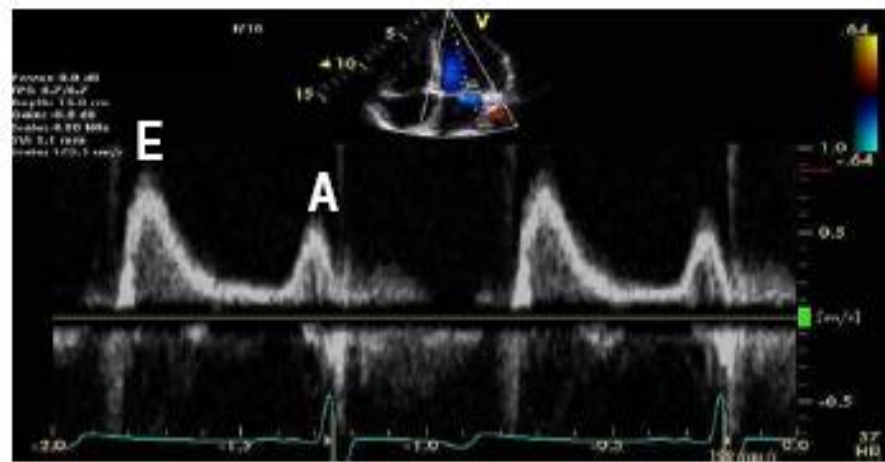
Tissue Doppler PW Doppler at mitral annulus: e'-wave velocity^c

Audu doplerogrāfija MV FG

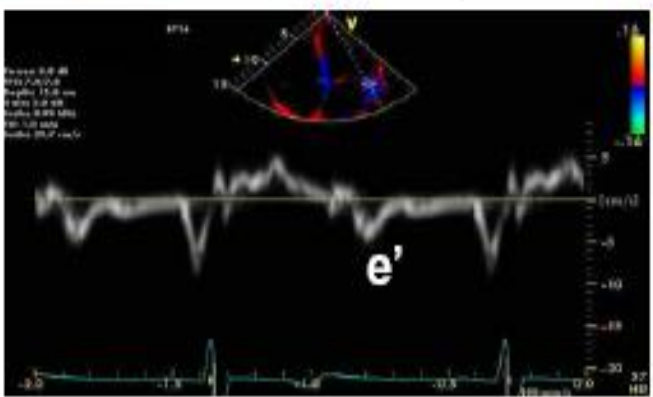
- 4CH pozīcija: PW + audu doplers (TDI)
- 1 cm FG līmenī (laterālā vai mediālā)
- 5-10 mm "sample volume"
- E` jāmēra laterālā FG un septālā FG
- $E/E' < 8$
- nevar izmantot:
 - pēc MV protēzešanas
 - MV FG kalcinoze
 - konstriktīvs perikardīts

Diastoliskā funkcija:

- LV diastolic function
- Normal or three degrees of dysfunction^a
- Velocity: E-wave, A-wave^b
- Deceleration time
- Tissue Doppler PW Doppler at mitral annulus: e'-wave velocity^c



Septal E/e' = 80/4 = 20



Lateral E/e' = 80/5 = 16

Diastoliskā funkcija:

