UPDATE SCD 2025

profid-project.eu

Ablation as alternative to ICD in hemodynamically tolerated VT in patients with structural heart disease

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From enthusiasm to reality...

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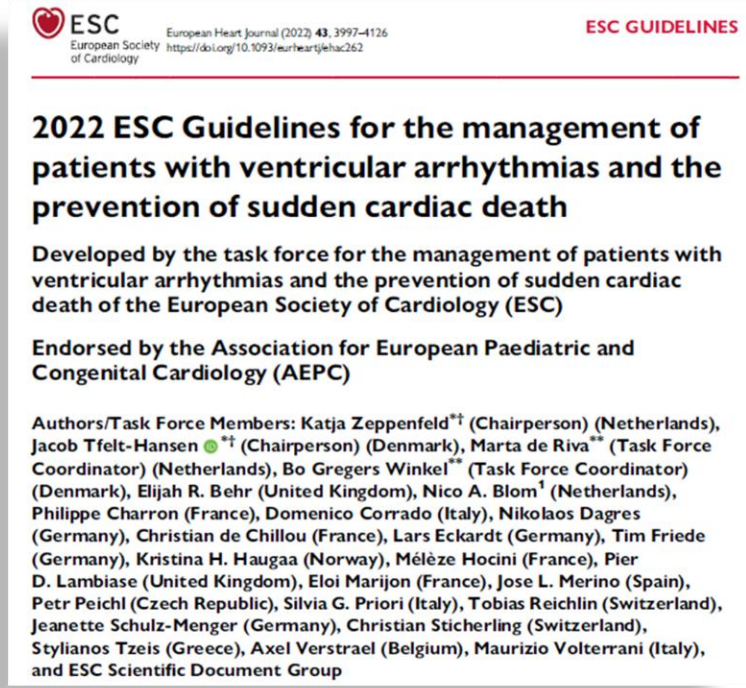
Declaration of conflict of interest

- Research grants: Biotronik, Bayer, Amgen, Roche
- Consultant fees: Abbot, Biotronik, Novartis, Bayer, Recordati, Amgen
- PROFID-EHRA: Investigator

I: Possible clinical scenarios in pts with SHD

II: What do the ESC guidelines say?



ESC European Society of Cardiology
European Heart Journal (2022) 43, 3997–4126
https://doi.org/10.1093/eurheartj/ehac262
ESC GUIDELINES

2022 ESC Guidelines for the management of patients with ventricular arrhythmias and the prevention of sudden cardiac death

Developed by the task force for the management of patients with ventricular arrhythmias and the prevention of sudden cardiac death of the European Society of Cardiology (ESC)

Endorsed by the Association for European Paediatric and Congenital Cardiology (AEPC)

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Zeppenfeld K: European Heart Journal (2022) 43, 3997–4126

What is new I

Recommendations	Class
Treatment of VA. General aspects (continued)	
In patients presenting with a haemodynamically tolerated SMVT in the absence of an established diagnosis, intravenous amiodarone may be considered.	**IIb**
In patients with SMVT or SPVT/VF triggered by a PVC with similar morphology and an indication for ICD, catheter ablation may be considered when an ICD is not available, contraindicated for concurrent medical reasons, or declined by the patient.	**IIb**
The WCD may be considered in the early phase after MI in selected patients.	**IIb**

2022 ESC Guidelines for the management of patients with ventricular arrhythmias and the prevention of sudden cardiac death
(European Heart Journal; 2022 – doi: 10.1093/eurheartj/ehac262)

What is new II

Recommendations	Class
Coronary artery disease (continued)	
ICD implantation should be considered in patients with CAD, LVEF ≤ 40% despite ≥ 3 months of OMT, and NSVT, if they are inducible for SMVT by PES.	**IIa**
In patients with CAD and haemodynamically well-tolerated SMVT and LVEF ≥ 40%, catheter ablation in experienced centres should be considered as an alternative to ICD therapy, provided that established endpoints have been reached.	**IIa**
Catheter ablation should be considered in patients with CAD and recurrent, symptomatic SMVT or ICD shocks for SMVT despite beta-blocker or sotalol treatment.	**IIa**

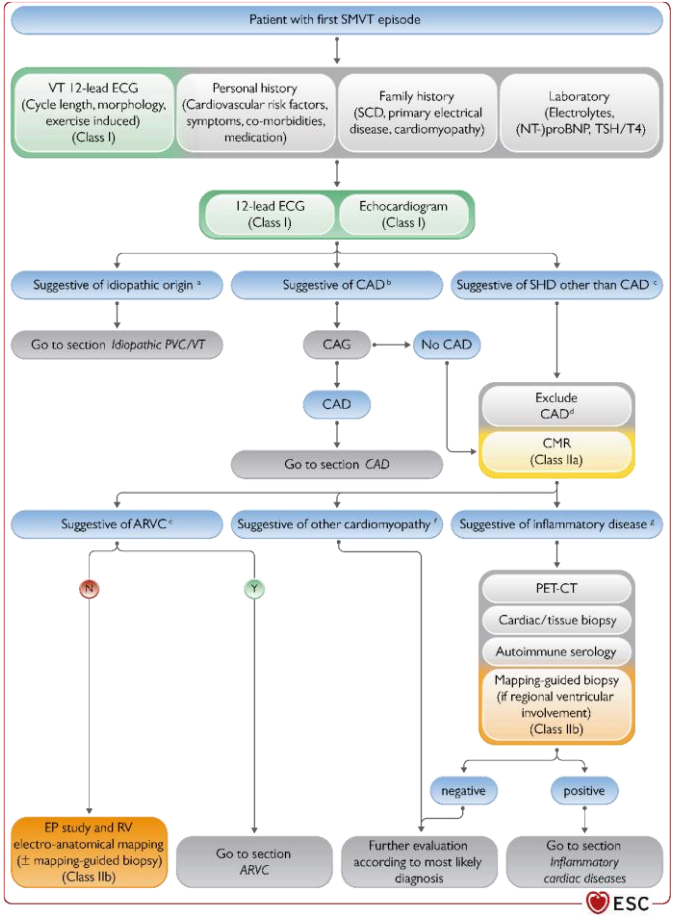
2022 ESC Guidelines for the management of patients with ventricular arrhythmias and the prevention of sudden cardiac death
(European Heart Journal; 2022 – doi: 10.1093/eurheartj/ehac262)

