Master Course in Heart Failure 25 BAKU

Baku Marriott Hotel Boulevard
30st of May - 1st of June

CMR IN HEART FEALURE

FESC. DR. JAMIL BABAYEV

TO DECLARE

- **I AM CMR SPECIALIST**

IN DER MEDIZIN GEHT ES NICHT NUR UM DAS, WAS WIR WISSEN, SONDERN AUCH UM DAS, WAS WIR ERKENNEN

MEDICINE IS NOT ONLY ABOUT WHAT WE KNOW, BUT ALSO ABOUT WHAT WE RECOGNIZE

(ANONYM)

CASE (12.2023)

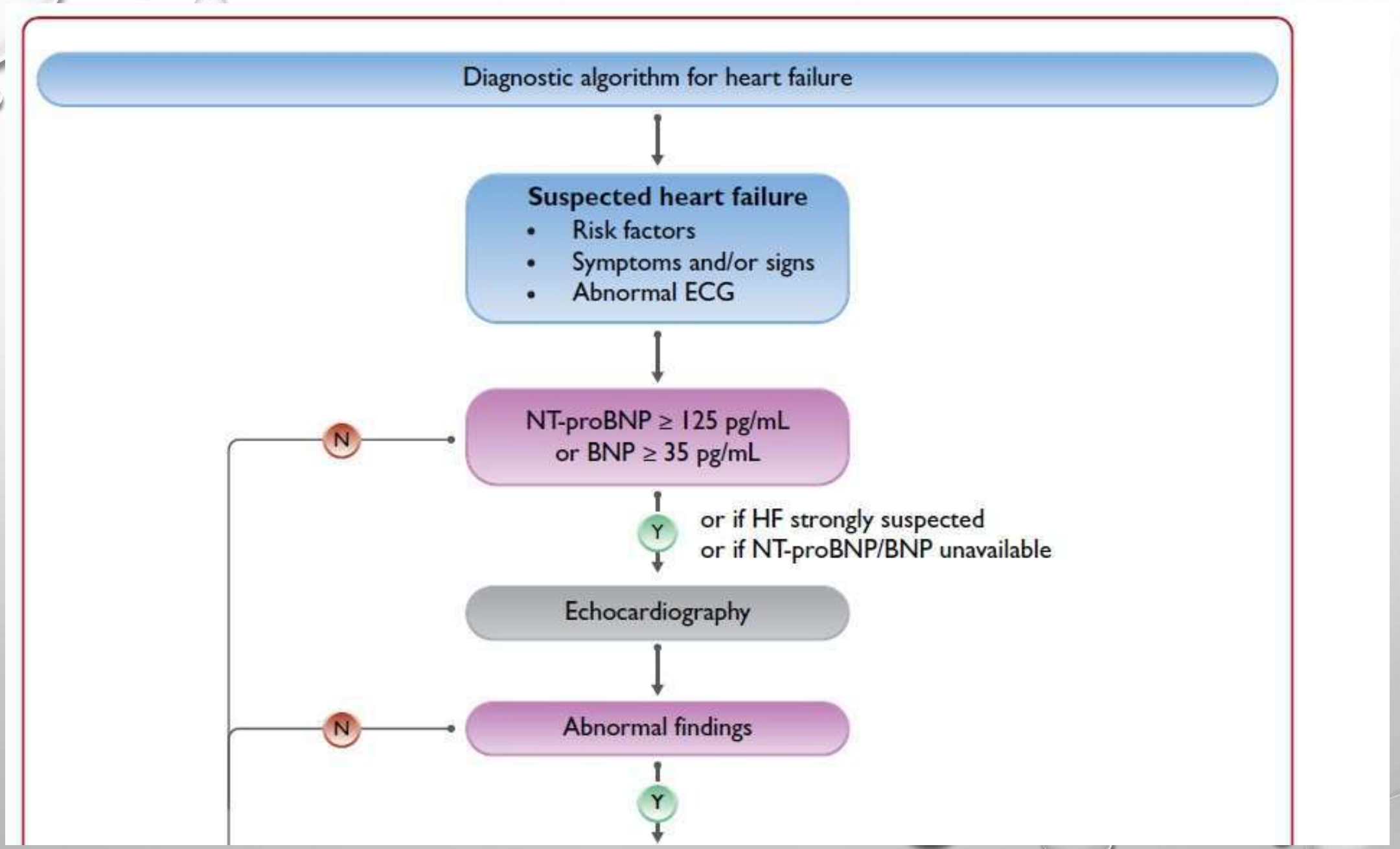
- YOUNG PATIENT (2004), M
- STUDENT
- DYSPNEA DURING WALKING, NIGHT CUFF, PRETIBIAL OEDEMA, FATIGUE, EXHAUSTION
- ANAMNESTIC: SYPTOMS WORSENED LAST 3 MONTH, HE HAS SKALIOSIS (RECIEVES FISIOTHERAPY). FIRST VISIT TO DOCTOR AT 12.2023. NO SIGNS OF COPD OR ANOTHER LUNG DISEASES.
- ALCOHOL-, DRUGS-,SMOKING-, FAMILY HISTORY OF HD-

OBJECTIVES

- HEIGHT-176 SM
- WEIGHT-67 KG
- NORMOSTENIC BODY CONFIGURATION
- AUSCULTATION: MUFFLED HEART SOUNDS, DOBLE SIDES WET RALES ON BASE LUNG LOBULES
- GIS: WITHOUT ANY SPECIAL FEATURES

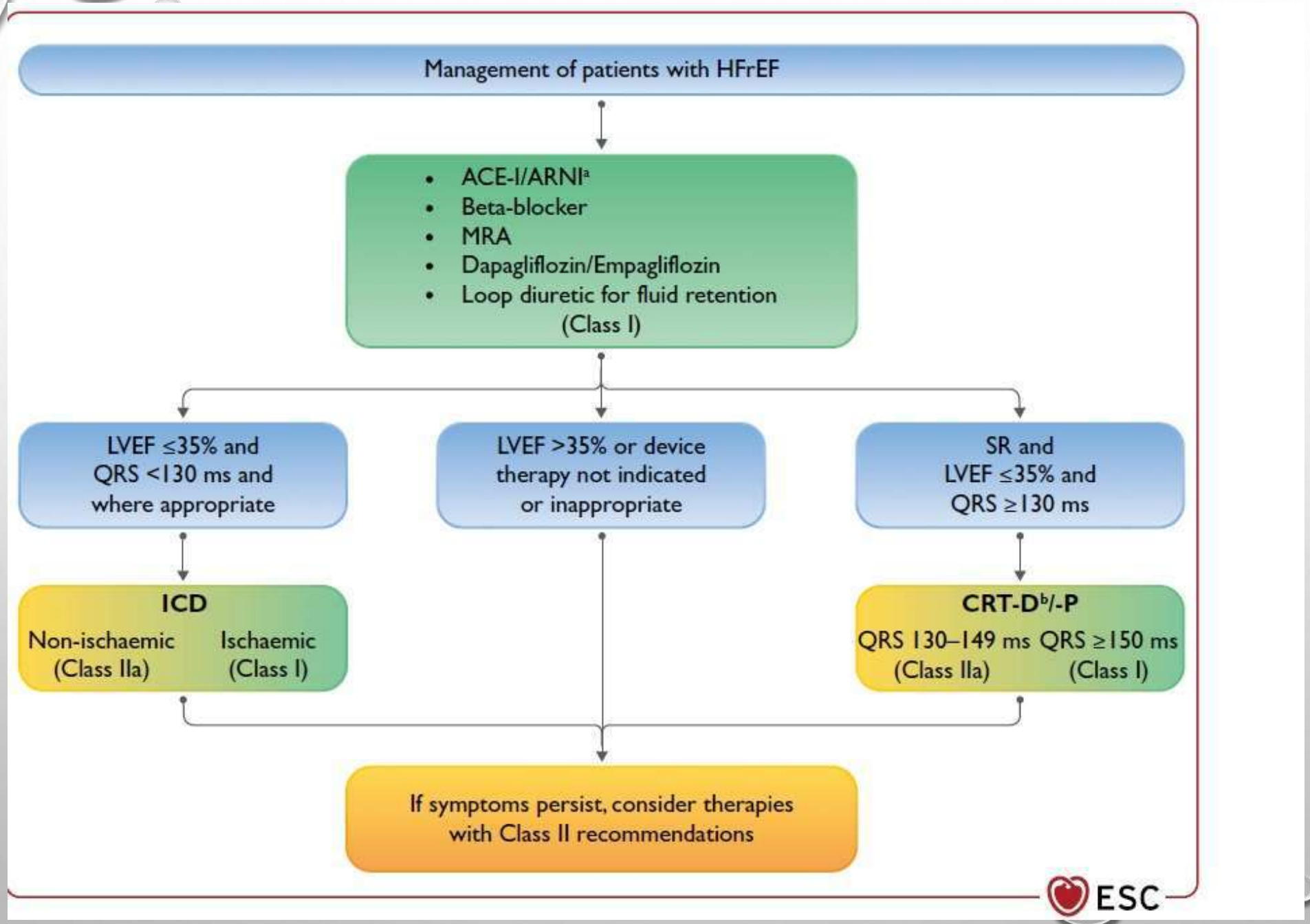
LABORATORY AND INSTRUMENTAL EXAM

- ECG: NSR. SINUS TACHYCARDIA. QRS-NORMAL.
- ECHO: ENLARGED LV, MODERATE LOW EF(GLOBAL), WALLSICKNES-NORMAL, MILD AI AND MI.
- NT PRO BNP: 2379 PG/ML
- CREATININ: 0,8 MG/DL
- CRP: 1,7 MG/DL
- ALT AND AST: NORMAL
- HEMOGRAMM: NORMAL


Diagnostic algorithm for heart failure
Suspected heart failure
• Risk factors
• Symptoms and/or signs
• Abnormal ECG
NT-proBNP ≥ 125 pg/mL
or BNP ≥ 35 pg/mL
N
Y
or if HF strongly suspected
or if NT-proBNP/BNP unavailable
Echocardiography
Abnormal findings
N
Y