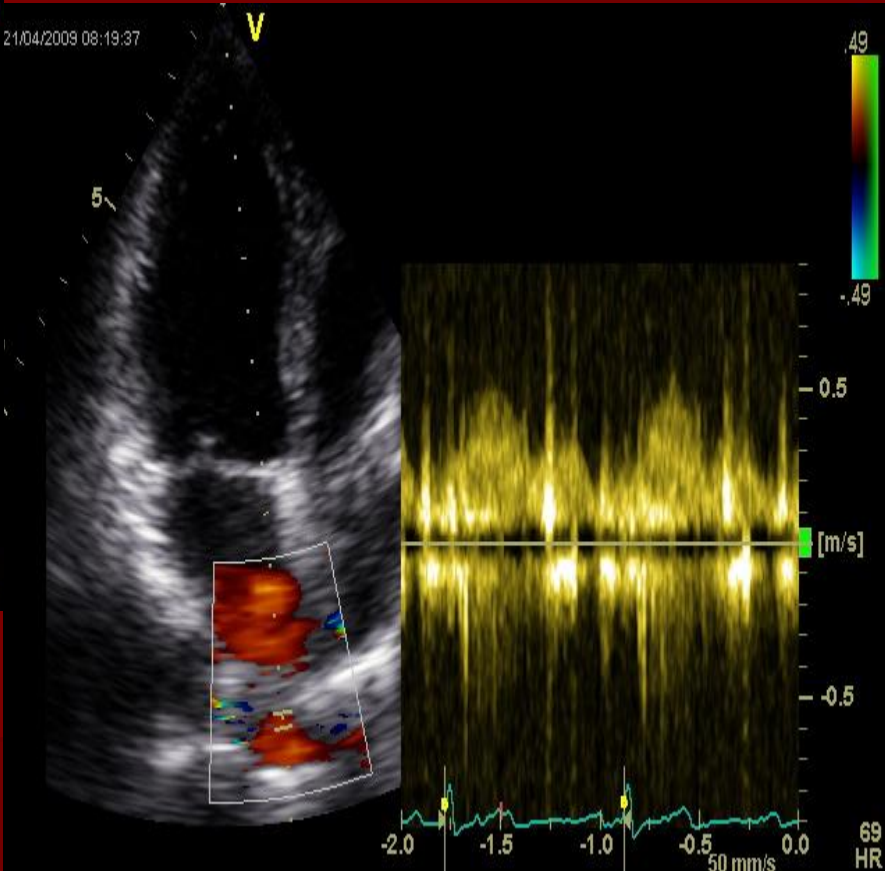
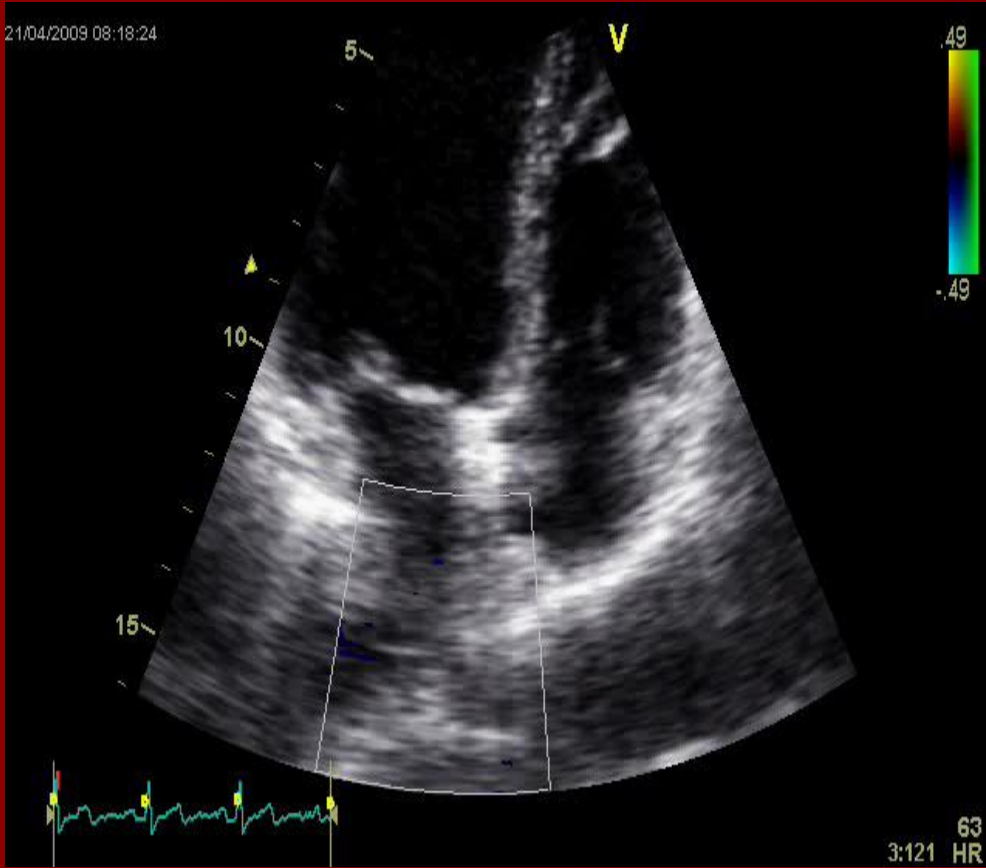
LV diastolic function
Normal or three degrees of dysfunction^a
Velocity: E-wave, A-wave^b
Deceleration time
Tissue Doppler PW Doppler at mitral annulus: e'-wave velocity^c

Plaušu vēnu plūsmas ātrums

- 4CH vai 3CH pozīcija: PW + krāsu doplers
- **2-3 mm !** "sample volume" + EKG 100 mm/s
- Nyquist limit of **40–50 cm/s.**
- **S-pīķis, D-pīķis, S/D, Ar** - ilgums un ātrums



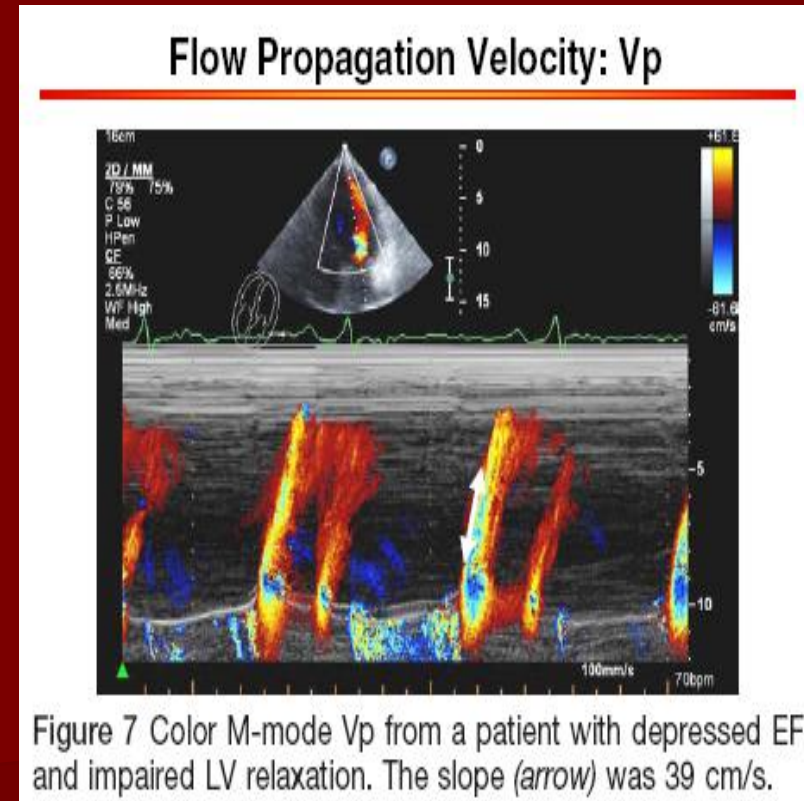
Ehokardiogrāfijas izmeklējuma, arhivācijas un slēdziena standartizācija. Jaunās rekomendācijas.



