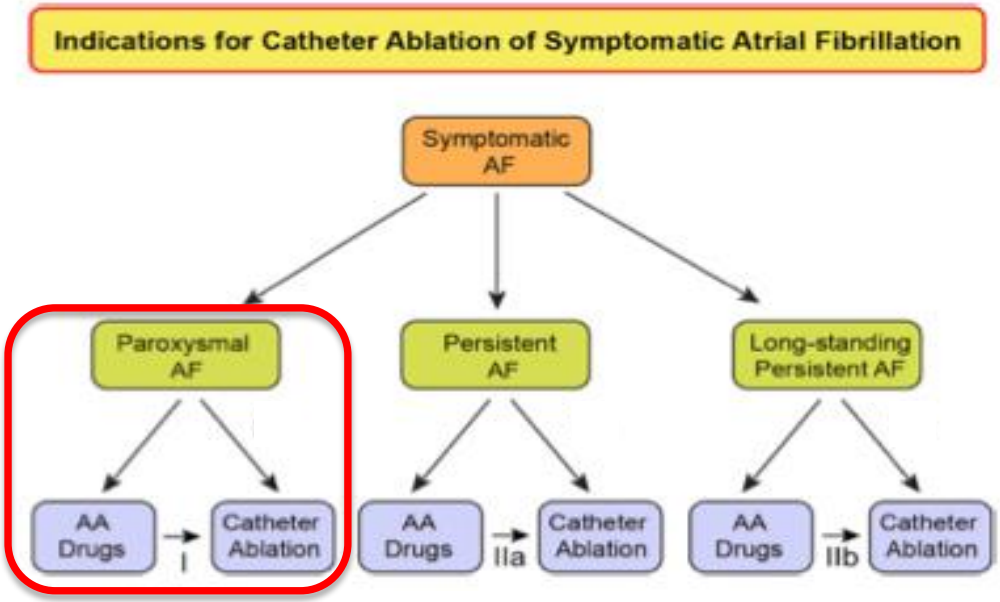
E.N. Meshalkin National Medical Research Centre
Novosibirsk, Russian Federation

Торакоскопический подход в лечении фибрилляции предсердий

Елесин Д.А.



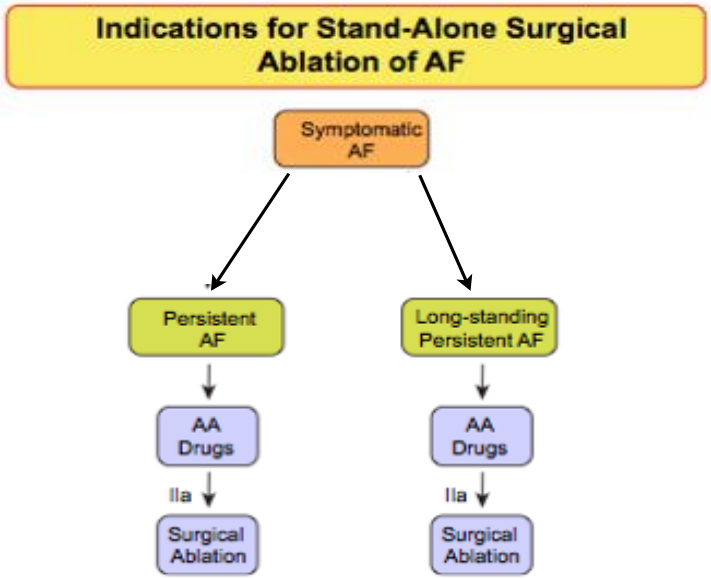
European Heart Journal Advance Access published August 27, 2016

European Heart Journal
doi:10.1093/eurheartj/ehw210

ESC GUIDELINES

2016 ESC Guidelines for the management of atrial fibrillation developed in collaboration with EACTS

Рекомендации	Класс доказанности	Уровень доказанности
Катетерная аблация симптомной пароксизмальной ФП рекомендуется для улучшения контроля симптомов у пациентов с выраженными клиническими проявлениями ФП на антиаритмической лекарственной терапии (амиодарон, дронедарон, флекаинид, пропафенон, соталол) и пациентов, предпочитающих дальнейшую терапию контроля ритма при условии проведения ее электрофизиологами, имеющими соответствующую квалификацию, в условиях опытного центра.	I	A



European Heart Journal Advance Access published August 27, 2016

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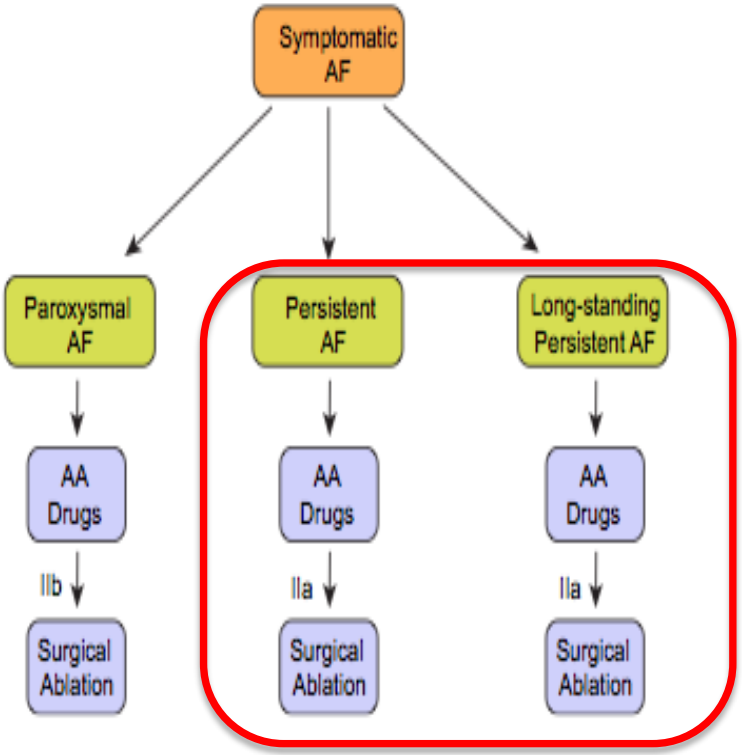
ESC GUIDELINES

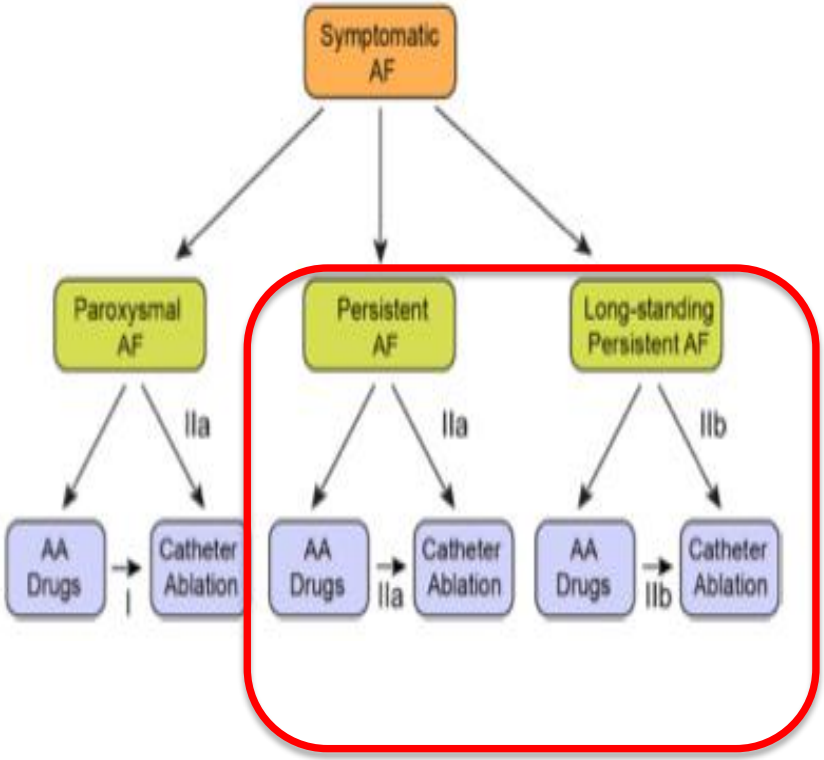
2016 ESC Guidelines for the management of atrial fibrillation developed in collaboration with EACTS

Рекомендации	Класс доказанности	Уровень доказанности
Миниинвазивную хирургию следует рассматривать у пациентов с симптомной персистирующей или длительно-персистирующей ФП, рефрактерной к ААТ для улучшения симптомов, учитывая выбор пациента, пользу и риск.	I Ia	C
Миниинвазивная хирургия с эпикардиальной изоляцией легочных вен должна быть рассмотрена у пациентов с симптоматичной ФП, когда катетерная аблация была неэффективна.	I Ia	B