DIAGNOSIS

- DILATED CARDIOMOPATY
- HIPERTROPHIC CARDIOMOPATY
- POSTPARTUM CARDIOMOPATY
- VALVE DISEASE
- ISHEMIC CARDIOMOPATY


Management of patients with HFrEF
ACE-I/ARNI[a]
Beta-blocker
MRA
Dapagliflozin/Empagliflozin
Loop diuretic for fluid retention
(Class I)
LVEF ≤35% and QRS <130 ms and where appropriate
LVEF >35% or device therapy not indicated or inappropriate
SR and LVEF ≤35% and QRS ≥130 ms
ICD
Non-ischaemic (Class IIa)
Ischaemic (Class I)
CRT-D[b]/-P
QRS 130–149 ms (Class IIa)
QRS ≥150 ms (Class I)
If symptoms persist, consider therapies with Class II recommendations
ESC

TREATMENT

- SACUBETRIL/VALSARTAN 24/26 MG 1-0-1

(1 MONTH LATER MAXIMAL DOSAGE OF 97/103 MG WAS REACHED)

- SPIRONOLACTONE 50 MG 0-1-0
- BISOPROLOL 2,5 MG 0-0-1
- EPAGLIFLOZIN 10 MG 1-0-0
- TORSEMİD 10 MG 1-0-0-0 (STOPED AFTER 1 MO)


"That's all Folks!"
LOONEY TUNES
TM & © Warner Bros. Entertainment Inc. (s23)

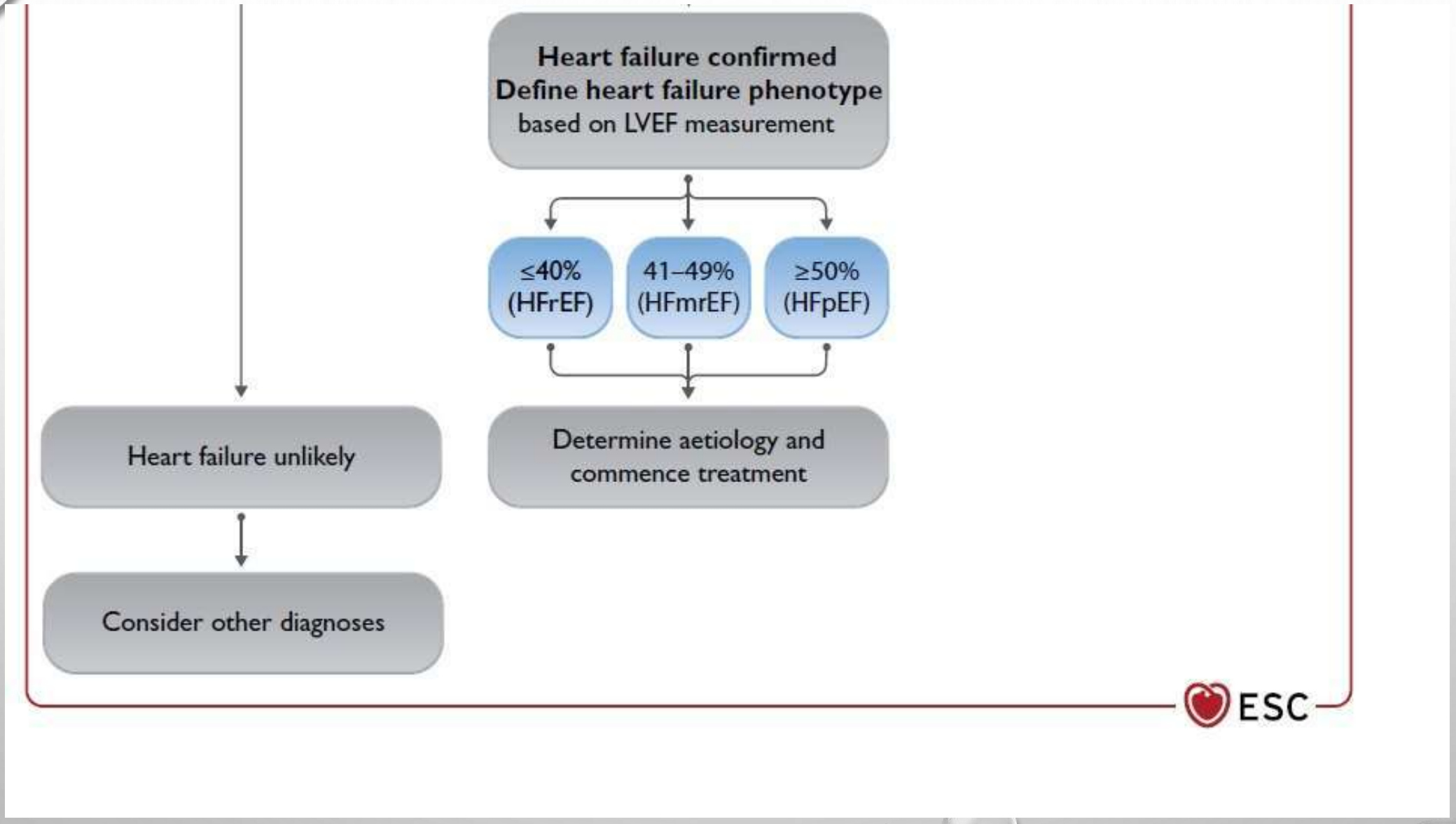

Heart failure confirmed
Define heart failure phenotype
based on LVEF measurement
≤40%
(HFrEF)
41–49%
(HFmrEF)
≥50%
(HFpEF)
Determine aetiology and
commence treatment
Heart failure unlikely
Consider other diagnoses
ESC

Table 5 Causes of heart failure, common modes of presentation and specific investigations

Cause	Examples of presentations	Specific investigations
CAD	Myocardial infarction	Invasive coronary angiography
	Angina or "angina-equivalent"	CT coronary angiography
	Arrhythmias	Imaging stress tests (echo, nuclear, CMR)
Hypertension	Heart failure with preserved systolic function	24 h ambulatory BP
	Malignant hypertension/acute pulmonary oedema	Plasma metanephrines, renal artery imaging
		Renin and aldosterone
Valve disease	Primary valve disease e.g., aortic stenosis	Echo – transoesophageal/stress
	Secondary valve disease, e.g. functional regurgitation	
	Congenital valve disease	
Arrhythmias	Atrial tachyarrhythmias	Ambulatory ECG recording
	Ventricular arrhythmias	Electrophysiology study, if indicated
CMPs	All	CMR, genetic testing
	Dilated	
	Hypertrophic	
	Restrictive	Right and left heart catheterization
	ARVC	
	Peripartum	
	Takotsubo syndrome	CMR, angiography
	Toxins: alcohol, cocaine, iron, copper	Trace elements, toxicology, LFTs, GGT

Recommendations for specialized diagnostic tests for selected patients with chronic heart failure to detect reversible/treatable causes of heart failure

Recommendations	Class[a]	Level[b]
CMR		
CMR is recommended for the assessment of myocardial structure and function in those with poor echocardiogram acoustic windows.	I	C
CMR is recommended for the characterization of myocardial tissue in suspected infiltrative disease, Fabry disease, inflammatory disease (myocarditis), LV non-compaction, amyloid, sarcoidosis, iron overload/haemochromatosis.	I	C
CMR with LGE should be considered in DCM to distinguish between ischaemic and non-ischaemic myocardial damage.	IIa	C
Non-invasive testing		
CTCA should be considered in patients with a low to intermediate pre-test probability of CAD or those with equivocal non-invasive stress tests in order to rule out coronary artery stenosis.	IIa	C
Non-invasive stress imaging (CMR, stress echocardiography, SPECT, PET) may be considered for the assessment of myocardial ischaemia and viability in patients with CAD who are considered suitable for coronary revascularization.[90–93]	IIb	B
Exercise testing may be considered to detect reversible myocardial ischaemia and investigate the cause of dyspnoea.[94–96]	IIb	C

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2023 ESC Guidelines for Management of Cardiomyopathies: Key Points

Aug 30, 2023 | Debabrata Mukherjee, MD, FACC

Print Font Size A A A

Authors: Arbelo E, Protonotarios A, Gimeno JR, et al., on behalf of the ESC Scientific Document Group.