What is new III

Recommendations	Class
DCM/HNDCM (continued)	
ICD implantation should be considered in DCM/HNDCM patients with a LVEF < 50% and ≥ 2 risk factors (syncope, LGE on CMR, inducible SMVT at PES, pathogenic mutations in LMNA, *PLN*, *FLNC*, and *RBM20* genes).	**IIa**
ICD implantation should be considered in patients with DCM/HNDCM and haemodynamically tolerated SMVT.	**IIa**
In a first-degree relative of a patient with apparently sporadic DCM/HNDCM, an ECG, and an echocardiogram may be considered.	**IIb**
Participation in high-intensity exercise including competitive sports is not recommended for individuals with DCM/HNDCM and a *LMNA* mutation.	**III**

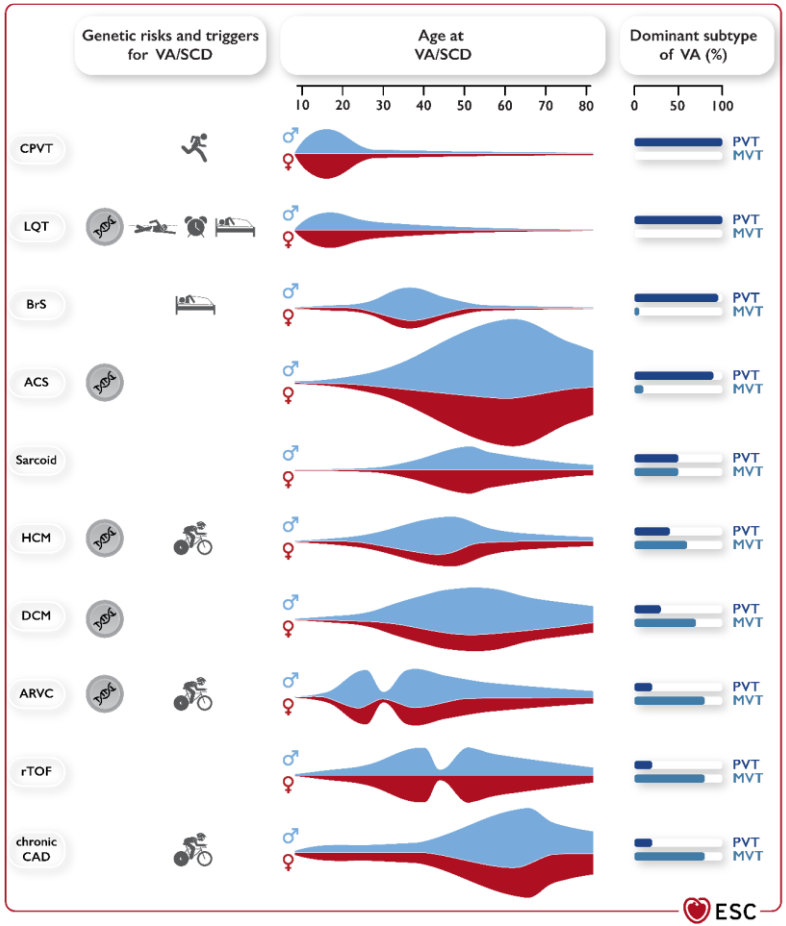
2022 ESC Guidelines for the management of patients with ventricular arrhythmias and the prevention of sudden cardiac death
(European Heart Journal; 2022 – doi: 10.1093/eurheartj/ehac262)

Algorithm for the evaluation of patients presenting with a first SMVT episode



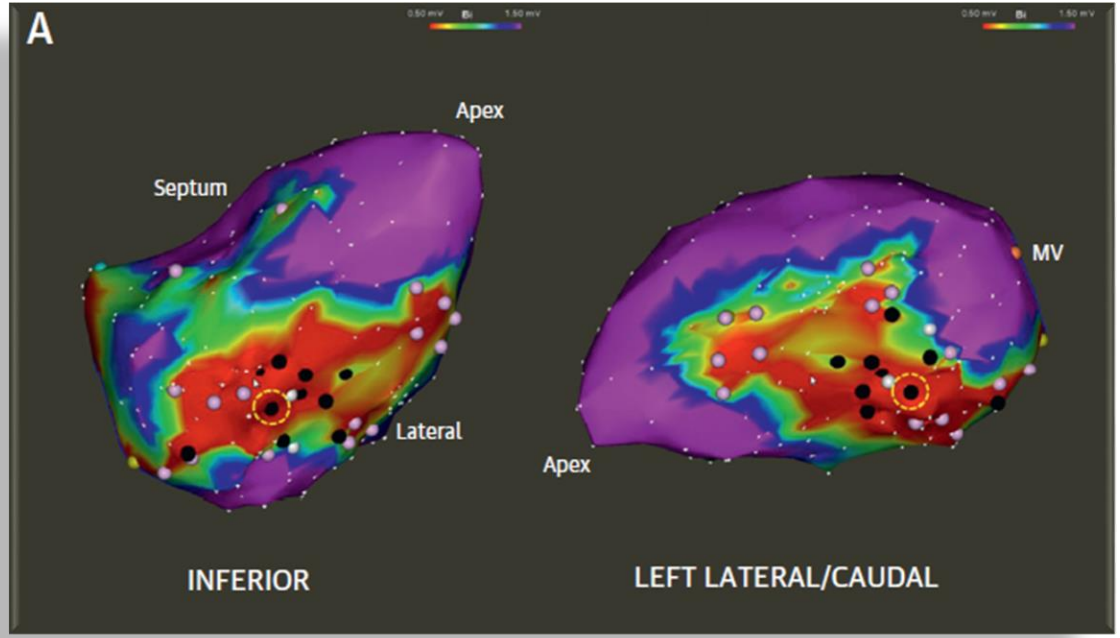
2022 ESC Guidelines for the management of patients with ventricular arrhythmias and the prevention of sudden cardiac death (European Heart Journal; 2022 – doi: 10.1093/eurheartj/ehac262)

