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Long-term outcomes of catheter ablation pulmonary veins on example of a clinical case patient with paroxysmal atrial fibrillation

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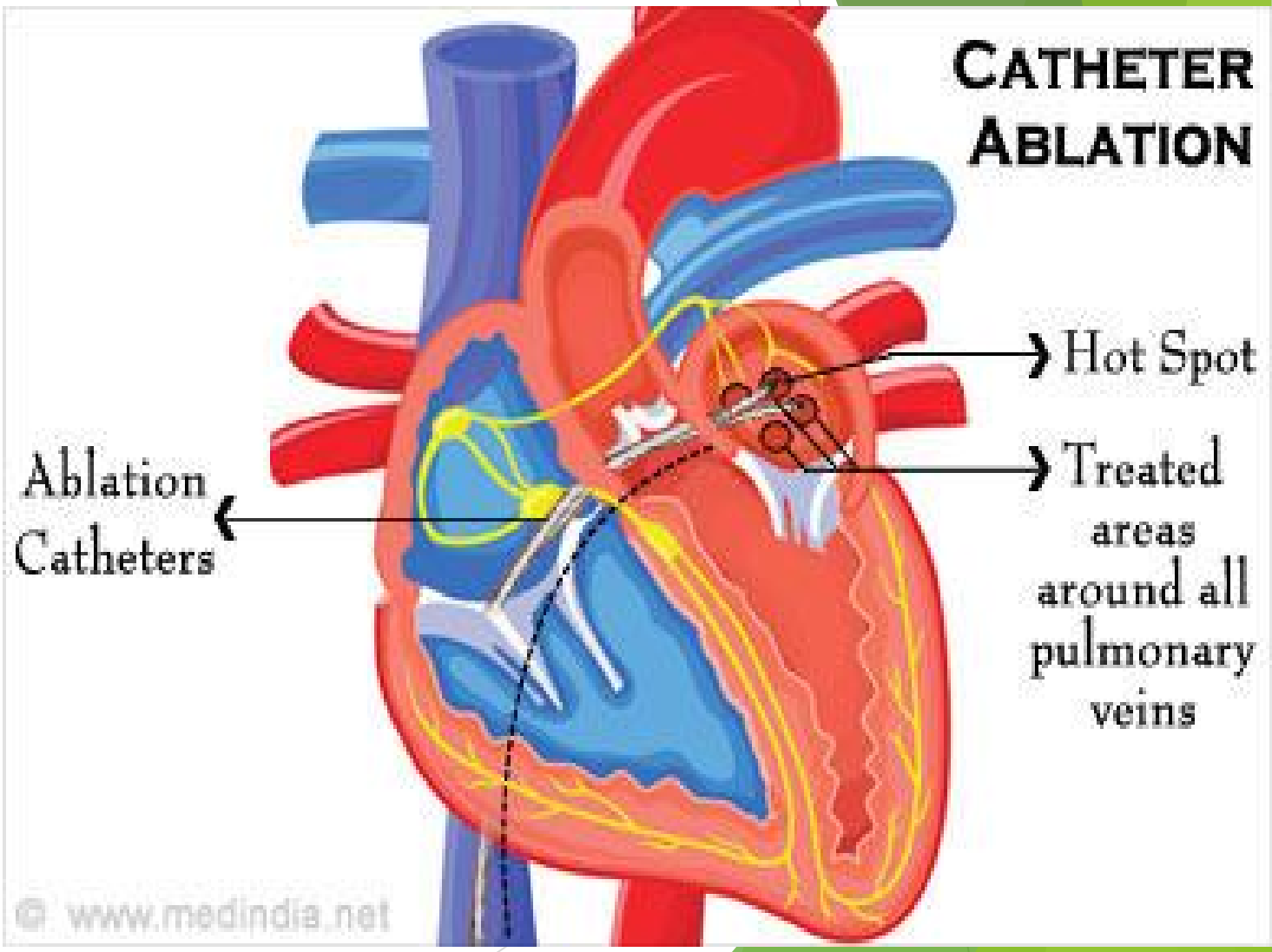
INTRODUCTION

- Despite good progress in the management of patients with atrial fibrillation (AF), this arrhythmia remains one of the major causes of stroke, heart failure, sudden death, and cardiovascular morbidity in the world
- Since the initial description of triggers in the pulmonary veins that initiate paroxysmal AF, **catheter ablation (CA)** of AF has developed from a specialized, experimental procedure into a common treatment to prevent recurrent AF
- As first-line treatment for paroxysmal AF, randomized trials showed only modestly improved rhythm outcome with CA compared to antiarrhythmic drug therapy

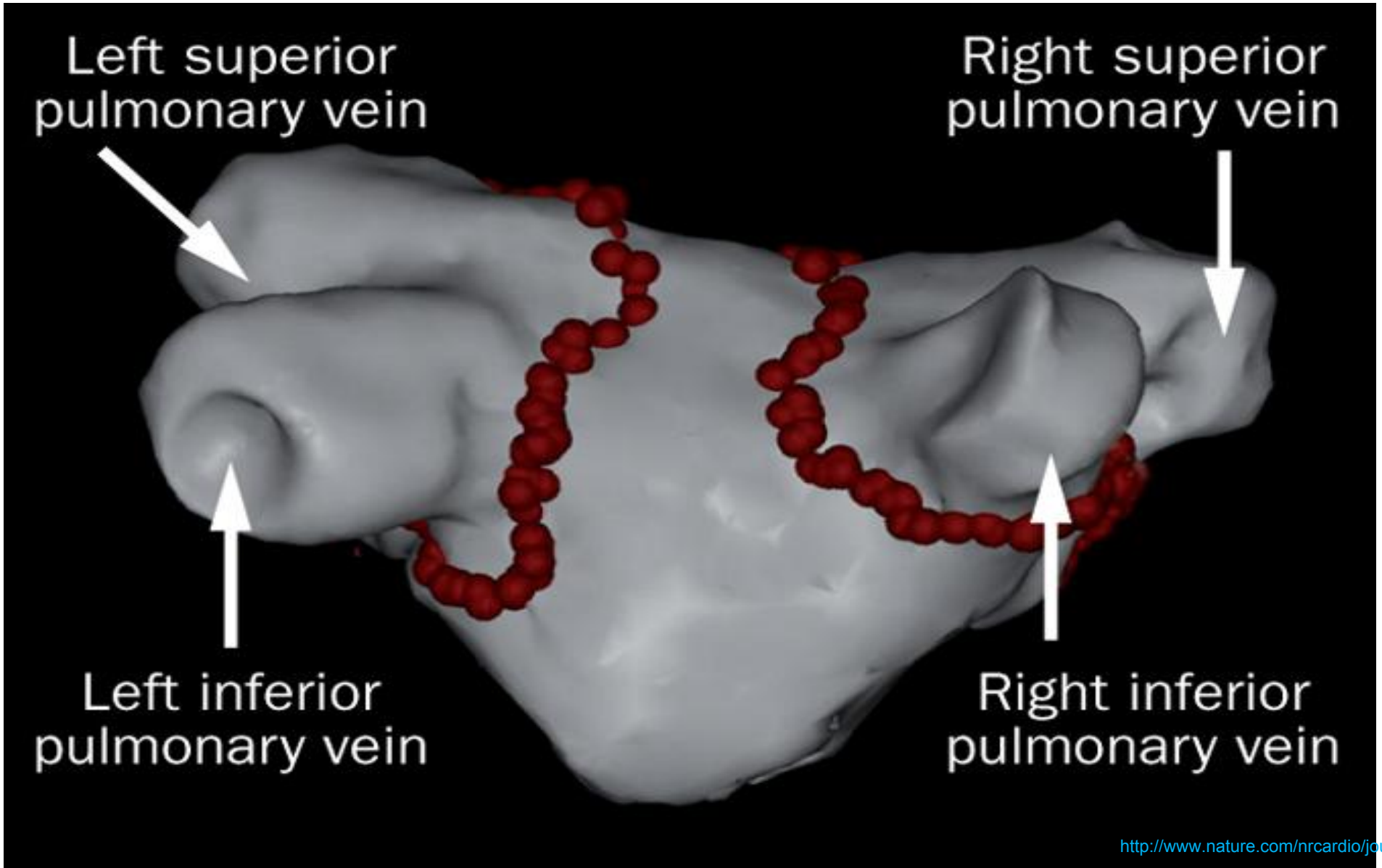
HARRISON INTERNAL MEDICINE BOOK (18th edition;
2016 ESC Guidelines for the management of atrial fibrillation developed in collaboration withEACTS

RADIOFREQUENCY CATHETER ABLATION (RFA) IN AF 1.2.

- Complete pulmonary vein isolation (PVI) on an atrial level is the best documented target for catheter ablation, achievable by point-by-point radiofrequency ablation, linear lesions encircling the pulmonary veins
- PVI was initially tested in patients with paroxysmal AF, but appears to be noninferior to more extensive ablation in persistent AF as well.



RADIOFREQUENCY CATHETER ABLATION (RFA) IN AF 2.2.