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Ischemic

Transmural infarct

Non-transmural (subendocardial) infarct

Non-ischemic

Midwall

HCM
RV overload

DCM

Myocarditis
Anderson-fabry
Chagas
Sarcoidosis

Subendocardial

Sarcoidosis

Epicardial

Sarcoidosis
Myocarditis
Anderson-fabry
Chagas

Global endocardial

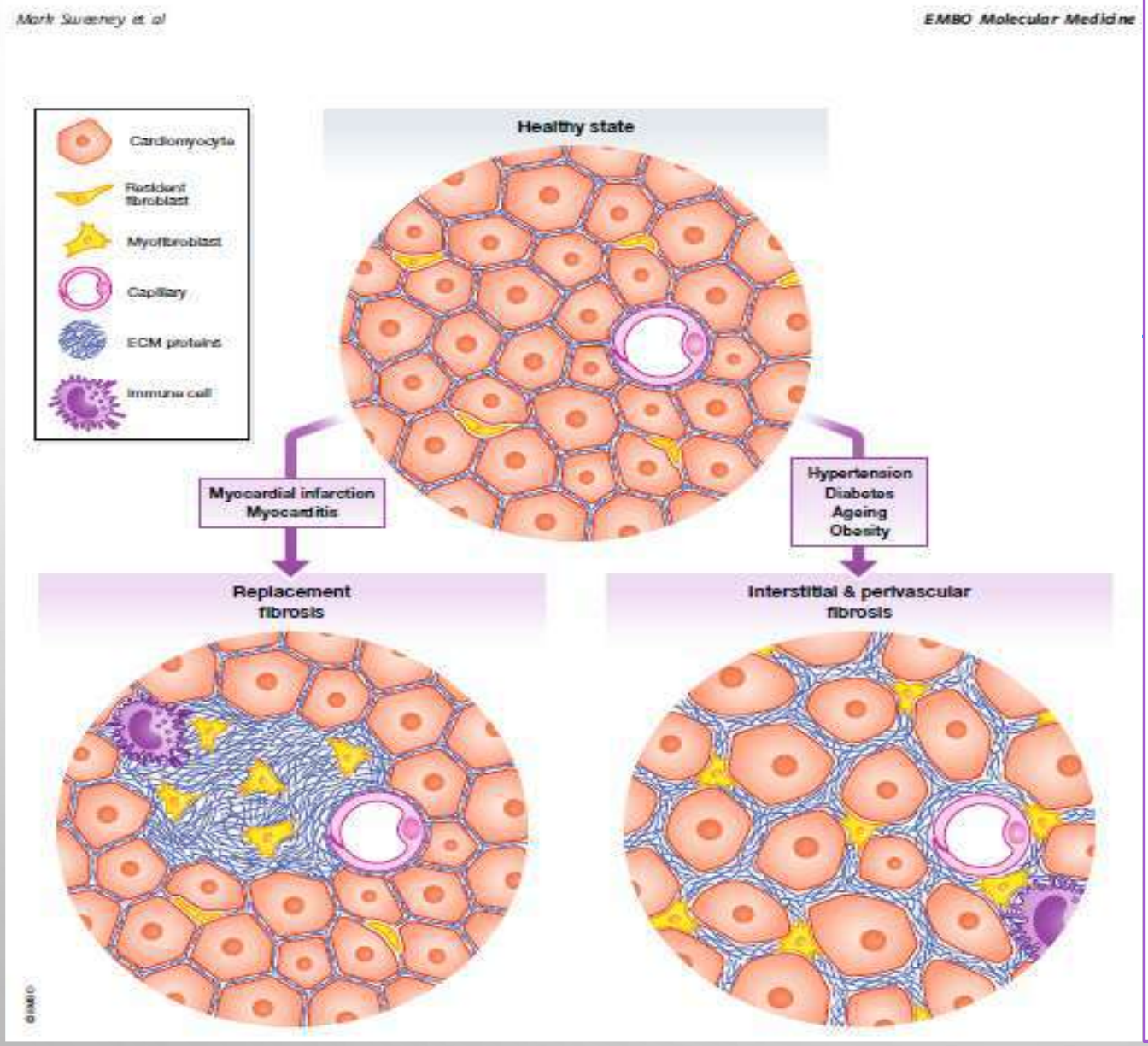
Amyloidosis
Scleroderma
Post-cardiac transplant

Transmural

Sarcoidosis

RV involvement

Sarcoidosis



- HISTOLOGYCAL DIFFERENCES BETWEEN REPARATIVE FIBROSIS AND INTERSTITIAL/PERIVASCULAR FIBROSIS

BIOPSY VS CMR

TABLE 1 Overview of Studies Validating Various T1-Mapping Methods Against Histological Specimens

First Author (Ref. #)	T1-Mapping Method	Patient Population	r and p Values
Flett et al. (8)	EQ-CMR ECV	18 AS and 8 HCM patients	$r^2 = 0.796$, $p < 0.001$
Fontana et al. (33)	ShMOLLI EQ ECV Multiple breath-hold ECV	18 AS patients	$r^2 = 0.685$, $p < 0.001$ $r^2 = 0.589$, $p < 0.001$
White et al. (37)	ShMOLLI single-bolus ECV ShMOLLI EQ ECV	18 AS patients	$r^2 = 0.69$, $p < 0.001$ $r^2 = 0.71$, $p < 0.001$
Bull et al. (32)	ShMOLLI native T1	19 AS patients	$r = 0.655$, $p = 0.002$
Miller et al. (36)	DynEq-CMR MOLLI ECV	6 Explanted hearts	$r^2 = 0.893$, $p = 0.004$
Iles et al. (34)	Multiple breath-hold post contrast	9 Patients with heart failure after orthotopic heart transplantation	$r = -0.70$, $p = 0.003$
Mascherbauer et al. (13)	Multiple breath-hold post contrast	9 Patients with heart failure and preserved ejection fraction	$r = 0.977$, $p < 0.001$
Iles et al. (35)	Multiple breath-hold post contrast	4 Explanted hearts; 8 patients with myectomy for HCM	$r = -0.78$, $p = 0.003$
Aus dem Siepen et al. (31)	MOLLI ECV	24 Patients with DCM	$r = 0.85$, $p < 0.01$

AS = aortic stenosis; CMR = cardiac magnetic resonance; DCM = dilated cardiomyopathy; DynEq = dynamic equilibrium; ECV = extracellular volume; EQ = equilibrium; HCM = hypertrophic cardiomyopathy; (Sh)MOLLI = (shortened) modified Look-Locker inversion recovery sequence.

JACC: CARD
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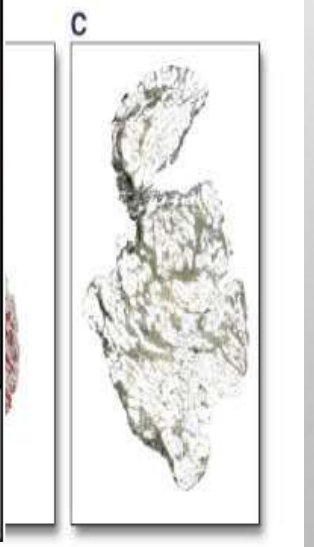
PUBLISHED

