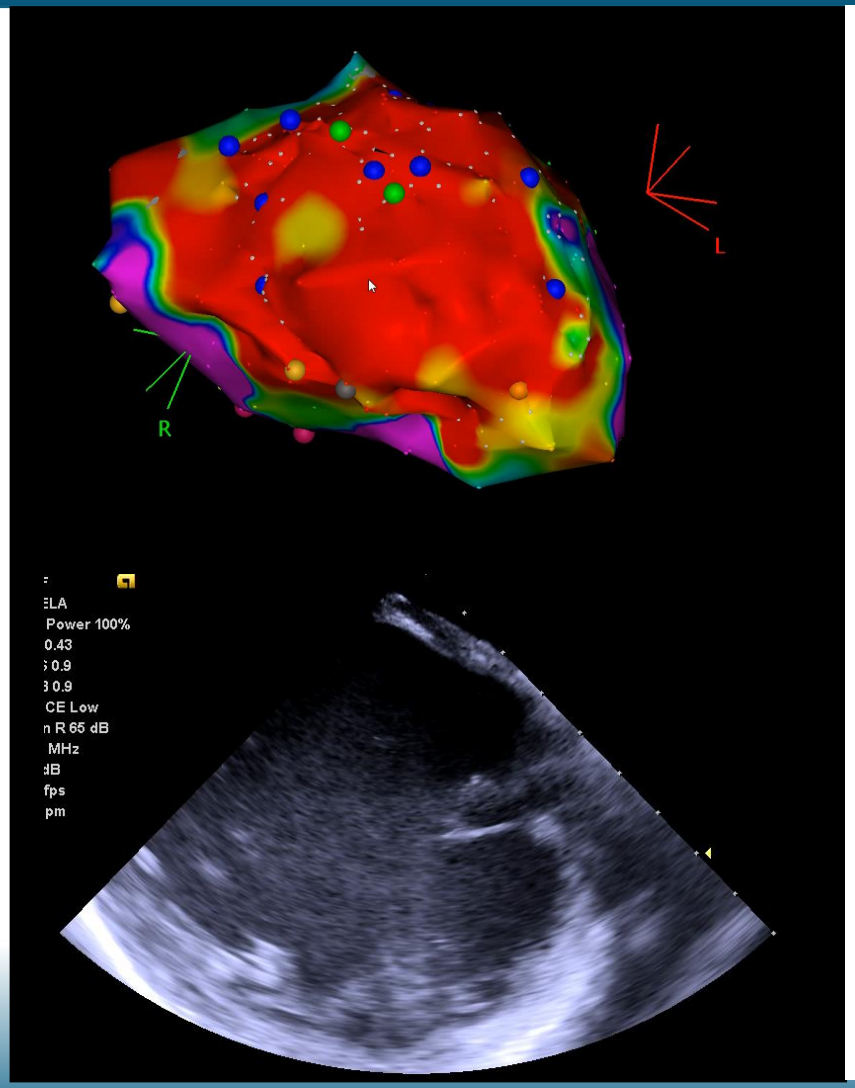
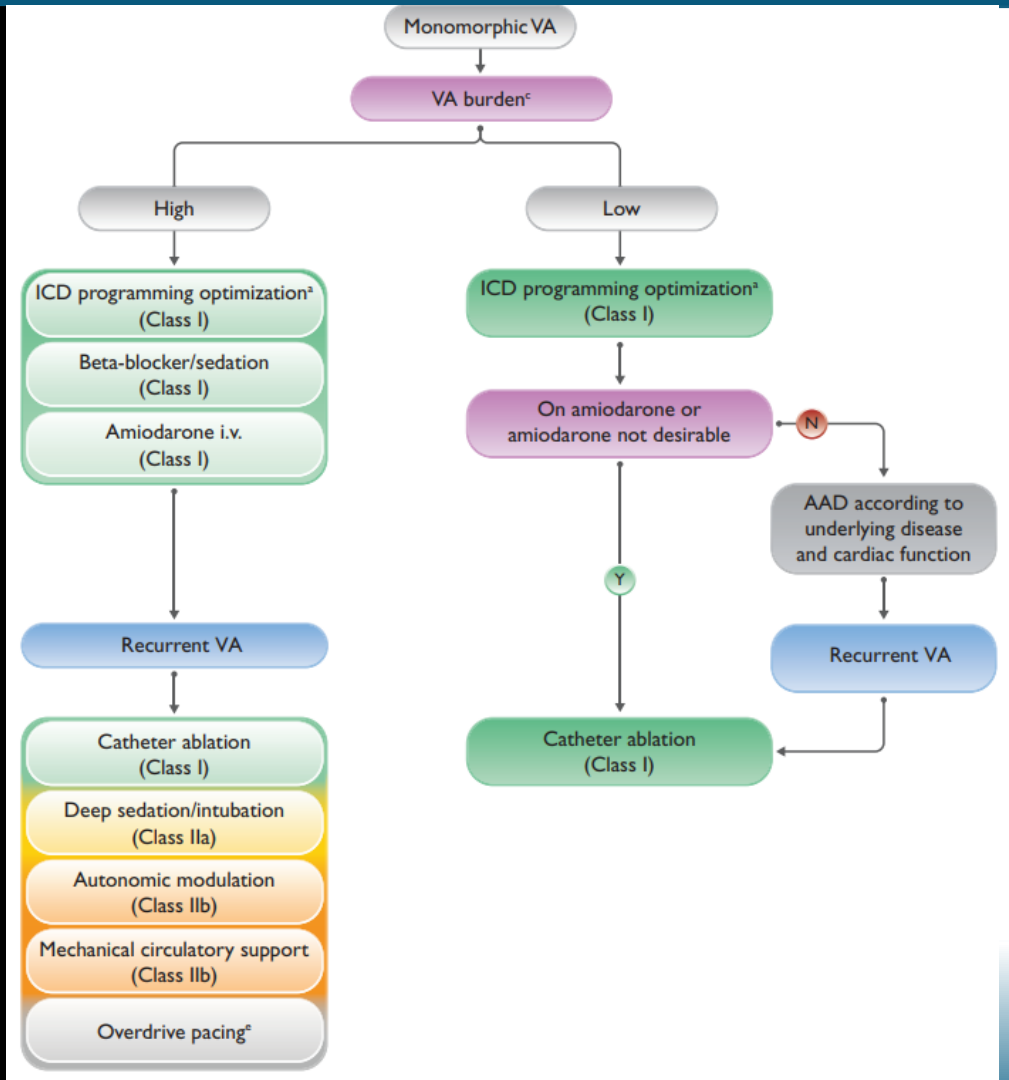
Katetrizační ablace komorové tachykardie u nemocného s trombem v levé komoře

Marek Hozman, Pavel Osmančík, Dalibor Heřman, Viktor Kočka, Petr Štros,
Zuzana Moťovská, Jaroslav Ulman, Ondřej Richter

Kardiologická klinika, 3. LF UK a FNKV, Praha

Úvod





1. 2022 ESC Guidelines on Ventricular Arrhythmias

Evidence z RCT

VANISH trial [1]

Ablace vs. eskalace antiarytmické terapie

132 RFA x 127 AA, populace s VT navzdory AA terapii, mFU 27,9 m

prim. endpoint: smrt / šok ICD po 30 dnech / arytmická bouře po 30 dnech

59,1 % vs. 68,5 %, P = 0,04, mortalita bez rozdílu

Vyšší incidence NÚ spojených s terapií u AA (39 vs. 20, P = 0,003)

SMS trial [2]

Populace s nestabilní VT, N = 111, RFA x ICD, mortalita bez rozdílu, redukce terapií ICD