Electroanatomical image of the left atrium and pulmonary veins (posterior view) showing lesions (red circles) for antral pulmonary vein isolation during catheter ablation of atrial fibrillation

http://www.nature.com/nrcardio/journal/v11/n5/fig_tab/nrcardio.2014.29_F1.html

CATHETER ABLATION OF PULMONARY VEINS VIDEO

https://www.youtube.com/watch?v=M3BBzmhL4Fc

COMPLICATIONS RELATED TO CA OF AF

Complication severity	Complication type	Rate[727, 748, 750, 754-759]
Life-threatening complications	Periprocedural death	<0.2%
	Oesophageal injury (perforation/fistula)[a]	<0.5%
	Periprocedural stroke (including TIA/air embolism)	<1%
	Cardiac tamponade	1–2%
Severe complications	Pulmonary vein stenosis	<1%
	Persistent phrenic nerve palsy	1–2%
	Vascular complications	2–4%
	Other severe complications	≈1%
Other moderate or minor complications		1–2%
Unknown significance	Asymptomatic cerebral embolism (silent stroke)[b]	5–20%
	Radiation exposure	

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COMBINING ANTIARRHYTHMIC DRUGS AND CATHETER ABLATION

- **Antiarrhythmic drug therapy is commonly given for 8–12 weeks after ablation** to reduce early recurrences of AF after catheter ablation, supported by a recent controlled trial where amiodarone halved early AF recurrences compared with placebo
- Prospective studies have not been done, but a meta-analysis of the available (weak) evidence suggests slightly better prevention of recurrent AF in patients treated with antiarrhythmic drugs after catheter ablation
- Many patients are treated with antiarrhythmic drug therapy after catheter ablation (most often amiodarone or flecainide), and this seems a reasonable option in patients with recurrent AF after ablation
- **The clinical case described below shows the long-term outcomes of CA pulmonary veins of the patient with paroxysmal atrial fibrillation**

OUR PATIENT

- A 66 years old female (25.08.1950)
- Retired
- Lives in Kharkiv
- Admitted to our polyclinic 14/10/2016

COMPLAINTS

- Dyspnea during ordinary physical activity, absent at rest

MEDICAL HISTORY 1.2.

- 2000 - autoimmune thyroiditis III degree with nodular goiter, euthyroid state; right – sided thyroidectomy and isthmus resection; according patient's report - euthyroidism all the time
- Since 2001- hypertension (max 220/110 mmHg, usual BP 150/90 mmHg (with drugs))
- 2010- paroxysmal tachycardia and palpitations, AF was first diagnosed
- Since 2012 dignosis: PAROXYSMAL ATRIAL FIBRILLATION, EHRA III. CHA2DS2-VASc - 2. HAS-BLED score - 2. ESSENTIAL ARTERIAL HYPERTENSION STAGE II, 3 GRADE. HYPERTENSIVE HEART (LVH). HEART FAILURE WITH PRESERVED EJECTION FRACTION
- 2014- catheter ablation surgery of pulmonary veins
- After 3 days of ablation the patient had a paroxysm of AF- an electrical cardioversion was performed, continued to intake prescribed anthyarritmic treatment for 3 months (betaxolol 10 mg/day, propafenon 300 mg/day)

MEDICAL HISTORY 2.2.

- Despite of drug intaking, ones in 3 weeks she had episodes of AF which were being stopped by intaking additional 300 mg of propafenon
- After 3 months the paroxysms of AF became more infrequent (once in 3 months), shorter duration (1-2 hours), stopped after intaking propafenon 300 mg with mild/moderate symptoms of paroxysms of AF
- 2015 – gross hematuria on warfarin (the drug intaking was stopped); since 2015 - takes aspirin for prevention thromboembolic complications
- Following months (over 3) notes poor control of BP (increasing of it despite taking hypotension drugs)
- After 8 months to the present day of CA she started suffer from paroxysmal tachycardias and heart palpitations with HR 120-130 bpm with mild symptoms, which are not related to physical exercise (mostly at night) 1 time per month, sometimes related to increasement of blood pressure (BP) with duration from 1-2 min to 6 hours and converted to sinus rhythm by taking additional propafenon 300 mg and sometimes procainamide 500 mg

HISTORY OF DISEASES

- 1981- appendectomy
- 1993 - acute pyelonephritis
- 2004 – radical hysterectomy, iatrogenic menopause
- 2007 - cyst in the right breast was removed

OBJECTIVE SUBJECT 1.2.

- The general condition is satisfactory, consciousness is clear, emotionally stable, optimistic mood
- Hypersthenic, height 174 cm, weight 105kg, BMI = 34.68 kg / m 2, waist-to-hip ratio 1,07
- Skin, visible mucous membranes are pale pink and clean
- Peripheral lymph nodes are not palpable
- The thyroid is not palpable in the right side, slightly in the left
- Signs of eyelid retraction, periorbital edema, proptosis are absent

OBJECTIVE SUBJECT 2.2.

- Respiratory System:
  pulmonary percussion –normal

  auscultation - weakened vesicular breathing, no adventitious sounds
- Cardiovascular system:

  heart borders extended to the left on 1,5 cm of midclavicular line, HR =78 bpm, regular.

  no pulse deficiency; heart sounds are muted
- BP left hand = BPsin= 175/100 mmHg (on the background of antihypertensive therapy), right hand = BPdex= 150/90 mmHg
- Gastrointestinal system:

  abdomen is soft, painless, symmetrical, no discrepancies of the abdominal muscles, no visible peristalsis

  liver edge is smooth, painless , palpated 1.5 cm below the costal arch

  spleen and pancreas are not palpable
- Symmetrical mild shin pitting edema

Recommendations for diagnostic workup of atrial fibrillation patients

Recommendations	Class[a]	Level[b]	Ref[c]
ECG documentation is required to establish the diagnosis of AF.	I	B	349
A full cardiovascular evaluation, including an accurate history, careful clinical examination, and assessment of concomitant conditions, is recommended in all AF patients.	I	C	
Transthoracic echocardiography is recommended in all AF patients to guide management.	I	C	339
Long-term ECG monitoring should be considered in selected patients to assess the adequacy of rate control in symptomatic patients and to relate symptoms with AF episodes.	IIa	C	

AF = atrial fibrillation; ECG = electrocardiogram.
[a]Class of recommendation.
[b]Level of evidence.
[c]Reference(s) supporting recommendations.

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PRESCRIBED EXAMINATIONS

- Complete blood test
- General urine test
- Fasting glucose level
- ECG
- EchoCG
- 24-h ECG monitoring
- Biochemical blood test (liver (ALT, AST, AP)* and renal function tests (BUN*, creatinine), coagulogram*
- Blood lipid spectrum
- Blood electrolytes (K, Na)*
- TSH, T4, T3*
- Chest X-Ray*
- Ultrasound of thyroid gland*
- Ultrasound of abdomen*

***not peformed examinations due to socio-economic problems**

COMMON BLOOD TEST (16/10/2016)

Measure	Result	Rate
Hemoglobin	137	F 120-158 g / l
Erythrocytes	4.52	F 4.0 – 5.2 T/L
Color index	1.06	0.85-1.15
Leukocytes	8.3	4.0 – 9.0 g/L
ESR	10	F 2-20 mm/h
Platelets	285	160-320 g/L
Band Neutrophils	1	1-6%

Measure	Result	Rate
Segmented Neutrophils	59	47-72 %
Eosinophils	2	0.5-5.0%
Basophils	0	1-1.0 %
Monocytes	4	3-11%
Lymphocytes	33	19-37%
Hematocrit	39	F 35-44 %

Conclusion : normal

GENERAL URINE TEST (16/10/16)

MEASURE	RESULT	NORMAL RANGE
SPECIFIC GRAVITY	1.014	1.001-1.040
REACTION	6.4	5.0-7.0
PROTEIN	0.021	to 0.033 g / l
GLUCOSE	Absent	Absent
LEUCOCYTES	2-3	6-8
EPITHELIUM TRANSITION	Not detected	Not detected
BACTERIA	Not detected	Not detected

Conclusion: normal

BIOCHEMICAL BLOOD TEST (16/10/16)

MEASURE	RESULT	NORMAL RANGE
Creatinine	92	53-123 mcmol/L

Conclusion: normal

ESTIMATED GFR		NORMAL RANGE
The Modification of Diet in Renal Disease (MDRD) Study equation	**54 ml/min/1.73 m2**	Age (60–69) - 85 ml/min/1.73 m2
GFR (mL/min/1.73 m^2) = 175 × $(S_{cr})^{-1.154}$ × $(Age)^{-0.203}$ × (0.742 if female) × (1.212 if African American)		

Conclusion: decreased kidney function

https://www.niddk.nih.gov/health-information/health-communication-programs/nkdep/lab-evaluation/gfr/estimating/Pages/estimating.aspx

FASTING GLUCOSE TEST (16/10/16)

RESULT	NORMAL RANGE
5.4	4.2-6.1 mmol/l

Conclusion: normal

THYROID-STIMULATING HORMONE (TSH) (16/10/16)

