

# Katetrizační ablace FS a uzávěr ouška levé síně

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XXII. české a slovenské sympozium o arytmiích a kardiostimulaci,

# Úvod

Optimální efekt ablace perzistentní fibrilace síní  $\approx$  opakovaná nebo extenzivní ablace v levé síni.



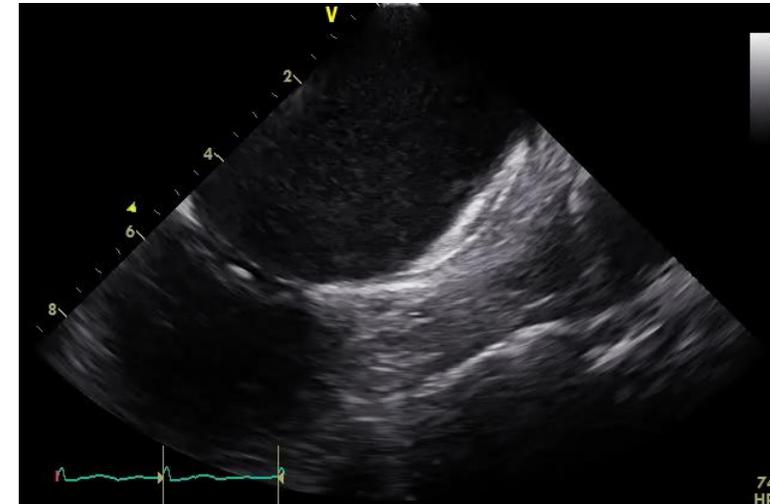
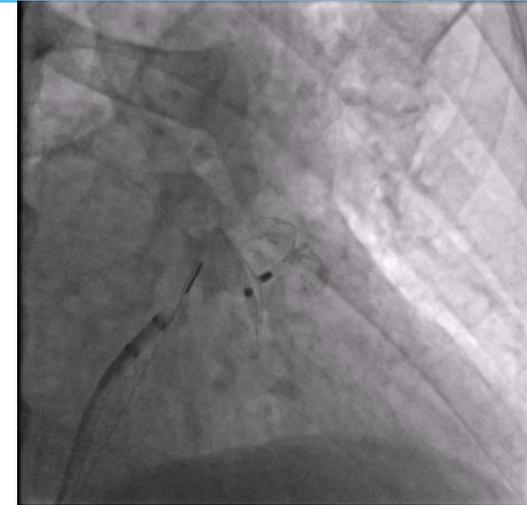
Cílená nebo náhodná elektrická izolace ouška levé síně



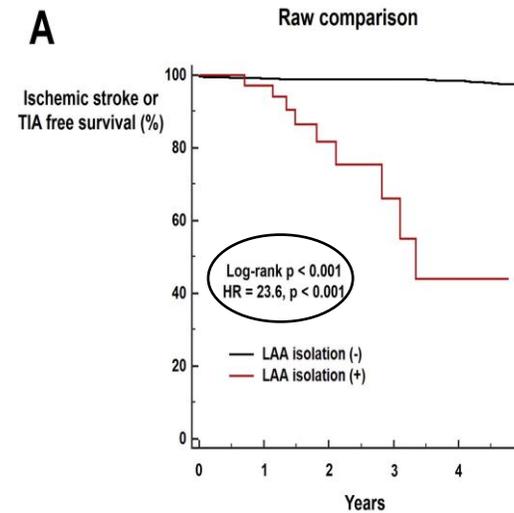
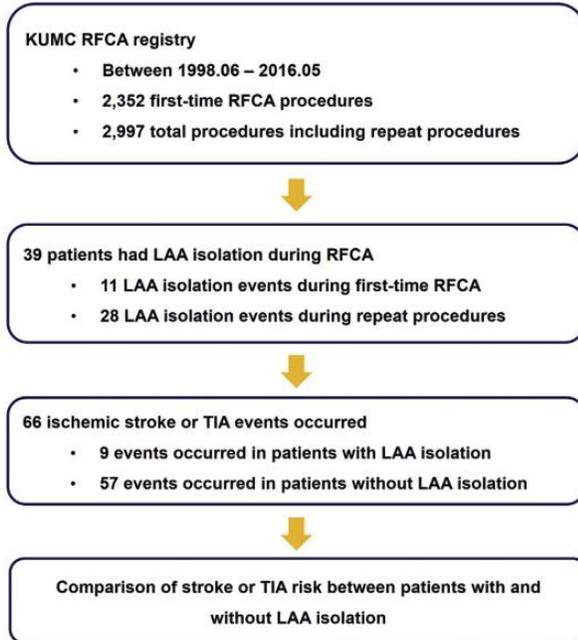
Zvýšené riziko trombembolických komplikací navzdory antikoagulační terapii