Genetic risks and triggers for VA / SCD

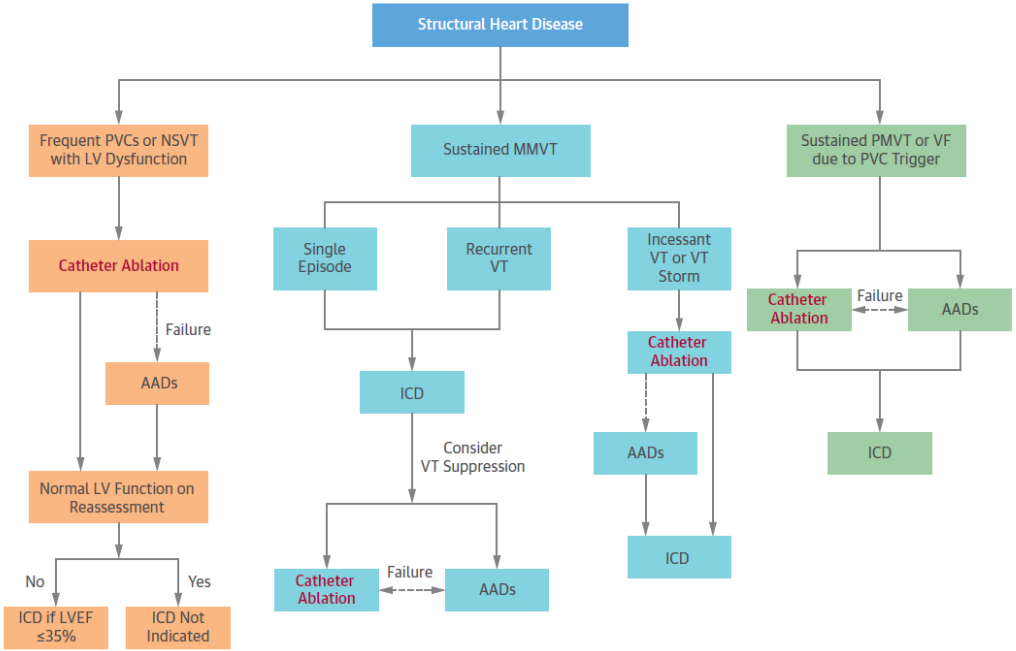


2022 ESC Guidelines for the management of patients with ventricular arrhythmias and the prevention of sudden cardiac death (European Heart Journal; 2022 – doi: 10.1093/eurheartj/ehac262)

III: What are the real data on the effectiveness of catheter ablation in patients with structural heart disease?

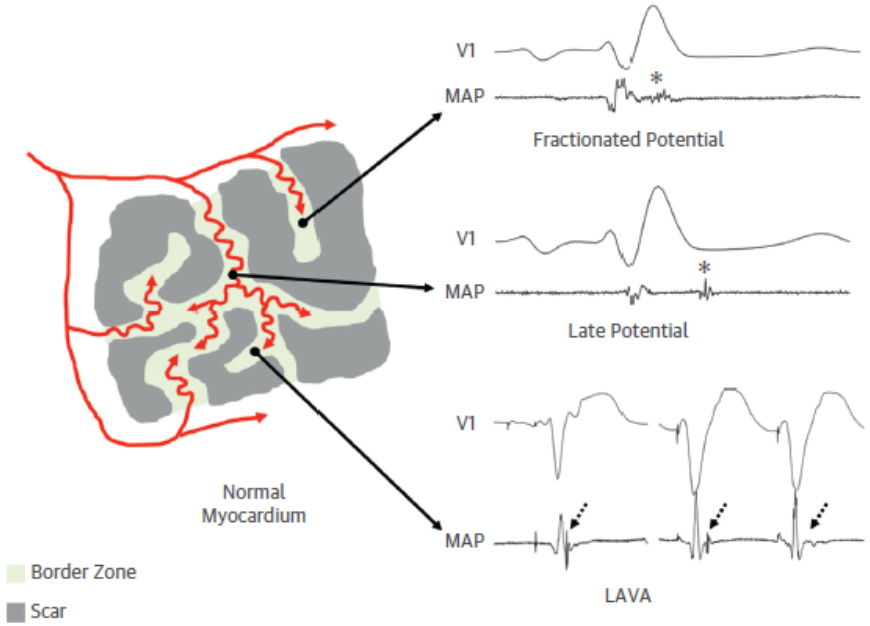


Role of Catheter Ablation in the Management of Patients With Structural Heart Disease



Dukkipati, S.R. et al. J Am Coll Cardiol. 2017;70(23):2924–41.

Patophysiology of Myocardial Scar and Substrate for Re-Entrant VT



Dukkipati, S.R. et al. J Am Coll Cardiol. 2017;70(23):2924–41.