Diastoliskā funkcija: alternatīva E/E' (ja nav audu doplera)

Transmitrālās plūsmas propagācijas ātrums (V_p)

- 4CH + color M-mode paralēli diastoliskai plūsmai
- norma $V_p > 50$ cm/s
- norma $E_{mv}/V_p < 2.5$



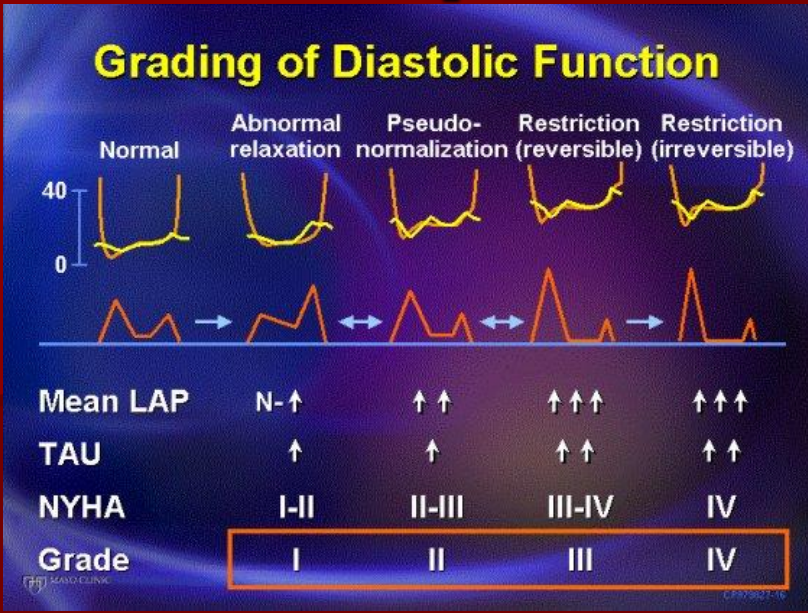
Diastoliskā disfunkcija

- “Izolēti” sastop aptuveni **50%** sirds mazspējas gadījumu
- Raksturojas ar progresīvi pieaugošu KK pildīšanās jeb diastolisko spiedienu
- **Morfoloģiski pieaug fibrozo audu daudzums – miokarda iestiepjamība samazinās**

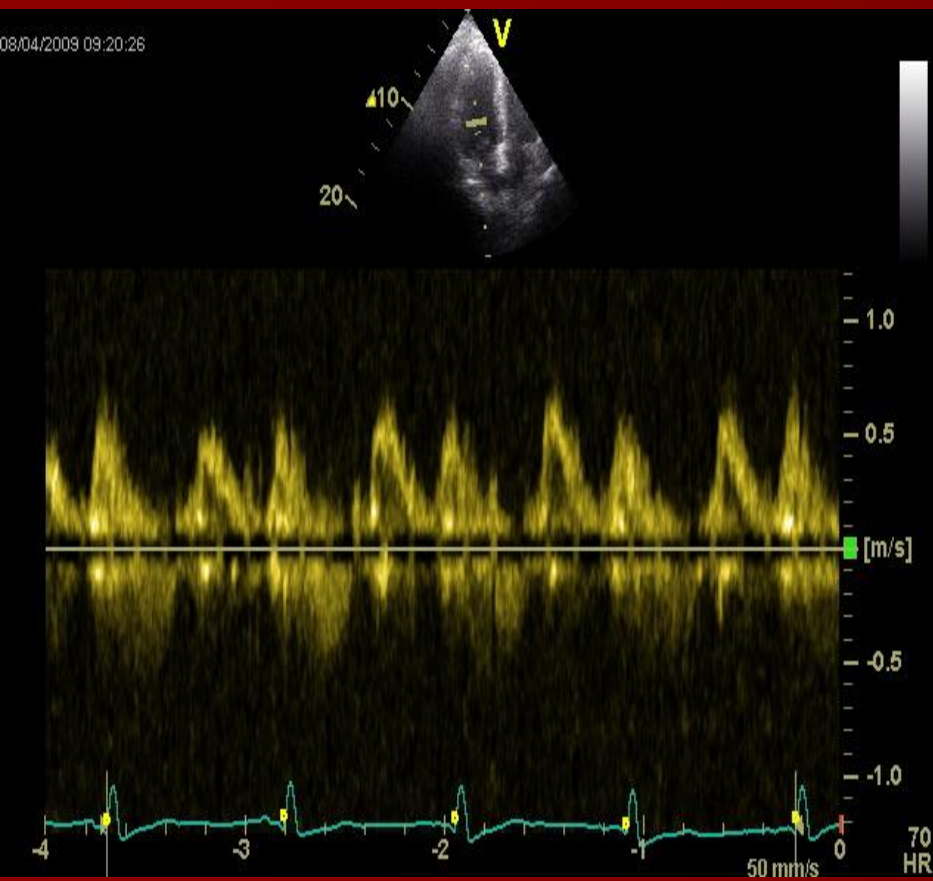
Diastoliskā funkcija:

LV diastolic function
Normal or three degrees of dysfunction^a
Velocity: E-wave, A-wave^b
Deceleration time
Tissue Doppler PW Doppler at mitral annulus: e'-wave velocity^c

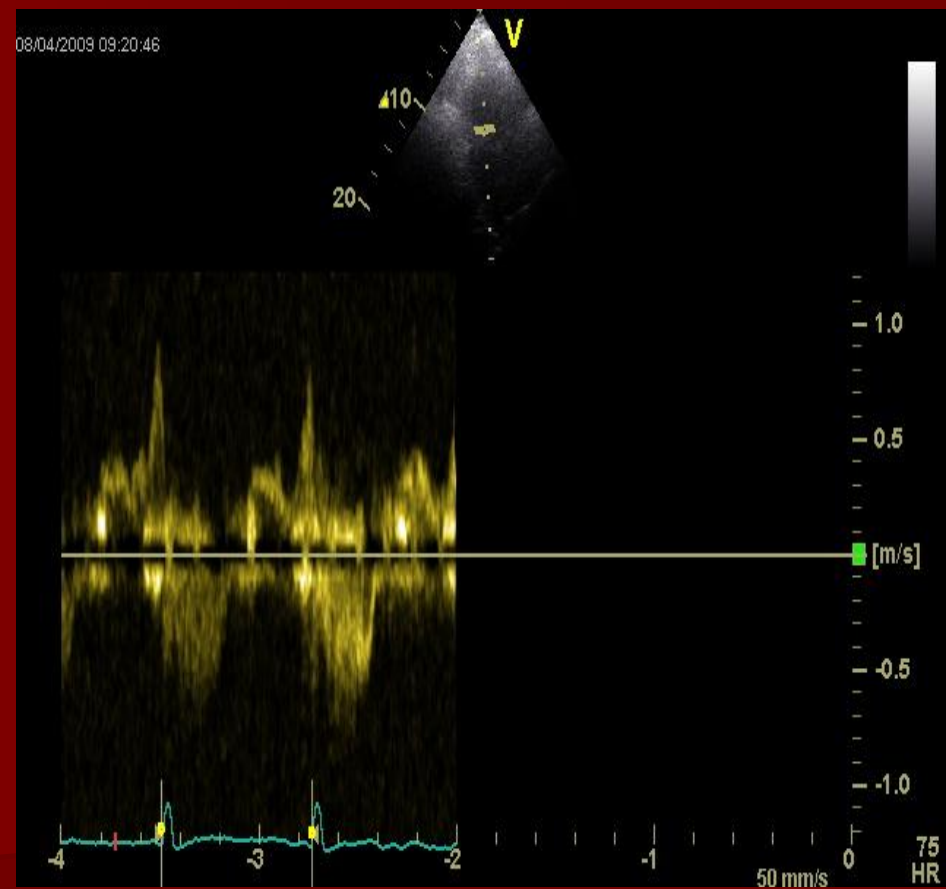
- I Traucēta relaksācija - viegla
- II Pseidonormalizācija - mērena
- III Restriktīva tipa - smaga



Ehokardiogrāfijas izmeklējuma, arhivācijas un slēdziena standartizācija. Jaunās rekomendācijas.



