



Latvijas Kardiologu biedrības
Ehokardiogrāfijas darba grupa

Ehokardiogrāfijas standarta protokola mērījumi 2012

Sagatavots sadarbībā ar:



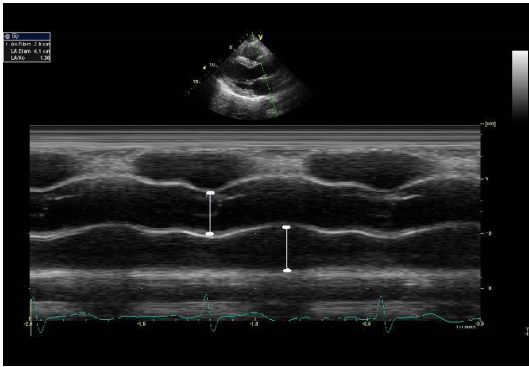
PHILIPS

Literatūra

- Roberto M. Lang, Michelle Bierig, Richard B. Devereux, Frank A. Flachskampf, Elyse Foster, Patricia A. Pellikka et al. 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. J Am Soc Echocardiogr 2005;18:1440-1463.
- Arturo Evangelista, Frank Flachskampf, Patrizio Lancellotti, Luigi Badano, Rio Aguilar, Mark Monaghan et al. European Association of Echocardiography recommendations for standardization of performance digital storage and reporting of echocardiographic studies. European Journal of Echocardiography (2008) 9, 438–448.
- Sherif F. Nagueh, Christopher P. Appleton, Thierry C. Gillebert, Paolo N. Marino, Jae K. Oh, Otto A. Smiseth et al. Recommendations for the Evaluation of Left Ventricular Diastolic Function by Echocardiography. J Am Soc Echocardiogr 2009 Feb;22(2):107-33.
- Lawrence G. Rudski, Wyman W. Lai, Jonathan Afilalo, Lanqi Hua, Mark D. Handschumacher, Krishnaswamy Chandrasekaran et al. Guidelines for the Echocardiographic Assessment of the Right Heart in Adults: A Report from the American Society of Echocardiography Endorsed by the European Association of Echocardiography, a registered branch of the European Society of Cardiology, and the Canadian Society of Echocardiography. J Am Soc Echocardiogr 2010;23:685-713.
- Thomas V. Johnson, John D. Symanski, Sanjay R. Patel, Geoffrey A. Rose. Improvement in the Assessment of Diastolic Function in a Clinical Echocardiography Laboratory Following Implementation of a Quality Improvement Initiative. J Am Soc Echocardiogr 2011;24:1169-1176.

Aorta

- M-režīms

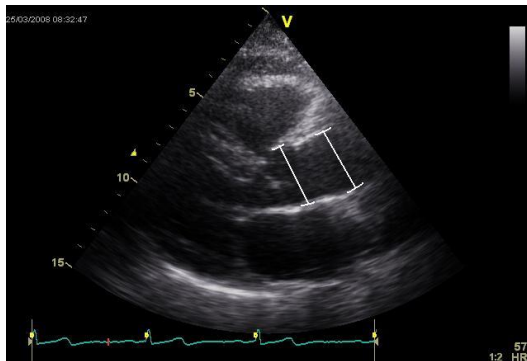


Aorta (Sinus Valsalva)

< 39 mm

$19 \pm 1 \text{ mm/m}^2$

- B-režīms



Aorta (Sinus Valsalva)

< 39 mm

$19 \pm 1 \text{ mm/m}^2$

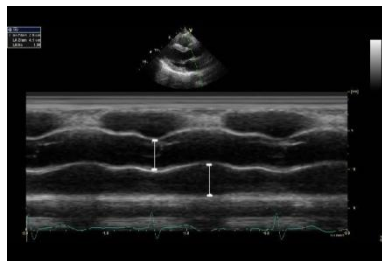
Ascendējošā aorta (Ao asc)

22-36 mm

$15 \pm 2 \text{ mm/m}^2$

Kreisais priekškambaris

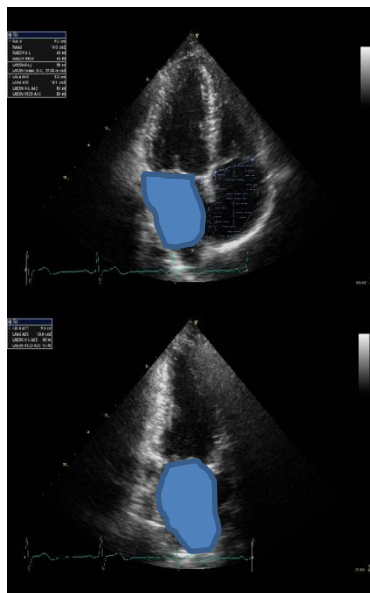
- M-režīms:



Kreisais priekškambaris, diametrs
LA

	Sievietes				Vīrieši			
Dilatācijas pakāpe	norma	viegla	mērena	izteikta	norma	viegla	mērena	izteikta
LA, cm	2.7–3.8	3.9–4.2	4.3–4.6	≥4.7	3.0–4.0	4.1–4.6	4.7–5.2	≥5.2

- B-režīms:



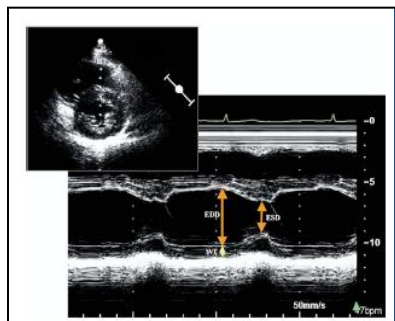
Kreisais priekškambaris, tilpuma indekss *
LAVI

	Sievietes / Vīrieši			
Dilatācijas pakāpe	norma	viegla	mērena	izteikta
LAVI, ml/m ²	22 ± 6	29–33	34–39	≥40

* Tilpums tiek noteikts apikālā 4-kameru, 2-kameru pozīcijas pēc laukuma-garuma metodes (A-L metode)

Kreisais Kambaris

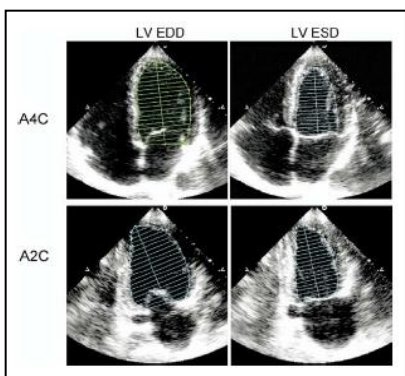
- M-režīms



Kreisais kambaris, diametrs un indekss
(LV EDD, EDD/BSA)

	Sievietes				Vīrieši			
Dilatācijas pakāpe	norma	viegla	mērena	izteikta	norma	viegla	mērena	izteikta
EDD, cm	3.9–5.3	5.4–5.7	5.8–6.1	≥6.2	4.2–5.9	6.0–6.3	6.4–6.8	≥6.9
EDD/BSA cm/m ²	2.4–3.2	3.3–3.4	3.5–3.7	≥3.8	2.2–3.1	3.2–3.4	3.5–3.6	≥3.7

- B-režīms

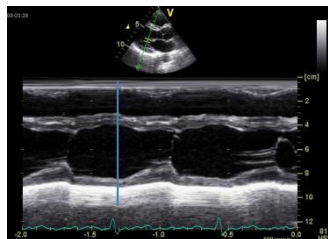


Kreisais kambaris, tilpuma indekss *
(LV EDV/BSA, LV ESV/BSA)

	Sievietes / Vīrieši			
Dilatācijas pakāpe	norma	viegla	mērena	izteikta
EDV/BSA ml/m ²	35–75	76–86	87–96	≥97
ESV/BSA ml/m ²	12–30	31–36	37–42	≥43

Kreisā kambara miokarda masa

• M-režīms



Kreisā kambara starpsienas un mugurējās sienas
IVSd, PWd

Kreisā kambara miokarda masas indekss
LV mass/BSA (LVMI)

	Sievietes				Vīrieši			
KK Hipertrofijas pakāpe	norma	viegla	mērena	izteikta	norma	viegla	mērena	izteikta
IVSd, cm	0.6–0.9	1.0–1.2	1.3–1.5	≥1.6	0.6–1.0	1.1–1.3	1.4–1.6	≥1.7
PWd, cm	0.6–0.9	1.0–1.2	1.3–1.5	≥1.6	0.6–1.0	1.1–1.3	1.4–1.6	≥1.7
LVMI, g/m ²	43–95	96–108	109–121	≥122	49–115	116–131	132–148	≥149

• B-režīms



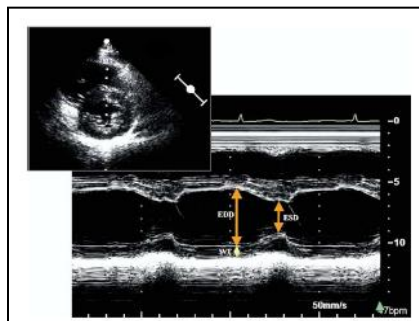
Kreisā kambara miokarda masas indekss
LV mass/BSA (LVMI)

	Sievietes				Vīrieši			
KK Hipertrofijas pakāpe	norma	viegla	mērena	izteikta	norma	viegla	mērena	izteikta
LVMI, g/m ²	44–88	89–100	101–112	≥113	50–102	103–116	117–130	≥131