Indications for Stand-Alone Surgical Ablation of AF



Indications for Catheter Ablation of Symptomatic Atrial Fibrillation

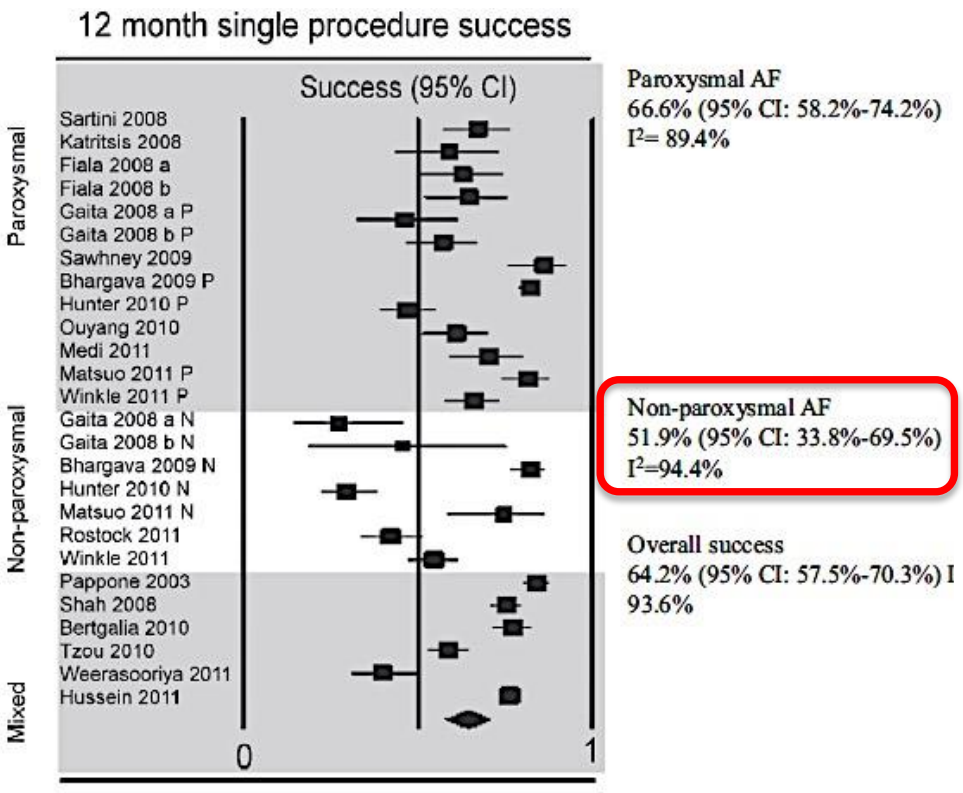


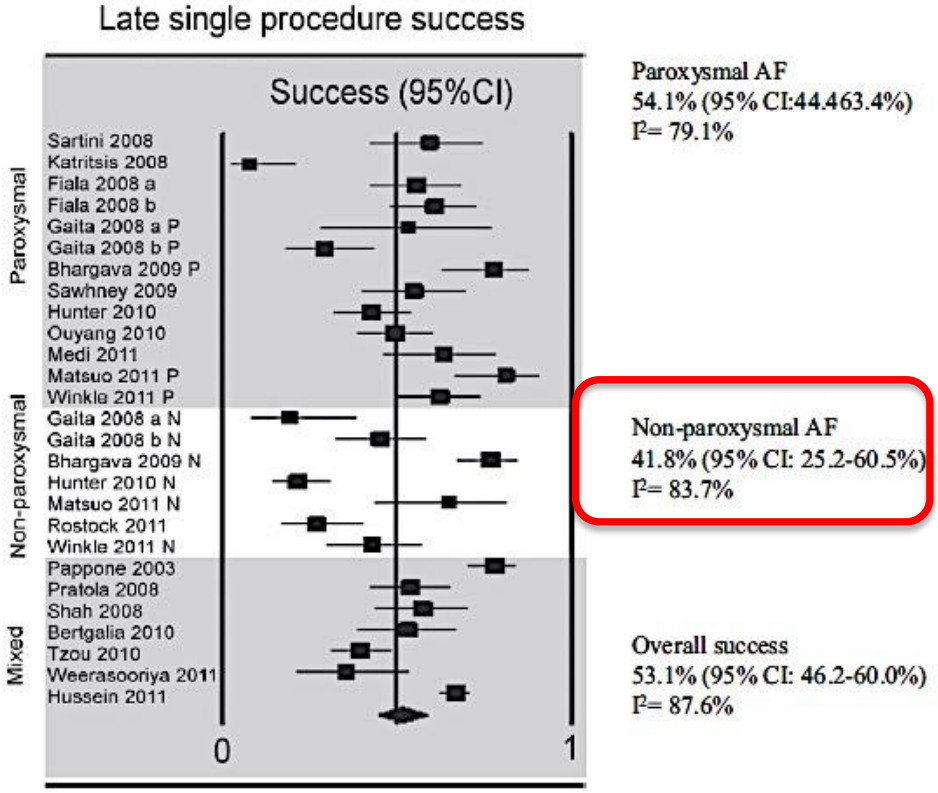
Хирургическое или катетерное лечение фибрилляции предсердий: что лучше?

Journal of the American Heart Association
OPEN ACCESS
American Heart Association | American Stroke Association

Long-term Outcomes of Catheter Ablation of Atrial Fibrillation: A Systematic Review and Meta-analysis

Anand N. Ganesan, Nicholas J. Shipp, Anthony G. Brooks, Pawel Kuklik, Dennis H. Lau, Han S. Lim, Thomas Sullivan, Kurt C. Roberts-Thomson and Prashanthan Sanders



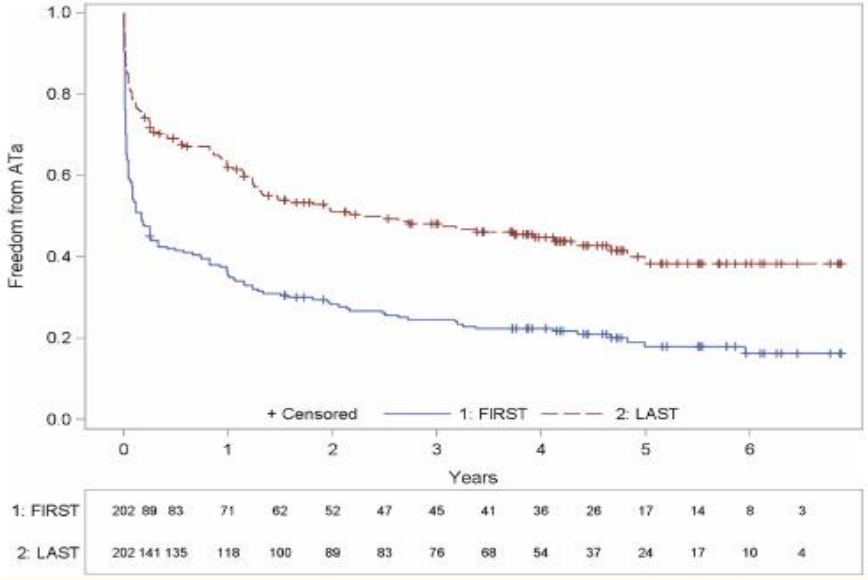


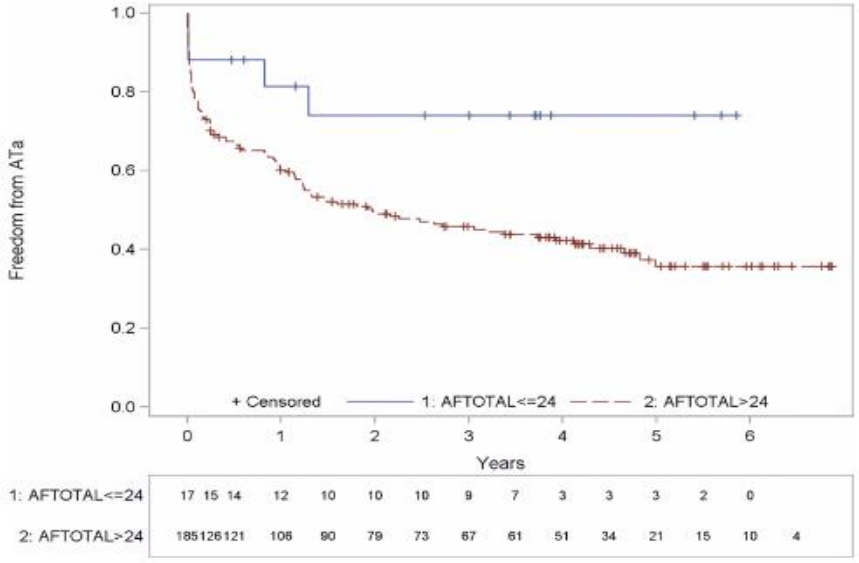
Catheter Ablation of Long-Standing Persistent Atrial Fibrillation

5-Year Outcomes of the Hamburg Sequential Ablation Strategy

Roland Richard Tilz, MD, Andreas Rillig, MD, Anna-Maria Thum, Anita Arya, MD, Peter Wohlmuth, Andreas Metzner, MD, Shibu Mathew, MD, Yasuhiro Yoshiga, MD, Erik Wissner, MD, Karl-Heinz Kuck, MD, Feifan Ouyang, MD

Hamburg, Germany





Procedure	PVI Only Until This Procedure	PVI and Additional Ablation		
		CFAE	LA Line	SVC/AES
First procedure (n = 202)	165 (165)	29 (29)	12 (12)	7 (7)
Second procedure (n = 126)	0 (60)	15 (21)	24 (26)	13 (0)
Third procedure (n = 42)	0 (5)	15 (20)	21 (26)	1 (0)
Fourth procedure (n = 11)	0 (0)	1 (2)	3 (6)	0 (0)
Fifth procedure (n = 2)	0 (0)	0 (0)	0 (2)	0 (0)
Ablation summary (last procedure)	105	60	60	21

Circulation
JOURNAL OF THE AMERICAN HEART ASSOCIATION

Atrial Fibrillation Catheter Ablation Versus Surgical Ablation Treatment (FAST): A 2-Center Randomized Clinical Trial