Katetrizační uzávěr ouška levé síně  $\rightarrow$  další redukce rizika TE komplikací

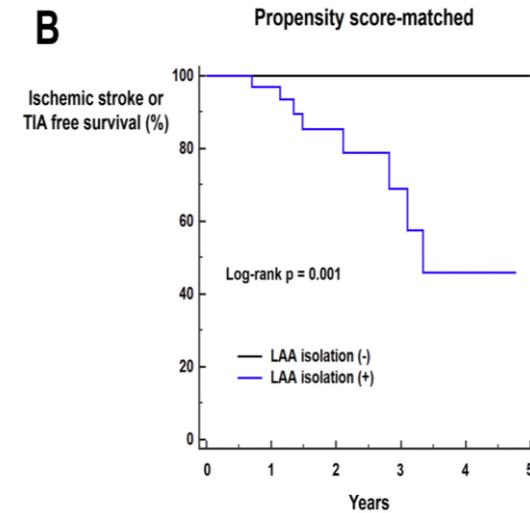


# Jaké je riziko trombembolie u elektricky izolovaného ouška LS?



Number at risk

Years	0	1	2	3	4	5
LAA isolation (-)	2310	1931	1561	1263	1008	775
LAA isolation (+)	39	33	14	6	1	0



Number at risk

Years	0	1	2	3	4	5
LAA isolation (-)	36	29	19	12	8	6
LAA isolation (+)	36	30	14	6	1	0

**Table 2** Presenting symptoms and clinical course of each patient

Patient no.	Type of the event	Date of the event	Date of LAA isolation	LAA isolation during the repeat procedure	Time interval between LAA isolation and the clinical event (d)	Imaging study (CT or MRI)	Infarction lesion in the imaging study	Neurologist confirmation	CHA <sub>2</sub> DS <sub>2</sub> -VASC score	Antithrombotic therapy before the clinical event
1	Ischemic stroke	2016/8/11	2014/10/20	Repeat RFCA	661	Performed	Documented infarction	Yes	3	Clopidogrel
2	Ischemic stroke	2017/7/11	2015/6/1	Repeat RFCA	771	Performed	Documented infarction	Yes	0	Clopidogrel
3	Ischemic stroke	2013/8/2	2012/3/29	First-time RFCA	491	Performed	Documented infarction	Yes	1	Aspirin + clopidogrel
4	Ischemic stroke	2016/5/7	2014/11/13	Repeat RFCA	541	Performed	Documented infarction	Yes	1	Warfarin
5	Ischemic stroke	2017/3/23	2016/2/4	First-time RFCA	413	Performed	Documented infarction	Yes	1	Edoxaban 60 mg
6	TIA	2017/8/16	2014/10/22	Repeat RFCA	1029	Performed	No infarction	Yes	0	None
7	TIA	2015/12/11	2013/12/31	Repeat RFCA	710	Performed	No infarction	Yes	0	Aspirin
8	TIA	2014/12/2	2014/3/20	Repeat RFCA	257	Not performed	NA	Yes	0	Warfarin
9	TIA	2017/6/15	2014/2/12	First-time RFCA	1219	Performed	No infarction	Yes	0	Edoxaban 60 mg

CT = computed tomography; LAA = left atrial appendage; MRI = magnetic resonance imaging; NA = not available; RFCA = radiofrequency catheter ablation; TIA = transient ischemic attack.