Bez VM

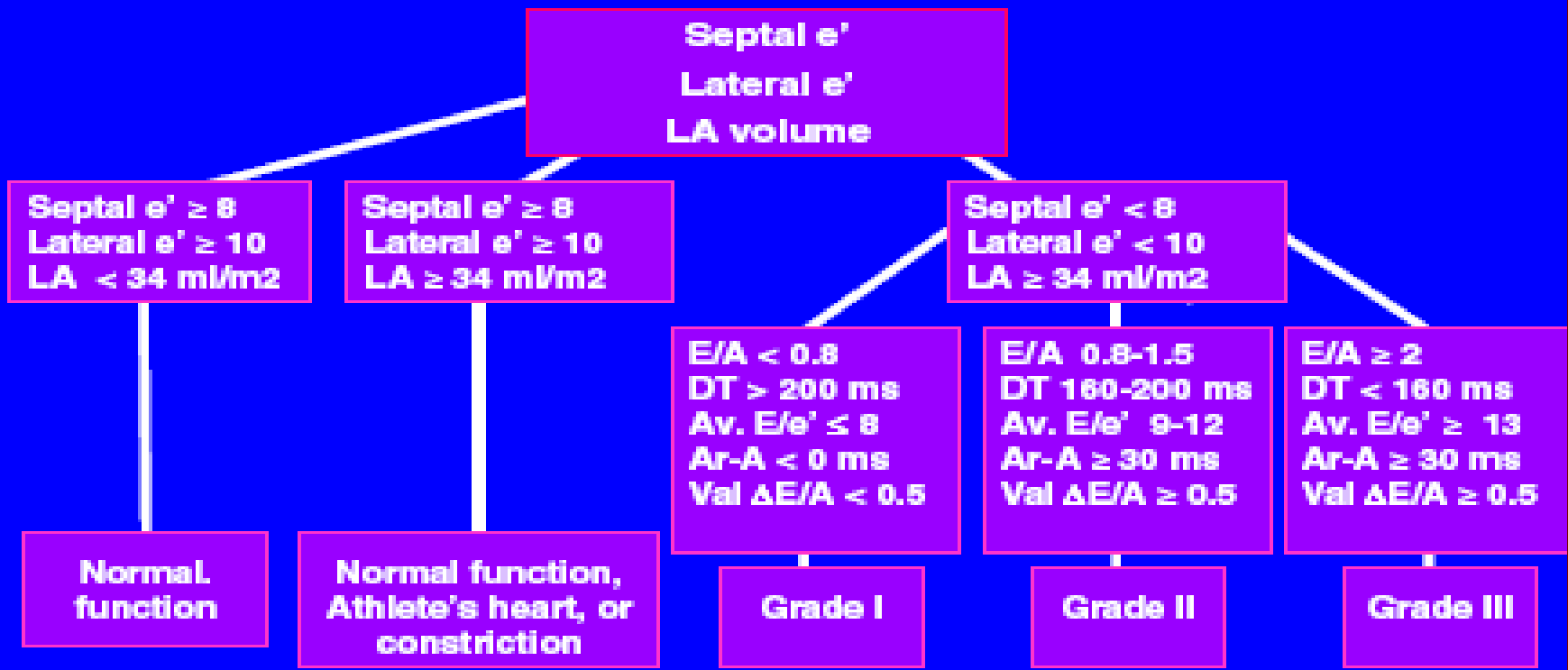


Ar VM

Diastoliskā funkcija:

- LV diastolic function
- Normal or three degrees of dysfunction^a
- Velocity: E-wave, A-wave^b
- Deceleration time
- Tissue Doppler PW Doppler at mitral annulus: e'-wave velocity^c

Practical Approach to Grade Diastolic Dysfunction



MV, TV, PV, AoV:

Valvular heart disease: evaluation of corresponding affected valve
Mitral valve
Mean gradient ^d
PHT mitral valve area ^d
Regurgitation: none, mild, moderate, severe or 0–4 degrees ^f
Aortic valve
Maximum velocity
Mean gradient ^d
Area (continuity equation: VTI at LVOT) ^e
Regurgitation: none, mild, moderate, severe or 0–4 degrees ^f
Tricuspid valve
Mean diastolic gradient ^d
Regurgitation: none, mild, moderate, severe or 0–4 degrees ^f
Maximum RV–RA systolic gradient for PA systolic pressure estimation ^g .
Pulmonary valve
Maximum velocity
Mean gradient ^d

NB! Mērījumi atkarīgi no:

- ir patoloģija
- patoloģijas nav

MV, TV, PV, AoV:

Patoloģijas nav:

- 2D-režīms (morfoloģija)
- M-režīms (AoV)
- PW, CW
- Krāsu doplers

arhivācija



MV, TV, PV, AoV:

Patoloģija IR:

■ regurgitācija:

- 
- 1. viegla
 - 2. mērena
 - 3. mērena-smaga
 - 4. smaga

Metodes:

- 1. ERO
- 2. vena contracta
- 3. regurgitācijas tilpums
- 4. regurgitācijas frakcija
- 5. pēc krāsu doplera
- 6. dp/dt

1 metode- labi
1+2 vēl
labāk...

MV, TV, PV, AoV:

Patoloģija IR:

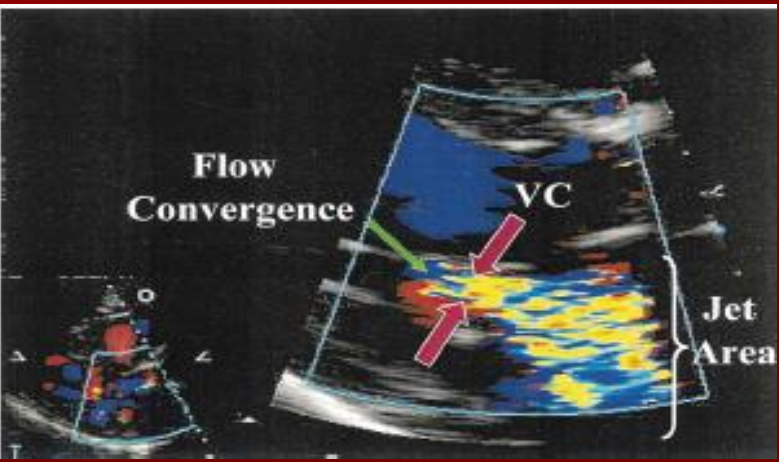
■ regurgitācija: NB !