Lucas V.A. Boersma, Manuel Castella, WimJan van Boven, Antonio Berruezo, Alaaddin Yilmaz, Mercedes Nadal, Elena Sandoval, Naiara Calvo, Josep Brugada, Johannes Kelder, Maurits Wijffels and Lluís Mont

Circulation. 2012;125:23-30; originally published online November 14, 2011;

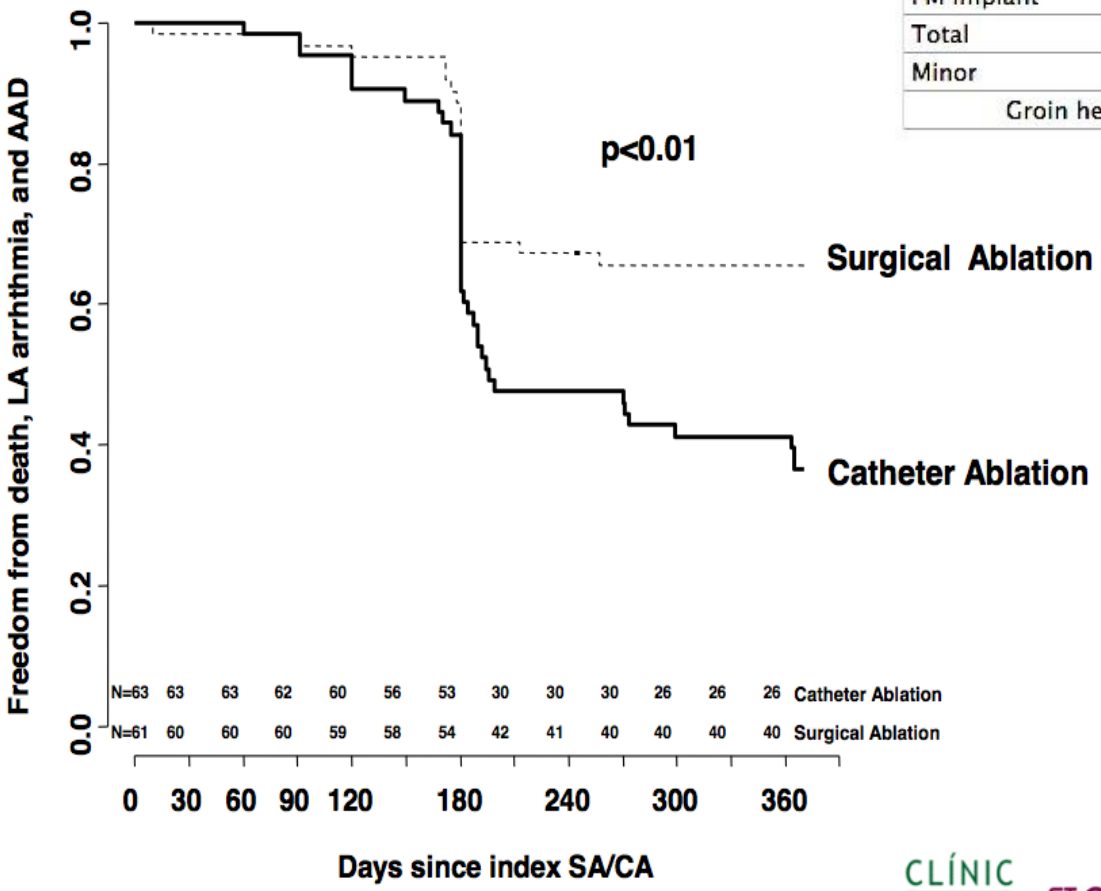
Background—Catheter ablation (CA) and minimally invasive surgical ablation (SA) have become accepted therapy for antiarrhythmic drug–refractory atrial fibrillation. This study describes the first randomized clinical trial comparing their efficacy and safety during a 12-month follow-up.

Methods and Results—One hundred twenty-four patients with antiarrhythmic drug–refractory atrial fibrillation with left atrial dilatation and hypertension (42 patients, 33%) or failed prior CA (82 patients, 67%) were randomized to CA (63 patients) or SA (61 patients). CA consisted of linear antral pulmonary vein isolation and optional additional lines. SA consisted of bipolar radiofrequency isolation of the bilateral pulmonary vein, ganglionated plexi ablation, and left atrial appendage excision with optional additional lines. Follow-up at 6 and 12 months was performed by ECG and 7-day Holter recording. The primary end point, freedom from left atrial arrhythmia >30 seconds without antiarrhythmic drugs after 12 months, was 36.5% for CA and 65.6% for SA (P=0.0022). There was no difference in effect for subgroups, which was consistent at both sites. The primary safety end point of significant adverse events during the 12-month follow-up was significantly higher for SA than for CA (n=21 [34.4%] versus n=10 [15.9%]; P=0.027), driven mainly by procedural complications such as pneumothorax, major bleeding, and the need for pacemaker. In the CA group, 1 patient died at 1 month of subarachnoid hemorrhage.

Conclusion—In atrial fibrillation patients with dilated left atrium and hypertension or failed prior atrial fibrillation CA, SA is superior to CA in achieving freedom from left atrial arrhythmias after 12 months of follow-up, although the procedural adverse event rate is significantly higher for SA than for CA.

Procedural Adverse Events of CA and SA

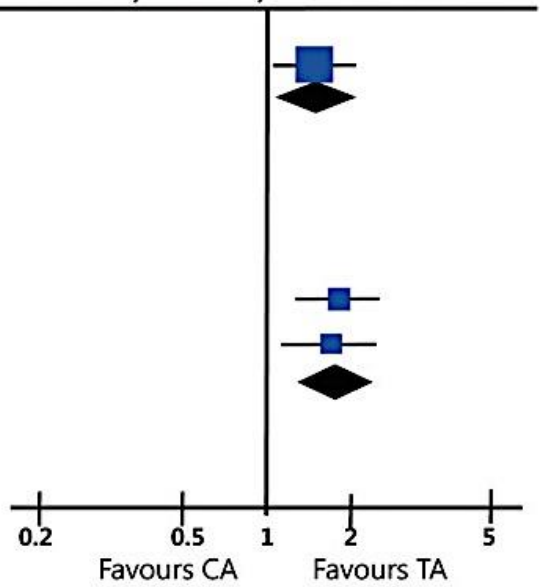
Adverse Events	CA N=63	SA N=61	*P*-Value
Pericardial effusion/tamponade	1	1	
TIA/Stroke	1	1	
Pneumothorax	…	6	
Hematothorax	…	1	
Rib fracture	…	1	
Sternotomy for bleeding	…	1	
Pneumonia	…	1	
Death	…	…	
PM implant	…	2	
Total	2 (3.2%)	14 (23.0%)	*P*=0.001
Minor			
Groin hematoma/bleed	4 (6.3%)	…	



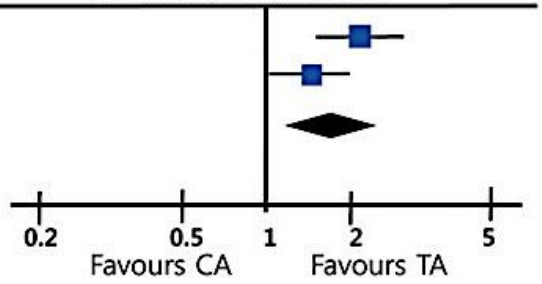
Epicardial thoracoscopic ablation versus endocardial catheter ablation for management of atrial fibrillation: a systematic review and meta-analysis

Hyun Jung Kim[a], Jin Suk Kim[b] and Tae Sik Kim[c,*]

Study or subgroup	TA Events	TA Total	CA Events	CA Total	Weight	Risk ratio M-H, random, 95% CI
6M						
Boersma 2012	41	61	28	63	100.0%	1.51 [1.09, 2.10]
Subtotal (95% CI)		**61**		**63**	**100.0%**	**1.51 [1.09, 2.10]**
Total events	41		28			
Heterogeneity: not applicable						
Test for overall effect: $Z = 2.48$ ($P = 0.01$)						
12M						
Boersma 2012	40	61	23	63	54.1%	1.80 [1.24, 2.61]
Pokushalov 2013	26	32	15	32	45.9%	1.73 [1.16, 2.60]
Subtotal (95% CI)		**93**		**95**	**100.0%**	**1.77 [1.34, 2.32]**
Total events	66		38			
Heterogeneity: $\tau^2 = 0.00$; $\chi^2 = 0.02$, df = 1 ($P = 0.90$); $I^2 = 0\%$						
Test for overall effect: $Z = 4.07$ ($P < 0.0001$)						



Study or subgroup	TA Events	TA Total	CA Events	CA Total	Weight	Risk ratio M-H, random, 95% CI
De Maat 2014	27	31	27	64	48.9%	2.06 [1.50, 2.84]
Wang 2011	51	83	37	83	51.1%	1.38 [1.03, 1.85]
Total (95% CI)		**114**		**147**	**100.0%**	**1.68 [1.12, 2.51]**
Total events	78		64			
Heterogeneity: $\tau^2 = 0.06$; $\chi^2 = 3.47$, df = 1 ($P = 0.06$); $I^2 = 71\%$						
Test for overall effect: $Z = 2.52$ ($P = 0.01$)						



Interactive CardioVascular and Thoracic Surgery Advance Access published September 23, 2016

Interactive CardioVascular and Thoracic Surgery (2016) 1–10
doi:10.1093/icvts/ivw311