# Jaké je riziko trombembolie u elektricky izolovaného ouška LS?

## Unexpectedly High Incidence of Stroke and Left Atrial Appendage Thrombus Formation After Electrical Isolation of the Left Atrial Appendage for the Treatment of Atrial Tachyarrhythmias

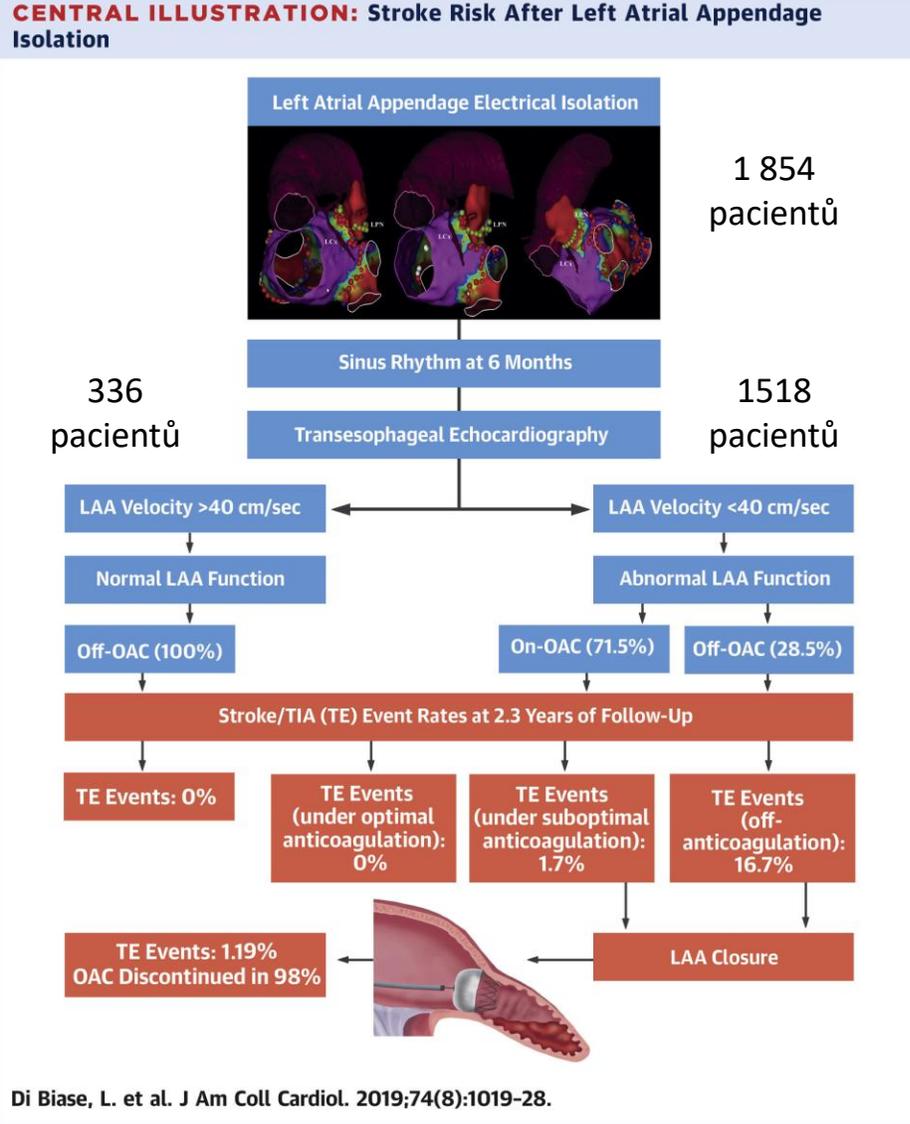
Andreas Rillig, MD\*; Roland R. Tilz, MD, FHRS\*; Tina Lin, MBBS, BMedSci, FRACP; Thomas Fink, MD; Christian-H. Heeger, MD; Anita Arya, PhD, MBBS; Andreas Metzner, MD; Shibu Mathew, MD; Erik Wissner, MD, FHRS; Hisaki Makimoto, MD, PhD; Peter Wohlmuth, PhD; Karl-Heinz Kuck, MD, FESC, FHRS; Feifan Ouyang, MD

Table 1. Baseline Characteristics of the Overall Group (n=100) and of Patients With LAAI (n=50) and Without LAAI (n=50)