T1 M

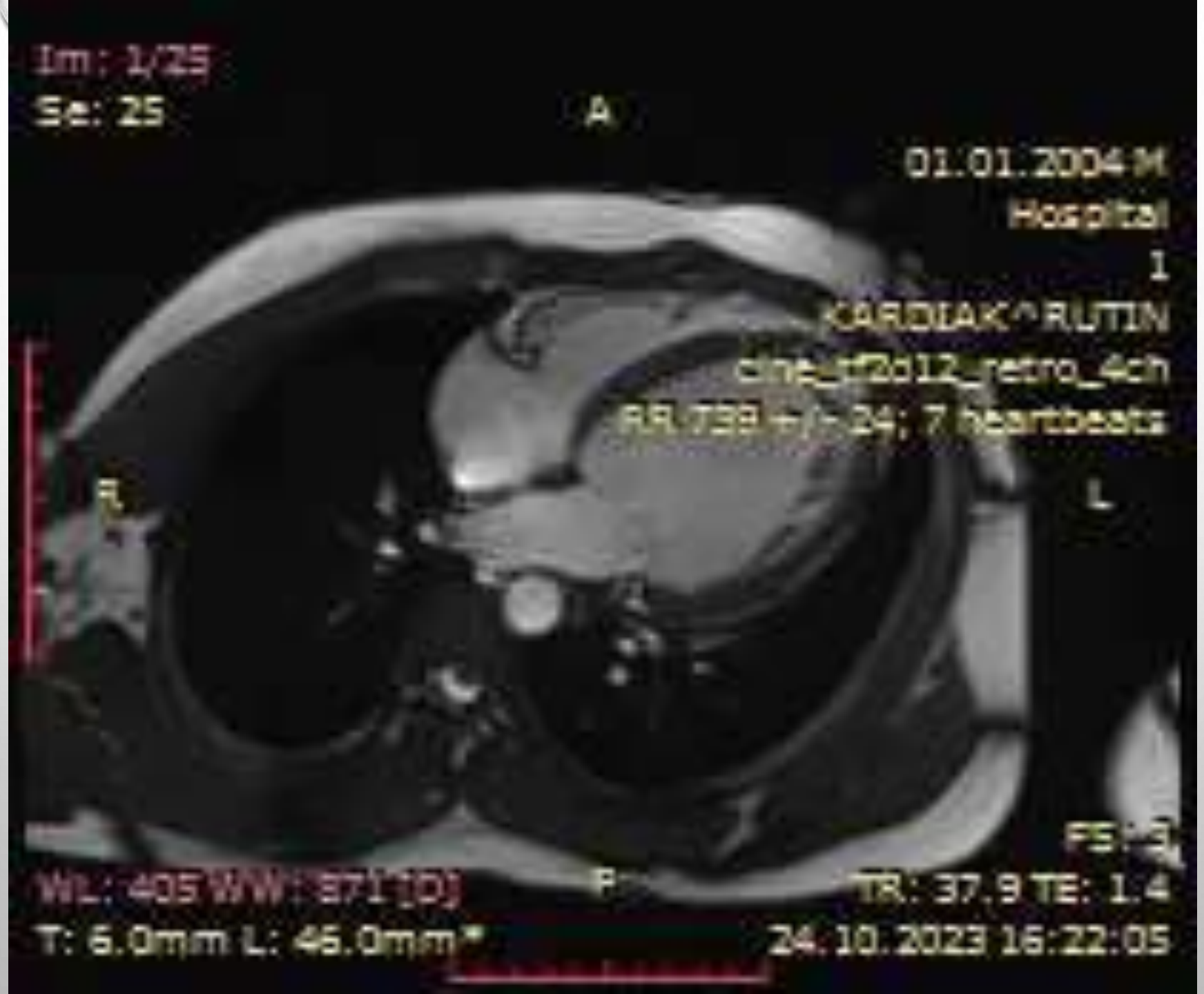
From

Andreas A
Franz Duc
Andreas G



CMR

- LV SIZE MILD-MODERATE ENLAGED
- LV FUNCTION SEVERE REDUSE (LVEF-18%)
- LA, RA SIZE-NORMAL
- RV SIZE AND FUNCTION ARE NORMAL
- NO SIGN OF LATE GADOLINIUM ENHANSMET IN LV, RV, LA AND RA
- NORMAL T1 AND T2 WEIGHTED SEQUENSEZ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1
^CARDIAK^RUTIN
cine_tf2d12_retro_4ch
RR 739 +/- 24; 7 heartbeats
R
L
FS: 3
WL: 405 WW: 871 [D]
P
TR: 37.9 TE: 1.4
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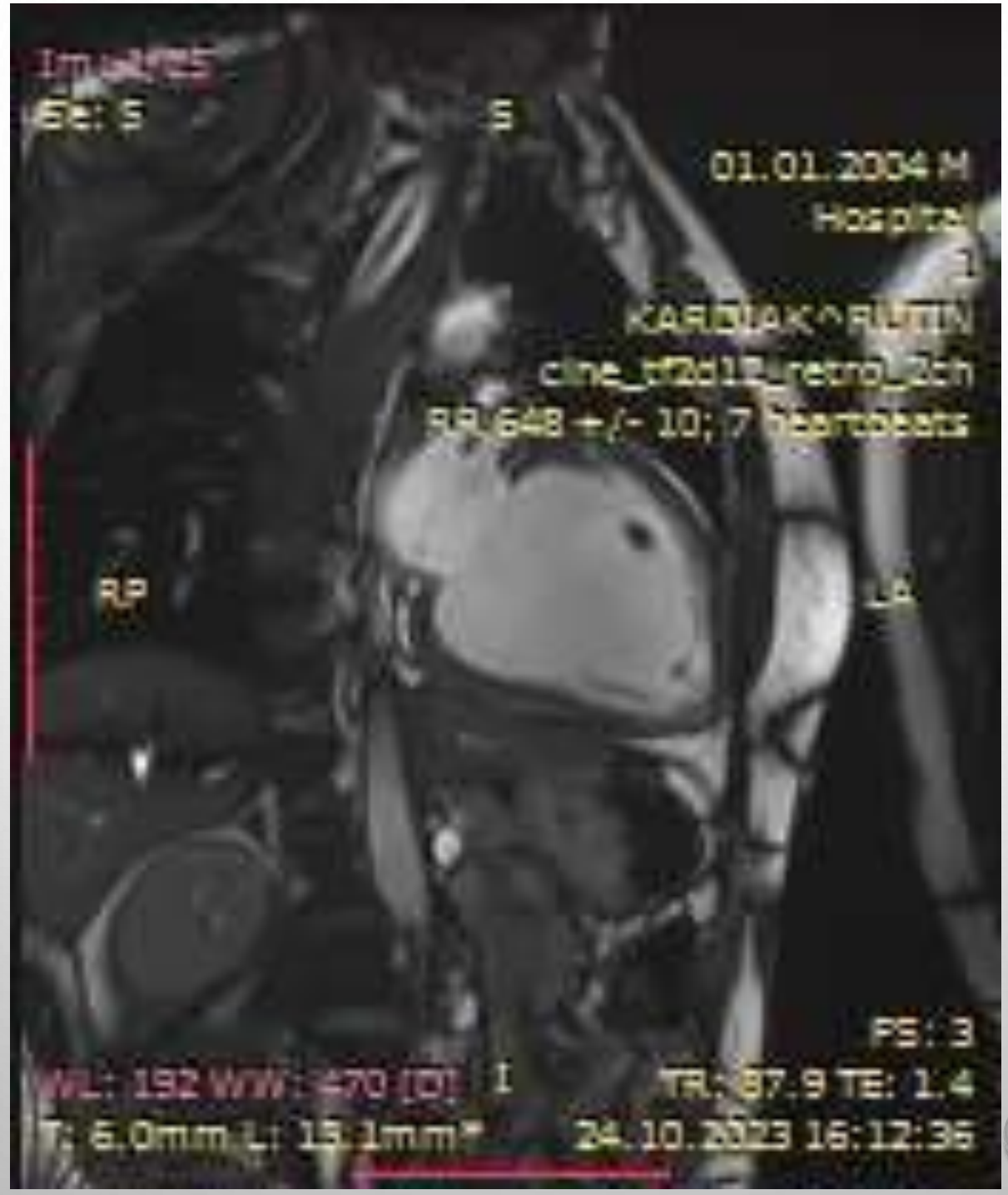
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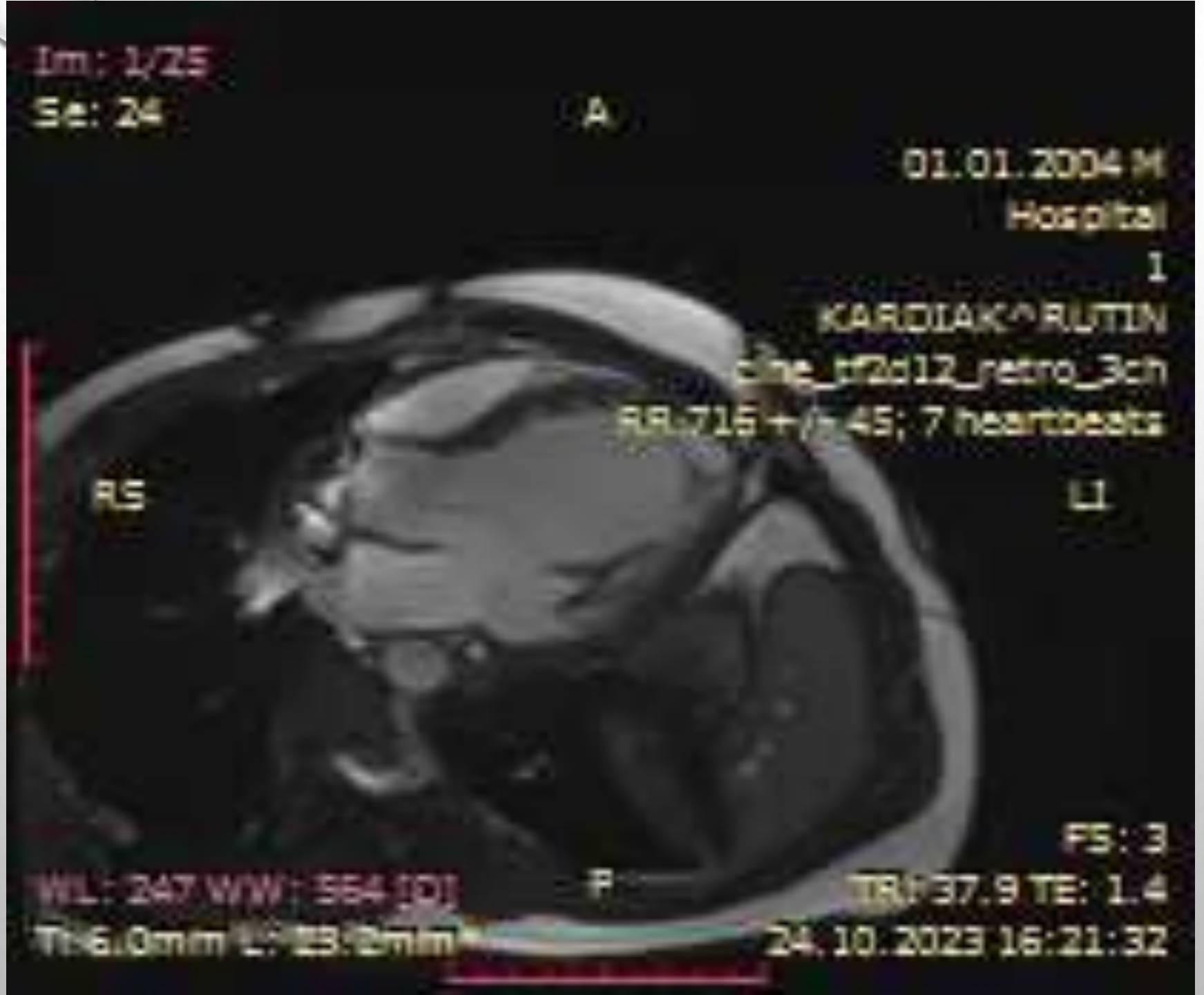
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Hospital
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RR:715 +/- 45; 7 heartbeats
RS
LI
FS: 3
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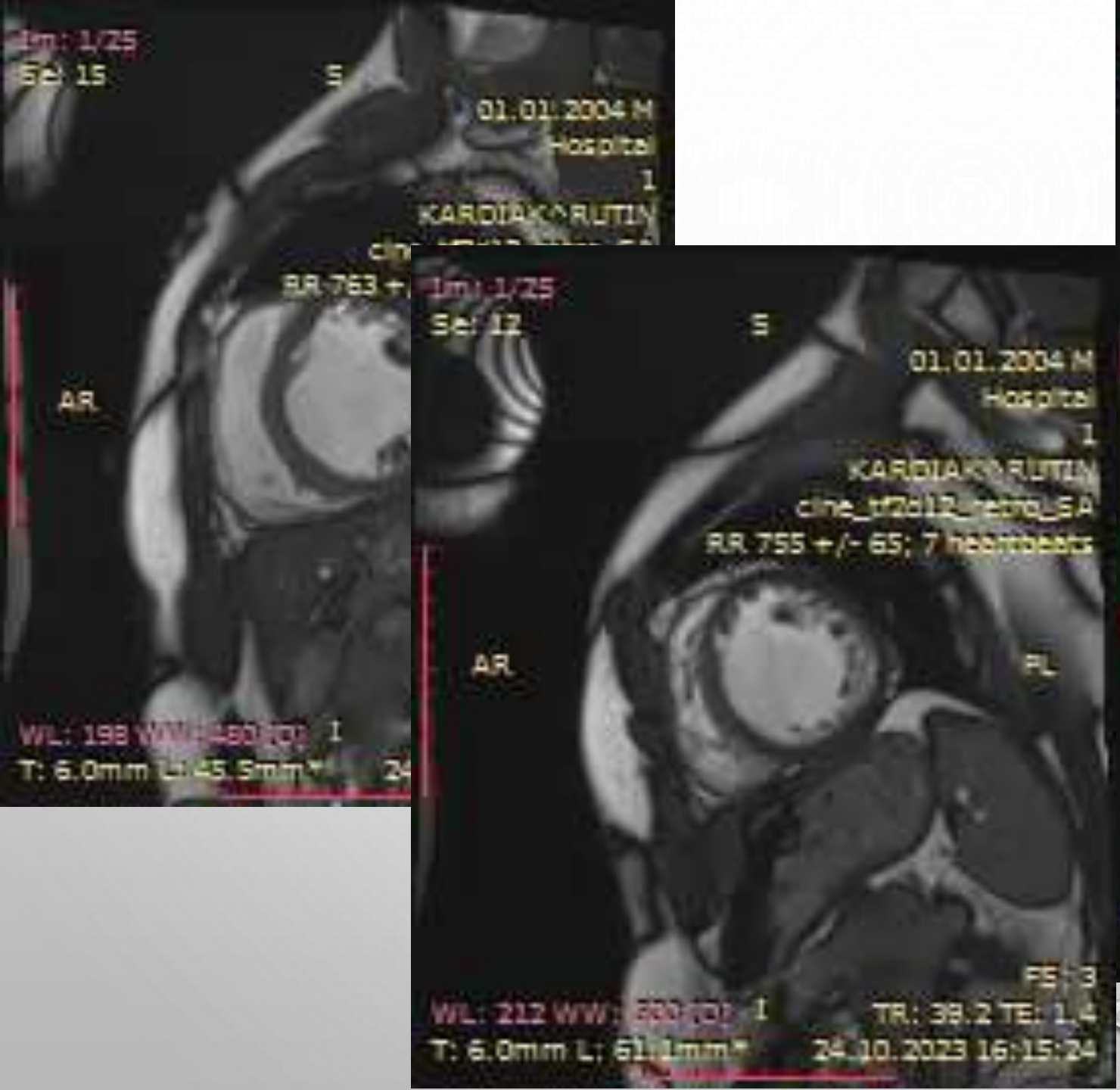
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KARDIAK^RUTIN
RR 763 +/-
AR
WL: 198 WW:
T: 6.0mm L: 45.5mm*
Im: 1/25
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S