STATE-OF-THE-ART

The totally thoracoscopic maze procedure for the treatment of atrial fibrillation

Charlotte van Laar[a,*], Johannes Kelder[b,c] and Bart P. van Putte[a]

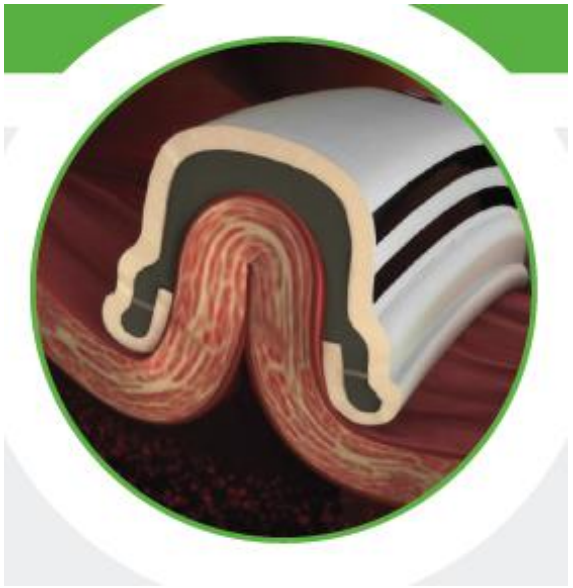
The purpose of this study was to update the current evidence regarding the efficacy and safety of the totally thoracoscopic maze (TT-maze) procedure for the treatment of atrial fibrillation (AF). Fourteen studies published between 2011 and 2016 and comprising 1171 patients were included as follows: 545 (46%) patients had paroxysmal AF (pAF), 268 (23%) persistent AF (persAF) and 358 (31%) longstanding persistent AF (LSPAF). Fixed- and random-effect models were used to calculate the pooled overall freedom from atrial arrhythmias. The 1- and 2-year pooled overall antiarrhythmic drug (AAD) free (off-AAD) success rates were 78% (95% confidence interval (CI): 72–83%, $n = 13$) and 77% (95% CI: 64–86%, $n = 6$), respectively. The 1- and 2-year pooled on-AAD success rates were 84% (95% CI: 78–89%, $n = 5$) and 85% (95% CI: 78–90%, $n = 3$), respectively. Subanalysis regarding the different types of AF revealed a 1-year pooled off-AAD success rate of 81% (95% CI: 73–86%, $n = 7$) for pAF, 63% (95% CI: 57–69%, $n = 5$) for persAF and 67% (95% CI: 52–79%, $n = 3$) for LSPAF. The overall in-hospital complication rate was <3% ($n = 36$). We conclude that the TT-maze is an effective strategy for the treatment of AF with maintained efficacy at the 2-year follow-up. Furthermore, the TT-maze has demonstrated similar efficacy to the Cox Maze IV procedure at the midterm follow-up with a lower complication rate. Extended follow-up research is needed to determine whether the high success rates after TT-maze will be stable over time.

AF freedom (AAD off) 1 and 2 years after surgery was **77%** and **78%**
AF freedom (AAD on) 1 and 2 years after surgery was **84%** and **85%**

AF freedom (AAD off) 1 year after surgery was
81% for paroxysmal,
78% - persistent,
67% - long-standing persistent patients

The overall in-hospital complication rate was less **3%**

ESTECH Cobra Fusion



ADVANTAGES

- One-side approach
- Easy reproducible technique

DISADVANTAGES

- LAA without management
- Impossible to isolate each PV collectors
- Gap in each box-lesion point leds to incompleteness of all pattern

HeartRhythm

Heart Rhythm. 2016 Jun;13(6):1246-52. doi: 10.1016/j.hrthm.2016.02.007. Epub 2016 Feb 15.

Electrophysiological findings after surgical thoracoscopic atrial fibrillation ablation.

Osmancik P[1], Budera P[2], Zdarska J[3], Herman D[3], Petr R[3], Straka Z[2].

⊕ Author information

Abstract

BACKGROUND: Hybrid ablation (a combination of thoracoscopic epicardial ablation and catheter ablation) has become a new technique for atrial fibrillation treatment.

OBJECTIVE: The goal of this study was to evaluate the success and electrophysiological follow-up after using the COBRA Fusion device to deliver a circumferential lesion set anterior to the pulmonary veins in an attempt to isolate the posterior left atrium (box isolation).

METHODS: Surgical ablation was carried out via a thoracoscopic approach using the COBRA Fusion radiofrequency catheter. An electrophysiology study was done 2-3 months later to verify box isolation (and to complete it, if needed) and to perform right-sided isthmus ablation. Fat thickness along the presumed box lesion line was measured using preprocedural computed tomography.

RESULTS: Thirty patients (mean age 60.0 ± 11.6 years; 22 men; 8 with long-standing persistent AF and 22 with persistent atrial fibrillation) were enrolled. The duration of the EP study was 216.3 ± 64.2 minutes. Box isolation, based on the EP study, was complete in 12 patients (40%) and incomplete in 18 patients (60%). Successful box isolation was achieved with catheter ablation in 16 of 18 patients (89%). A total of 39 gaps in these 16 patients were identified. Typical gap locations were the anterior-superior part of the superior pulmonary veins and the roofline. Fat thickness along the roofline was substantially higher than that along the inferior line (4.58 ± 1.61 mm vs 2.37 ± 0.76 mm; $P < .001$).

CONCLUSION: There is a relatively low rate of complete isolation using the COBRA catheter ablation system. The superior line and anterior parts of superior pulmonary veins have most conduction gaps.