	Overall Group (n=100)	Patients With LAAI (n=50)	Patients Without LAAI (n=50)	P Value
Female, n, %	53 (53)	28 (56)	25 (50)	0.55
Age, y	70.0 (65.0–73.5)	71.0 (66.0–74.0)	69.0 (64.0–73.0)	0.24
Hypertension, n (%)	67 (67%)	31 (62%)	36 (72%)	0.29
Diabetes mellitus, n (%)	11 (11%)	4 (8%)	7 (14%)	0.34
CAD, n (%)	16 (16%)	9 (18%)	7 (14%)	0.59
Stroke or TIA before index procedure, n (%)	11 (11%)	7 (14%)	4 (8%)	0.34
CHA <sub>2</sub> DS <sub>2</sub> -VASc score*	2.0 (2.0–3.0)	3.0 (2.0–3.0)	2.0 (2.0–3.0)	0.71
LA diameter, mm*	46.0 (43.0–49.0)	46.0 (43.0–49.0)	45.5 (43.0–50.0)	0.68
LV function, %*	65.0 (65.0–65.0)	65.0 (65.0–65.0)	65.0 (65.0–65.0)	0.13
PFO, n (%)	5 (5%)	3 (6%)	2 (4%)	0.66
NOAC, n (%)	48 (48%)	21 (42%)	27 (54%)	0.23
Phenprocoumon, n (%)	47 (47%)	24 (48%)	23 (46%)	0.84
ASA therapy, n (%)	3 (3%)	3 (6%)	0 (0)	0.08
Clopidogrel therapy, n (%)	2 (2%)	2 (4%)	0 (0)	0.15
LAA thrombus or embolic event (combined), n (%)	13 (13%)	13 (26%)	0 (0)	<0.01
Smoke in LAA before ablation, n (%)	17 (17%)	9 (18%)	8 (16%)	0.75
Degree of smoke in LAA before ablation (median)	1.0 (1.0–2.0)	2.0 (1.0–2.0)	1.0 (1.0–2.0)	0.66
Smoke in LAA after ablation, n (%)	28 (29%)	19 (41%)	9 (18%)	0.012
Degree of smoke in LAA after ablation (median)	2.0 (1.0–3.0)	3.0 (1.0–3.0)	1.0 (1.0–2.0)	0.041
LAA flow velocity after ablation, m/s	0.4 (0.2–0.5)	0.2 (0.15–0.40)	0.5 (0.44–0.64)	<0.01
Number of ablation procedures before index procedure with LAAI (median)	1 (0–2)	2 (1–3)	0 (0–1)	<0.01
<b>LAA Morphology</b>				
Cactus, n (%)	17 (17%)	8 (16%)	9 (18%)	0.79
Chicken wing, n (%)	58 (58%)	28 (56%)	30 (60%)	0.69
Windssock, n (%)	19 (19%)	10 (20%)	9 (18%)	0.80
Cauliflower, n (%)	6 (6%)	4 (8%)	2 (4%)	0.40
<b>AF type</b>				
Paroxysmal AF, n (%)	36 (36%)	20 (40%)	16 (32%)	
Persistent AF, n (%)	51 (51%)	23 (46%)	28 (56%)	
LS-AF, n (%)	13 (13%)	7 (14%)	6 (12%)	

	LAAI group (n = 50)	Control group (n = 50)	P value
Stroke	2 (4%)	0	< 0.001
TIA	1 (2%)	0	
LAA thrombus (TEE)	10/47 = 21%	0	< 0.001
On OAC among thrombus pts	9/10	–	
Sinus rhythm at FU	32 (64%)	–	
TOE	47/50 (94%)	–	

# Jaké je riziko trombembolie u elektricky izolovaného ouška LS?



LAAEI je spojena s významným rizikem CMP, které lze účinně snížit optimální nepřerušenou antikoagulační léčbou nebo použitím LAAO.

# Je lepší OAC nebo LAAO po ablaci FS?

**AHA 2024**  
November 16-18, 2024  
Chicago

## OPTION trial

#AHA 2024

PCR  
online

@Sticchi\_Alex Source: PCRONline.com

**1600** patients at high risk for stroke undergoing ablation for atrial fibrillation (AF) randomized to Left Atrial Appendage Closure (LAAC) vs Oral Anticoagulation (OAC).

Primary **Efficacy** Endpoint: composite of death from any cause, stroke or systemic embolism at 36 months.  
Primary **Safety** Endpoint: non-procedural bleeding (ISTH major bleeding and clinically relevant non-major bleeding).