RESULT	NORMAL RANGE
3.2	0.4-4.0 mIU/L

Conclusion: normal

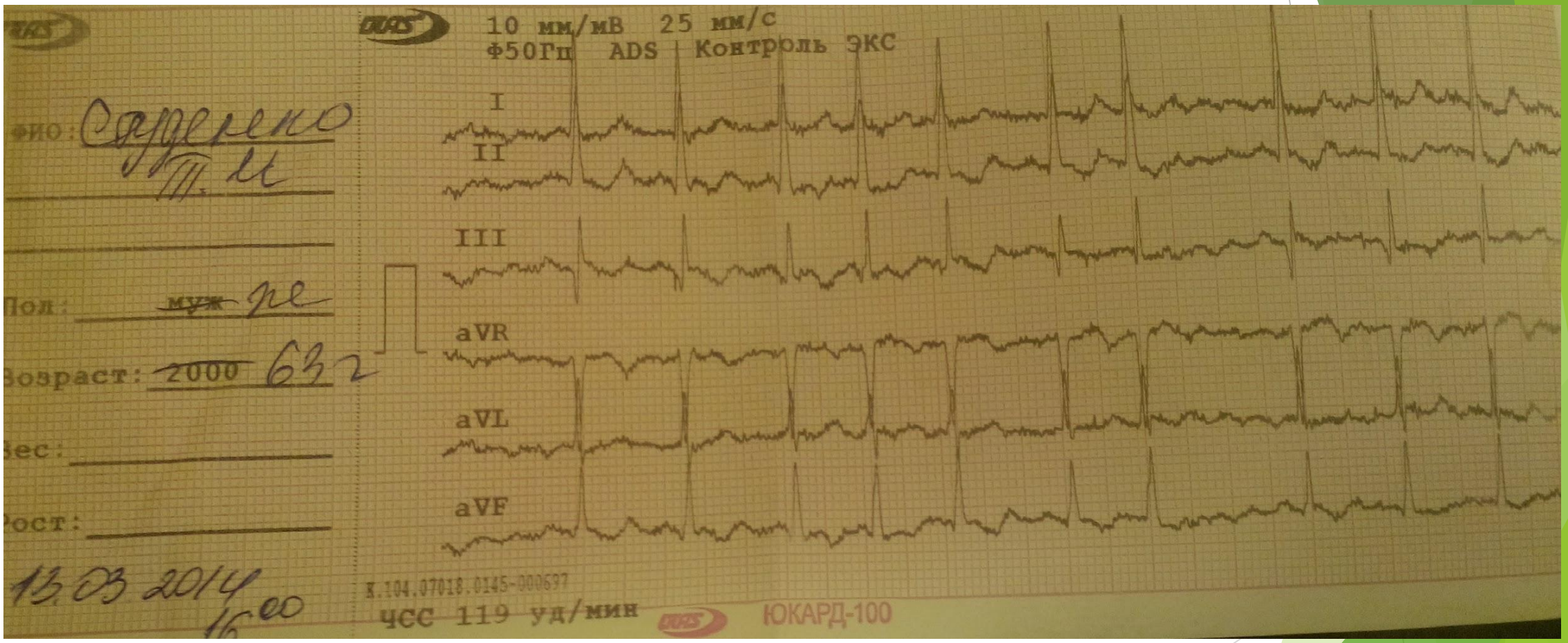
BLOOD LIPID SPECTRUM (16/10/16)

MEASURE	RESULT	RATE
TOTAL CHOLESTEROL	7.34	≤ 5.2 mmol / l
VLDL	0.97	<1.0 mmol / l
LDL	5.29	<3.5 mmol / l
HDL- cholesterol levels	1.08	>0.9 mmol / l
Triglycerides	2.12	≤2.3 mmol / l
COEFFICIENT of atherogenicity	5.8	To 3.0 mmol/l

Conclusion: dyslipidemia

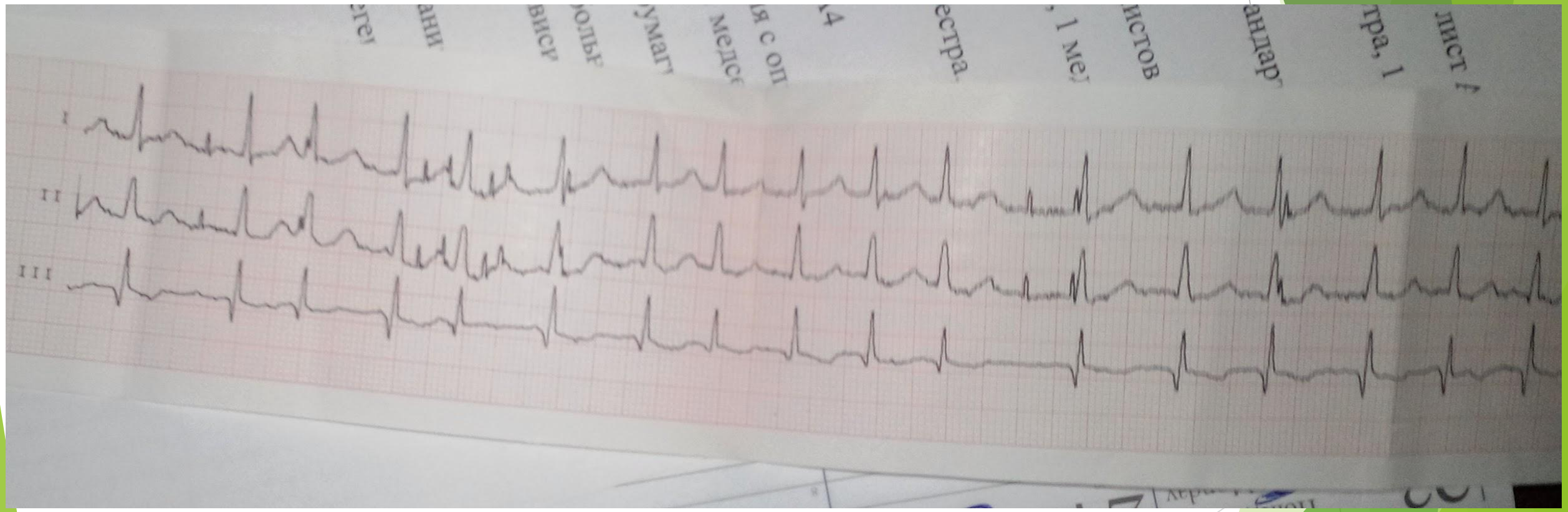
http://eurheartj.oxfordjournals.org/content/ehj/34/39/3035.full.pdf

ECG with paroxysm of AF before CA



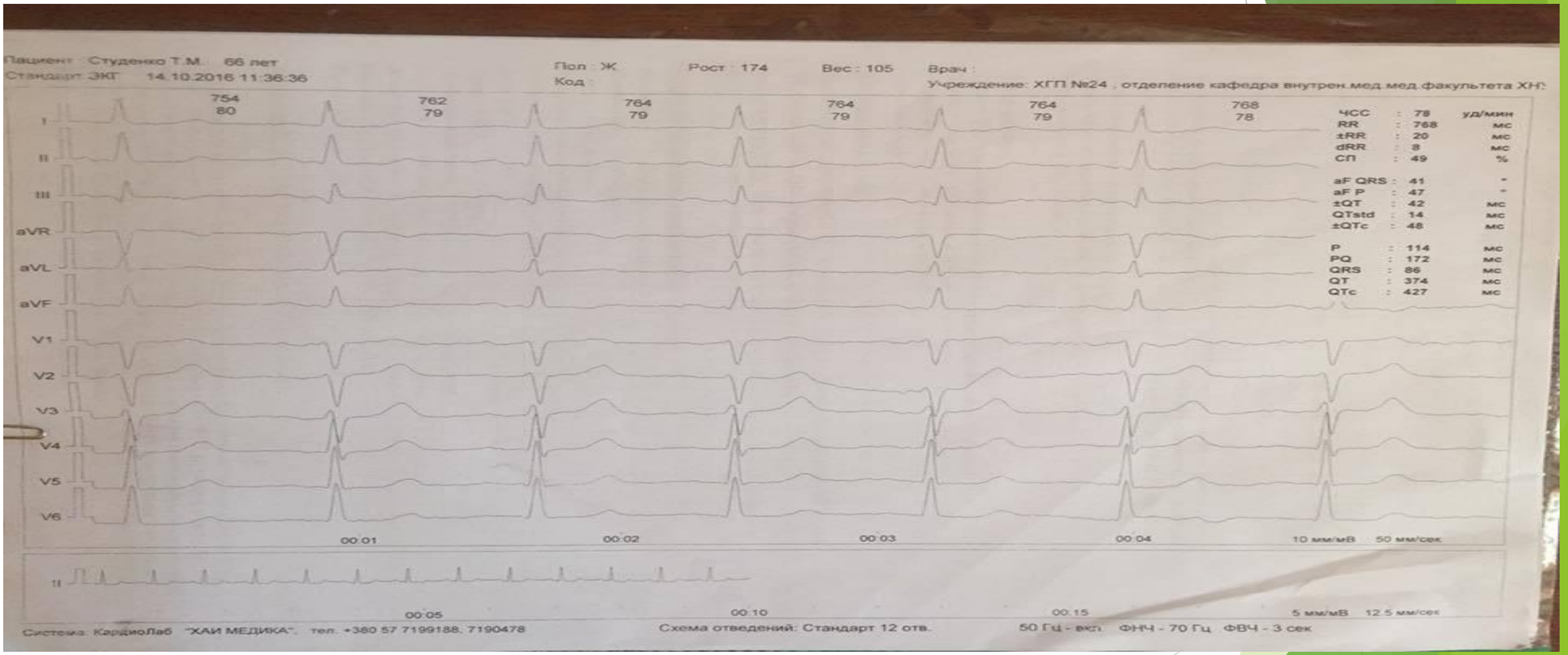
<u>Conclusion:</u> paroxysm of AF with HR 115-125 bpm

ECG with paroxysm of AF 2 years after CA



<u>Conclusion:</u> paroxysm of AF with HR 90-110 bpm. Violation of the repolarization processes on the left ventricular posterior wall (also artifacts on the ECG)

ECG 2 years after CA



<u>Conclusion:</u> sinus rhytm, regular, heart rate 78bpm , signs of left ventricular hypertrophy

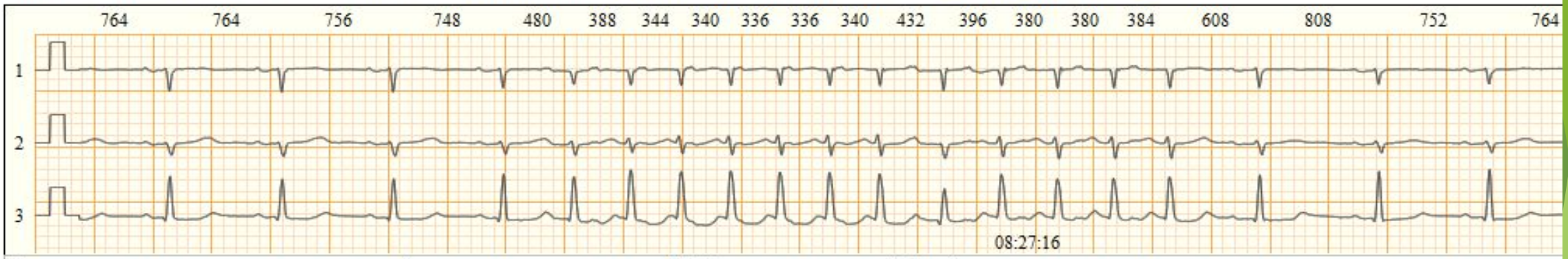
24-h AMBULATORY ECG MONITORING 2 YEARS AFTER CA 1.2.