AtriCure

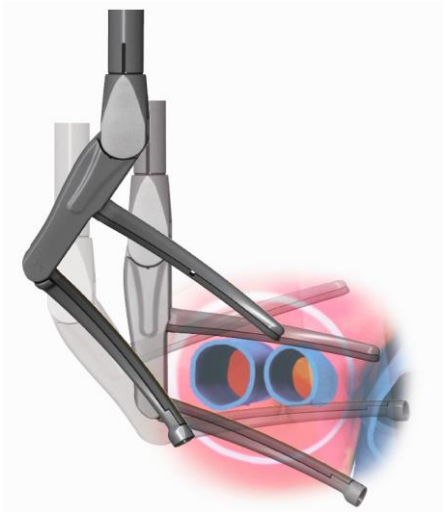
ADVANTAGES

- Separate isolation of PV islands

DISADVANTAGES

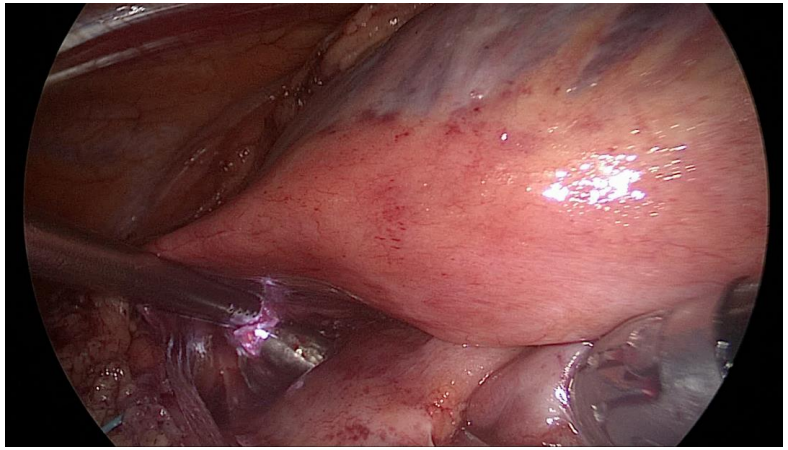
- Technically demanded procedure

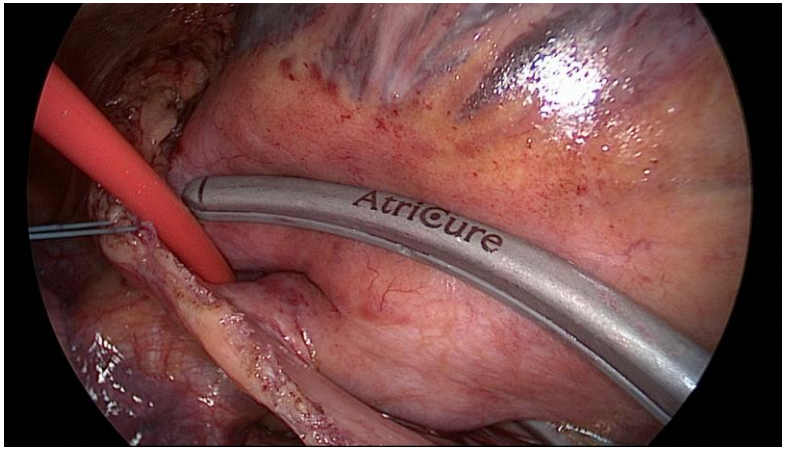
Multifunctional pen

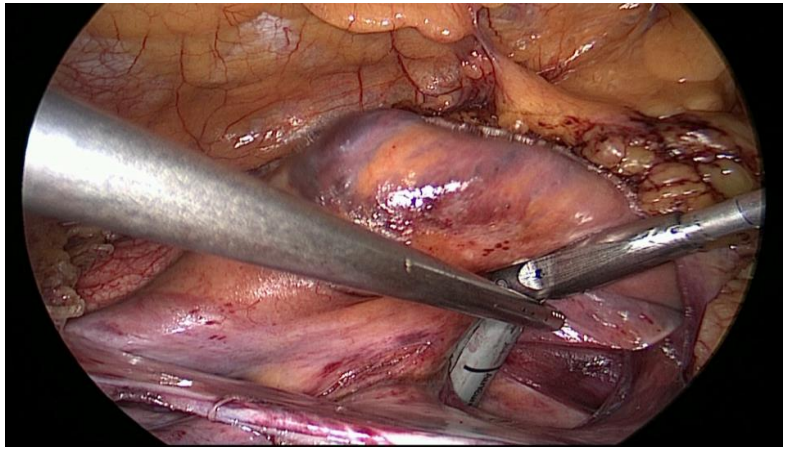


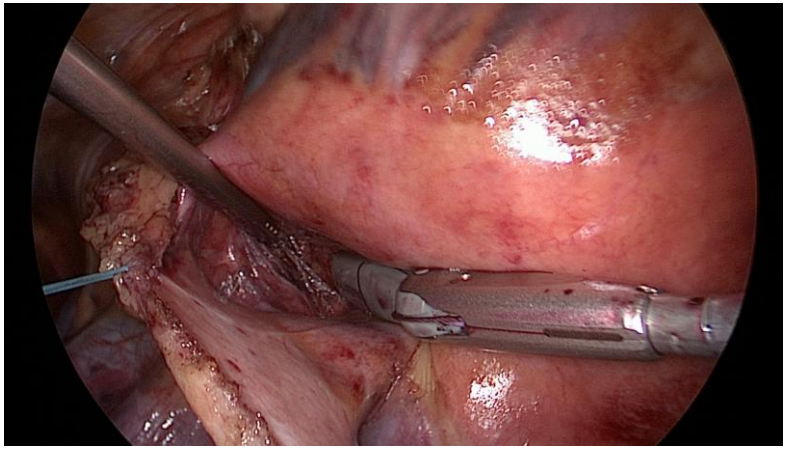
Bipolar dry clamp
Synergy Access

AtriCure

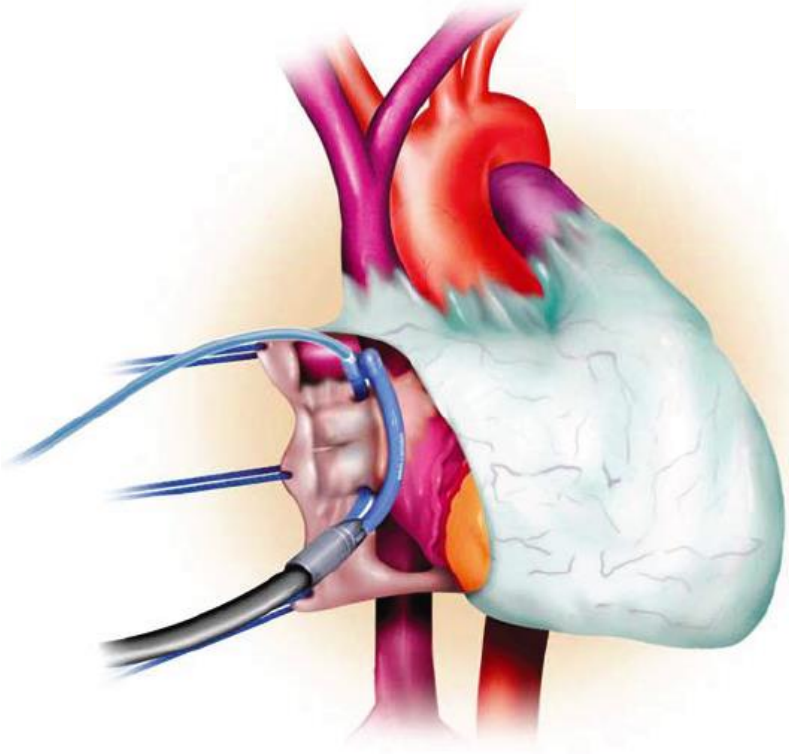








Medtronic CardioBlate Gemini



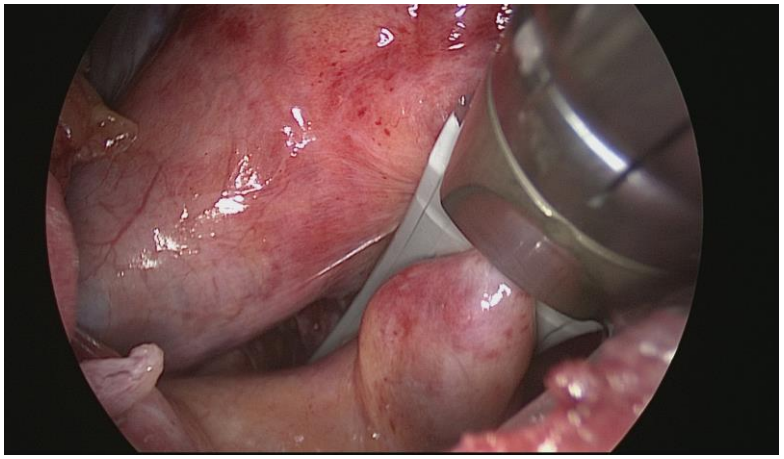
ADVANTAGES

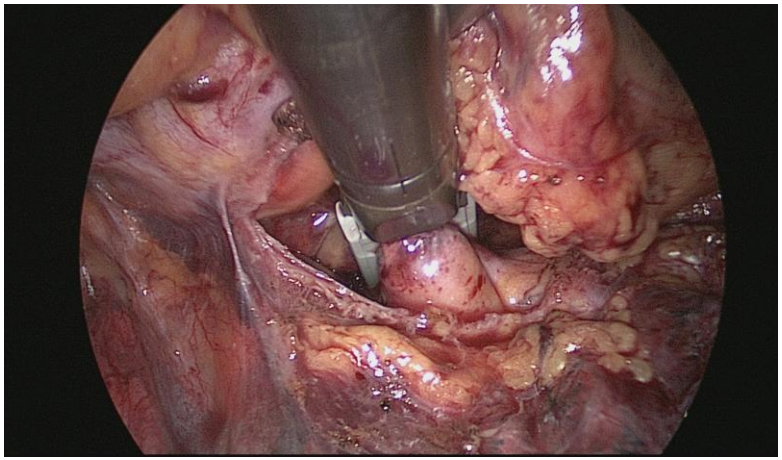
- Easy reproducible technique with short learning curve

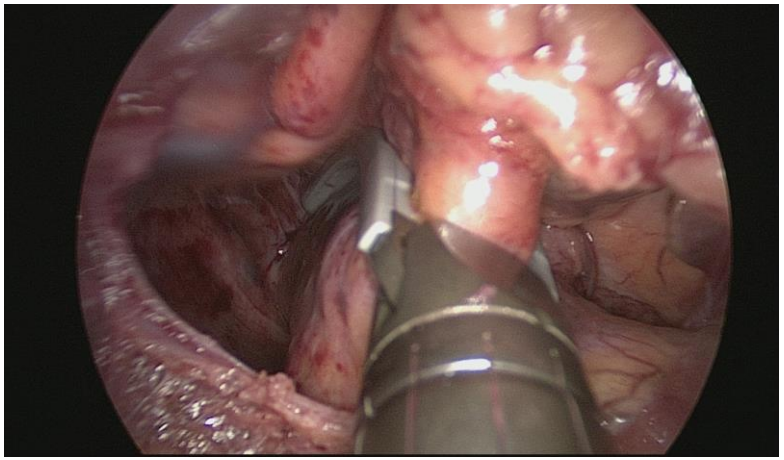
DISADVANTAGES

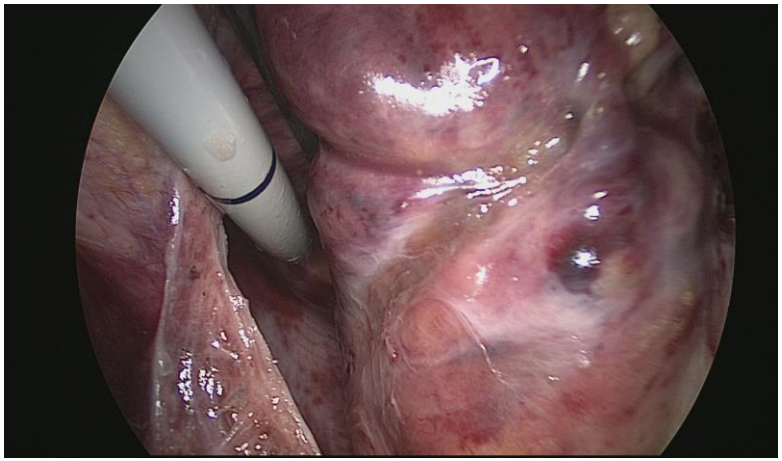
- Impossible to isolate each PV collectors (dissector is not available now) – as a option 180 degree turn
- Gap in each box-lesion point leds to incompleteness of all pattern