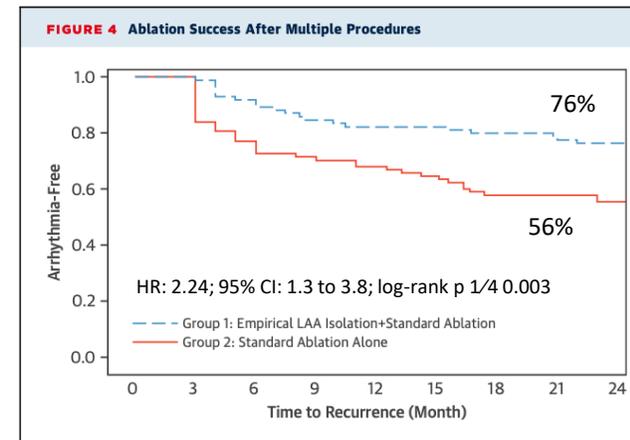
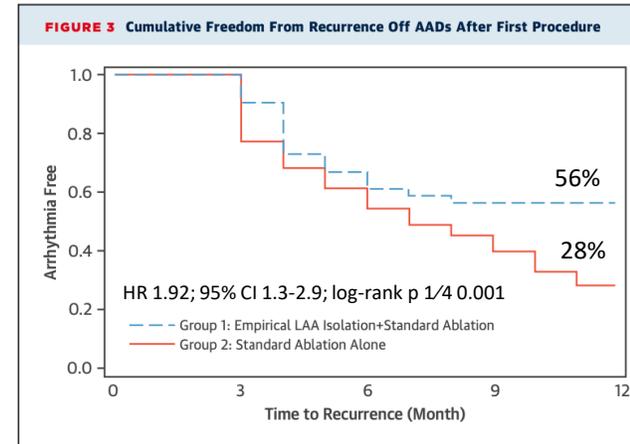
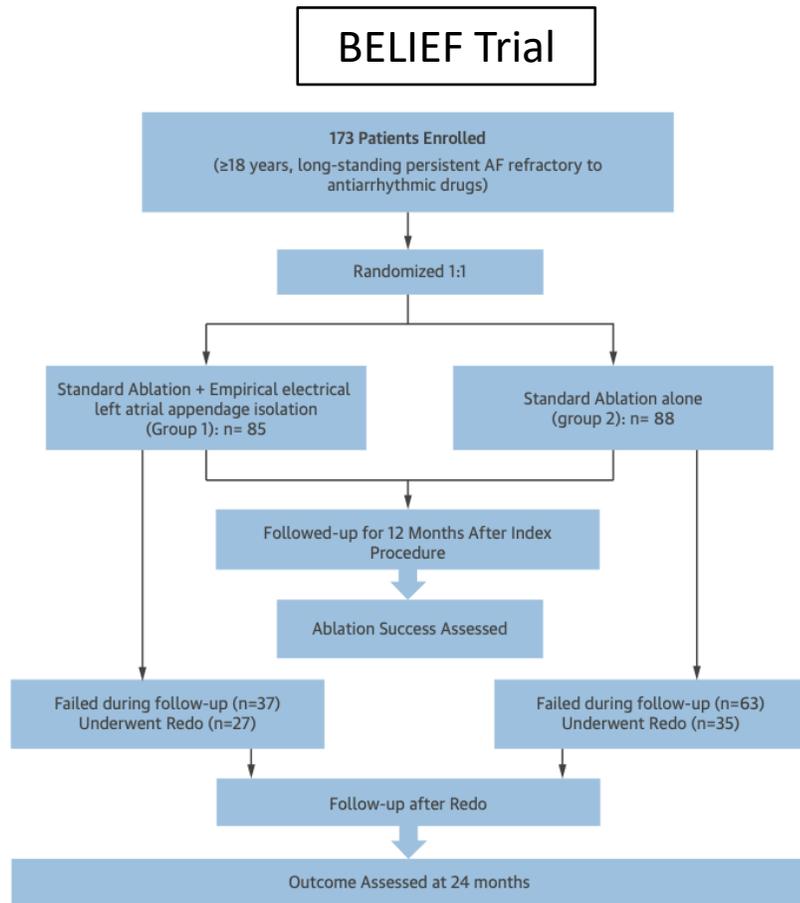
LAAC	OAC
 WATCHMAN FLX device (Boston Scientific)	
<b>Efficacy 5.3%</b>	<b>Efficacy 5.8%</b>
<b>Safety 8.5%</b>	<b>Safety 18.1%</b>

HR 0.91; P<0.001 for noninferiority; HR 0.44; P<0.001 for superiority

The OPTION trial affirms that LAAC is a strong, safe alternative to long-term OAC for post-ablation AF patients, particularly those at high risk of bleeding, providing comparable stroke prevention with a significantly reduced bleeding risk. Further studies with longer follow-up are needed to confirm its benefits.