1. Sapp et al., NEJM, 2016
2. Kuck et al., Circ EP, 2017

Přítomnost trombu v hrotu levé komory

Přítomnost LV trombu zvyšuje 4x riziko embolizační události

157 trombus+ vs. 400 trombus -, FU 3,3 roky, HR3.99 (95% CI 1.54–10.35; p = 0.004)

Nejvyšší embolizační potenciál po dobu 2 týdnů od IM

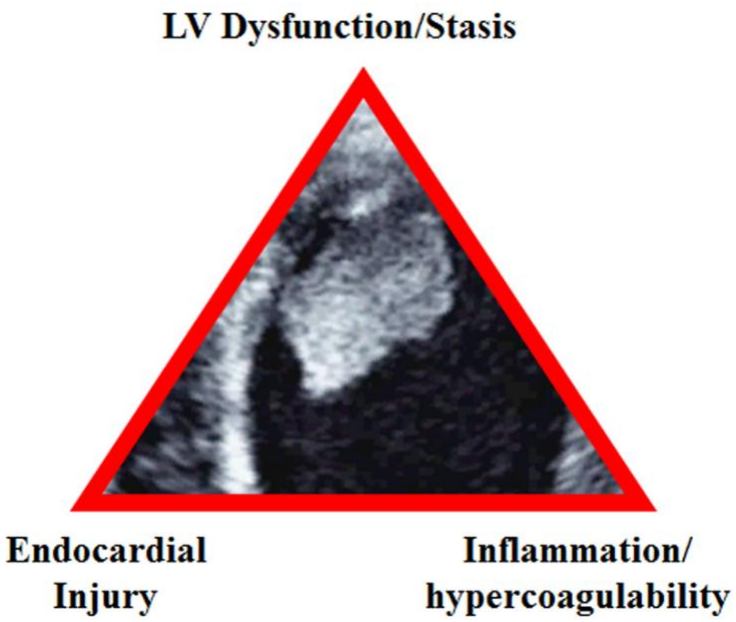
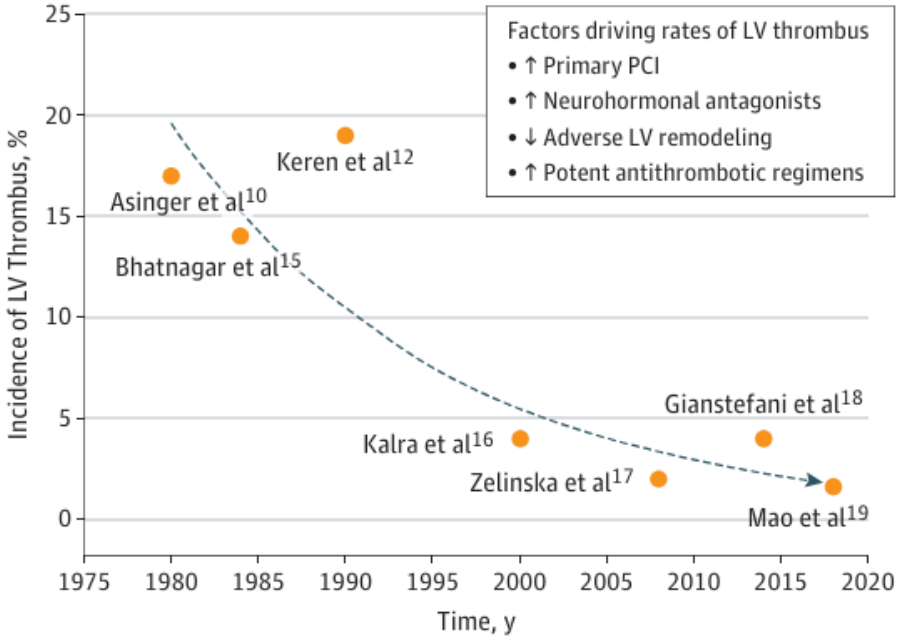


Figure 1. Temporal Trend in Incidence of Left Ventricular Thrombus as Diagnosed by Echocardiogram



LV indicates left ventricular; PCI, primary percutaneous coronary intervention.

1. Levine et al., Circulation, 2022
2. McCarthy et al., JAMA Cardiology, 2018
3. Velangi et al., Circ Cardivasc Img, 2019
4. Stratton et al., Circulation 1988

Ablace VT?

Table I.

Characteristics of Patients with LV Endocavitary Thrombus

Patient	LVEF (%)	Aneurysm Location	History of Bypass Surgery	Interval between Ablation and MI (Months)	Clinical VT CL (ms)	Thrombus Detected by TTE	Size of Thrombus (mm)	Number of Ablation Procedures	Epicardial Ablation	Outcome
1.	25–30	Anterior	Yes	336	428	No	12 × 18	5	No	No recurrence
2.	30–35	Anterior	Yes	372	350	Yes	10 × 31	1	No	Two VT episodes treated with ATP
3.	35	Anterior	No	132	500	Yes	11 × 24	2	No	No recurrence
4.	25–30	Inferior	No	N/A	521	No	16 × 30	2	Yes	Single VT episodes treated with ATP
5.	25–30	Anterior	Yes	216	272	Yes	16 × 18	2	No	Implantation of VAD
6.	40	Anterior	No	288	500	No	12 × 21	3	Yes	No recurrence
7.	20	Anterior	No	66	400	Yes	6 × 33	3	Twice	Died
8.	35–40	Inferior	No	240	461	No	7 × 27	1	No	No recurrence

ATP = antitachycardia pacing; CL = cycle length; LV = left ventricular; LVEF = LV ejection fraction; MI = myocardial infarction; N/A = not available; TTE = transthoracic echocardiography; VAD = ventricular assist device; VT = ventricular tachycardia.

1. Peichl et al., PACE, 2015

Ablace VT?

Pt	Age	Sex	LVEF(%)	Etiology	Prior Ablations	Prior epi Ablations	Prior Cardiac Surgery	Presentation	AAD Before Ablation	LV thrombus dimensions (mm x mm)	Thrombus Location	Atrial Fibrillation	Duration of Thrombus	Anti-coagulation	Mapping	Ablation
1	59	M	25	ICM (AWMI)	0	0	0	ES with ICD shocks	Amiodarone, lidocaine	35 × 14	Apical	No	≥3 days	None	Endo LV	Endo LV
2	51	M	31	ICM (AWMI)	0	0	0	ES with ICD shocks	Amiodarone	n/a	Apical	No	≥2 days	None	Endo LV	Endo LV
3	72	M	24	ICM (IWMI)	2	1	0	ES with ICD shocks	Amiodarone	21 × 5	Apical	No	11 months	Warfarin	Endo LV	Endo LV
4	50	M	26	NICM (viral)	0	0	0	Recurrent VT	Amiodarone	14 × 46	Apical	No	74 months	Dabigatran		
5	68	M	25	NICM (idiopathic)	2	0	0	Drug toxicity	Amiodarone, mexiletine	24 × 16	Apical	Yes, paroxysmal (CHA2DS2-VASc 5)	≥3 months	Warfarin		
6	77	F	35	NICM (Chagas)	3	0	1	ES with ICD shocks	Amiodarone	15 × 30	Apical	No	≥4 months	Warfarin	Epi RV + Epi LV + Endo RV	Epi RV + Epi LV + Endo RV
7	54	M	27	ICM (AWMI)	0	0	0	ES with ICD shocks	Amiodarone	22 × 36	Apical	No	≥3 days	None (plavix + aspirin 81)	Epi LV	Epi LV
8	52	M	10	NICM (idiopathic)	1	0	0	ES with ICD shocks	Amiodarone	18 × 13	Apical	Yes, paroxysmal (CHA2DS2-VASc 5)	≥1 month	Warfarin	Epi LV + Endo LV	Epi LV + Endo LV
															Epi LV + Endo RV	Epi LV
															Epi LV	Epi LV

ICM = ischemic cardiomyopathy; NICM = non-ischemic cardiomyopathy; AWMI = anterior wall myocardial infarction; IWMI = inferior wall myocardial infarction; ES = electrical storm; AAD = antiarrhythmic drug; Endo = endocardial, Epi = epicardial; OHT = orthotopic heart transplantation.