Conclusion :

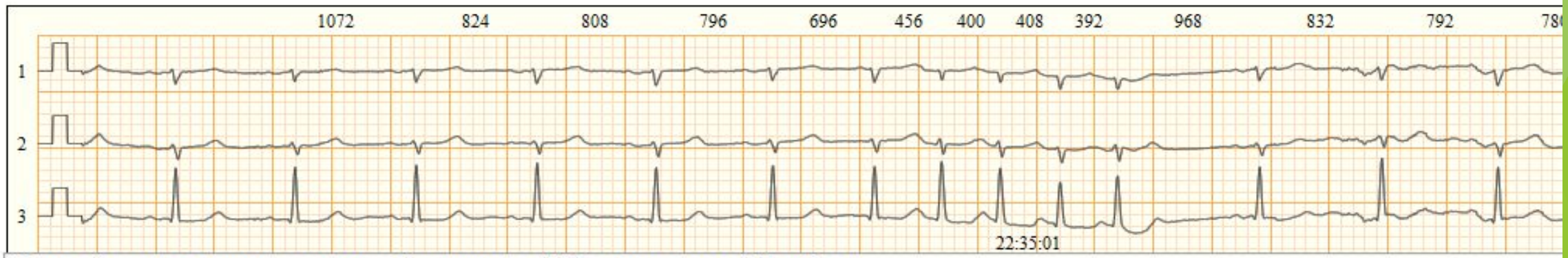
- During the monitoring 22 h 38 min was registered sinus rhythm with a mean heart rate 74 bpm (maximum HR 120 pm, at 20:05:15, minimum HR 66 bpm - 16:50:55)
- Was recorded: single supraventricular premature contractions (total 266); single monomorphic ventricular premature contractions (total 49); short episodes of supraventricular tachyarrhythmias (total 4) with an average heart rate of 160 bpm with max duration for up to 5 seconds
- Ischemic changes have not been identified
- Circadian index 1.07 (N 1.24-1.44)

24-h AMBULATORY ECG MONITORING 2 YEARS AFTER CA 2.2. : Episodes of short supraventricular tachyarrhythmia

Парные и групповые НЖЭ. Всего парных и групповых наджелудочковых экстрасистол 3 (днем: 2, ночью: 1).

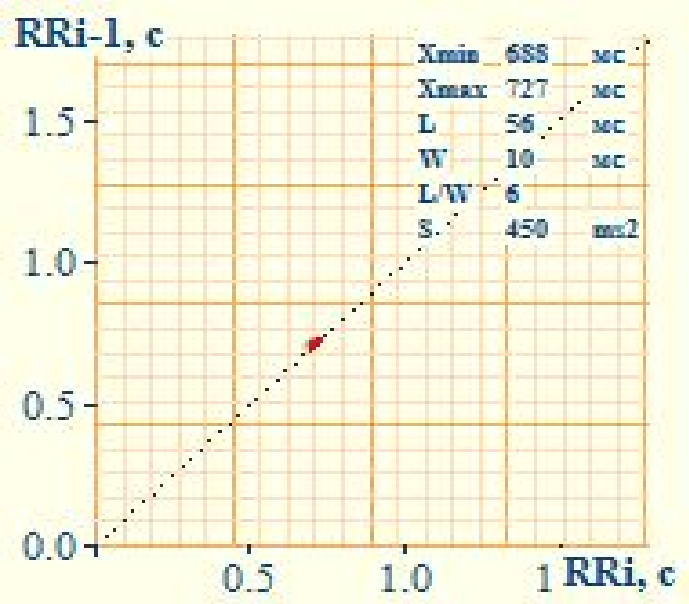


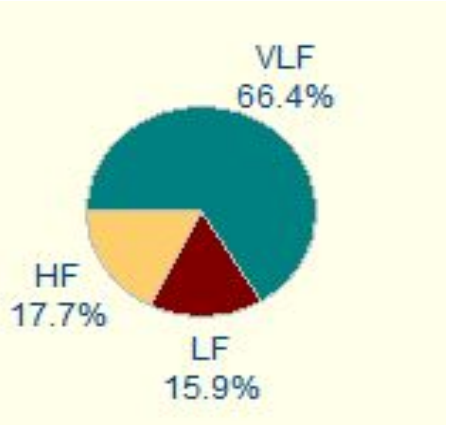
Короткие пароксизмы суправентрикулярной тахикардии с максимальной ЧСС внутри эпизода: 156 уд/мин



Короткий пароксизм суправентрикулярной тахикардии с ЧСС внутри эпизода: 150 уд/мин

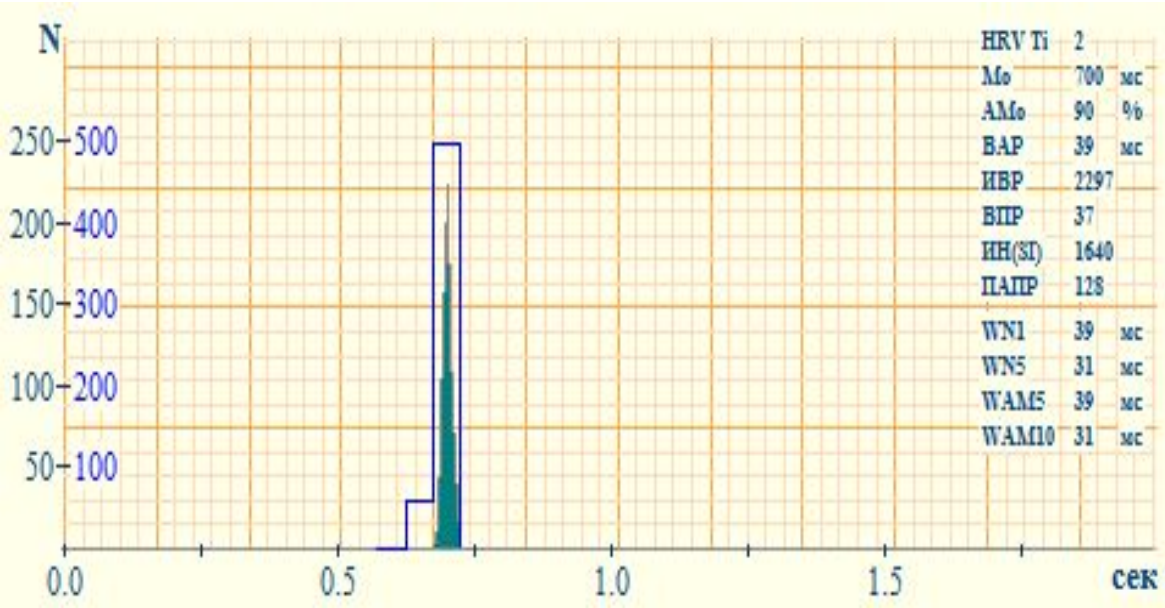
HEART RATE VARIABILITY 2 YEARS AFTER CA

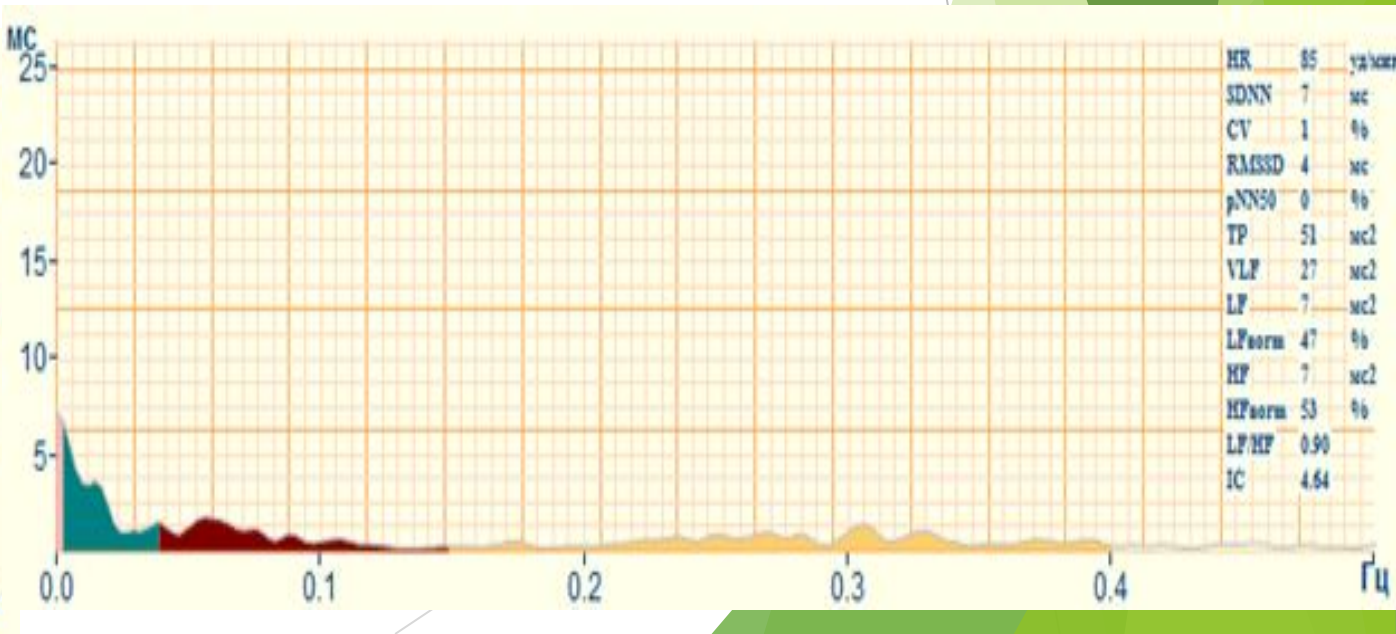




Conclusion:

- This character of the rhythmogram and HRV indicates the structure to stabilize the heart rhythm with the transition of its regulation from the reflex autonomic level to a lower humoral-metabolic, are not able to quickly provide homeostasis
- Functional heart capabilities are reduced
- Condition of a poor adaptation with a sharp decline in the functional capacity of the body





ECHOCARDIOGRAPHY 1.2.