- Nízké procento CMP v obou větvích (1.2% and 1.3%)
- Problémy
  - ITT analýza vs noninferiority design
  - Úmrtí z jakékoliv příčiny v kompozitním endpointu
  - Missing data 9%!

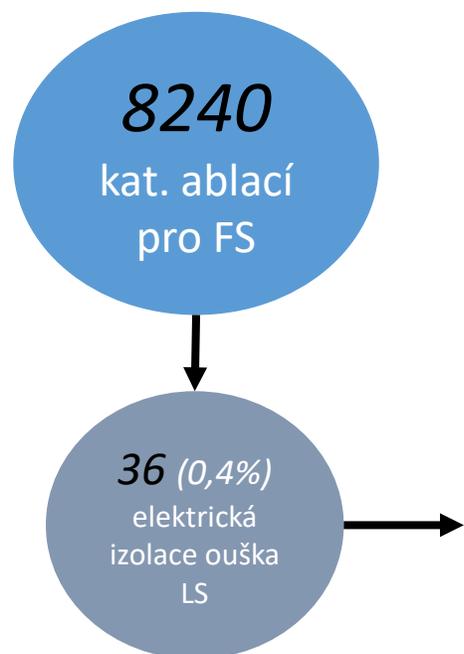
# Jaký je vliv izolace ouška na klinický efekt ablace FS?



Di Biase et al. JACC 2016

# Soubor pacientů

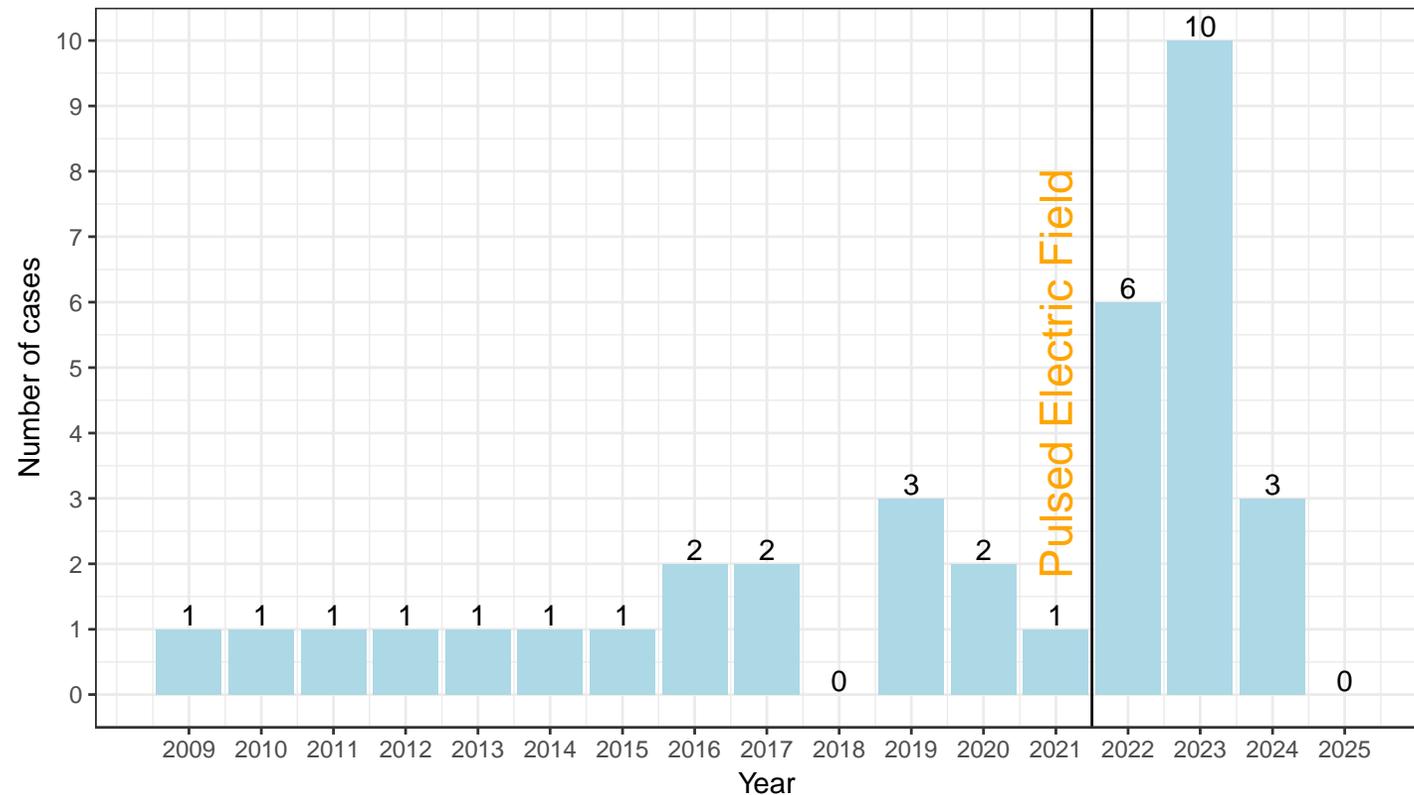
>300 katetrizačních uzávěrů ouška LS (*od roku 2014*)