Summary of Randomized Controlled Studies Assessing Catheter Ablation of Ventricular Tachycardia in Patients With Structural Heart Disease

Study, Year	Study Period	Sample Size		Inclusion Criteria	Control Arm	Age (y)	Male (%)	ICM (%)	Baseline LVEF (%)	Follow-Up (mo)
		CA	OC							
SMASH-VT, 2007[6]	2000-2006	64	64	Prior MI, ICD for VF or unstable VT	Medical therapy	67 ± 10	87	100	32 ± 9	22.5 ± 5.5
VTACH, 2010[4]	2002-2006	52	55	Prior MI, LVEF ≤50%, ICD indicated for stable VT	ICD + medical therapy	66 ± 8	93	100	34 ± 9	22.5 ± 9
CALYPSO, 2015[1]	2012-2014	13	14	IHD, ≥1 ICD shock or ≥3 ATP therapies for monomorphic VT in last 6 mo	AAD therapy	63 ± NR	93	100	30 ± NR	6[a]
VANISH, 2016[7]	2009-2015	132	127	Prior MI, ICD in situ, ≥1 episode of VT while on a Class I/III AAD	Escalation of AAD therapy	69 ± 8	93	100	31 ± 11	27.9 ± 17.1
SMS, 2017[5]	2002-2010	54	57	IHD, LVEF ≤40%, unstable VT	ICD + medical therapy	67 ± 8	84	100	31 ± 7	27.0 ± 13.2
BERLIN-VT, 2020[9]	2015-2018	76	83	Prior MI, LVEF 30%-50%), ICD in situ for life-threatening VT	Medical therapy until third ICD shock (then VT ablation)	66 ± 10	87	100	41 ± 6	13.2 ± 9.5
PARTITA, 2022[3]	2012-2021	23	24	Cardiomyopathy, had first ICD shock	Medical therapy	68 ± 9	85	81	32 ± 9	24.2 (8.5-24.4)
SURVIVE-VT, 2022[2]	2010-2017	71	73	Prior MI, sustained VT causing ICD shock or syncope	AAD therapy	70 ± 9	96	100	33 ± 11	23[a]
PAUSE-SCD, 2022[8]	2015-2020	60	61	LVEF <50%, ICD indicated for secondary prevention or inducible monomorphic VT on EPS	ICD + medical therapy	55 (46-64)	81	35	40 (30-49)	31.3 (20.1-40)

Sohaib A. Virk,:https://doi.org/10.1016/j.jacep.2022.09.002

Indications for catheter ablation of sustained monomorphic VT in patients with structural heart disease

Class I indication

In patients with structural heart disease and incessant monomorphic VT or VT storm, for whom AADs are ineffective or not tolerated, catheter ablation is recommended.

In patients with ICM and symptomatic sustained monomorphic VT for whom AADs are ineffective or not tolerated, catheter ablation is recommended.

In patients with ICM, sustained monomorphic VT, and an ICD who experience frequent ICD therapies, catheter ablation is recommended.

In patients with ICM who experience recurrent monomorphic VT despite chronic amiodarone therapy, catheter ablation is recommended in preference to escalating AAD therapy.

In patients with bundle branch reentrant VT, catheter ablation is recommended for reducing the risk of recurrent VT.

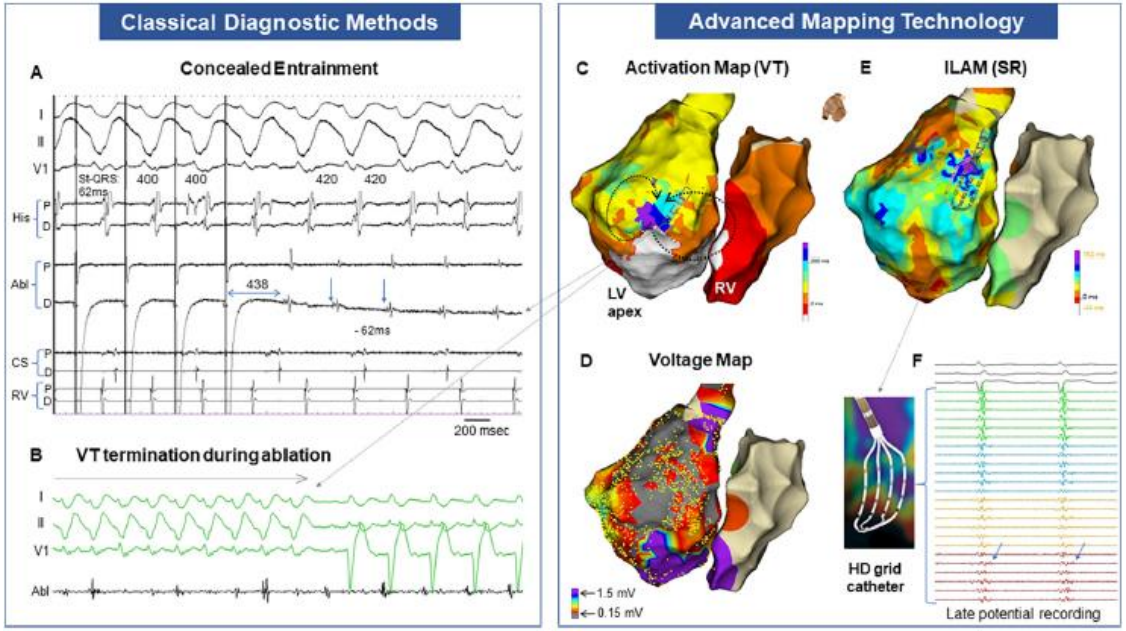
Class IIa indication

In patients with ICM and sustained monomorphic VT who undergo an ICD implantation, perioperative catheter ablation should be considered to reduce the risk of recurrent VT or ICD therapies.

In patients with non-ischemic cardiomyopathy and sustained monomorphic VT for whom AADs are ineffective or not tolerated, catheter ablation should be considered.