Name	Result before ablation	Result 2 years after ablation	Normal
1) Acoustic window	normal	normal	normal
2) Aorta	34	34	20-37 mm
3) Aortic Valve	17.5	16	17-26 mm
4) Left Atrium	44	42	To 38 mm
5) Mitral Valve	Regurgitation I degree	Regurgitation I degree	
6)Posterior wall of the LV	13	12	6-11 mm
7) Interventricular septum	13	12	6-11 mm
8) Right Ventricle	26	26	D.: (9-26 mm)

ECHOCARDIOGRAPHY 2.2.

Name	Result before ablation	Result 2 years after ablation	Normal
9) Right Atrium	35	35	<38 mm
10) Tricuspid Valve			
11) Ejection Fraction	52	57	55-78%

Conclusion 2 years after ablation: Atherosclerosis of aorta and aortic valves mild degree. Moderate dilatation of left atrium. Concentric left ventricle hypertrophy (LV Mass Index 100 g/m^2. RWT 0.49). Dyssynergic areas were not identified. Diastolic function - relaxation violation (E/A-0.8)

BASIC CLINICAL SYNDROMES

- Atherosclerosis (sclerotic changes of aorta and aortic valve)
- Arterial hypertension
- Arrhythmias (paroxysmal AF)
- Reduction of circadian index and heart spectrum, as a manifestation of reducing humoral and autonomic regulation with non-dipper HR
- Heart failure
- Dyslipidemia
- Hypertensive heart (LVH, atrial enlargement, diastolic dysfunction)
- Obesity

The clinical diagnosis according to current classifications

TYPES OF AF ACCORDING GUIDELINES

AF pattern	Definition
First diagnosed AF	AF that has not been diagnosed before, irrespective of the duration of the arrhythmia or the presence and severity of AF-related symptoms.
Paroxysmal AF	Self-terminating, in most cases within 48 hours. Some AF paroxysms may continue for up to 7 days. AF episodes that are cardioverted within 7 days should be considered paroxysmal.
Persistent AF	AF that lasts longer than 7 days, including episodes that are terminated by cardioversion, either with drugs or by direct current cardioversion, after 7 days or more.
Long-standing persistent AF	Continuous AF lasting for ≥1 year when it is decided to adopt a rhythm control strategy.
Permanent AF	AF that is accepted by the patient (and physician). Hence, rhythm control interventions are, by AF. Should a rhythm control strategy be adopted, the arrhythmia would be re-classified as 'long-standing definition, not pursued in patients with permanent persistent AF'.

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MODIFIED EUROPEAN HEART RHYTHM ASSOCIATION SYMPTOM SCALE (MODIFIED FROM WYNN ET AL)

Modified EHRA score	Symptoms	Description
I	None	AF does not cause any symptoms
2a	Mild	Normal daily activity not affected by symptoms related to AF[a]
2b	Moderate	Normal daily activity not affected by symptoms related to AF, but patient troubled by symptoms[a]
3	Severe	Normal daily activity affected by symptoms related to AF
4	Disabling	Normal daily activity discontinued

AF = atrial fibrillation; EHRA = European Heart Rhythm Association.
[a]EHRA class 2a and 2b can be differentiated by evaluating whether patients are functionally affected by their AF symptoms. AF-related symptoms are most commonly fatigue/tiredness and exertional shortness of breath, or less frequently palpitations and chest pain.[42,194,200–202]

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CHA2-DS2-VASC RATING SCALE RISK OF THROMBOEMBOLIC COMPLICATIONS IN PATIENTS WITH ATRIALFIBRILLATION / FLUTTER

	RISK FACTOR	POINTS
C	Congestive heart failure/left ventricular dysfunction	**1**
H	Hypertension	**1**
A2	Age ≥75 years	**2**
D	Diabetes mellitus	**1**
S2	Stroke/transient ischaemic attack/thromboembolism	**2**
V	Vascular disease (prior myocardial infarction, peripheral artery disease, aortic plaque)	**1**
A	Age 65–74 years	**1**
SC	Sex category (i.e. female gender)	**1**
Conclusion: total points 5. The expected frequency of strokes per year		**6.7%**

www.thrombosisadviser.com/en/atrial-fibrillation/af-is-a-major-stroke-risk-factor

SCALE HAS-BLED: RISK FACTORS FOR BLEEDING (ESC GUIDELINES FOR THE MANAGEMENT OF ATRIAL FIBRILLATION, 2011)

	Condition	Points
H	**Hypertension**: (uncontrolled, >160 mmHg systolic)	1
A	**Abnormal renal function:** dialysis, transplant, Cr >2.6 mg/dL or >200 µmol/L Abnormal liver function: Cirrhosis or Bilirubin >2x Normal or AST/ALT/AP >3x Normal	1
S	**Stroke:** Prior history of stroke	1
B	**Bleeding:** Prior Major Bleeding or Predisposition to Bleeding	1
L	**Labile INR:** (Unstable/high INRs), Time in Therapeutic Range < 60%	1
E	**Elderly:** Age > 65 years Medication	1
D	**Prior Alcohol or Drug Usage History** (Antiplatelet agents, NSAIDs)	1

Conclusion: HAS-BLED score- 4. The patient has a HIGH risk of bleeding. The risk of major bleeding within 1 year in patients with atrial expressed as bleeds per 100 patient years: 3.76 – 6.4%

http://www.globalrph.com/has-bled-score.cgi

CLASSIFICATION OF OFFICE BLOOD PRESSURE LEVELS (MMHG)

Category	Systolic		Diastolic
Optimal	<120	and	<80
Normal	120–129	and/or	80–84
High normal	130–139	and/or	85–89
Grade 1 hypertension	140–159	and/or	90–99
Grade 2 hypertension	160–179	and/or	100–109
Grade 3 hypertension	>/=180	and/or	>/=110
Isolated systolic hypertension	>/=140	and	<90

http://emedicine.medscape.com/article/241381-overview

CLASSIFICATION OF HYPERTENSION STAGES (RECOMMENDATIONS OF THE ASSOCIATION OF CARDIOLOGISTS OF UKRAINE 2008)

Stage	The degree of target organ damage
I	Objective changes in the target organs are absent
II	There is objective evidence of target organ damage without symptoms with their hand or dysfunction:Left ventricular hypertrophy (on ECG, ultrasound, Ro) Generalized narrowing of retinal arteries Microalbuminuria and / or a small increase in serum creatinine (y m. - 115 - 133 mmol / L at x. -107 - 124 mmol / l) Carotid artery disease - a thickening of the intima-media> 0.9 mm or the presence of atherosclerotic plaques.
III	There is objective evidence of target organ damage with symptoms from their side and impaired heart - myocardial infarction, heart failure II A - III stage; brain - stroke, transient ischemic attack, acute hypertensive encephalopathy, vascular dementia; fundus - hemorrhage and retinal exudates with papilledema the optic nerve or without; kidney - concentration of plasma creatinine in males> 133 umol / L, y Women> 124; vessels - dissecting aortic aneurysm; peripheral arterial occlusion

http://www.mif-ua.com/education/symposium/arterialnaya-gipertenziya-v-2014-g-klassifikacii-diagnostika-lechenie#test_end

THE NEW YORK HEART ASSOCIATION (NYHA) FUNCTIONAL CLASSIFICATION (FUNCTIONAL CAPACITY) OF CHRONIC HEART FAILURE

NYHA Class	Level of Clinical Impairment
I 	No limitation of physical activity. Ordinary physical activity does not cause undue breathlessness, fatigue, or palpitations.
II 	Slight limitation of physical activity. Comfortable at rest, but ordinary physical activity results in undue breathlessness, fatigue, or palpitations.
III 	Marked limitation of physical activity. Comfortable at rest, but less than ordinary physical activity results in undue breathlessness, fatigue, or palpitations.
IV 	Unable to carry on any physical activity without discomfort. Symptoms at rest can be present. If any physical activity is undertaken, discomfort is increased.

http://www.intechopen.com/books/primary-care-in-practice-integration-is-needed/integrated-care-for-heart-failure-in-primary-care

AMERICAN HEART ASSOCIATION HEART FAILURE STAGES

Class	Objective Assessment
A	No objective evidence of cardiovascular disease. No symptoms and no limitation in ordinary physical activity.
B	Slight limitation of physical activity. Comfortable at rest. Ordinary physical activity results in fatigue, palpitation, dyspnea (shortness of breath).
C	Objective evidence of moderately severe cardiovascular disease. Marked limitation in activity due to symptoms, even during less-than-ordinary activity. Comfortable only at rest.
D	Objective evidence of severe cardiovascular disease. Severe limitations. Experiences symptoms even while at rest.

http://www.sunshineheart.com/patients/classification-of-heart-failure

DEFINITION OF HEART FAILURE WITH PRESERVED (HFpEF), MID-RANGE (HFmrEF) AND REDUCED EJECTION FRACTION (HFrEF)

Type of HF		HFrEF	HFmrEF	HFpEF
CRITERIA	1	Symptoms ± Signs[a]	Symptoms ± Signs[a]	Symptoms ± Signs[a]
	2	LVEF <40%	LVEF 40–49%	LVEF ≥50%
	3	–	1. Elevated levels of natriuretic peptides[b]; 2. At least one additional criterion: a. relevant structural heart disease (LVH and/or LAE), b. diastolic dysfunction (for details see Section 4.3.2).	1. Elevated levels of natriuretic peptides[b]; 2. At least one additional criterion: a. relevant structural heart disease (LVH and/or LAE), b. diastolic dysfunction (for details see Section 4.3.2).