Základní charakteristiky	N = 36 <sup>1</sup>
Ženy	16 (44%)
Věk (roky)	67 (8)
BMI	28 (4)
Perzistentní FS	31 (86%)
Trvání FS (měsíce)	121 (66)
Předchozí ablace	32 (89%)
Arteriální hypertenze	26 (72%)
Diabetes Mellitus	7 (19%)
ICHS	5 (14%)
CMP nebo TIA	3 (8.3%)
Chronické onemocnění ledvin	1 (2.8%)
Srdeční selhání	11 (31%)
Anamnéza krvácení	2 (5.6%)
CHA2DS2-VASC	3 (1)

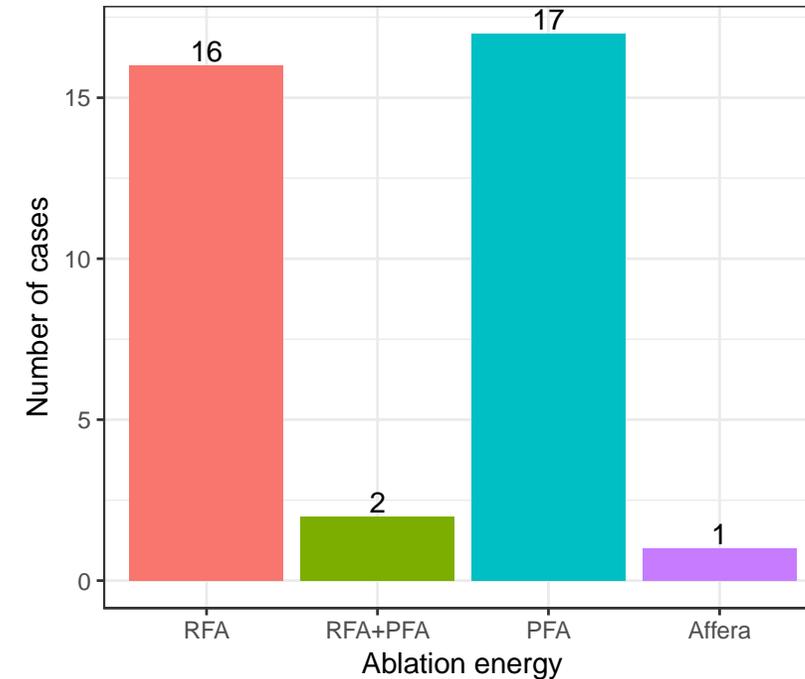
Echokardiografie	N = 36 <sup>1</sup>
LVEF (%)	54 (10)
LVEDD (mm)	52 (7)
LAD (mm)	45 (8)
LAVi (ml/m <sup>2</sup> )	52 (22)
E (cm/s)	86 (20)
A (cm/s)	42 (39)
E/A	2.4 (0.9)