Pt	VT Recurrence Data	Follow-Up	Complication
1	No VT to end of f/u	14 mo	None
2	No VT to end of f/u	18 mo	None
3	VT recurrence at 5 days, OHT at 10 days for intractable VT	Died at 296 days of OHT rejection	None
4	No VT to end of f/u	44 mo	None
5	VT recurrence at 499 days	25 mo	None
6	No VT to end of f/u	32 mo	None
7	VT recurrence at 1 day	30 mo	None
8	VT recurrence at 373 days	Died at 374 days of HF	Embolic stroke

Mo = months; VT = ventricular tachycardia.

1. Hygriv et al., JCE, 2015

Ablace VT?

used if the LV endocardium is not well visualized. Although ablation procedures might be safe in the presence of laminated thrombi [535], it would be prudent in the absence of an urgent indication for VT ablation, and especially in the presence of a mobile thrombus, to anticoagulate the patient for a period of time and reassess for LV thrombus prior to the ablation procedure. Not every patient has optimal echocardiographic win-

2019 HRS/EHRA/APHRS/LAHRS expert consensus statement on catheter ablation of ventricular arrhythmias

Kazuistika

25.10.2023

77letý muž přijat pro hraničně hemodynamicky tolerovanou setrvalou monomorfní VT s nutností DC kardioverze.

Ischemická choroba srdeční
- staged PCI 2022 - 1xDES ad ACS a 1xDES ad RMS
- stp. 2x CABG RIA (LIMA) a RMS žilním 2012
- aneurysma LK anteroseptoapikálně, EF 30-35%
- trombus v hrotu LKS 2012 - přechodně antikoagulován
- stp. STEMI přední stěny, aneuryzma LK anteroseptoapikálně, 1987

Dyslipidemie na terapii

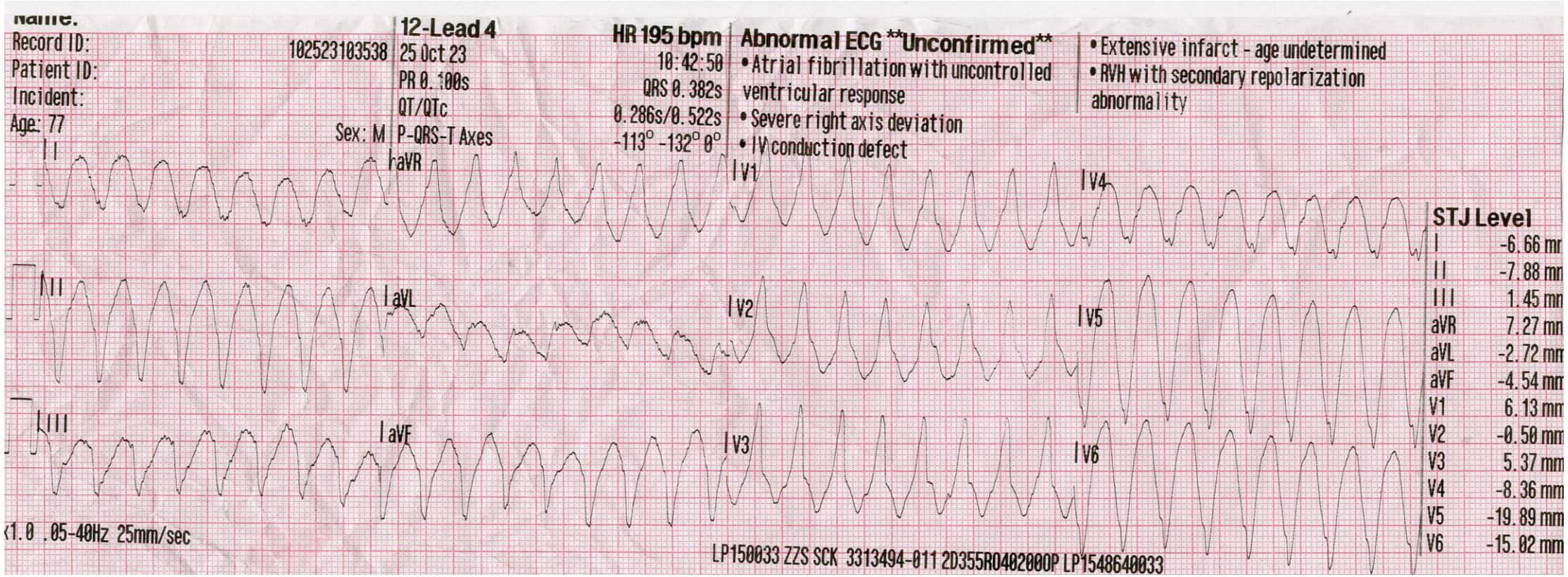
Anamnesticky vřed duodena před 15 lety

Stp. TIA

Stp. resekci aneurysmatu abdominální aorty 3/2017

Medikace: Godasal 100mg tbl. 1-0-0, Rivocor 5mg tbl 1/2-0-0, Nolpaza 40mg tbl 1-0-0, Rosucard 40mg tbl 0-0-1, Furon 40mg tbl 1/2-0-0, Verospiron 25mg tbl 1/2-0-0

Kazuistika

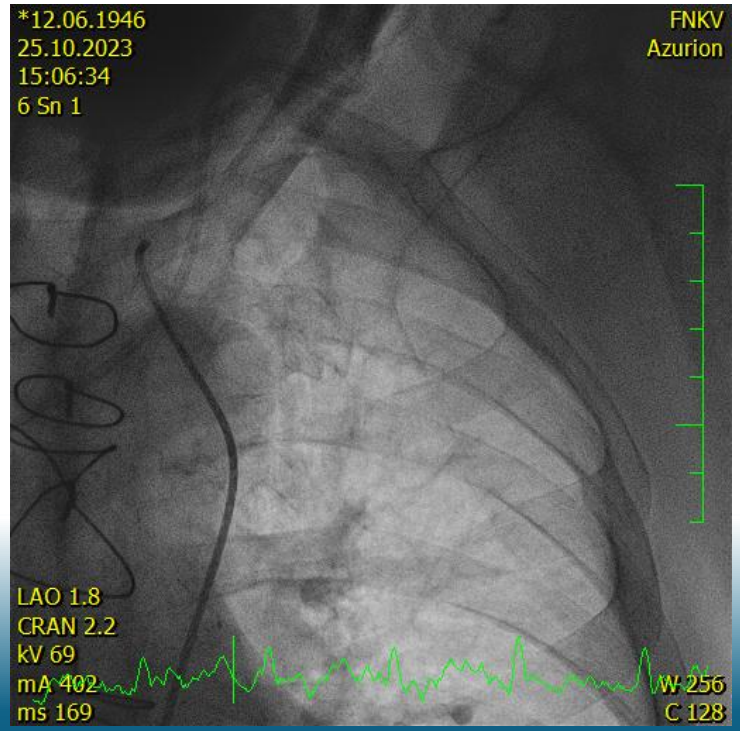

Name:
Record ID: 102523103538
Patient ID:
Incident:
Age: 77
Sex: M
12-Lead 4
25 Oct 23
PR 0.100s
QT/QTc
P-QRS-T Axes
HR 195 bpm
10:42:50
QRS 0.382s
0.286s/0.522s
-113° -132° 0°
Abnormal ECG **Unconfirmed**
• Atrial fibrillation with uncontrolled ventricular response
• Severe right axis deviation
• IV conduction defect
• Extensive infarct - age undetermined
• RVH with secondary repolarization abnormality
I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6
STJ Level
I -6.66 mm
II -7.88 mm
III 1.45 mm
aVR 7.27 mm
aVL -2.72 mm
aVF -4.54 mm
V1 6.13 mm
V2 -0.50 mm
V3 5.37 mm
V4 -8.36 mm
V5 -19.89 mm
V6 -15.02 mm
x1.0 .05-40Hz 25mm/sec
LP150033 ZZS SCK 3313494-011 2D355R0402000P LP1548640033