- 1. US leņķis (max 20-30°)
- 2. PW, CW Pastiprinājums/ "gain"
- 3. Krāsu dopler:
 - skala / "scale"

MR: Nyquist limit of 50-60 cm/s.

AR: Nyquist limit of 45-50 cm/s.

■ regurgitācija: Vena contracta



Metodes:

- 1. ERO
- 2. *vena contracta*
- 3. regurgitācijas tilpums
- 4. regurgitācijas frakcija
- 5. pēc krāsu doplera
- 6. dp/dt

1 metode-
labi
1+2 vēl
labāk...

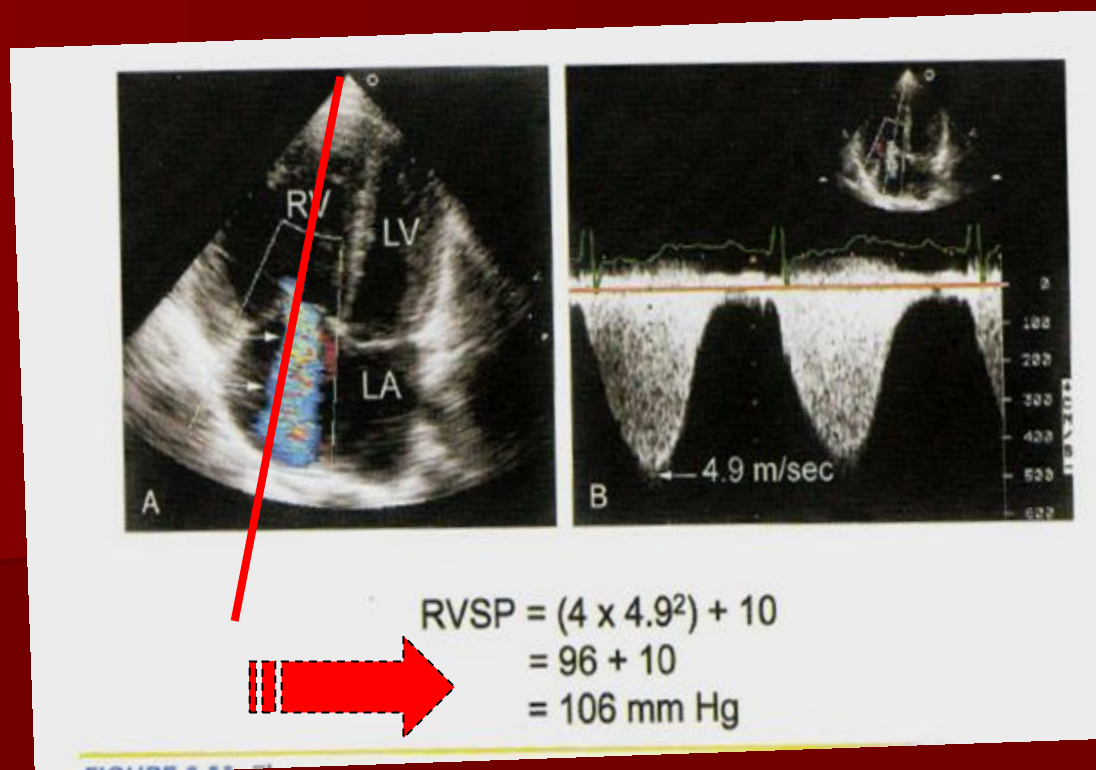
MV, TV, PV, AoV:

Patoloģija IR:

■ Trikuspidāla regurgitācija:

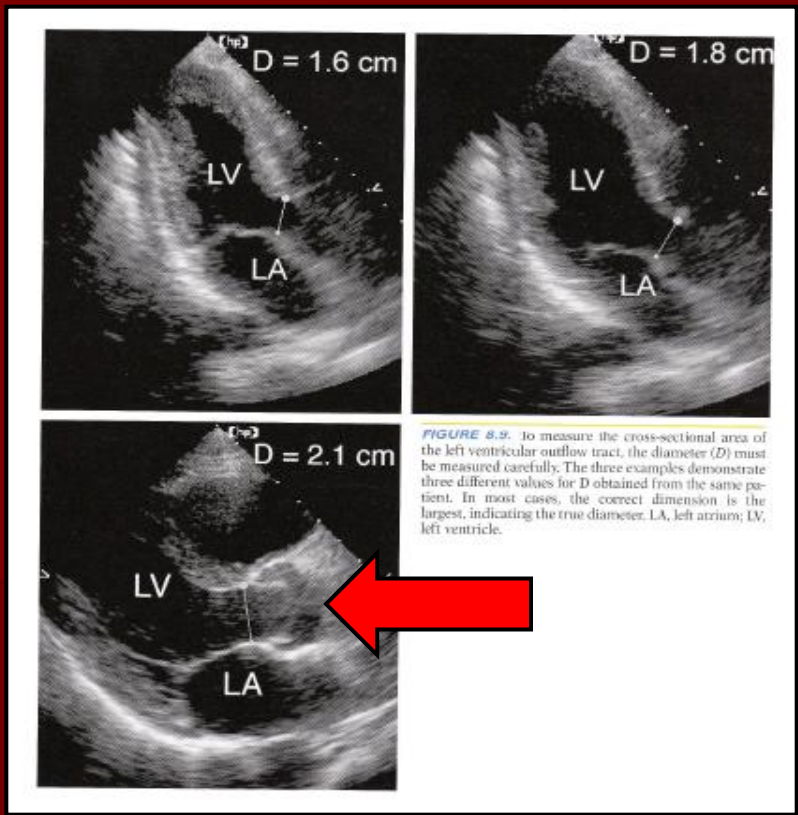
sistoliskais spiediens a.pulmonalis

- 4CH
- CW
- V max
- VCI diametrs (LĀ spiediens)



MV, TV, PV, AoV:
Patoloģija IR:

- stenoze:
Vmax un vidējais PG = PG mean
- **CW**
- *AoV pēc VTI.*
NB! LVOT diametrs 2D, AoV atvērta!!!
- *MV pēc PHT.*

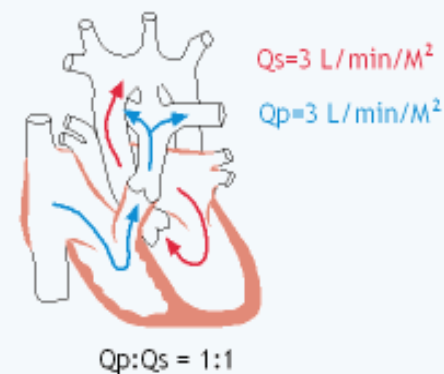


Papildus rekomendācijas:

- ja ir defekts ar šuntu vai PFO
 - **Q_p/Q_s norma ~ 1**

Kas ir nepieciešams:

1. 2D-režīms: RVOT un LVOT diametri
2. PW: LVOT VTI un RVOT VTI



Secinājums :

- jāizmanto EAE rekomendācijas

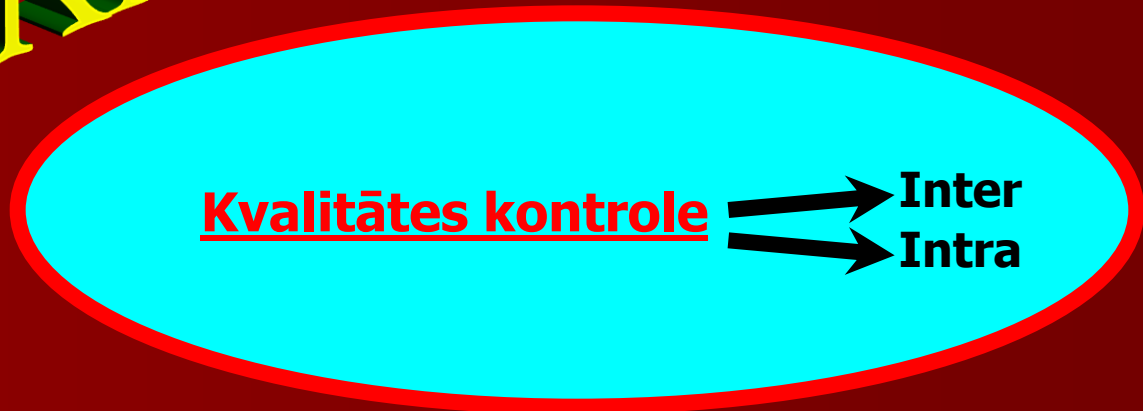


GLOBALI

- jāievēro EAE/ASE normatīvus

UZDEVUMI :

LOKĀLI



Pašizglītība Pētnieciskais darbs

Tehnoloģijas un metodoloģijas
zināšanas

Skola

Ehokardiogrāfijas izmeklējuma, arhivācijas un slēdziena standartizācija. Jaunās rekomendācijas.

ASV 2008 g.

Exam Date: Exam Time: Patient DOB:
Height: 175.20 cm Weight:68.04 kg
Referring Phys:
Gender: M BSA:1.83
Referring Diag:
Resting BP:126/47 mmHg
Indication: MYOCARDIAL INFARCTION
Study Type:TTE

LVEDVI (ml/m2): 78
LVESVI (ml/m2): 39
LV Ejection Fraction (%): 50
LV Mass Index (TE): 133
LA Volume Index (ml/m2):
Aortic Root Dimension (cm): 3.9
Pulmonary VTI (cm): 35
LVOT VTI (cm): 23
Cardiac Chambers:

LV: *The left ventricular volume is mildly increased. *There is severe left ventricular hypertrophy. The pattern of hypertrophy is concentric. The left ventricular ejection fraction is estimated to be 50 to 55%. Left ventricular systolic function is borderline to mildly decreased. No left ventricular thrombus is noted. There is severe hypokinesis to akinesis of the distal anterior, septal, and apical walls.