Gemini

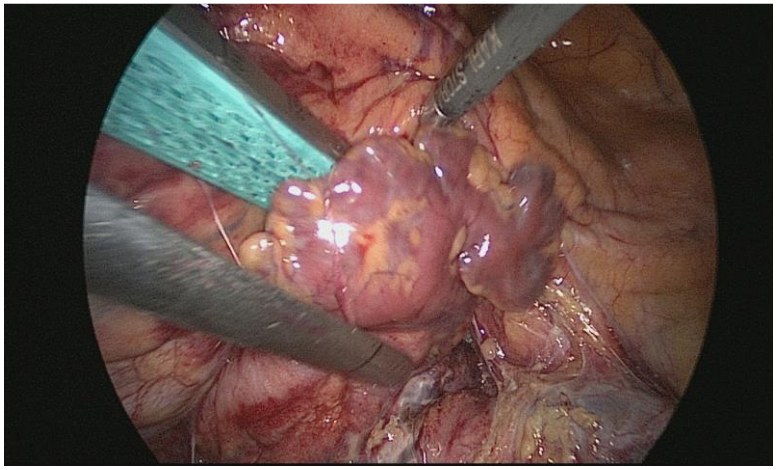


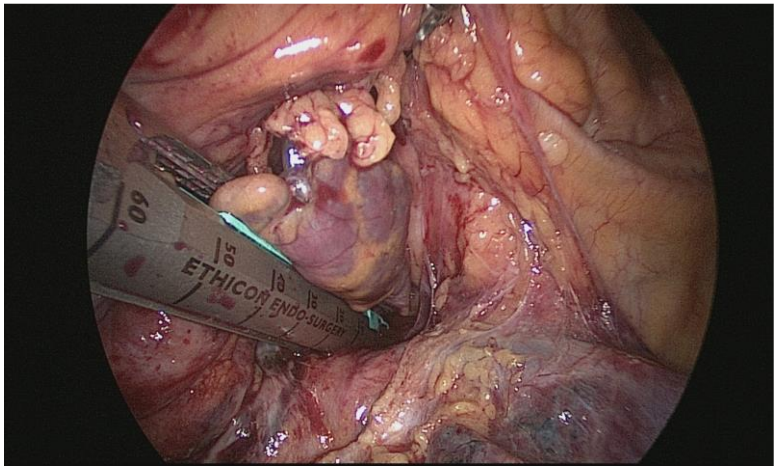


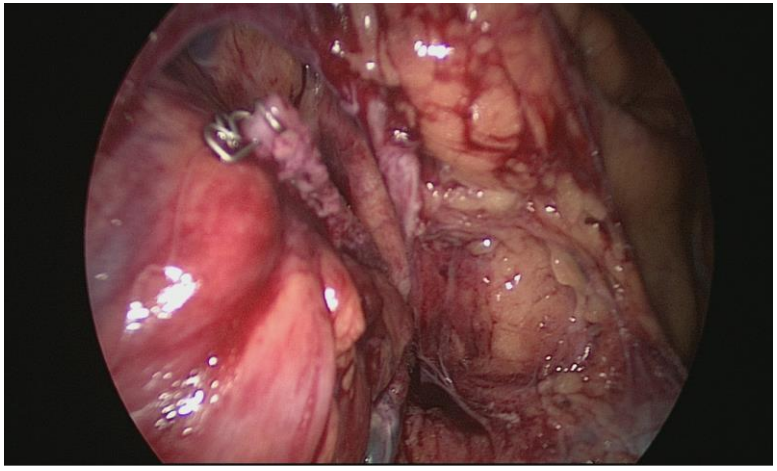




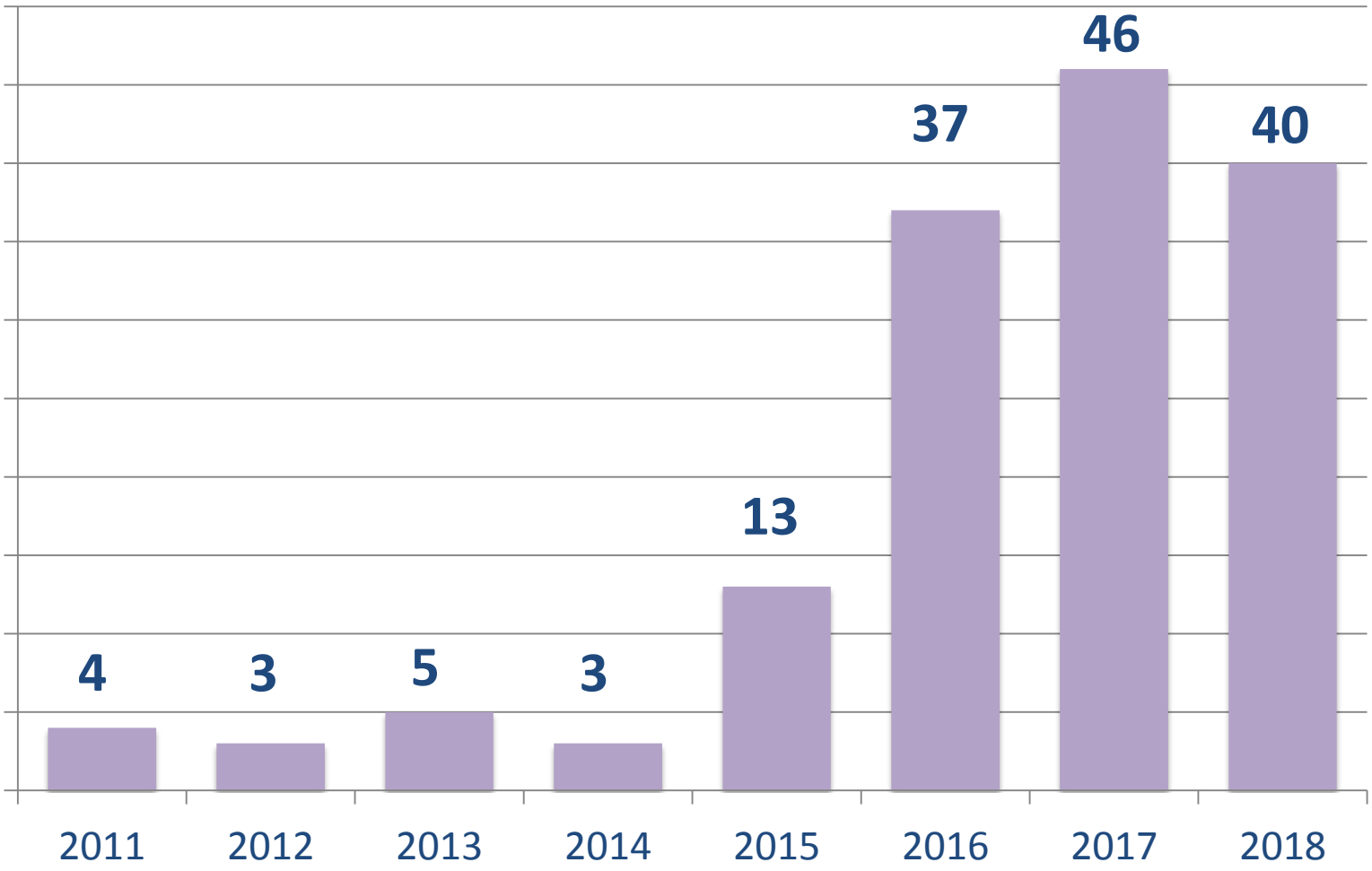
Резекция ушка ЛП



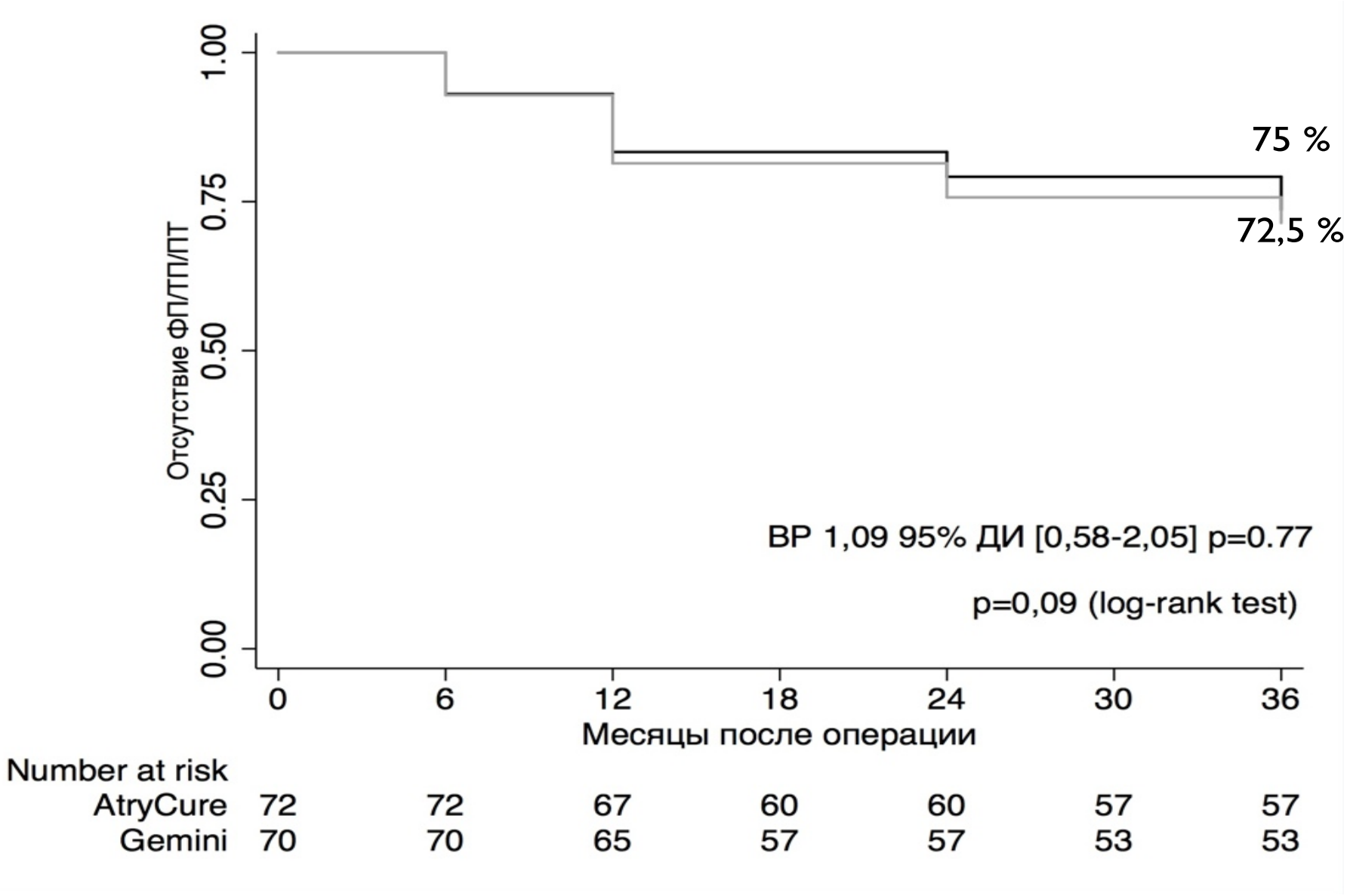




151 пациент (2011-2018 Декабрь) Gemini



Gemini или AtriCure



Показания

- Пациенты с симптоматичной персистирующей или длительноперсистирующей ФП без сопутствующей патологии сердца
- Пациенты с выраженной атриомегалией (LA volume more than 150 ml)
- Предыдущая не эффективная катетерная аблация

Противопоказания

Абсолютные