BNP = B-type natriuretic peptide; HF = heart failure; HFmrEF = heart failure with mid-range ejection fraction; HFpEF = heart failure with preserved ejection fraction; HFrE heart failure with reduced ejection fraction; LAE = left atrial enlargement; LVEF = left ventricular ejection fraction; LVH = left ventricular hypertrophy; NT-proBNP = N-term pro-B type natriuretic peptide.

[a]Signs may not be present in the early stages of HF (especially in HFpEF) and in patients treated with diuretics.

[b]BNP>35 pg/ml and/or NT-proBNP>125 pg/mL.

2016 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure

CARDIOVASCULAR RISK STRATIFICATION CHART WITH RECOMMENDED FOLLOW-UP FREQUENCY FOR EACH CATEGORY

		Blood pressure (mmHg)				
Other risk factors, OD or disease		Normal SBP 120-129 or DBP 80-84	High normal SBP 130-139 or DBP 85-89	Grade 1 HT SBP 140-159 or DBP 90-99	Grade 2 HT SBP 160-179 or DBP 100-109	Grade 3 HT SBP ≥180 or DBP ≥110
No other risk factor	Risk level	Average risk	Average risk	Low added risk	Moderate added risk	High added risk
	Follow up visits /year	0	0	2	2	3.5
1-2 risk factors	Risk level	Low added risk	Low added risk	Moderate added risk	Moderate added risk	Very high added risk
	Follow up visits /year	3.5	3.5	2	2	3
3 or more risk factors, MS, OD or Diabetes	Risk level	Moderate added risk	High added risk	High added risk	High added risk	Very high added risk
	Follow up visits /year	3.5	3.5	3.5	3.5	3.5
Established CV or renal disease	Risk level	Very high added risk	Very high added risk	Very high added risk	Very high added risk	Very high added risk
	Follow up visits /year	3.5	3.5	3.5	3.5	3.5

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LIPOPROTEIN PATTERNS (FREDRICKSON PHENOTYPES)

Phenotype	Elevated Lipoprotein(s)	Elevated Lipids
I	Chylomicrons	TGs
IIa	LDL	Cholesterol
IIb	LDL and VLDL	TGs and cholesterol
III	VLDL and chylomicron remnants	TGs and cholesterol
IV	VLDL	TGs
V	Chylomicrons and VLDL	TGs and cholesterol

LDL = low-density lipoprotein; TGs = triglycerides; VLDL = very-low-density lipoprotein

http://www.merckmanuals.com/professional/endocrine-and-metabolic-disorders/lipid-disorders/dyslipidemia

CLASSIFICATION OF CHRONIC KIDNEY DISEASE (CKD STAGES)

NKF CKD Stage (USA)	KDIGO GFR Category (International)	Glomerular Filtration Rate (mL/min/1.73 m²)	Terms
Stage 1	G1	≥90	Normal or high In the absence of evidence of kidney damage and abnormal urinalysis, neither GFR category G1 nor G2 fulfill the criteria for CKD
Stage 2	G2	60–89	Mildly decreased relative to a young adult level In the absence of kidney damage and abnormal urinalysis, neither GFR category G1 nor G2 fulfill the criteria for CKD
Stage 3A	G3a	45–59	Mildly to moderately decreased
Stage 3B	G3b	30–44	Moderately to severely decreased
Stage 4	G4	15–29	Severely decreased
Stage 5	G5	<15	Kidney failure
Stage 5D	G5	<15	Dialysis
Stage 5T	G5	<15	Kidney transplant

https://www.google.com.ua/url?sa=t&rct=j&q=&esrc=s&source=web&cd=3&ved=0ahUKEwjF56uN4r_QAhXGVSwKHTfmDl4QFggrMAI&url=http%3A%2F%2Fghsrenal.com%2Fckd%2FHFHS_CKD_GUIDELINES_V7.0.pdf&usg=AFQjCNE5Ww6O5G9DQnR28wwTya1LSQT0GQ&sig2=CXDpmnnTBG51p4Wq6cqK4w&cad=rja

WAIST TO HIP RATIO

Waist to Hip Circumference Ratio Standards for Men and Women

		Disease Risk Related to Obesity			
	Age (years)	Low	Moderate	High	Very High
MEN	20-29	<0.83	0.83-0.88	0.89-0.94	>0.94
	30-39	<0.84	0.84-0.91	0.92-0.96	>0.96
	40-49	<0.88	0.88-0.95	0.96-1.00	>1.00
	50-59	<0.90	0.90-0.96	0.97-1.02	>1.02
	60-69	<0.91	0.91-0.98	0.99-1.03	>1.03
WOMEN	20-29	<0.71	0.71-0.77	0.78-0.82	>0.82
	30-39	<0.72	0.72-0.78	0.79-0.84	>0.84
	40-49	<0.73	0.73-0.79	0.80-0.87	>0.87
	50-59	<0.74	0.74-0.81	0.82-0.88	>0.88
	60-69	<0.76	0.76-0.83	0.84-0.90	>0.90

(Adapted from Heyward VH, Stolarcyzk LM: Applied Body Composition Assessment. Champaign IL, Human Kinetics, 1996, p82.)

http://nutritionfirstfitness.com/tools.php?tool=waisttohip

CLASSIFICATION OF OVERWEIGHT AND OBESITY BMI CLASSIFICATION

Classification	BMI Category (kg/m^2)	Risk of developing health problems
Underweight	< 18.5	Increased
Normal Weight	18.5 - 24.9	Least
Overweight	25.0 - 29.9	Increased
Obese class I	30.0 - 34.9	High
Obese class II	35.0 - 39.9	Very high
Obese class III	>= 40.0	Extremely high

http://www.hc-sc.gc.ca/fn-an/nutrition/weights-poids/guide-ld-adult/bmi_chart_java-graph_imc_java-eng.php

COMPLETE MAIN DIAGNOSIS OF OUR PATIENT

Diagnosis before ablation

- PAROXISMAL ATRIAL FIBRILLATION, EHRA III
- CHA2DS2-VAS score - 2
- HAS-BLED score - 2
- ESSENTIAL ARTERIAL HYPERTENSION STAGE II,3 GRADE
- HYPERTENSIVE HEART (LVH)
- HEART FAILURE WITH PRESERVED EJECTION FRACTION

Diagnosis 2 years after ablation

- CONDITION AFTER CA OF PULMONARY VEINS DUE TO PAROXYSMAL AF (25/04/14), WITH DECREASEMENT IN FREQUENCY OF PAROXYSMS FROM ONES IN 3 WEEKS TO ONES PER 2 MONTHS.
- CHA2DS2-VAS score - 5
- HAS-BLED score - 4
- ESSENTIAL ARTERIAL HYPERTENSION STAGE II,3 GRADE
- HYPERTENSIVE HEART (LVH)
- HEART FAILURE WITH PRESERVED EJECTION FRACTION II FC, STAGE B
- SYSTEMIC ATHEROSCLEROSIS (ATHEROSCLEROSIS OF THE AORTA AND AORTIC VALVES, DYSLIPIDEMIA II A TYPE AFTER FREDRICKSON)
- VERY HIGH ADDED TOTAL CV RISK
- AUTOIMMUNE THYROIDITIS (FOCAL? Riedel's? Hashimoto's?)
- CONDITION AFTER RIGHT – SIDED THYROIDECTOMY AND ISTHMUS RESECTION (2000), EUTHYROID
- DEEP DECLINE THE POWER OF ALL BRANCHES AUTONOMIC REGULATION: NON-DIPPER HR WITH LOW DEGREE OF TP

CO-MORBIDITY OF OUR PATIENT

2 years after ablation

- **CKD 3A: HYPERTENSIVE NEPHROPATHY (eGFR 54 ML/MIN/1.73 m2)**
- **OBESITY I CLASS**
- **NON-ALCOHOLIC FATTY LIVER DISEASE?**

TREATMENT

GOAL-BASED FOLLOW-UP

Category	Intervention	Follow-up aspects	Performance indicator (examples)
Prognostic	Comorbidity control (relevant examples given)	Obesity Arterial hypertension Heart failure Coronary artery disease Diabetes Valvular heart disease	Weight loss Blood pressure control Heart failure therapy and hospitalizations Statin and antiplatelet therapy; revascularization Glycaemic control Valve repair or replacement
Prognostic	Anticoagulation	Indication (risk profile; timing, e.g. post-cardioversion). Adherence (NOAC or VKA) and INR (if VKA). NOAC dosing (co-medications; age; weight; renal function).	Stroke Bleeding Mortality
Mainly symptomatic Partly prognostic	Rate control	Symptoms Average resting heart rate <110 bpm	Modified EHRA score Heart failure status LV function Exercise capacity Hospitalization Therapy complications
Symptomatic at present	Rhythm control	Symptoms vs. side effects Exclusion of pro-arrhythmia (PR; QRS; QTc interval)	
Relevant for implementation of therapy and adherence	Patient education and self-care capabilities	Knowledge (about disease; about treatment; about management goals) Capabilities (what to do if…)	Adherence to therapy Directed evaluation, preferably based on systematic checklists
Relevant for chronic care management	Caregiver involvement	Who? (spouse; GP; home nurse; pharmacist) Clearly spelling out participation roles Knowledge and capabilities	Directed evaluation of task performance (e.g. via patient card) Dispensed medication Log of follow-up visits

p.m. = beats per minute; mEHRA symptoms scale = modified European Heart Rhythm Association symptoms scale; GP = general practitioner; INR = international normalized tio; LV = left ventricular; NOAC = non-vitamin K antagonist oral anticoagulant; VKA = vitamin K antagonist.