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Hospital
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KARDIAK^RUTIN
cine_tf2d12_retro_SA
RR 755 +/- 65; 7 heartbeats
AR
FL
FS: 3
WL: 212 WW:
TR: 38.2 TE: 1.4
T: 6.0mm L: 61.1mm*
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RR 708 +/- 53; 7 heartbeats
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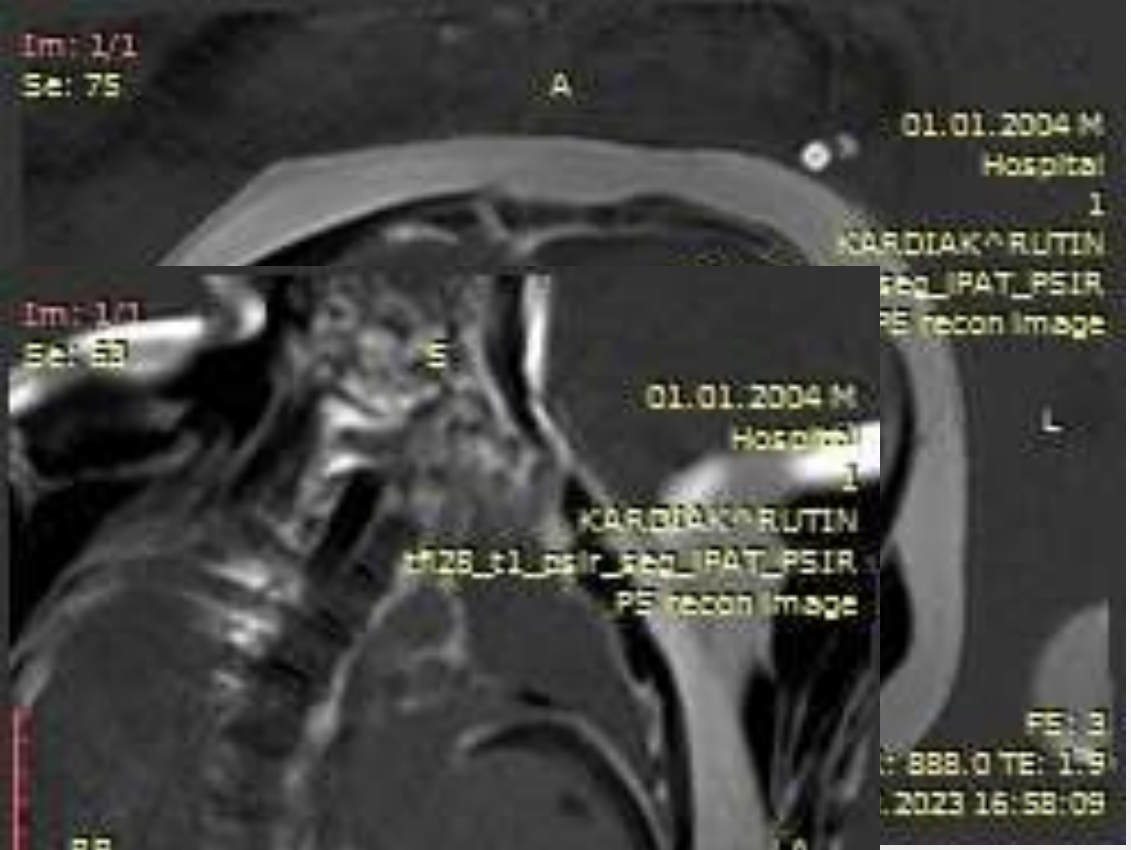
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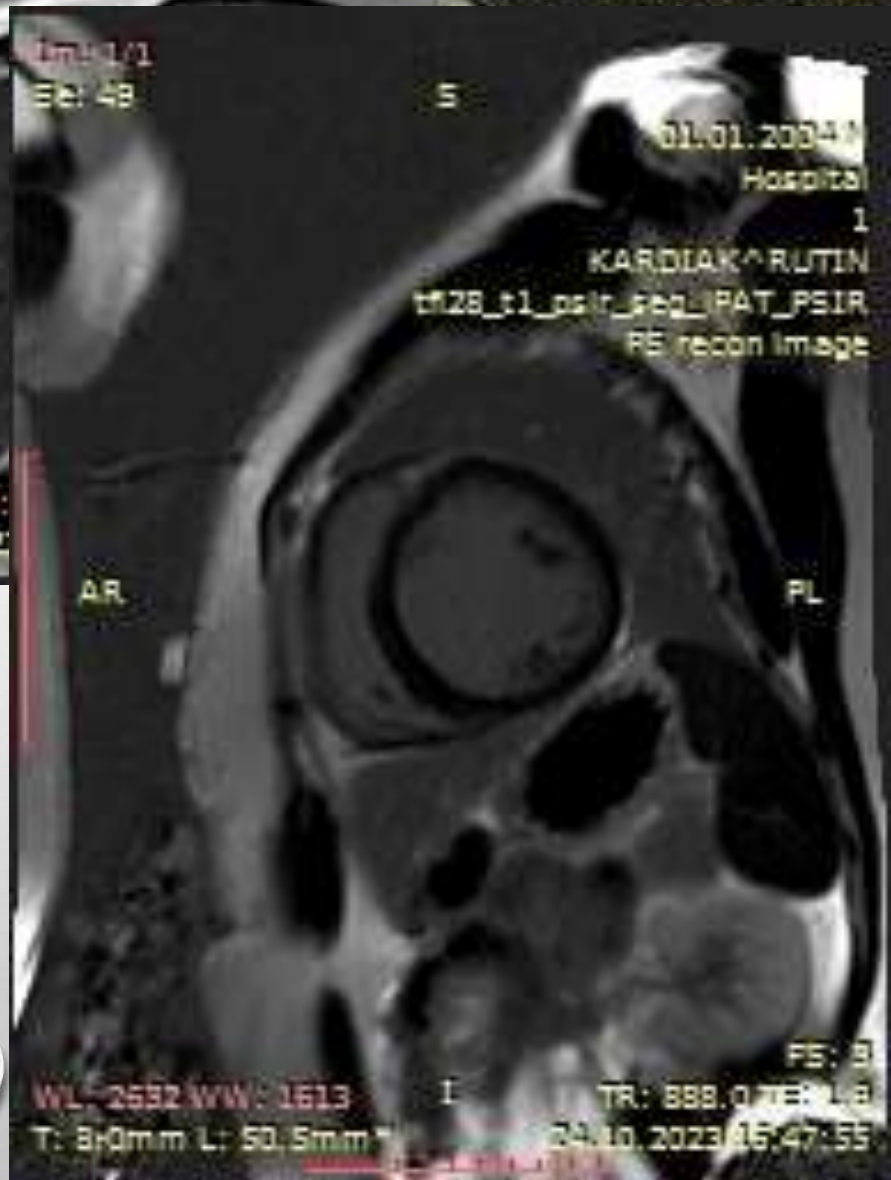
RS
WL: 2395 WW:
T: 8.0mm L: 2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RS recon image
AR
PL
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TR: 888.0 TE: 1.9
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RS
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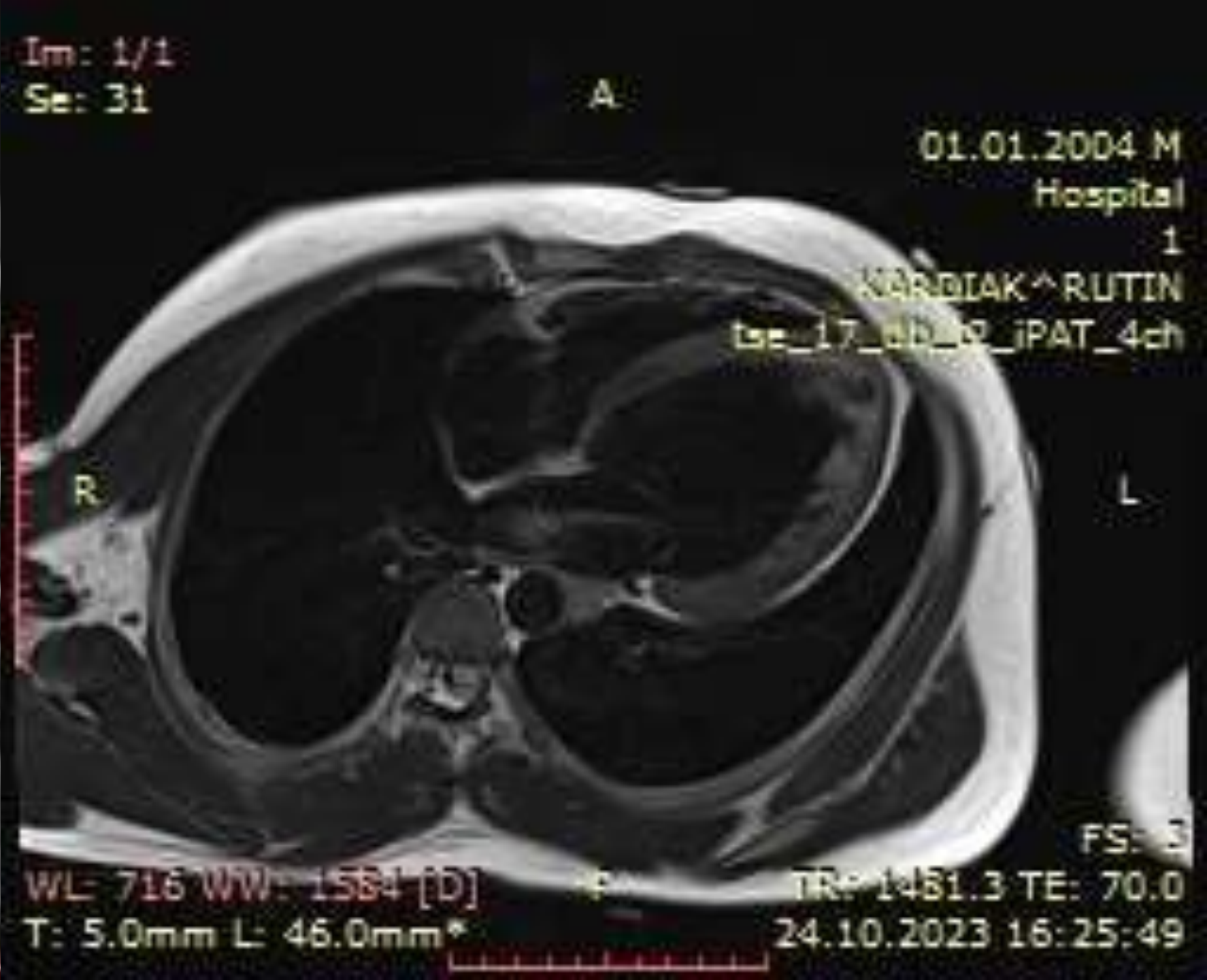
T: 6.0mm L: 41.7mm*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FS:
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TR: 1481.3 TE: 70.0
T: 5.0mm L: 46.0mm*
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MSCT