- Тромбоз левого предсердия
- Пациенты перенесшие вмешательства на грудной клетке

Относительные

- Размер ЛП более 65 мм (volume more than 200-250 ml)
- ФВ ЛЖ менее 35%
- Тяжелая сопутствующая патология

268 пациентов (2011-2018 Декабрь)

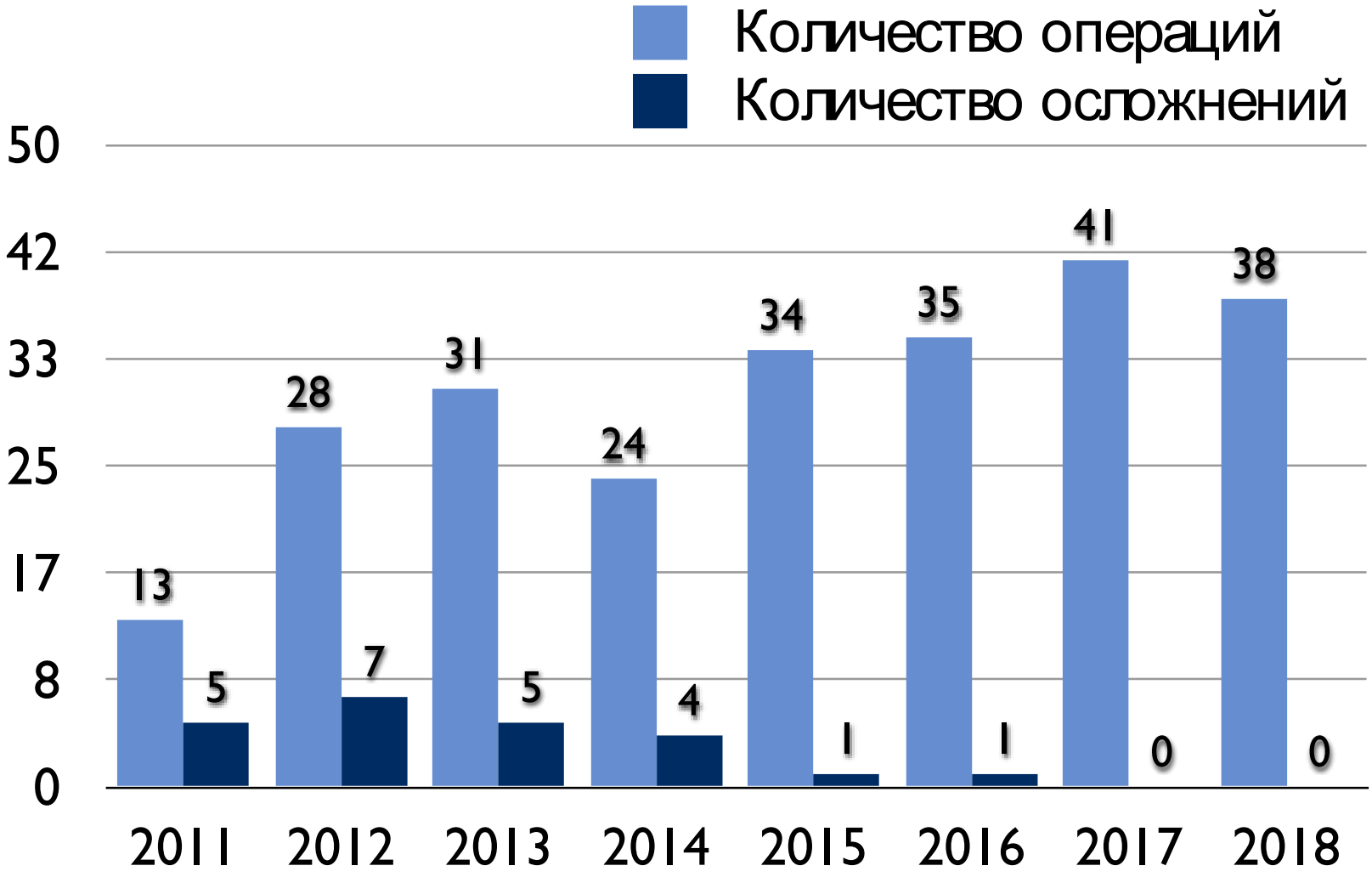
- Госпитальная летальность – 0.0%
- Стернотомия – 2.23% (6 пациентов)

Первые 50 пациентов – 8.0% (n=4)

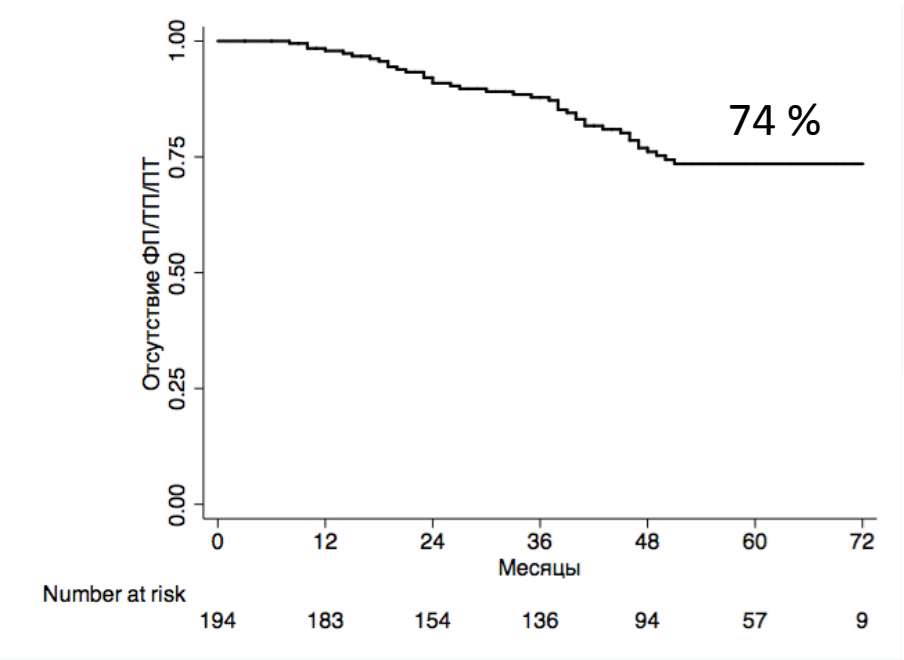
Следующие 218 пациентов – 0.9% (n=2)

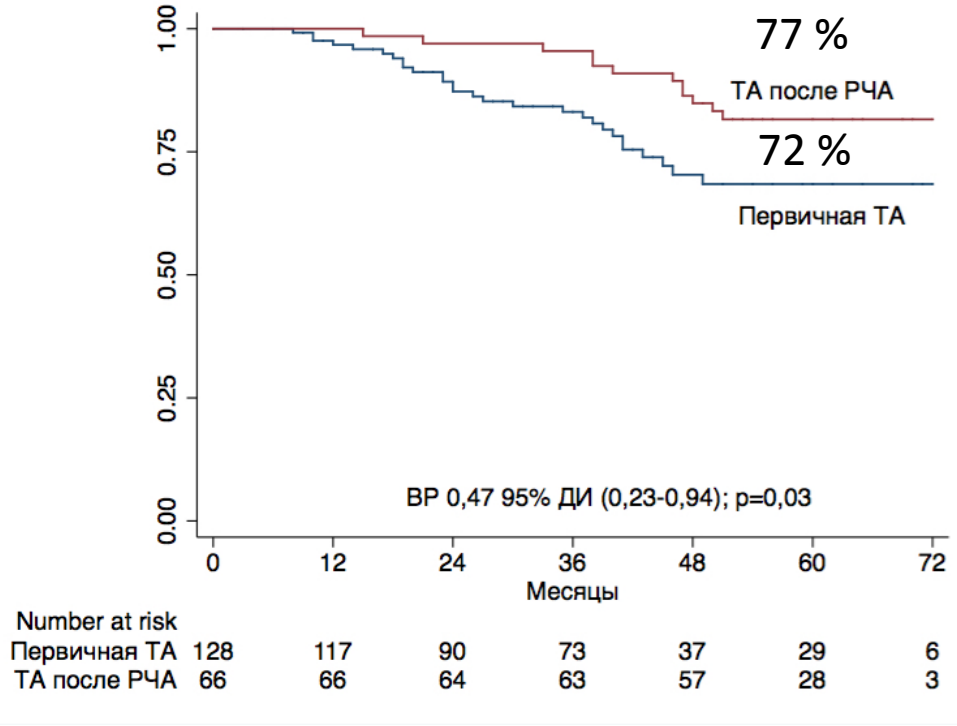
- Инсульт – 0.75% (2 пациента)
- Имплантация ЭКС – 1.86% (5 пациентов)