Nakahara S: Journal of Cardiology 81 (2023) 57–62

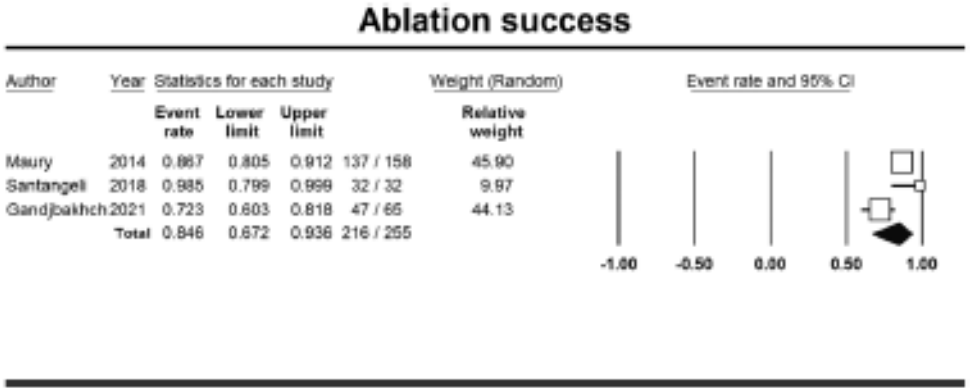
Identification of the ventricular tachycardia (VT) circuit by classic diagnostic methods and by electroanatomical mapping



Nakahara S: Journal of Cardiology 81 (2023) 57–62

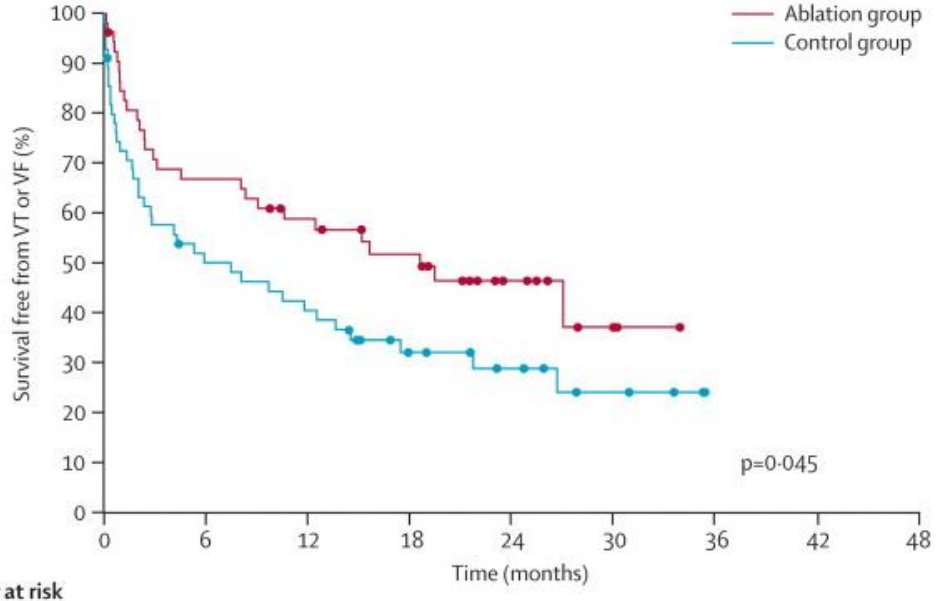
Catheter ablation as first-line treatment for ventricular tachycardia in patients with structural heart disease and preserved left ventricular ejection fraction: a systematic review and meta-analysis

- Outcomes of catheter ablation: mortality, complications, and success rates (920 pts):



Pooled success rate of catheter ablation was 84.6% (95% CI 67.2–93.6). Complications occurred in 6.4% (95% CI 4.0–9.9) of patients, and 13.9% (95% CI 10.1–18.8) required ICD implantation after ablation. VT recurrence was observed in 23.2% (95% CI 14.8–34.6) of patients

VTACH: primary endpoint, first recurrence of any VT or VF, occurred after a median of 18.6 months in the ablation group and 5.9 months in the control group (p=0.045, log-rank test)



Kuck K.H. Lancet, Volume 375, Issue 9708

Long-termoutcomes of different ablation strategies for ventricular tachycardia in patients with structural heart disease: Systematic review and meta-analysis

- In patients with SHD who had VT related mainly to ischaemic substrates, there was a significantly lower risk of the composite primary outcome of long-term VA recurrence and all-cause mortality among those undergoing substrate modification compared to standard ablation.

- Long-term success is improved when performing complete substrate modification.

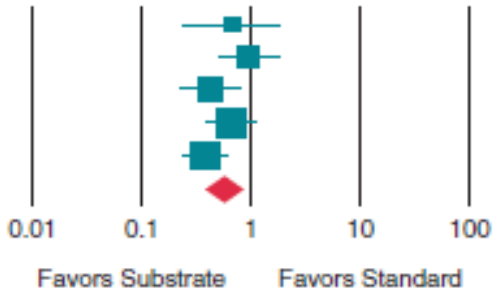
Ghannam M. Journal of Cardiovascular Electrophysiology, 2025; 36:1579–1587

Outcomes in substrate vs. standard ablation

A

Ventricular Arrhythmia Recurrence / All-Cause Mortality

Study name	MH risk ratio	Lower limit	Upper limit	Events / Total: Substrate	Events / Total: Standard	Relative weight
Arenal	0.67	0.24	1.87	6/18	3/6	9.61
Volkmer	0.97	0.51	1.83	11/25	10/22	19.55
Di Biase 2012	0.43	0.22	0.82	9/43	24/49	19.13
Makimoto	0.66	0.40	1.09	17/50	18/35	25.66
Di Biase 2015	0.38	0.23	0.63	14/58	38/60	26.06
	0.57	0.40	0.81	57/194	93/172	