Kreisais kambaris, izsviedes frakcija

EF

• M-režīms



- Teicholz metode*

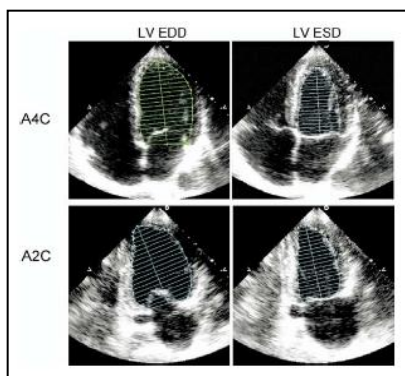
• M –režīma lietošanas ierobežojumi:

1. Ja US stara orientācija nav perpendikulāri KK garenasij
2. Nozīmīgas reģionālās kontraktilitātes atšķirības
3. Izmainīta KK ģeometrija

• B-režīms

- Simpsona metode

- Laukuma-garuma metode



Kreisais kambaris, izsviedes frakcija
EF % (M- , B- režīmi)

Sievietes / Vīrieši

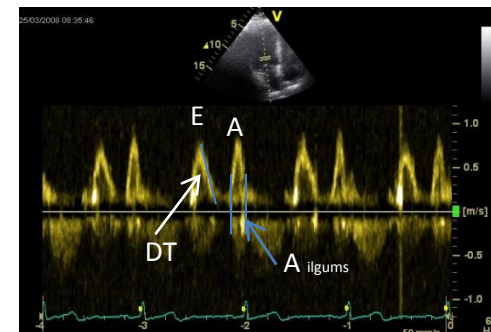
samazinājuma pakāpes	norma	viegli samazināta	mēreni samazināta	izteikti samazināta
EF, %	≥55	45–54	30–44	<30

Diastoliskā funkcija

Vecums, gadi

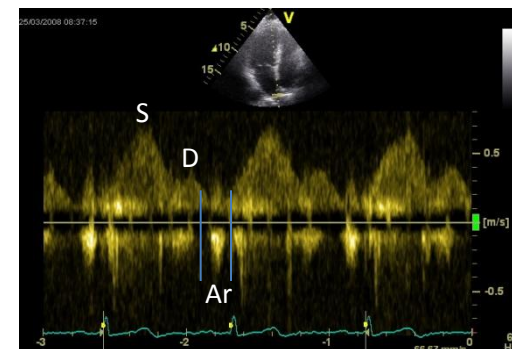
Transmitrālā diastoliskā plūsma

Mērījumi	16-20	21-40	41-60	>60
IVRT, msec	50 ± 9 (32-68)	67 ± 8 (51-83)	74 ± 7 (60-88)	87 ± 7 (73-101)
E/A	1.88 ± 0.45 (0.98-2.78)	1.53 ± 0.40 (0.73-2.33)	1.28 ± 0.25 (0.78-1.78)	0.96 ± 0.18 (0.6-1.32)
DT, msec	142 ± 19 (104-180)	166 ± 14 (138-194)	181 ± 19 (143-219)	200 ± 29 (142-258)
A ilgums, msec	113 ± 17 (79-147)	127 ± 13 (101-153)	133 ± 13 (107-159)	138 ± 19 (100-176)



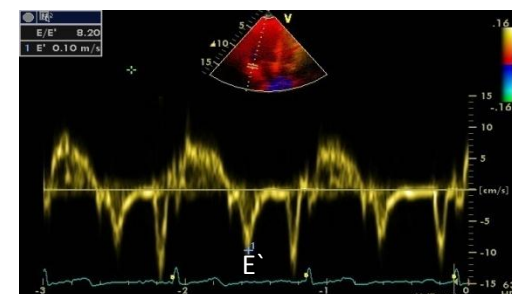
Plaušu vēnu plūsma

S/D	0.82 ± 0.18 (0.46-1.18)	0.98 ± 0.32 (0.34-1.62)	1.21 ± 0.2 (0.81-1.61)	1.39 ± 0.47 (0.45-2.33)
Ar (cm/s)	16 ± 10 (1-36)	21 ± 8 (5-37)	23 ± 3 (17-29)	25 ± 9 (11-39)
Ar ilgums, msec	66 ± 39 (1-144)	96 ± 33 (30-162)	112 ± 15 (82-142)	113 ± 30 (53-173)



Mitrālā fibrozā gredzena diastoliskās kustības ātrums

E' med. (cm/s)	14.9 ± 2.4 (10.1-19.7)	15.5 ± 2.7 (10.1-20.9)	12.2 ± 2.3 (7.6-16.8)	10.4 ± 2.1 (6.2-14.6)
E' lat. (cm/s)	20.6 ± 3.8 (13-28.2)	19.8 ± 2.9 (14-25.6)	16.1 ± 2.3 (11.5-20.7)	12.9 ± 3.5 (5.9-19.9)