# Časový vývoj počtu izolovaných oušek LS



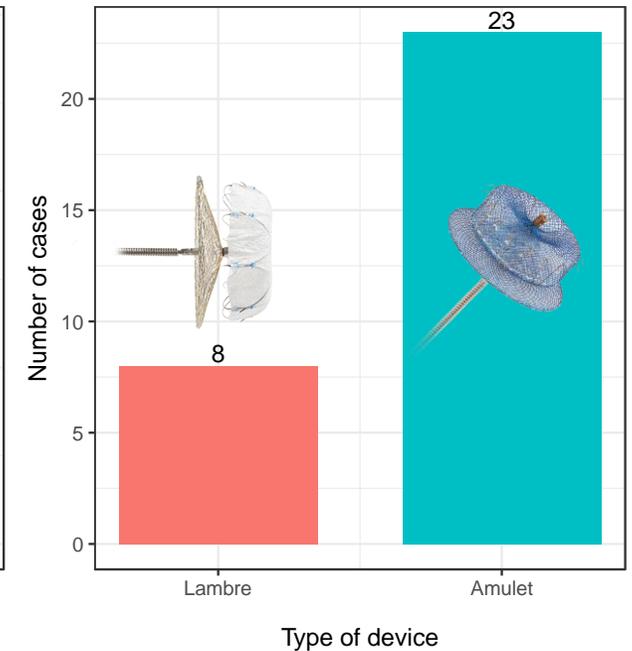
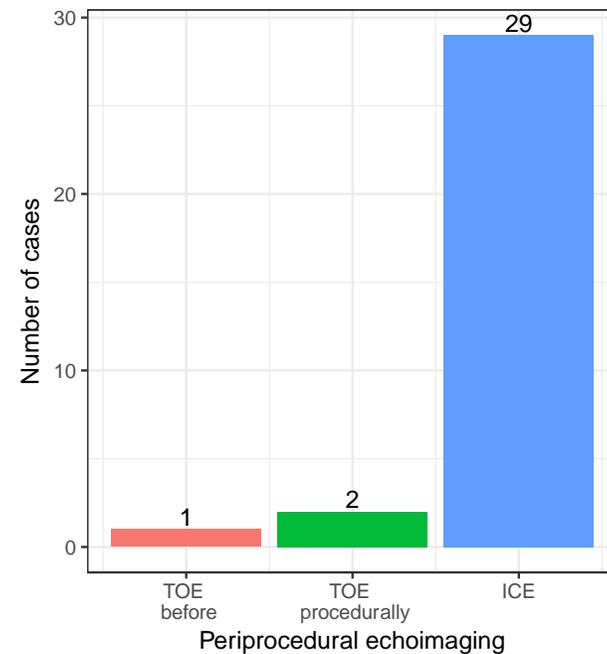
# Procedurální charakteristiky (izolace ouška LS)

Procedurální charakteristiky	N = 36 <sup>1</sup>
Trvání výkonu (min)	178 (81)
Reizolace plicních žil	17 / 36 (47%)
Ablace zadní stěny (BOX)	14 / 36 (39%)
Ablace stropu	13 / 36 (36%)
Ablace na přední stěně	18 / 36 (50%)
Laterální mitrální isthmus	21 / 36 (58%)
Spodní stěna	8 / 36 (22%)
Spontánní izolace LAA	6 / 35 (17%)
Periprocedurální izolace LAA	29 / 35 (83%)
Celkový počet ablací	3 (1)



# Procedurální charakteristiky (kat. uzávěr ouška LS)

Procedurální charakteristiky	N = 32 (88%)
Trvání výkonu (min)	52 (33)
Celková anestezie	3 (9,4%)
Délka hospitalizace (dny)	4 (1)
Antitrombotická terapie po výkonu	
ASA	8 (26%)
DAPT + Warfarin	1 (3.2%)
Warfarin	5 (16%)
NOAC	17 (55%)



# Klinické výsledky

## Follow-up:

- průměr **10 let**
- median (IQR) **5 (3, 15)**

## Antitrombotická terapie ve 3M po ablaci

Bez terapie	2 (6.7%)
SAPT	9 (30%)
DAPT+Warfarin	1 (3.3%)
DAPT	1 (3.3%)
NOAC	12 (40%)
Warfarin	5 (17%)

*Hemoperikard*  
2/32 (6,3%)

*Trombus na  
okluderu*  
0/30 (0%)

*Recidiva FS/ST*  
17/35 (49%)

*CMP*  
1/32 (3,2%)

*Leak (max 4mm)*  
5/30 (17%)

*Úmrtí*  
2/35 (5.7%)

# Závěr

## Katetrizační uzávěr elektricky izolovaného ouška:

- dlouhodobě snižuje riziko TE komplikací i u pacientů na antitrombotické terapii,
- má přijatelné periprocedurální riziko.



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Děkuji za pozornost!