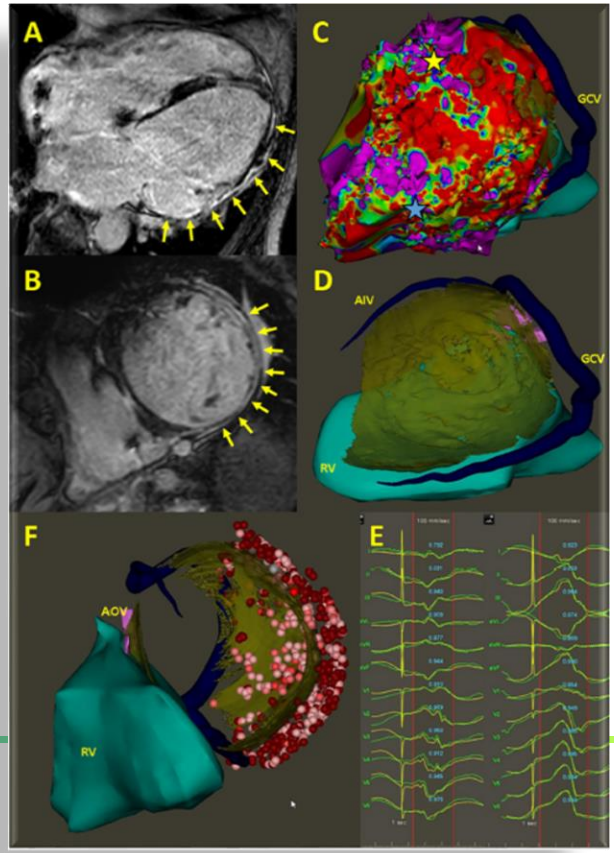
Random effects models
Heterogeneity: Tau2=0.06; Chi2=6.48; df=4; P=0.17; I2=38.3%
Test for overall effect Z=–3.13 (p=0.00)

Briceno DF: Europace (2018) 20, 104–115

Ventricular Tachycardia Ablation in Patients With Severely Decreased Left Ventricular Ejection Fraction

- Patients with very severe cardiomyopathy undergoing VT ablation represent a high risk population, experiencing high rates of VT recurrence and death on midterm follow up.
- Procedural and delayed enhancement cardiac magnetic resonance imaging (DE-CMR) characteristics among patients with very severecardiomyopathy (CM) and without left-ventricular assist devices (LVAD) have been incompletely described.
- Despite severe remodeling, DE-CMR provides localizing information on the arrhythmia site of origin.

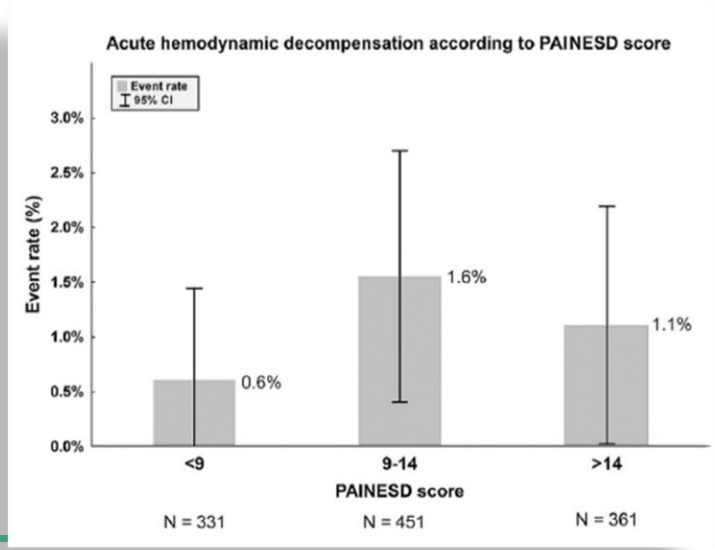
Complex cases: Epicardial ablation of ventricular tachycardia in pt. with severe nonischemic cardiomyopathy and LVEF 0.10…



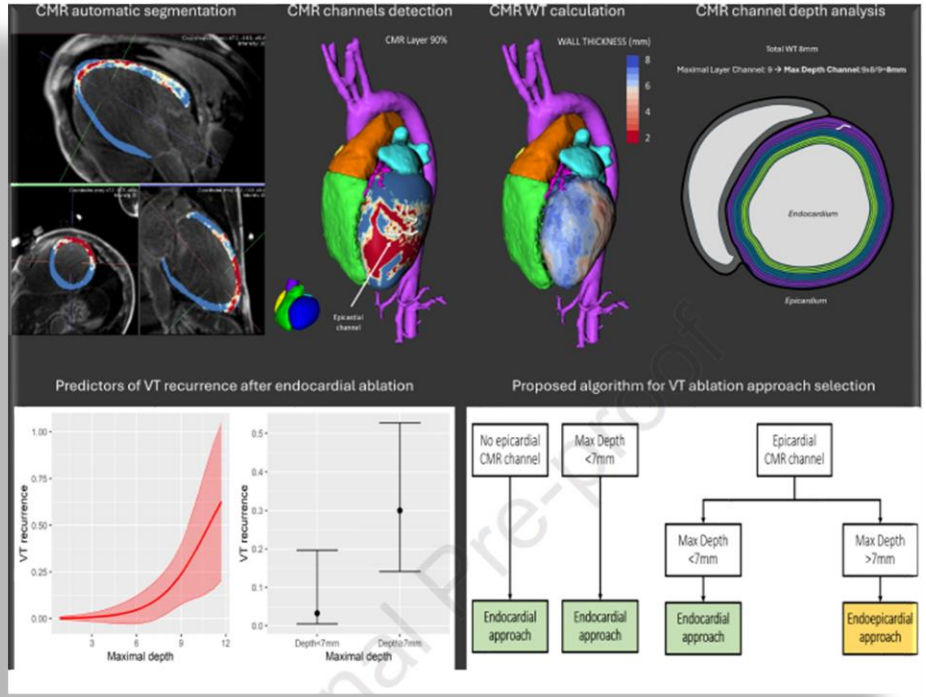
Ghannam M. Journal of Cardiovascular Electrophysiology, 2025; 36:1579–1587

Periprocedural Acute Hemodynamic Decompensation Associated With Substrate Based Ablation of Ventricular Tachycardia in Patients With Structural Heart Disease – Rare And Nonpredictable Event

- PAINESD score in 1143 patients with structural heart disease (SHD) and recurrent ventricular tachycardia (VT) are at considerable risk of periprocedural complications of radiofrequency (RF) catheter ablation including acute hemodynamic decompensation (AHD).