Right Ventricle: The right ventricular volume is normal. The right ventricular systolic function is normal.

Left Atrium: There is mild left atrial enlargement.

Right Atrium: There is mild right atrial enlargement.

Cardiac output:

Cardiac Valves:

Aortic Valve: The aortic valve is sclerotic without leaflet restriction. Mild aortic insufficiency is present.

Mitral Valve: The mitral valve anatomy and motion are normal. Mild mitral regurgitation is present.

Tricuspid Valve: Tricuspid valve anatomy and motion are normal. Mild tricuspid regurgitation is present.

Pulmonic Valve: Pulmonic valve anatomy and motion are normal.

Other:

Diastolic Function: There is Doppler evidence of impaired LV relaxation which may be normal for the patient's age. Mitral A wave dominance with systolic predominant pulmonary venous flow suggests normal LV filling pressures.

Pulmonary Artery Pressure: The pulmonary artery systolic pressure is estimated to be 74 mmHg based on an RA pressure of 10 mmHg.

Aorta: The aortic root is mildly dilated at the Sinuses of *****.

Pericardium: The pericardium is normal.

IVC and Hepatic Veins: The inferior vena cava is greater than 18 mm in diameter and collapses more than 50% with inspiration consistent with a right atrial pressure of 6-10 mmHg.

Other:

Conclusions:

1. The left ventricular volume is mildly increased. There is severe left ventricular hypertrophy. The pattern of hypertrophy is concentric. The left ventricular ejection fraction is estimated to be 50 to 55%. Left ventricular systolic function is borderline to mildly decreased. No left ventricular thrombus is noted. There is severe

hypokinesis to akinesis of the distal anterior, septal, and apical walls.

2. Mild biatrial enlargement

3. No hemodynamically significant valvular disease is noted.

4. There is Doppler evidence of impaired LV relaxation which may be normal for the patient's age. Mitral A wave dominance with systolic predominant pulmonary venous flow suggests normal LV filling pressures.

5. The pulmonary artery systolic pressure is estimated to be 74 mmHg based on an RA pressure of 10 mmHg.

6. The inferior vena cava is greater than 18 mm in diameter and collapses more than 50% with inspiration consistent with a right atrial pressure of 6-10 mmHg.

Compared to the previous study on 8/11/05, the LV is smaller with improved contractility. The degree of AI and TR have decreased. However, the PA systolic pressure remains elevated to a severe degree, despite Doppler evidence of normal LV filling pressures.



Ehokardiogrāfiskā izmeklēšana

MFD „Kardiocentrs”, Rīga, Maskavas ielā 297, LV-1063, tel. 67186595, www.kardio.lv

Aparāts: VIVID 7 Dimension GE
Pacients: dz.gads BSA m²
Izmeklēšanas datums: / / g.
Eho-kvalitāte: Indikācijas: Ritms:

M-režīms:

Ao ascendens - Ao Diam cm (<3.9), indekss <2.1cm/m²
K.ātrijs - LA Diam cm (2.7-4.0)
EDD - LVIDd cm
EDD index (LVIDd Index) cm/m² (2.2-3.2)
ESD - LVIDs cm
ESD index (LVIDs Index) cm/m² (1.4-2.1)

Kambaru starpsiena - IVSd cm (0.6-1.0)
Mugurējā siena - LVPWd cm (0.6-1.0)
KK masas indekss (ASE) – LVd Mass Ind g/m² (siev. 44-88, vir. 50-102)
EF (Teich) % (≥55) ; FS %

B-režīms:

K.ātrija tilpums (Simpson, A-L, Ellipsoid) ml
K.ātrija tilpuma indekss – LAEDV Index ml/m² (<29 ml/m²)
EDV ml
EDV indekss ml/m² (35-75)
ESV ml
ESV indekss ml/m² (12-30)
EF (Simpson, biplane) % (≥55)
KK masas indekss (TE, A-L) – LVd Mass Ind g/m² (siev. 44-88, vir. 50-102)

IVC cm (<1.7), kolabē >50% Perikards:

Kambaru Starpsiena: Ātriju starpsiena:

	anatomija	FG, cm
AoV		
MV		
TV		
PV		



Ehokardiogrāfiskā izmeklēšana

Doppler Eho-kg

	Vmax, m/s	Pgmax, mmHG	Pgmean, mmHG	Laukums, cm²	Regurgitācija
AoV				VTI	
MV				PHT	
TV					
PV					

KK reģionālā kontraktilitāte

Normokinēzija-1
Hipokinēzija-2
Akinēzija-3
Diskinēzija-4

KK Diastoliskā funkcija

	DT, msec	IVRT, msec	E/A	E/E’
Norma				
I (prolongēta)				
II (pseudonormalizācija)				
III (restriktīva)				
Valsalva manevrs				

Sirds disinhronija

	Interventrikulāra	Intraventrikulāra
PW, AoV-PV (≥40 msec)		
TDI, SEP-LAT		

Slēdziens:

Paraksts:

**P
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!**



Paldies par uzmanību!

Ehokardiogrāfijas izmeklējuma, arhivācijas un slēdziena standartizācija. Jaunās rekomendācijas.