(RCA) Sağ Koronar Arter

1. **Proksimal**: Normal
2. **Orta:** Normal
3. **Distal:** Normal
4. **PDA-PLA:** Normal

(LMA) Sol Ana Koronar Arter

5. **LMA:** Normal

(LAD) Sol Ön Enen Koronar Arter

1. **Proksimal:** Normal
2. **Orta:** Normal
3. **Distal:** Normal
4. **D1:** Normal
5. **D2:** Normal

(LCX) Sirkumfleks Koronar Arter

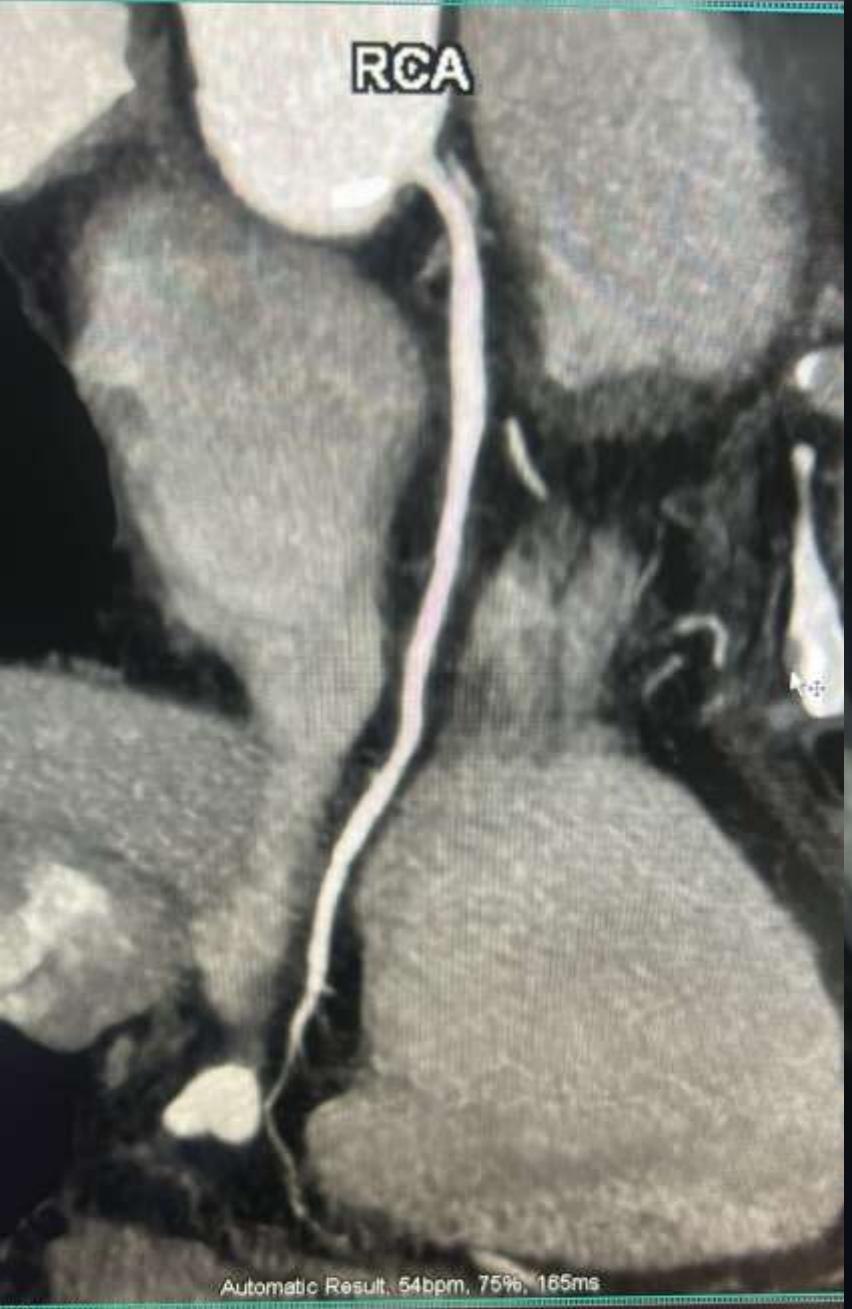
6. **Proksimal:** Normal
7. **OM1:** Normal
8. **Orta**: Normal
9. **OM2**: Normal