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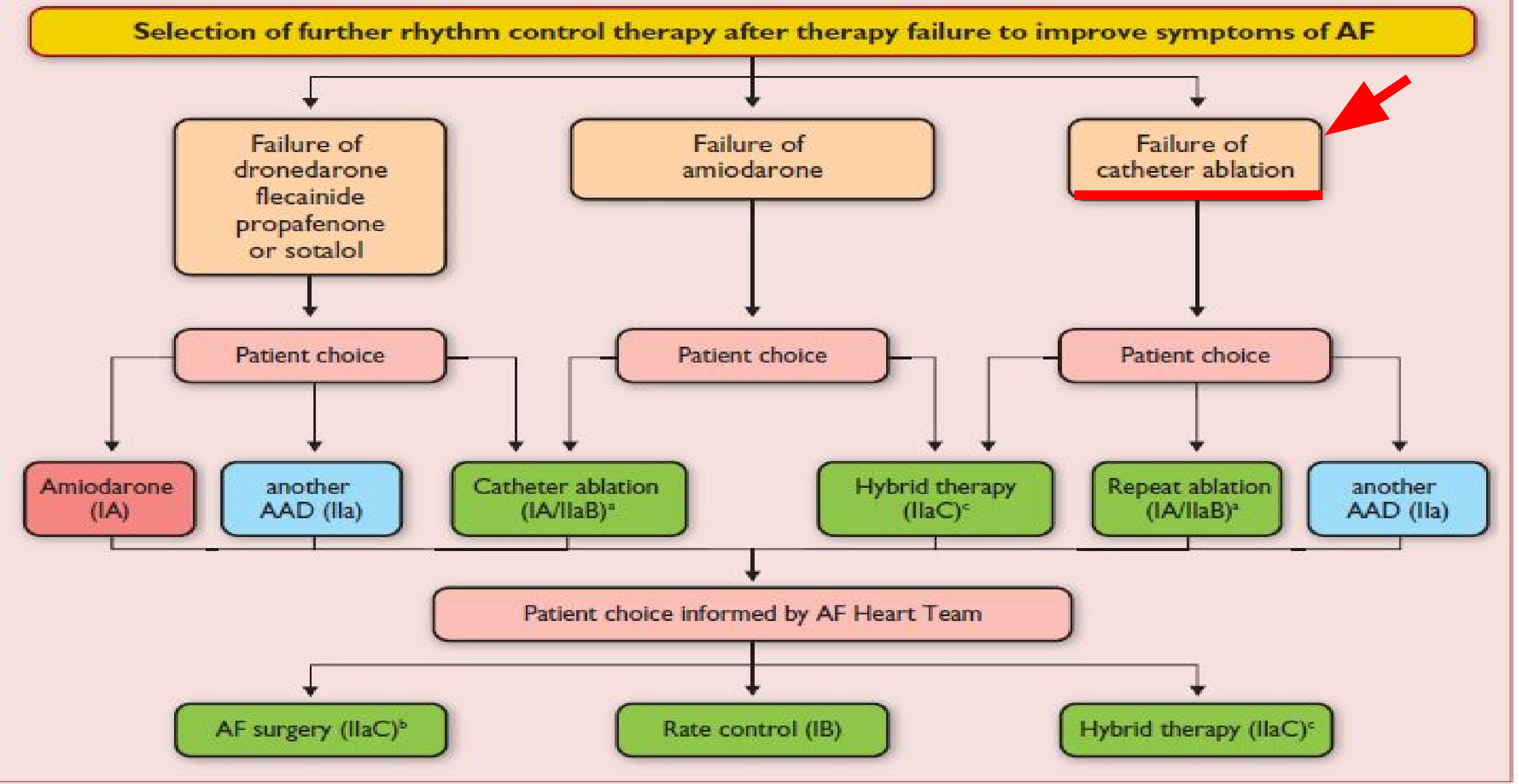
LIFESTYLE MODIFICATION

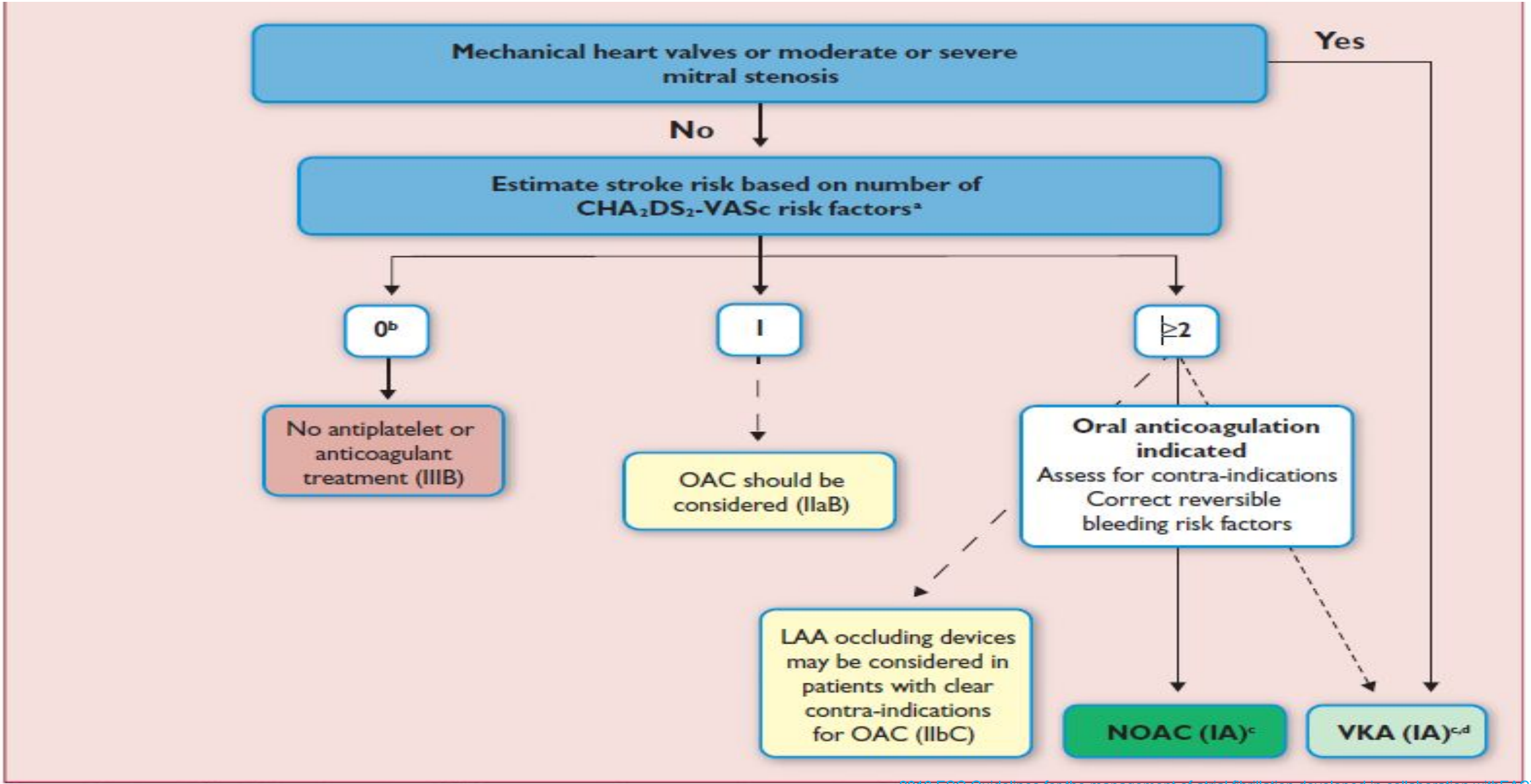
- Intensive weight reduction in addition to the management of other cardiovascular risk factors (in the range of 10–15 kg weight loss achieved), led to fewer AF recurrences and symptoms compared with an approach based on general advice in obese patients with AF
- DASH diet
- Control of compliance to medical recommendations

http://www.mayoclinic.org/healthy-lifestyle/nutrition-and-healthy-eating/in-depth/dash-diet/art-20048456



AAD = antiarrhythmic drug; AF = atrial fibrillation; PVI = pulmonary vein isolation.
[a]catheter ablation should target PVI. IA for paroxysmal AF, IIaB for persistent and long-standing persistent AF.
[b]AF surgery may be PVI (e.g. in paroxysmal AF) or maze surgery (e.g. in therapy-refractory or persistent and long-standing persistent AF).
[c]Hybrid therapy involves combination of antiarrhythmic drugs, catheter ablation, and/or AF surgery.