Diastoliskā disfunkcija

EF < 55%

E/A MV

E/A < 1 un
E ≤ 50 cm/s

E/A ≥ 1- < 2, vai
E/A < 1 un E > 50
cm/s

E/A ≥ 2
DT < 150
msec

E/E' vid. < 8
S/D > 1
Ar - A < 0 msec
LKSS < 30 mmHG
Valsalva Δ E/A < 0,5

E/E' vid. > 15
S/D < 1
Ar - A ≥ 30 msec
LKSS > 35 mmHG
Valsalva Δ E/A ≥ 0,5

KK Pildīšanās
spiediens nav
paaugstināts

KK Pildīšanās
spiediens ir
paaugstināts

EF ≥ 55%

E/E'

E/E' ≤ 8
(Sep., Lat., vai
Vid.)

E/E' 9-14

Sep. E/E' ≥ 15
Lat. E/E' ≥ 12
Vid. E/E' ≥ 13

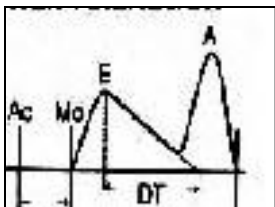
LAVI < 34 ml/m²
Ar - A < 0 msec
LKSS < 30 mmHG
Valsalva Δ E/A < 0,5

LAVI ≥ 34 ml/m²
Ar - A ≥ 30 msec
LKSS > 35 mmHG
Valsalva Δ E/A ≥ 0,5

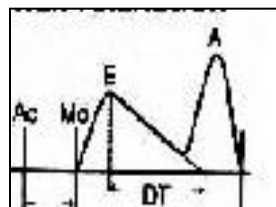
KK Pildīšanās
spiediens nav
paaugstināts

KK Pildīšanās
spiediens ir
paaugstināts

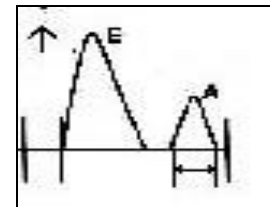
DD pakāpes



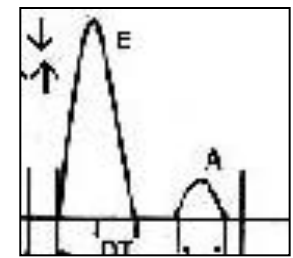
I. ar normālu KK PS



IC. ar ↑ KK PS



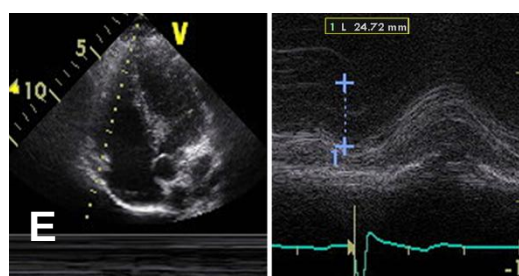
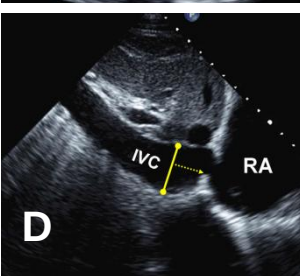
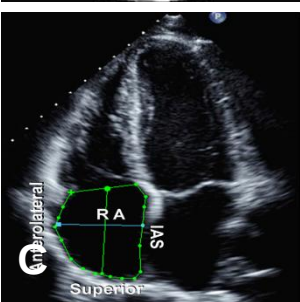
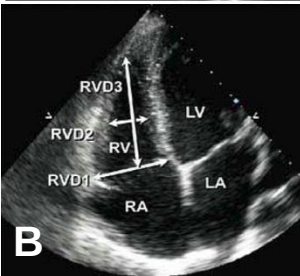
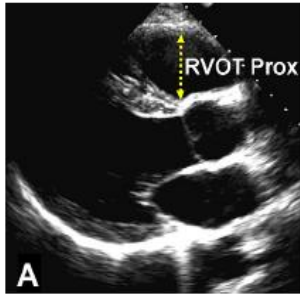
II. ar ↑ KK PS



III. ar ↑ KK PS

Labais kambaris un priekškambaris, IVC

- B-režīms



Mērījumi	Norma
A. Labā kambara izejas trakts (RVOT prox), cm	$\leq 3,3$
B. Labā kambara bazālais diametrs (RVD1), cm	$\leq 4,2$
C. Labā priekškambara laukums (RAA), cm ²	≤ 18
D. Apakšējā dobā vēna (IVC), cm	≤ 2.1
E. TV gredzena sistoliskas kustības ekskursija (TAPSE), cm	≥ 1.6