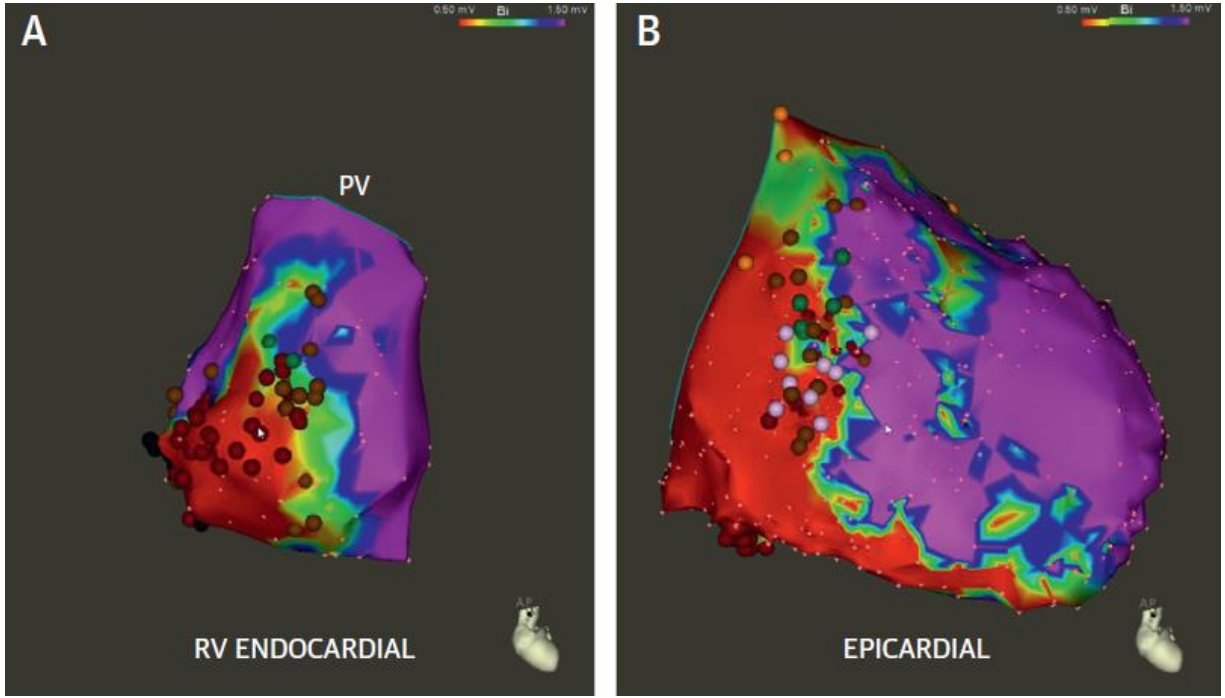


Cardiac magnetic resonance to evaluate 3D ventricular substrate depth: Prognostic implications for VT ablation approach



Vázquez-Calvo S, *Heart Rhythm* (2025), doi: https://doi.org/10.1016/j.hrthm.2025.11.008.

Take home message:
Catheter ablation of complex ventricular tachycardias should be performed in expert centers



Conclusions I

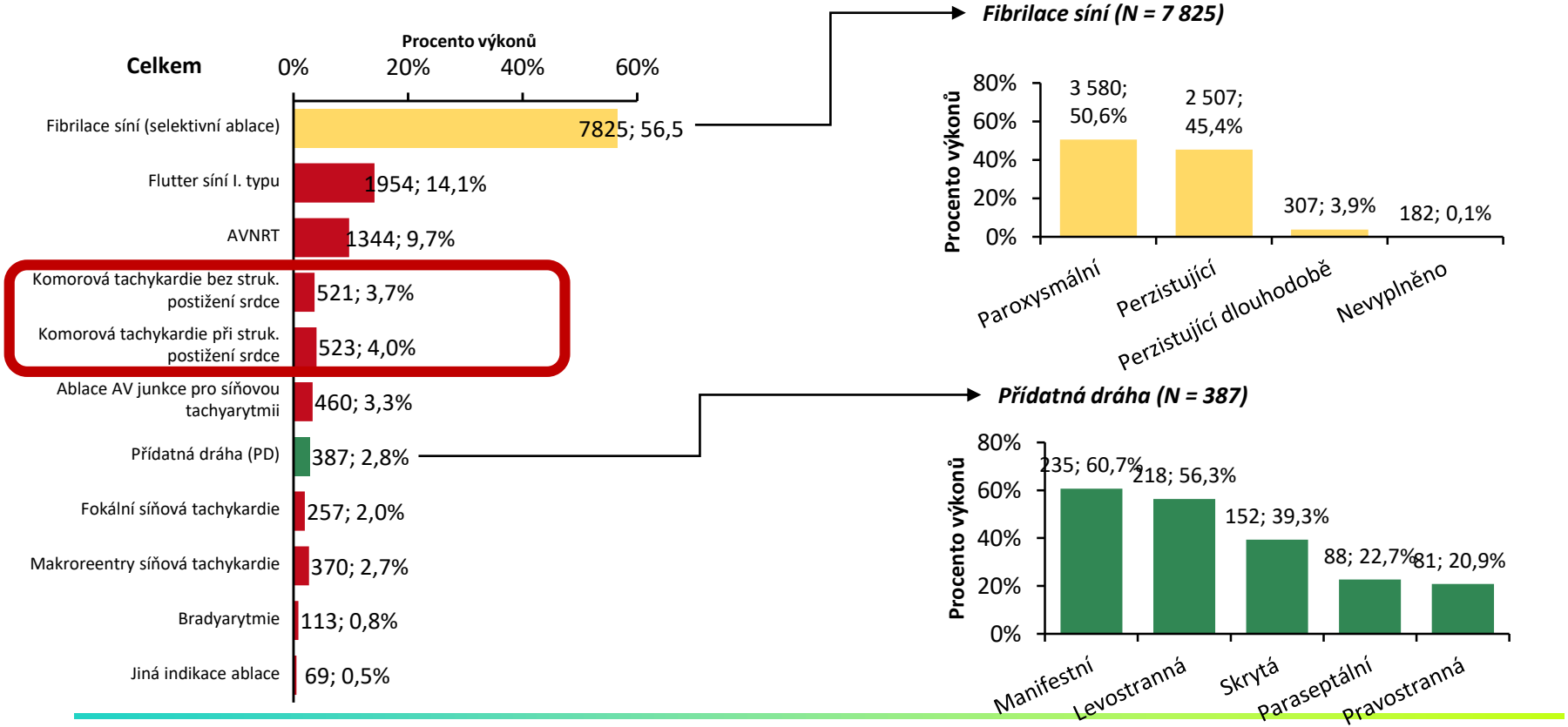
- **Recent advancements in catheter ablation** for structural ventricular tachycardia (VT), such as high-density mapping and cardiac imaging–based detection of target areas, MR-LGE based analysis, have significantly improved the efficacy of ablation procedures.