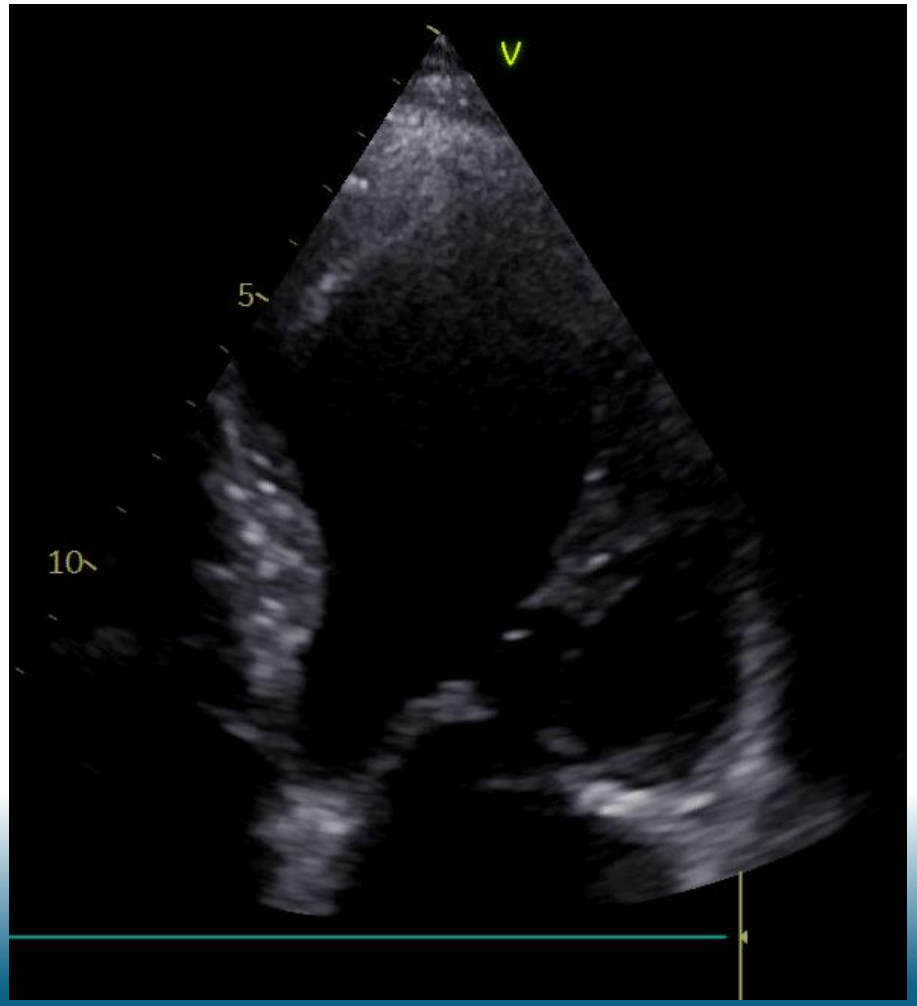
Kazuistika

Hospitalizace na KJ, amiodaron i.v.

V den přijetí TTE a SKG

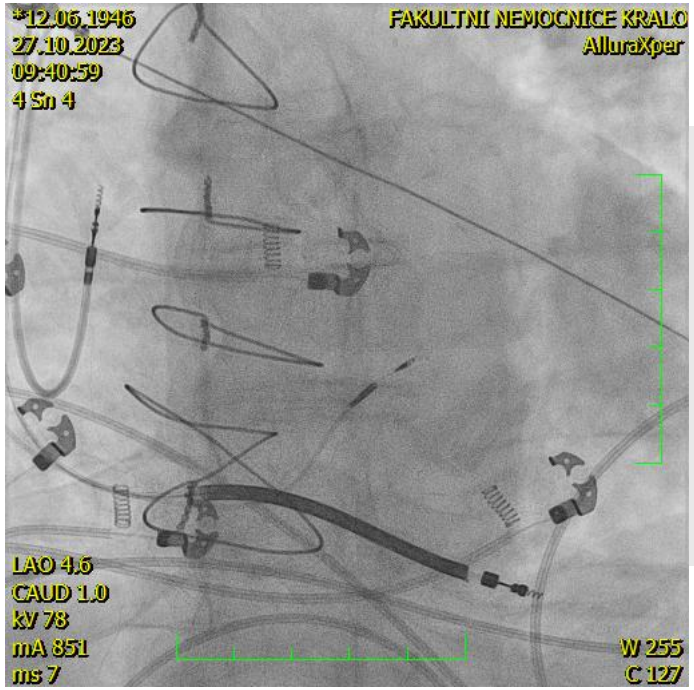
Nasazena antikoagulační terapie

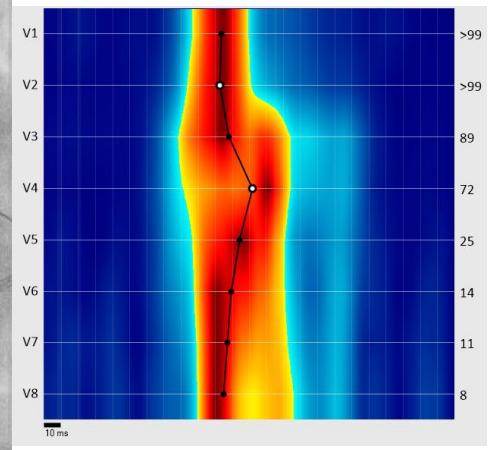


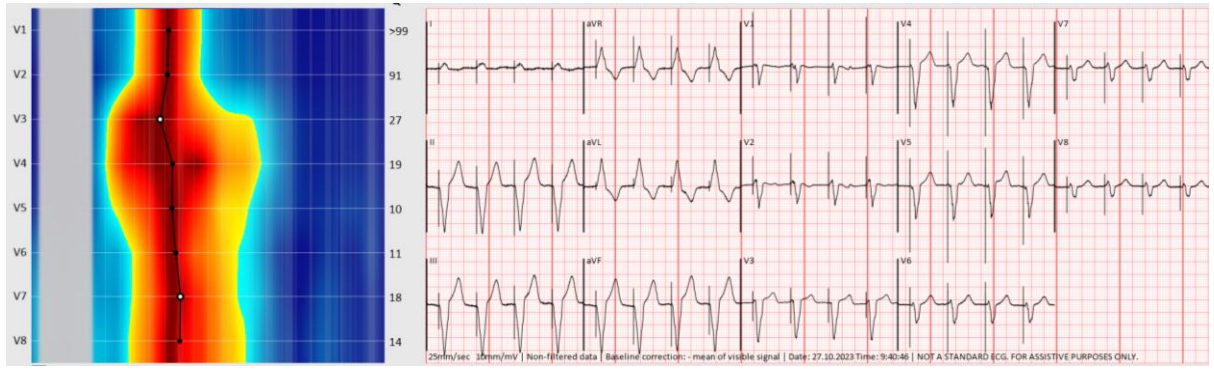


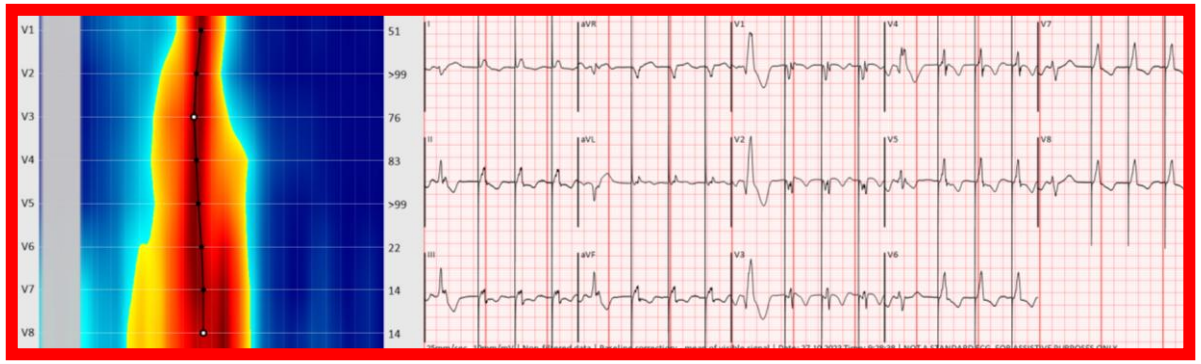
Kazuistika

27.10.2023 provedena implantace ICD (+ LBAP)