STROKE PREVENTION IN AF



AF = atrial fibrillation; LAA = left atrial appendage; NOAC = non-vitamin K antagonist oral anticoagulant; OAC = oral anticoagulation; VKA = vitamin K antagonist.

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ANTICOAGULATION AFTER SUCCESSFUL' CATHETER ABLATION

- In view of the long-term recurrence rates of AFaccording 2016 guidlines OAC is recommended to continue in AF patients after 'successful' catheter ablation
- Nonetheless, observational data suggest that the stroke risk may be lower after catheter ablation of AF compared with other AF patients
- The ongoing EAST – AFNET 4 trial will inform, in a more general way, whether rhythm control therapy can reduce stroke rates in anticoagulated AF patients
- In addition, there seems to be a place for a controlled trial evaluating the termination of OAC therapy at an interval after 'successful' catheter ablation

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AF AND HYPERTENSION

- Secondary analyses of trials in patients with LVH and hypertension have found that angiotensin receptor blockers (ARBs) (losartan, valsartan) are better in preventing first occurrence of atrial fibrillation than beta-blocker (atenolol) or calcium antagonist (amlodipine) therapy, consistent with similar analyses in patients with heart failure

SUMMARY OF RECOMMENDATIONS ON THERAPEUTIC STRATEGIES IN HYPERTENSIVE PATIENTS WITH HEART DISEASE 1.2.

Recommendations	Class [a]	Level [b]	Ref. [c]
In hypertensive patients with CHD, a SBP goal <140 mmHg should be considered.	IIa	B	141, 265
In hypertensive patients with a recent myocardial infarction beta-blockers are recommended. In case of other CHD all antihypertensive agents can be used, but beta-blockers and calcium antagonists are to be preferred, for symptomatic reasons (angina).	I	A	284
Diuretics, beta-blockers, ACE inhibitors, angiotensin receptor blockers, and/or mineralocorticoid receptor antagonists are recommended in patients with heart failure or severe LV dysfunction to reduce mortality and hospitalization.	I	A	411
In patients with heart failure and preserved EF, there is no evidence that antihypertensive therapy per se or any particular drug, is beneficial. However, in these patients, as well as in patients with hypertension and systolic dysfunction, lowering SBP to around 140 mmHg should be considered. Treatment guided by relief of symptoms (congestion with diuretics, high heart rate with beta-blockers, etc.) should also be considered.	IIa	C	-

2013 ESH/ESC Guidelines for themanagement of arterial hypertension

SUMMARY OF RECOMMENDATIONS ON THERAPEUTIC STRATEGIES IN HYPERTENSIVE PATIENTS WITH HEART DISEASE 2.2.

ACE inhibitors and angiotensin receptor blockers (and beta-blockers and mineralocorticoid receptor antagonists if heart failure coexists) should be considered as antihypertensive agents in patients at risk of new or recurrent atrial fibrillation.	IIa	C	-
It is recommended that all patients with LVH receive antihypertensive agents.	I	B	458
In patients with LVH, initiation of treatment with one of the agents that have shown a greater ability to regress LVH should be considered, i.e. ACE inhibitors, angiotensin receptor blockers and calcium antagonists.	IIa	B	580

ACE = angiotensin-converting enzyme; CHD = coronary heart disease; EF = ejection fraction; LV = left ventricle; LVH = left ventricular hypertrophy; SBP = systolic blood pressure.

[a]Class of recommendation.

[b]Level of evidence.

[c]Reference(s) supporting recommendation(s).

2013 ESH/ESC Guidelines for themanagement of arterial hypertension

ORAL ANTIARRYTHMIC DRUGS USED FOR MAINTANING SINUS RHYTHM

Drug	Dose	Main contra-indications and precautions	Warning signs warranting discontinuation	AV nodal slowing	Suggested ECG monitoring during initiation
Amiodarone	600 mg in divided doses for 4 weeks, 400 mg for 4 weeks, then 200 mg once daily	Caution when using concomitant therapy with QT-prolonging drugs and in patients with SAN or AV node and conduction disease. The dose of VKAs and of digitalis should be reduced. Increased risk of myopathy with statins. Caution in patients with pre-existing liver disease.	QT prolongation >500 ms	10–12 bpm in AF	Baseline, 1 week, 4 weeks
Dronedarone	400 mg twice daily	Contra-indicated in NYHA Class III or IV or unstable heart failure, during concomitant therapy with QT-prolonging drugs, or powerful CYP3A4 inhibitors (e.g. verapamil, diltiazem, azole antifungal agents), and when CrCl <30 mg/mL. The dose of digitalis, beta-blockers, and of some statins should be reduced. Elevations in serum creatinine of 0.1–0.2 mg/dL are common and do not reflect a decline in renal function. Caution in patients with pre-existing liver disease.	QT prolongation >500 ms	10–12 bpm in AF	Baseline, 1 week.
Flecainide Flecainide slow release	100–150 mg twice daily 200 mg once daily	Contra-indicated if CrCl <50 mg/mL, liver disease, IHD or reduced LV ejection fraction. Caution in the presence of SAN or AV node or conduction disease. CYP2D6 inhibitors (e.g. fluoxetine or tricyclic antidepressants) increase plasma concentration.	QRS duration increases >25% above baseline	None	Baseline, day 1, day 2–3
Propafenone Propafenone SR	150–300 mg three times daily 225–425 mg twice daily	Contra-indicated in IHD or reduced LV ejection fraction. Caution in the presence of SAN or AV node and conduction disease, renal or liver impairment, and asthma. Increases concentration of digitalis and warfarin.	QRS duration increase >25% above baseline	Slight	Baseline, day 1, day 2–3
d,l sotalol	80–160 mg twice daily	Contra-indicated in the presence of significant LV hypertrophy, systolic heart failure, asthma, pre-existing QT prolongation, hypokalaemia, CrCl<50 mg/mL. Moderate renal dysfunction requires careful adaptation of dose.	QT interval >500 ms, QT prolongation by >60 ms upon therapy initiation	Similar to high dose blockers	Baseline, day 1, day 2–3

AF = atrial fibrillation; b.p.m. = beats per minute; CrCl = creatinine clearance; CYP2D6 = cytochrome P450 2D6; CYP3A4 = cytochrome P450 3A4; ECG = electrocardiogram;

PATIENT'S MEDICAL TREATMENT FOR LAST 6 MONTH

- Bisoprolol 5 mg per day
- Propafenon 150 mg 2 times per day (without this drug –recurrence of AF paroxysms); episodically additionally 300 with/without procainamide 500 mg
- Valsartan 80 mg per day
- Atorvastatin 10 mg (do not intake regularly)
- Aspirin 75 mg per day

OUR RECOMMENDED TREATMENT

- B- blocker - CARVEDILOL 12,5 mg 2 times p/day under control of ECG
- AAD – PROPAFENONE 150 mg 3 times per day under control of ECG; additional 300 mg of propafenon in case of paroxysm of AF
- ARBs – VALSARTAN 160 mg in the morning
- Anticoagulant - RIVAROXABAN 15 mg p/day
- Statin-ROSUVASTATIN 20 mg in the evening
- Consulting with other subspecials to change treatment strategy (repeat catheter ablation?)

ADDITIONAL RECOMMENDED EXAMINATIONS

- Repeat 24h – ECG monitoring in a month
- T4, T3, Anti-TPO
- Biochemical blood test (liver (ALT, AST, AP) and renal function tests (BUN), coagulogram
- Blood electrolytes (K, Na)
- Chest X-Ray
- Ultrasound of thyroid gland and abdomen
- Consultation with an endocrinologist

PROGNOSIS

- Prognosis for life - non-compliance to doctor's appointments – non-satisfactory
- The prognosis for recovery - an unfavorable

CONCLUSION 1.2.

- According to recent studies it has been demonstrated that pulmonary vein CA has favourable outcomes at 6-12 months post-ablation, but there are only few studies with a long-term follow-up and, as we see on our clinical case, after 2 years patient present with current deterioration of AF
- The vast majority of very longstanding paroxysmal/persistent AF patients maintained sinus rhythm at a mean follow-up time of 5 years following CA, associated with a significant improvement in symptom scores and, as we see on our clinical case, after 2 years patient maintained sinus rhythm, but with recurrence paroxysms of AF for last year with mild/moderate of symptom scores
- Often this procedure is not a radical solution of the problem, and most patients (as it also was shown on the example of our clinical case) are require adjunctive therapies including antiarrhythmics, DC cardioversions and re-ablation

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https://www.ncbi.nlm.nih.gov/pubmed/27878420, https://www.ncbi.nlm.nih.gov/pubmed/27889553,
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1431605/

CONCLUSION 2.2.

- Also our patient needs correction of the treatment of arterial hypertension and more properly diagnosis (and treatment) of thyroid disorder, and improvement the regulation at all levels - from the daily rhythm of the HR up to relations in the activity of the vagal activity branches, first of all, interventions in the lifestyle and searching for the optimum time drug administration
- Of course, consider the presence of multiple syndromes on presented clinical case, we must not forget about the problem of polypharmacy and try to avoid it (many studies in ambulatory care define polypharmacy as a medication count of five or more medications, but it is practically impossible to investigate the biochemical compatibility in vivo of more than 4 drugs)

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https://www.ncbi.nlm.nih.gov/pubmed/27878420, https://www.ncbi.nlm.nih.gov/pubmed/27878422,
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1431605/

THANK YOU FOR ATTENTION!