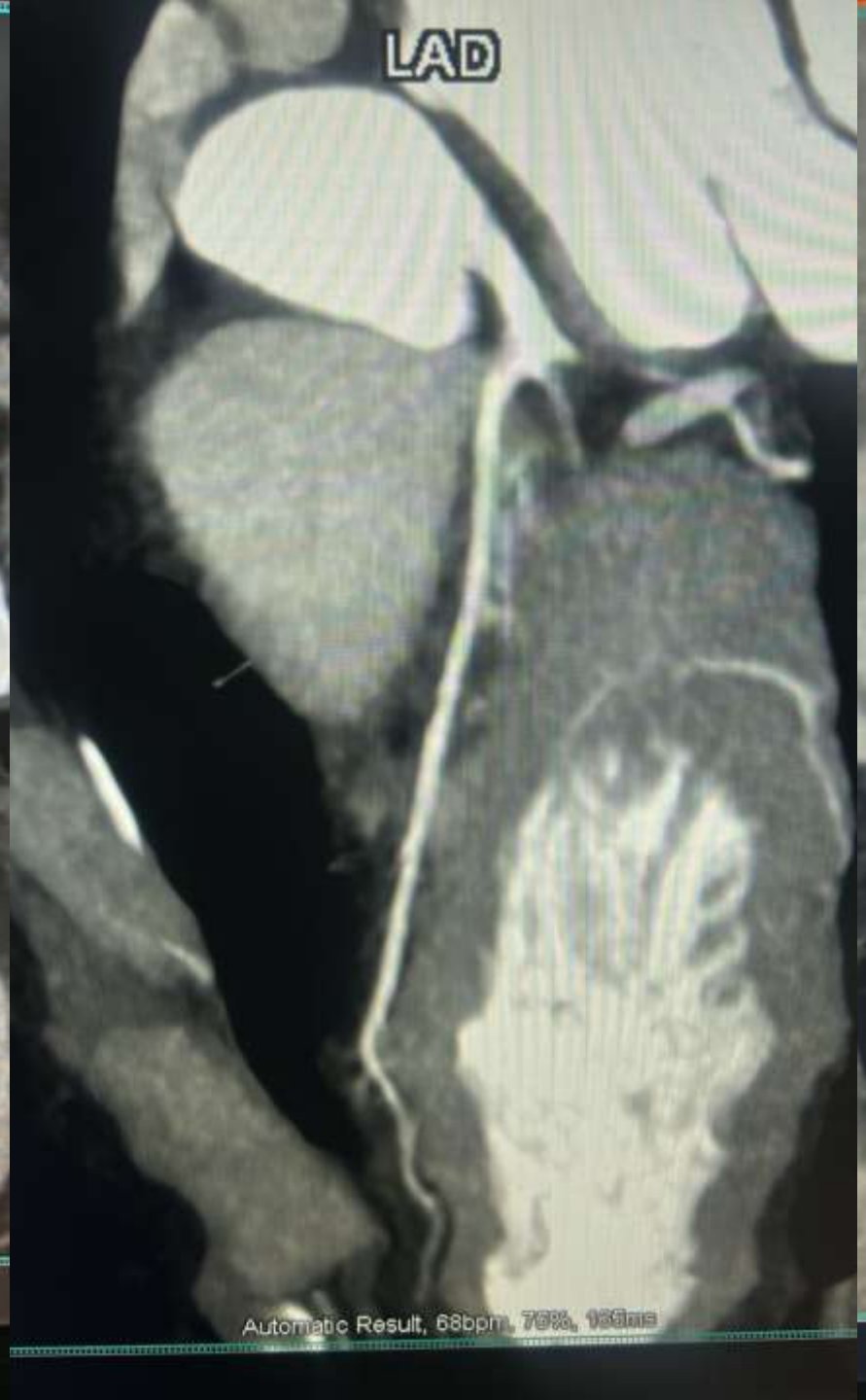
Kalsium Skorlama

Kalsiyum skorlamasında **Agatston skoru 0.0% Percentile**

Koroner Anomaliya

Yox


RCA
Automatic Result, 54bpm, 75%, 165ms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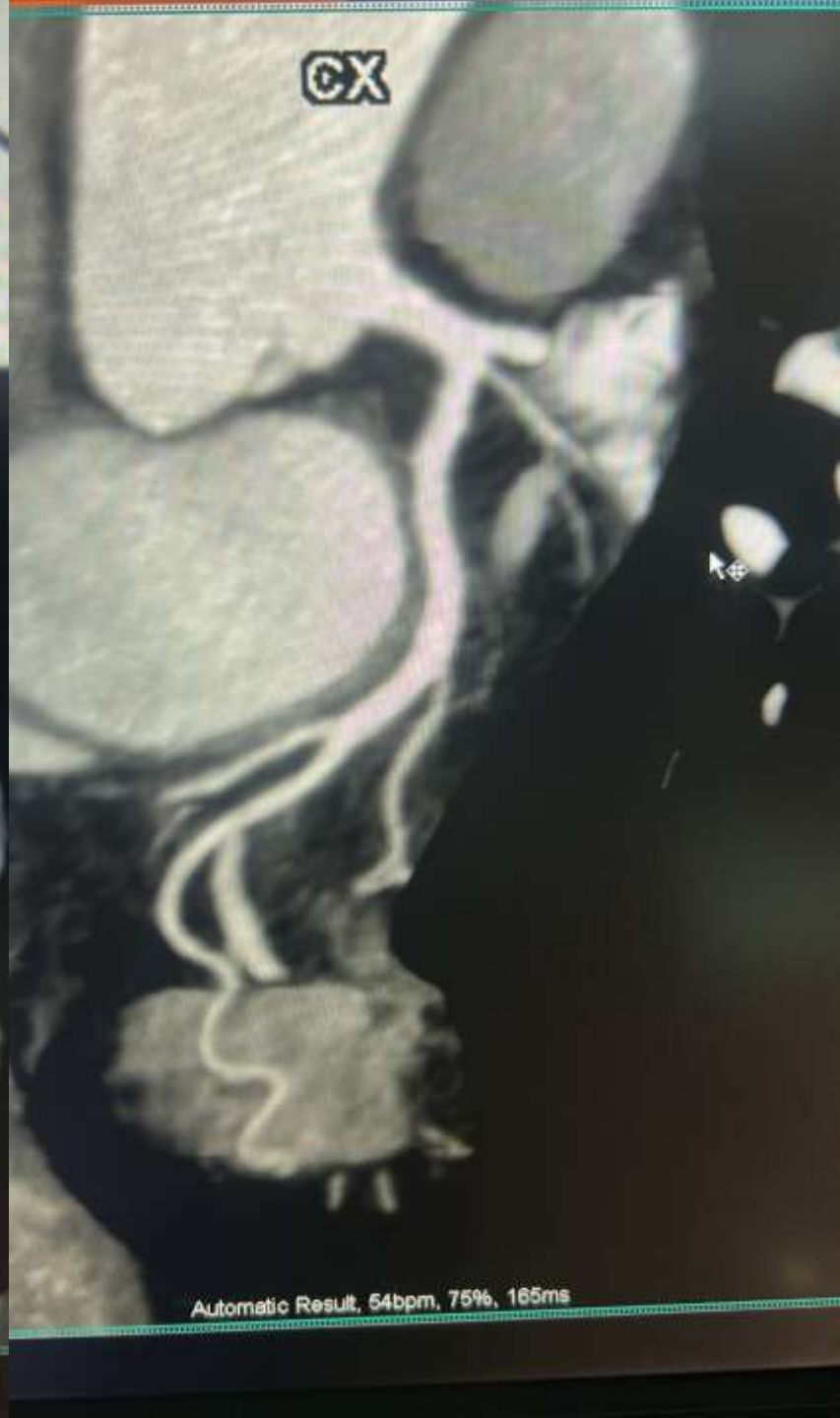
CX
Automatic Result, 54bpm, 75%, 165ms

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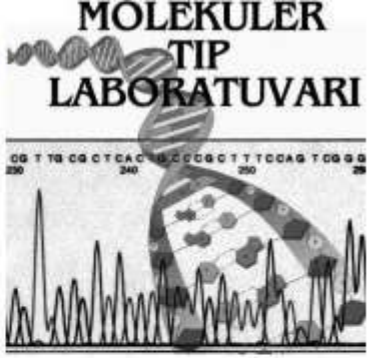


EGE ÜNİVERSİTESİ TIP FAKÜLTESİ ÇOCUK SAĞLIĞI VE HASTALIKLARI ANABİLİM DALI

MOLEKÜLER TIP LABORATUVARI
Bornova – İzmir

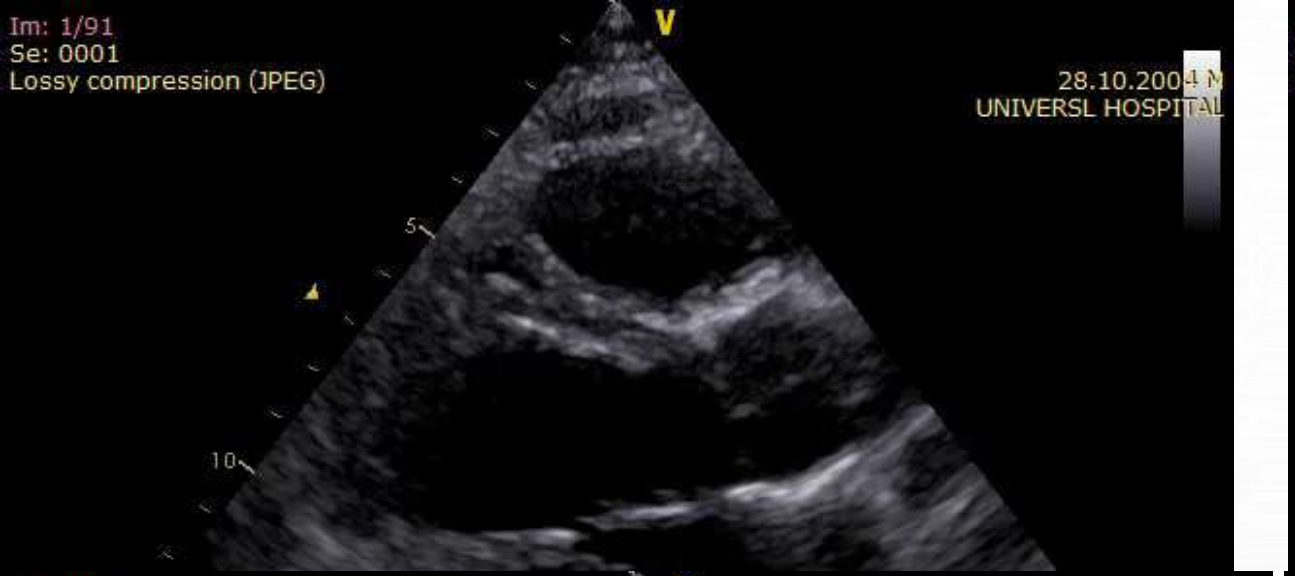
Tel: (232) 3901078

Genetik Analiz Raporu

SONUÇ	-***SCN5A*** (NM_000335.5) geninde heterozigot p.T1303M (c.3908C>T) varyantı saptanmıştır. -***ACADVL*** (NM_000018.4) geninde heterozigot p.K278del (c.833_835del) varyantı saptanmıştır. -***PCSK9*** (NM_174936.4) geninde heterozigot p.G394S (c.1180G>A) varyantı saptanmıştır.

-***SCN5A*** genindeki heterozigot mutasyonlar otozomal dominant olarak kalıtılan "Long QT Sendromu Tip 3 (OMIM No:603830)" ve "Kardiyomiyopati, Dilate, 1E (OMIM No:601154)" tablosuna neden olmaktadır. Bu gendeki değişiklikler ACMG kriterlerine göre bildirilmesi gerekli değişiklikler arasındadır. Olguda heterozigot olarak saptanan p.T1303M (c.3908C>T) varyantı daha önce HGMD veritabanında tanımlanmıştır (CM992663) ve "Long QT Sendromu" ile ilişkilendirilmiştir. Franklin programı saptanan değişikliği ACMG kriterlerine göre "Olası Patojenik" olarak sınıflandırmaktadır. Bu değişiklik açısından kardiyolojik değerlendirme ve aile taraması önerilir.