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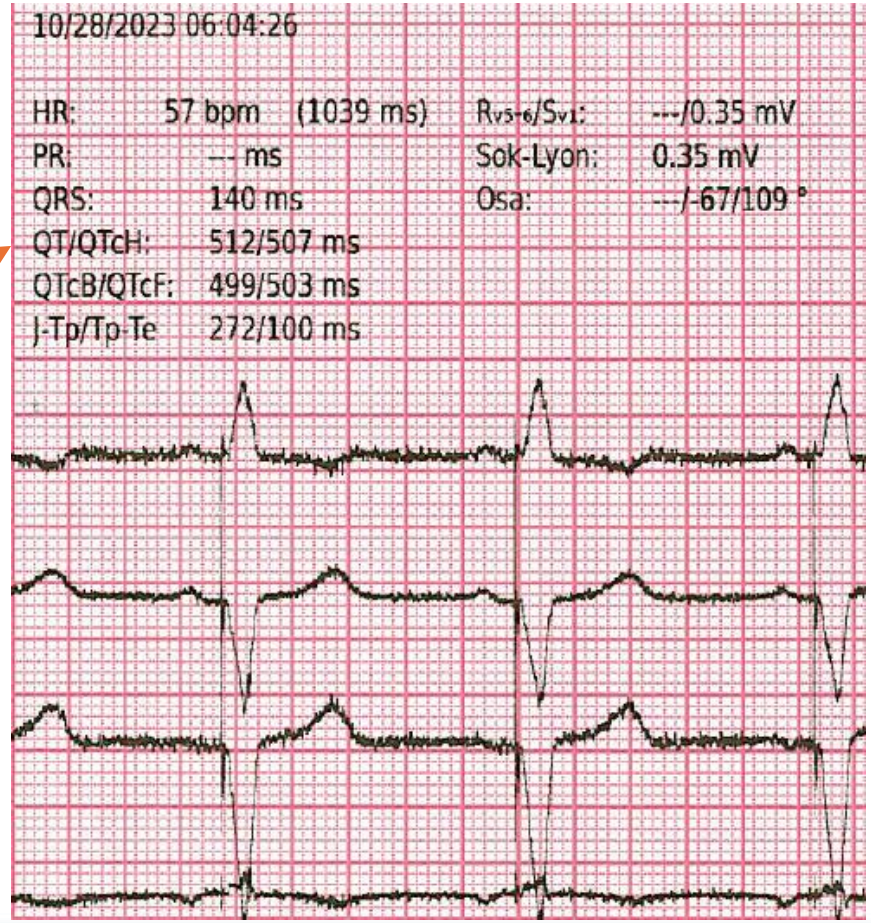
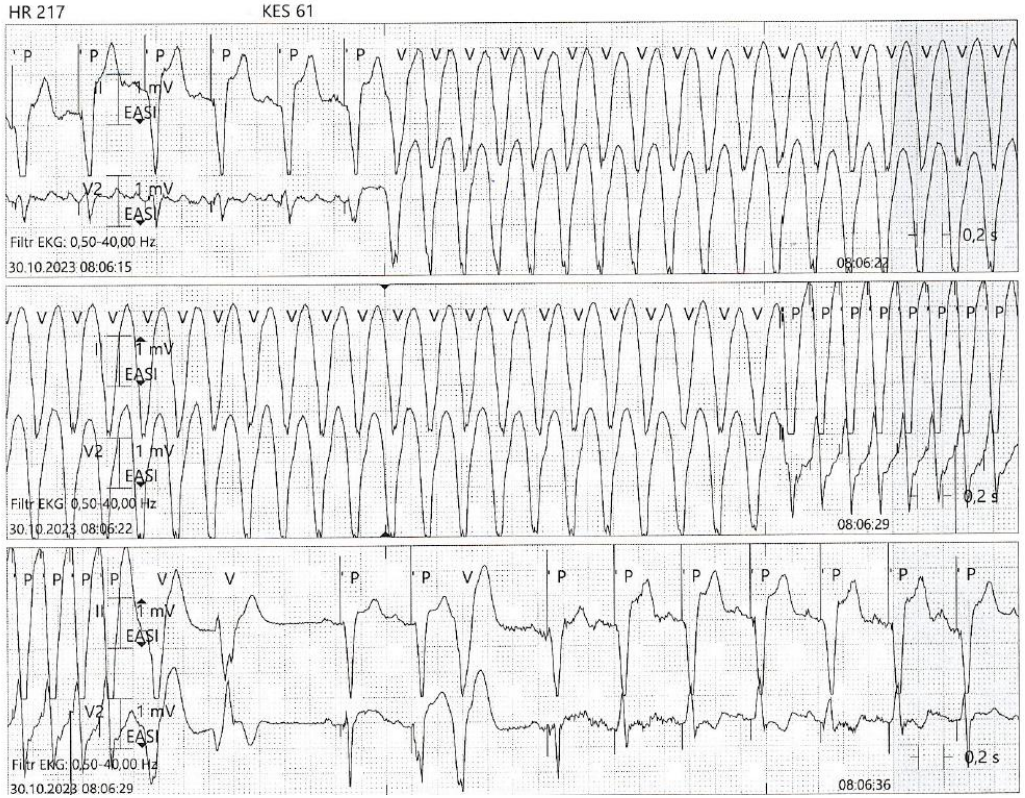

10/28/2023 06:04:26
HR: 57 bpm (1039 ms)
PR: --- ms
QRS: 140 ms
QT/QTcH: 512/507 ms
QTcB/QTcF: 499/503 ms
J-Tp/Tp-Te 272/100 ms
RV5-6/SV1: ---/0.35 mV
Sok-Lyon: 0.35 mV
Osa: ---/-67/109 °