- **Catheter ablation as the first line of VT treatment in patients with SHD and preserved LVEF appears to be a promising therapeutic option.**

Conclusions II

- Our findings indicate **that VT ablation is viable for patients with SHD and preserved LVEF, especially those with monomorphic hemodynamically tolerated VT.**
- However, due to the lack of direct comparisons with other treatments such as ICDs and anti-arrhythmic medication, **further research is needed.**
- But **HD tolerated VT could be signals a risk of life-threatening arrhythmias**
- However, **certain patients with frequent premature ventricular contractions (PVCs) or VT and tachycardiomyopathy should be considered for ablation before ICD implantation** because left ventricular function may improve, consequently decreasing the risk of SCD and obviating the need for an ICD.
- These results should be considered preliminary, and **additional studies are necessary to establish VT ablation as the definitive first-line treatment in this population**

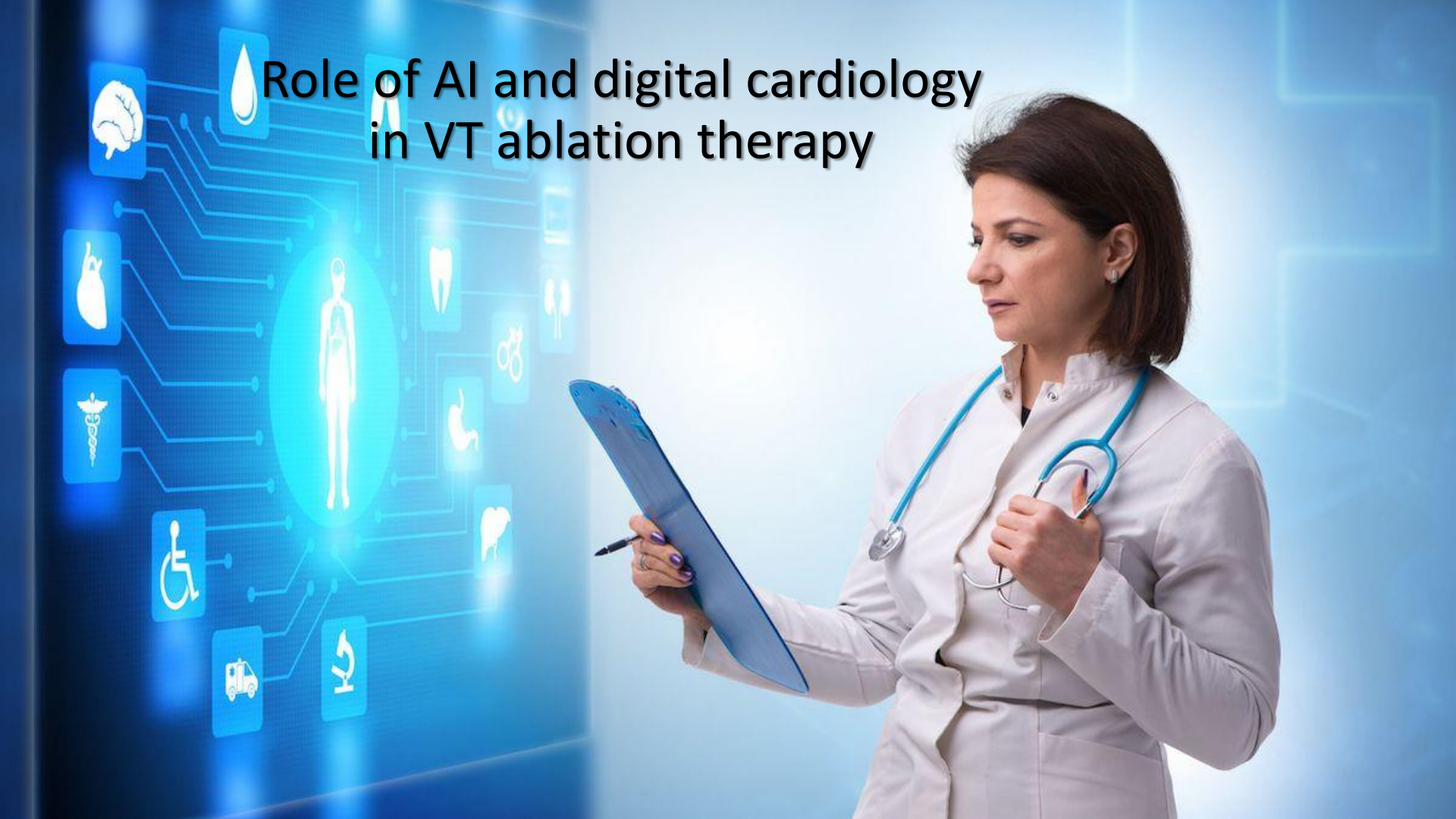
Czech Ablation Registry 2024



Počet provedených výkonů v roce 2024 (N = 13 852)

Jeden výkon může mít více typů arytmií.

Role of AI and digital cardiology in VT ablation therapy



Thank you for your attention!