-HETEROZYGOUS MUTATIONS IN THE SCN5A GENE CAN CAUSE THE AUTOSOMAL DOMINANT INHERITED "LONG QT SYNDROME TYPE 3 (OMIM NO:603830)" AND "CARDIOMYOPATHY, DILATED, 1E (OMIM NO:601154)" TABLE. …THE P.T1303M (C.3908C>T) VARIANT DETECTED HETEROZYGOUS IN THE CASE WAS PREVIOUSLY IDENTIFIED IN THE HGMD DATABASE (CM992663) AND WAS ASSOCIATED WITH "LONG QT SYNDROME". THE FRANKLIN PROGRAM CLASSIFIES THE DETECTED CHANGE AS "POSSIBLY PATHOGENIC" ACCORDING TO THE ACMG CRITERIA. CARDIOLOGICAL EVALUATION AND FAMILY SCREENING ARE RECOMMENDED FOR THIS CHANGE.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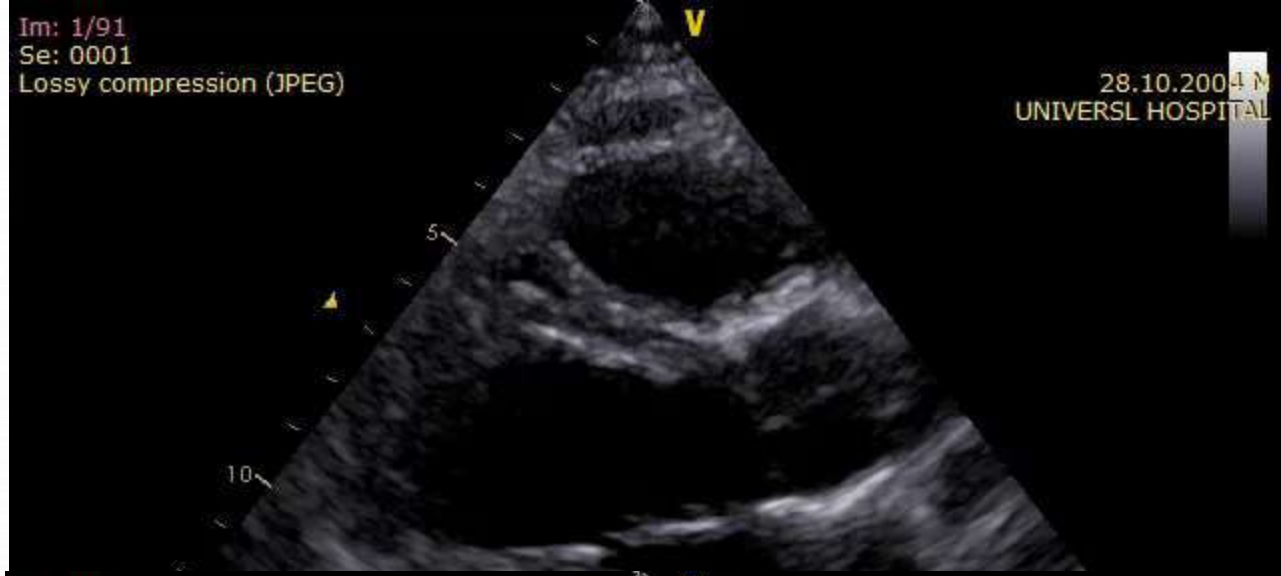
UNIVERSL HOSPITAL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28.10.2004 M
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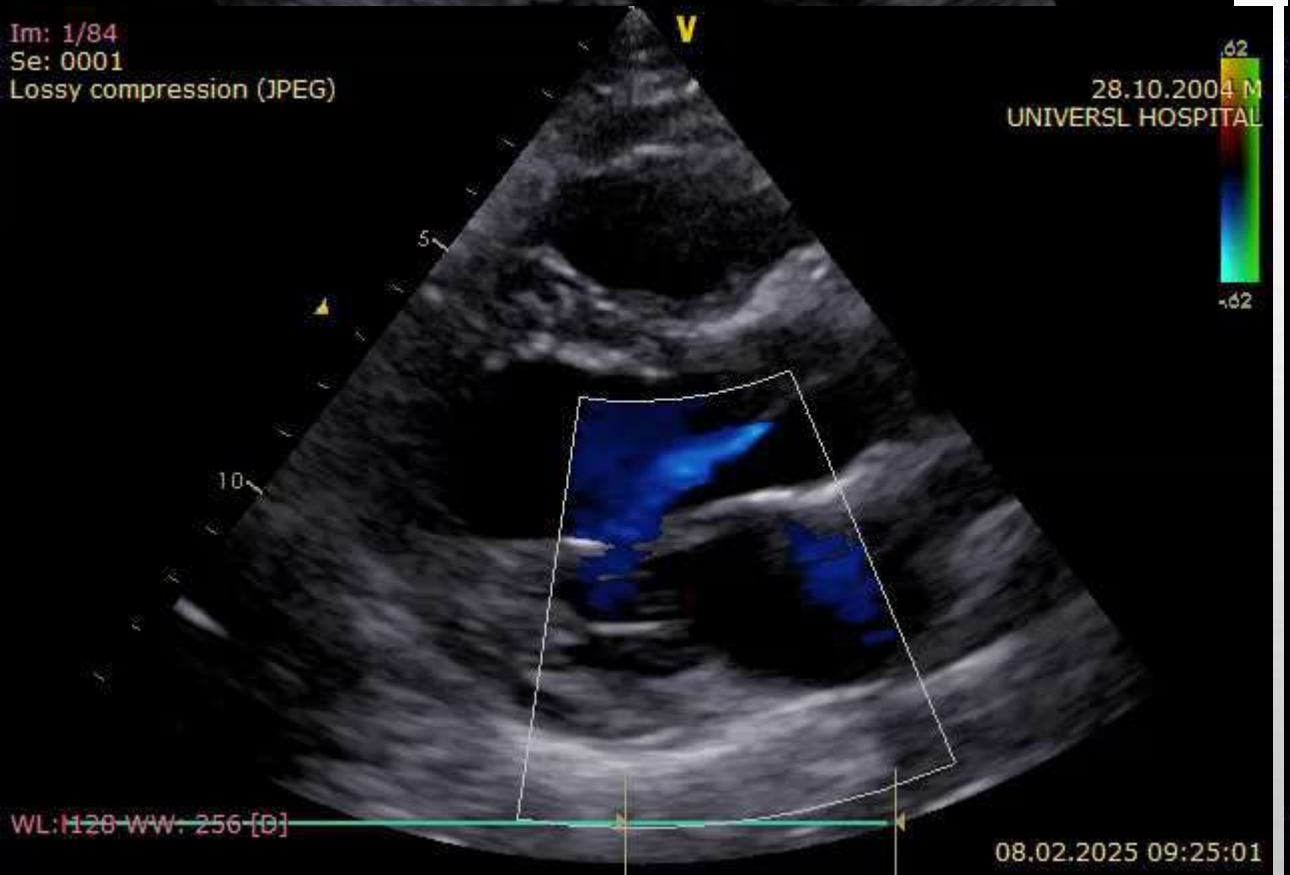
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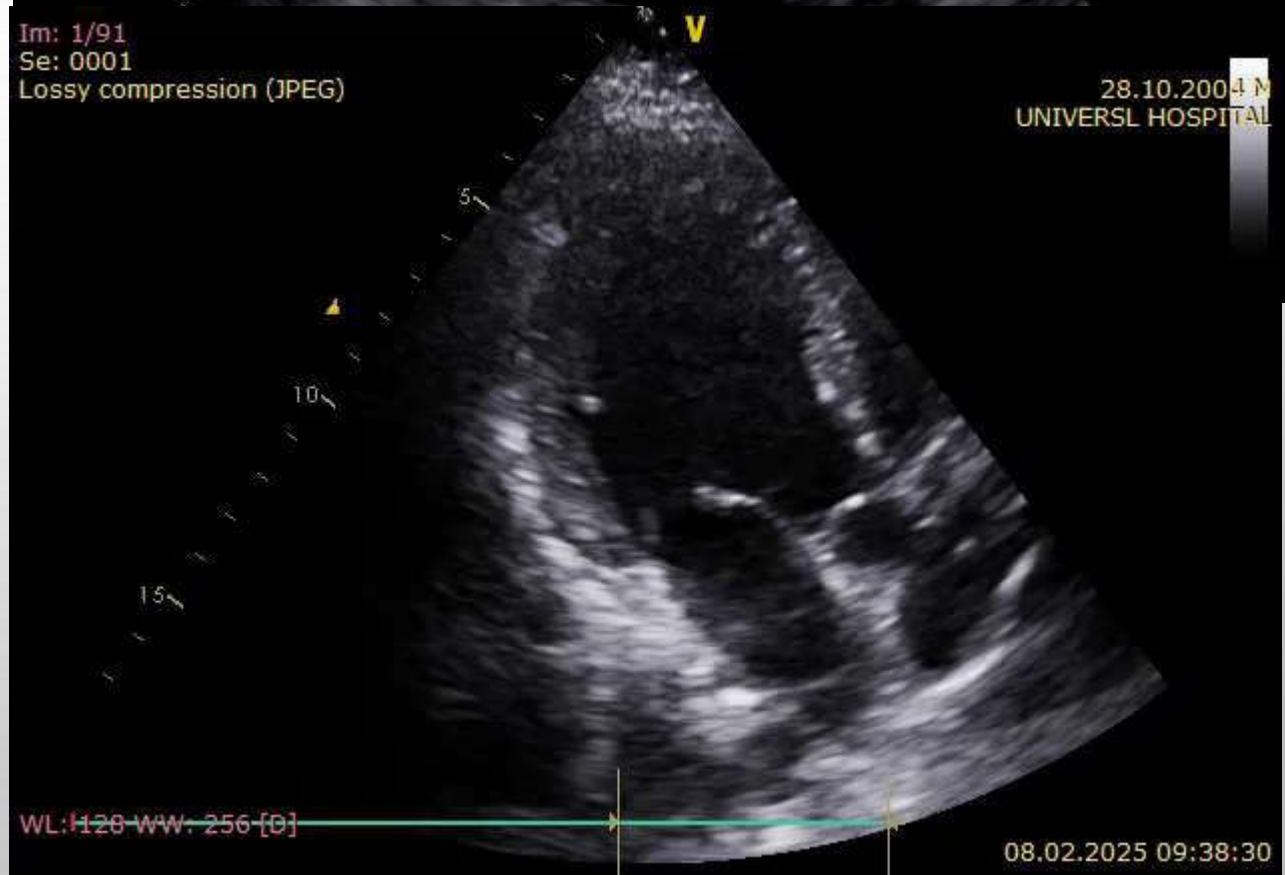
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08.02.2025

- **NT PRO BNP-NORMAL**
- **ECG-NSR**
- **ECHO-NORMAL LV SIZE. MILDE REDUSE LFEF-45%(SIMPSON BIPLAN). NORMAL SIZE ANF FUNCTION OF RV. NORMAL SIZE OF LA AND RA. MILDE AI AND MI.**
- **BEGINING GYNECOMASTY-CHANGE SPIRONALAKTON TO FINERENON**

TREATMENT

- SACUBETRIL/VALSARTAN 97/103 MG 1-0-1
- FINERENON 20 MG 0-1-0
- BISOPROLOL 2,5 MG 0-0-1
- EPAGLIFLOZIN 10 MG 1-0-0

THANK YOU FOR YOUR ATTENTION!!!