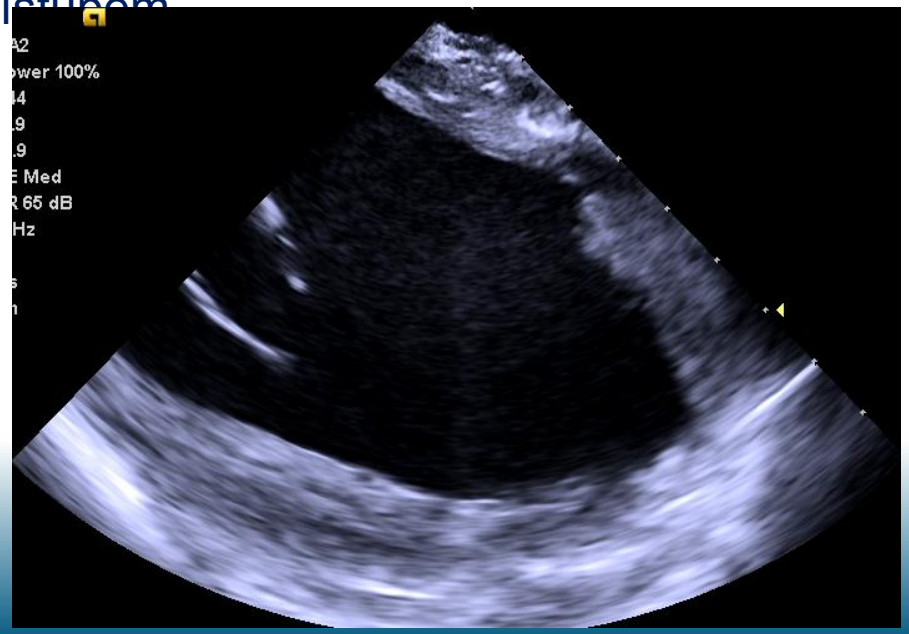

HR 217
KES 61
Filtr EKG: 0,50-40,00 Hz
30.10.2023 08:06:15
08:06:22
0,2 s
Filtr EKG: 0,50-40,00 Hz
30.10.2023 08:06:22
08:06:29
0,2 s
Filtr EKG: 0,50-40,00 Hz
30.10.2023 08:06:29
08:06:36
0,2 s

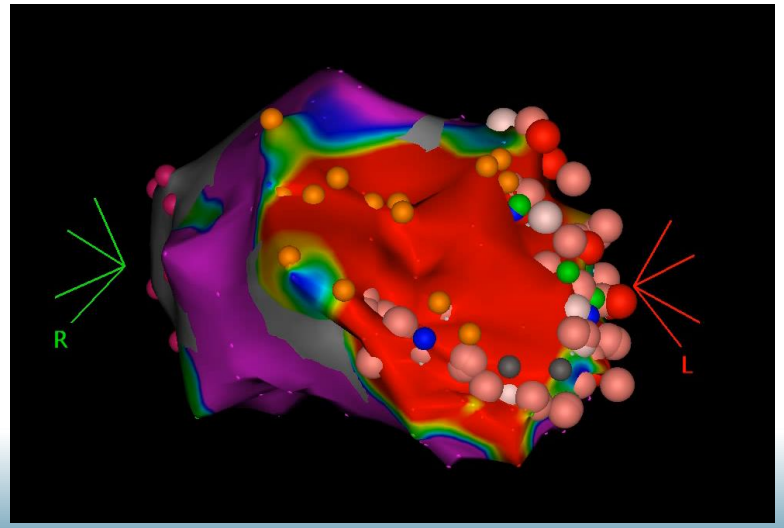
Kazuistika

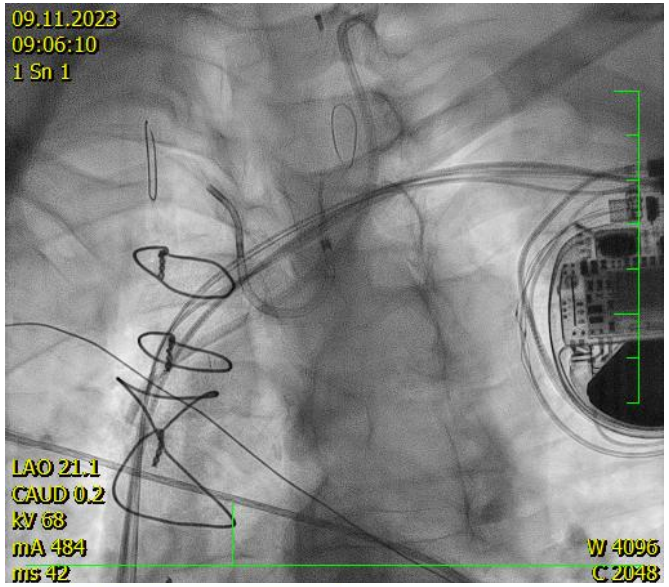
9.11.2023 provedena katetrizační ablace komorové tachykardie

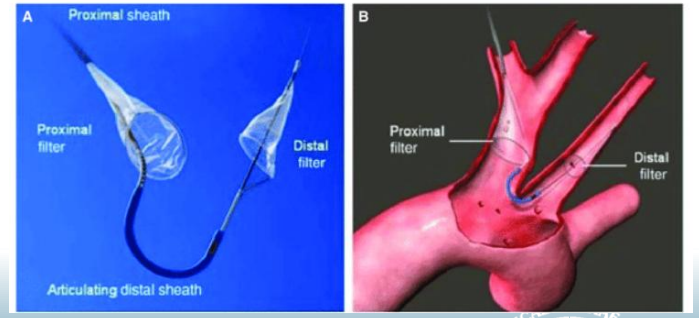
Před výkonem zaveden karotický protekční systém Sentinel

Při stimulaci z pravé komory (train 100/min resp. 120/min + 1,2,3 extra) noninducibilní setrvalá monomorfní VT, ablace čistě substrátovým přístupem









Heeger et al., 2018, JAHA

Kazuistika

Dále během hospitalizace bez rekurence VT, propuštěn 16. hospitalizační den.

Medikace při propuštění: Xarelto 20mg tbl. 1-0-0, Cordarone 200mg tbl. 1-0-0, Tezeo 40mg tbl. 1-0-0, Rosucard 40mg tbl. 0-0-1, Eplerenon 25mg tbl. 0-1-0, Jardiance 10mg tbl. 1-0-0, Furon 40mg tbl. 1/2-0-0, Betaloc ZOK 50mg tbl. 1-0-0, Kalnormin 1g tbl. 1-0-0

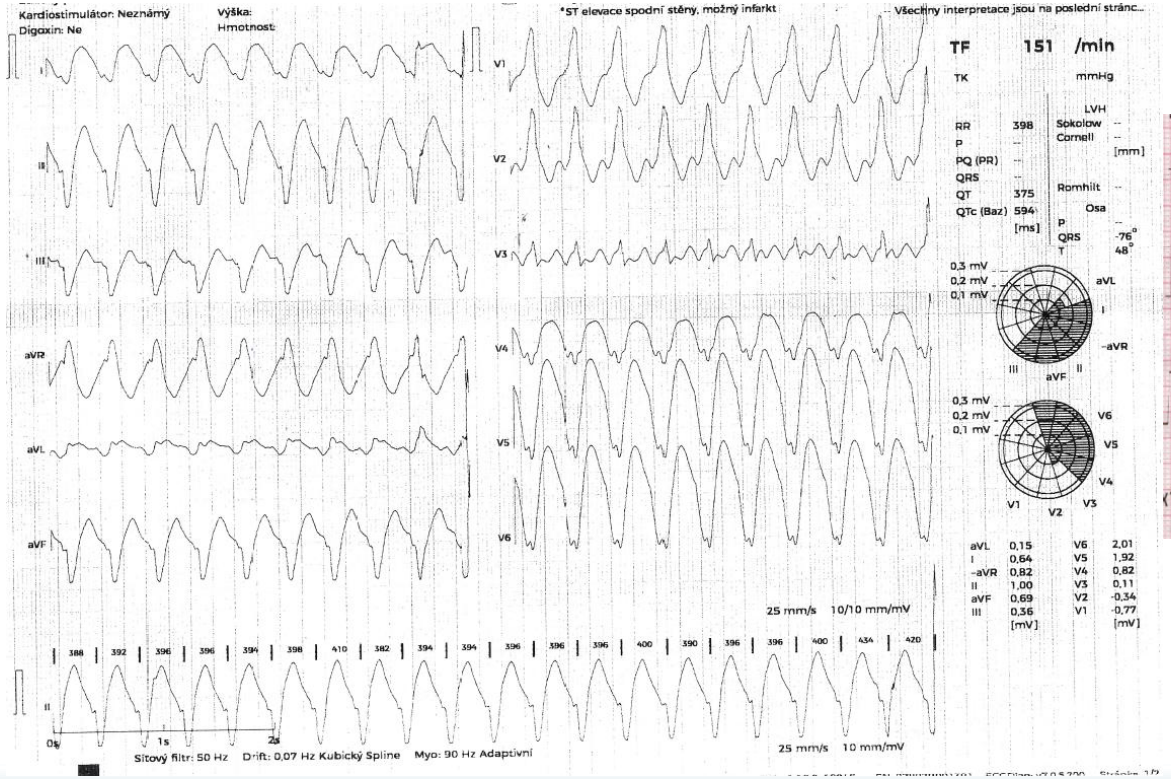
Ambulantní kontrola 3m po ablaci

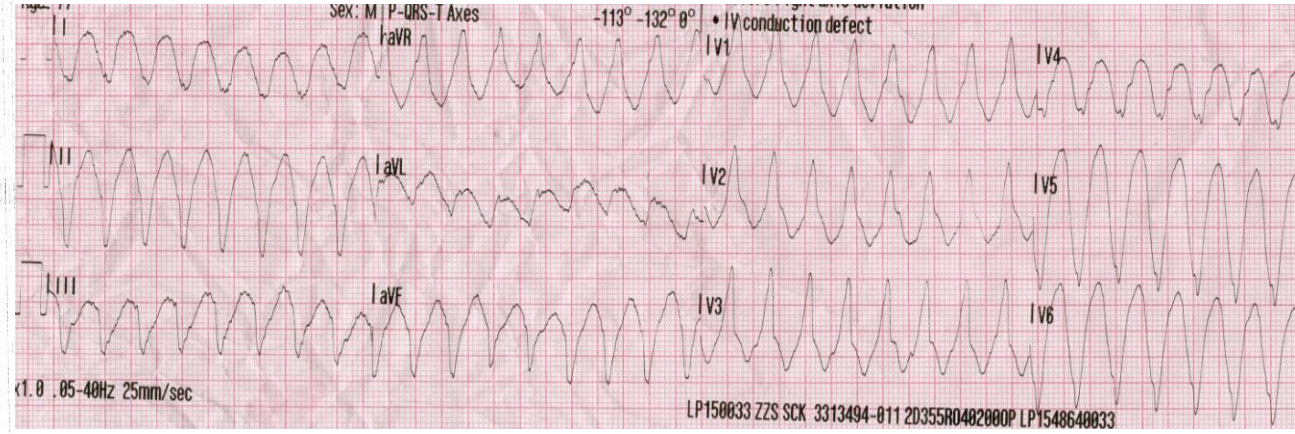
Práh pravé komory: 0,5 V. **Práh levé komory:** 0,25V. **Práh síně:** 0,75V.
Sensing na pravokomorové elektrodě: dostatečný.
Impedance: beze změn.
Biventrikulární stimulace RV/LV: 99%.
Komorové arytmie: bez VT od poslední kontroly
Paměť přístroje: AHRE nedetekována.
Stav baterie: OK, ERI za 6,7 let.
Nastavení přístroje - ponecháno.

Závěr: normální parametry elektrod a BiV přístroje

Kazuistika

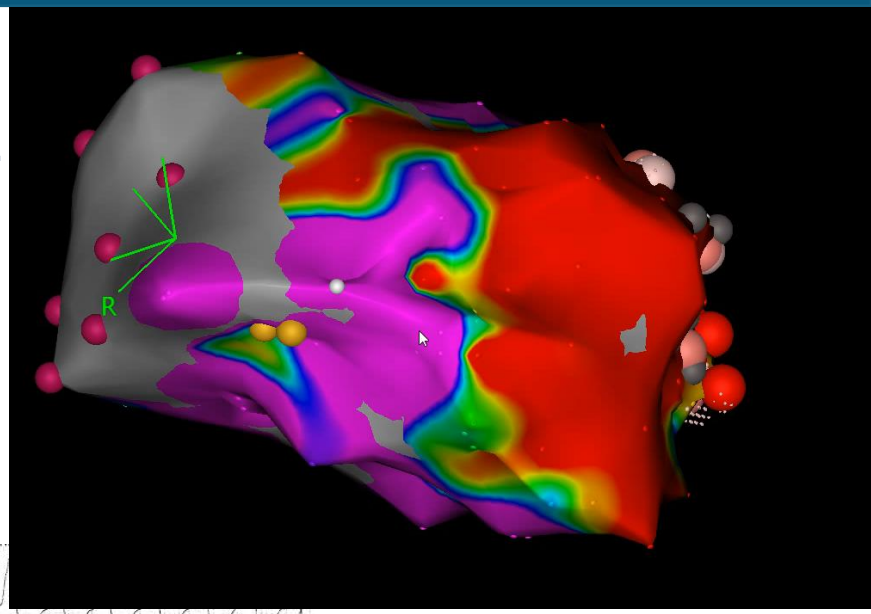
8.4.2024 rekurence hemodynamicky tolerované VT identické morfologie

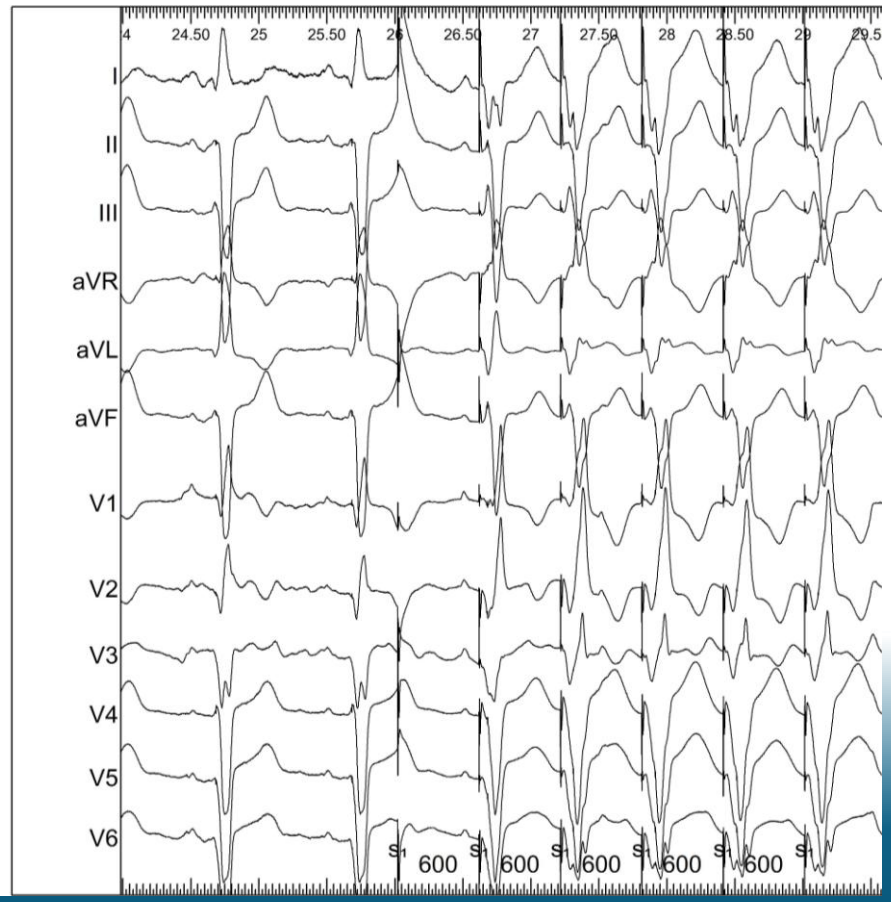


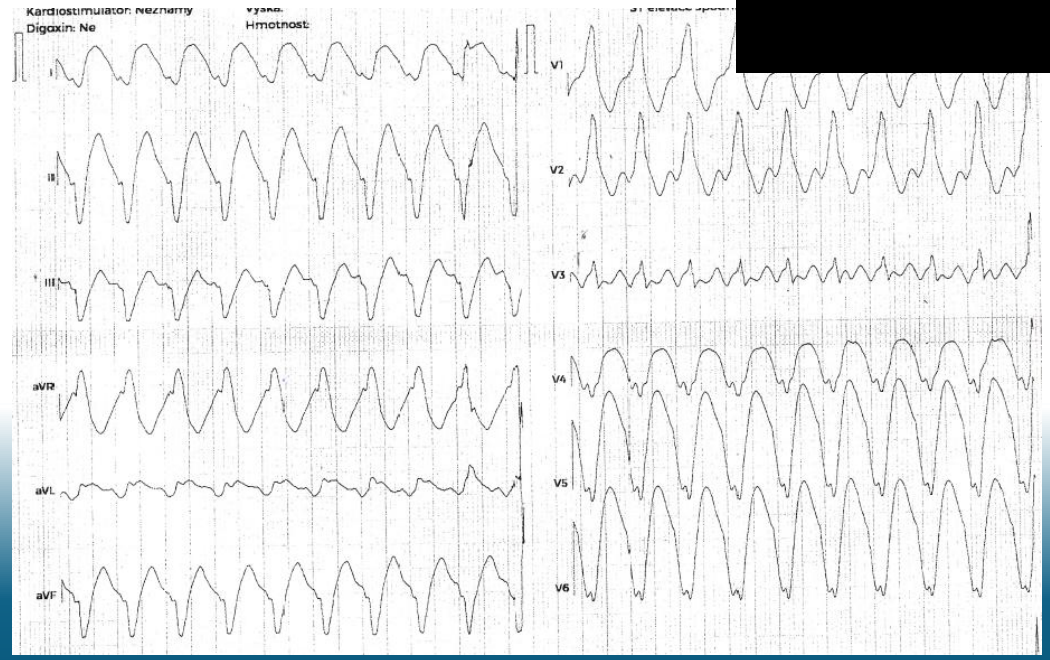


Kazuistika

10.4.2024 provedena reablace. Klinická arytmie v úvodu opět noninducibilní.

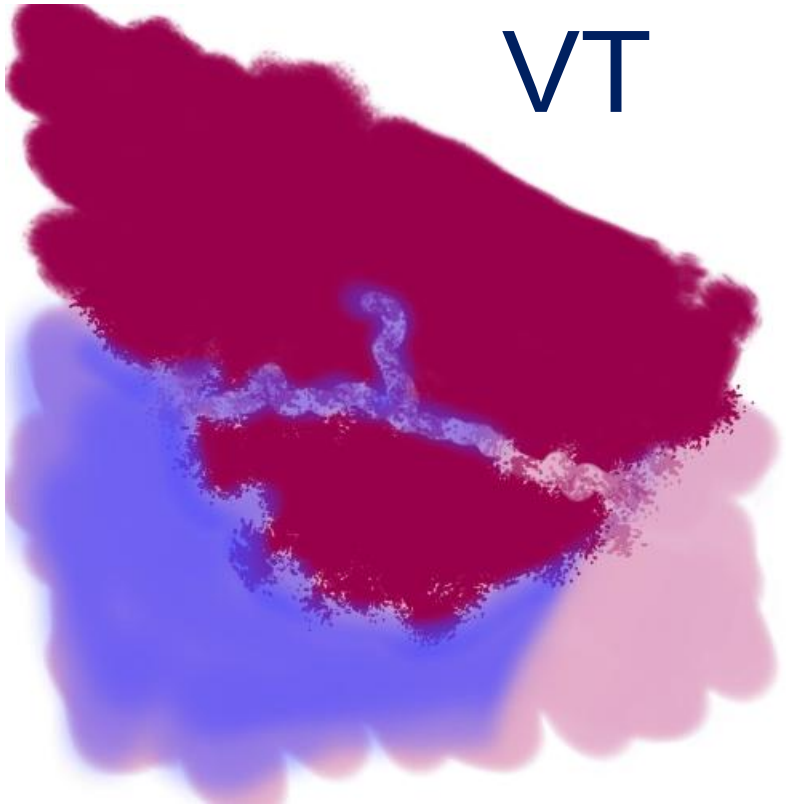


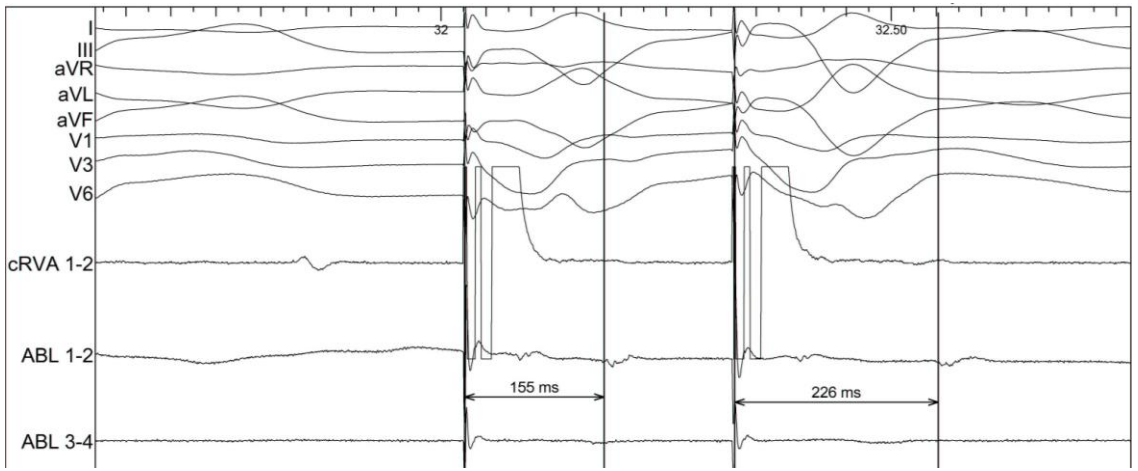




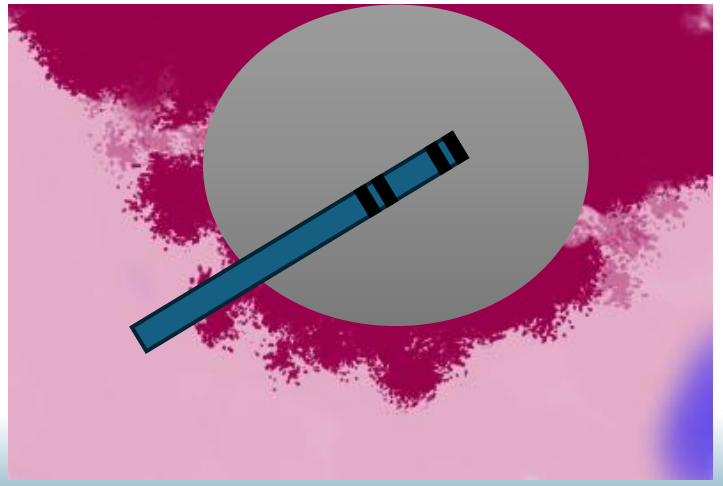
Kazuistika

VT





SR



Závěrem

Katetrizační ablace VT u nemocných s laminárním trombem v levé komoře je možná s akceptovatelným rizikem komplikací

Vzhledem k limitovaným možnostem mapování lze očekávat vyšší riziko rekurence

Alternativu představuje stereotaktická radioablace (STAR)

Epikardiální mapování po CABG ?

› Circ Arrhythm Electrophysiol. 2015 Feb;8(1):94-101. doi: 10.1161/CIRCEP.114.002349. Epub 2015 Jan 9.

Percutaneous epicardial access for mapping and ablation is feasible in patients with prior cardiac surgery, including coronary bypass surgery

Děkuji za pozornost

marek.hozman@fnkv.cz