Кривая обучения



Свобода от ФП





Journal of Cardiovascular Electrophysiology

Catheter Versus Surgical Ablation of Atrial Fibrillation After a Failed Initial Pulmonary Vein Isolation Procedure: A Randomized Controlled Trial

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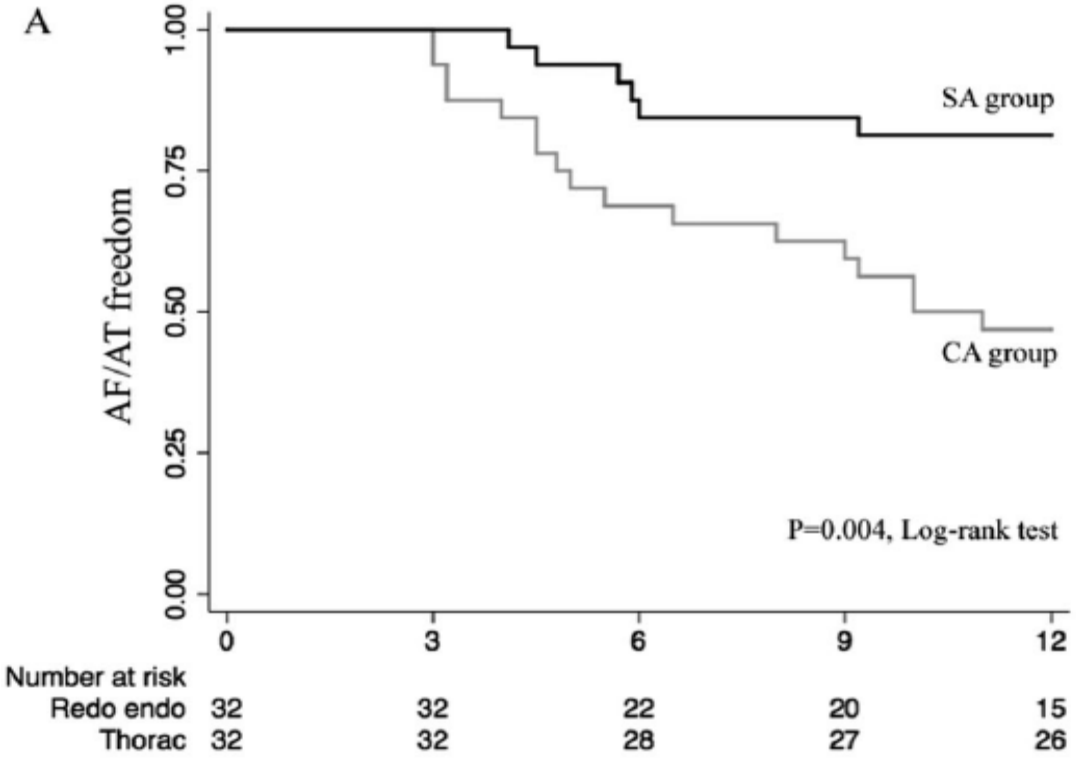
Catheter Versus Surgical Ablation. ***Introduction:*** **The aim of this prospective randomized study was to compare the efficacy and safety of catheter ablation (CA) versus surgical ablation (SA) in the treatment of paroxysmal and persistent AF after failed initial pulmonary vein isolation procedure.**

Methods and Results: **Patients with a history of symptomatic AF after a previous failed first ablation procedure were eligible for this study. Patients were randomized to CA (n = 32) or SA (n = 32) redo ablation. The primary endpoint was recurrence of atrial tachyarrhythmia at 1 year of follow-up. At the 12-month follow-up, 26 (81%) of the 32 SA group patients and 15 (47%) of the 32 CA group were AF/AT-free on no antiarrhythmic drugs (P = 0.004, Log-rank test). In patients with PAF, 17 (85%) patients of the 20 in SA group and 10 (56%) patients of the 18 in CA group were AF-free (P = 0.04, log-rank test). In patients with PersAF, 9 (75%) patients of the 12 in SA group and 5 (36%) patients of the 14 in CA group were AF-free (P = 0.04, log-rank test). The number of the serious adverse event in the SA group was significantly higher (1 CA group vs. 7 SA group; P = 0.02).**

Conclusion: **In patients with PAF and PersAF after failed initial CA, SA is superior to CA for maintenance of sinus rhythm, although serious adverse event rate is significantly higher for SA.** *(J Cardiovasc Electrophysiol, Vol. pp. 1-6)*



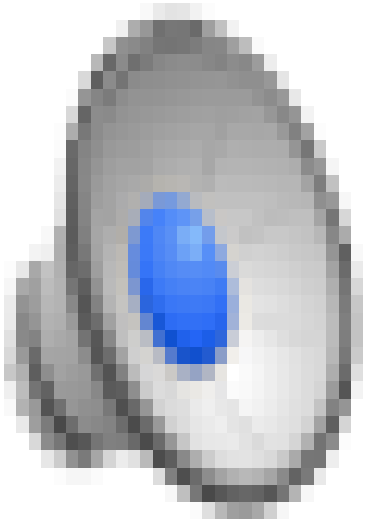
In patients with paroxysmal and persistent AF after failed initial catheter ablation, thoracoscopic surgical ablation was superior in maintenance of sinus rhythm

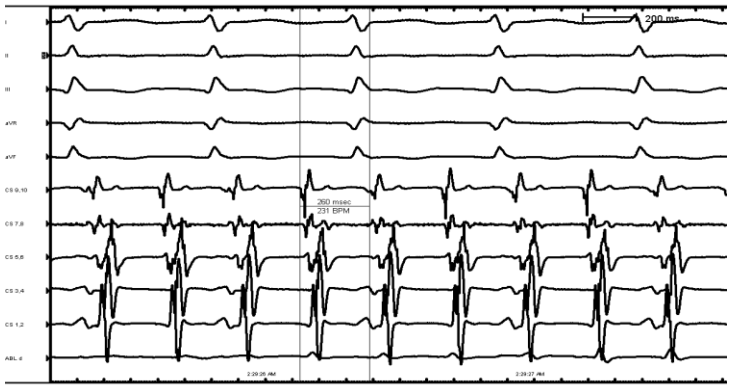
The number of the serious adverse event (except atrial flutter and groin hematoma) in the SA group was significantly higher (1 CA group vs. 7 SA group; P = 0.02)

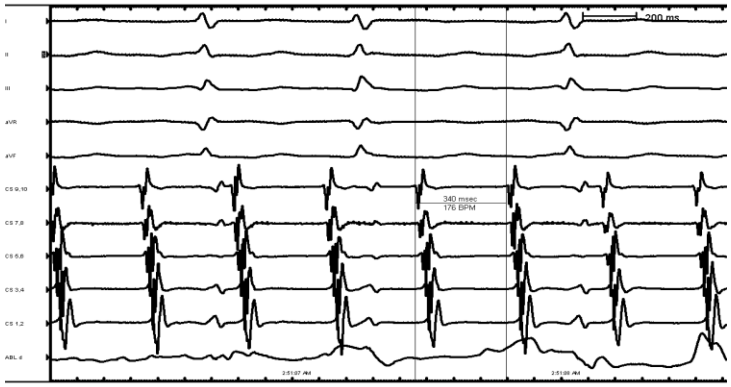
Adverse Events of CA and SA

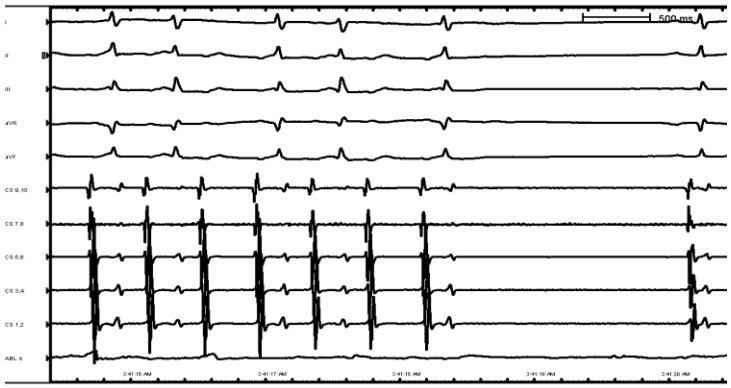
	CA (n = 32)	SA (n = 32)	P
Pericardial effusion/tamponade	0	1	0.32
TIA/Stroke	1	0	0.32
Pneumothorax	0	3	0.08
Hematothorax/hydrothorax	0	3	0.08
Groin hematoma/bleed	2	0	0.08
Atrial flutter/tachycardia	3	1	0.30
Total	6	8	0.5

Трепетание предсердий

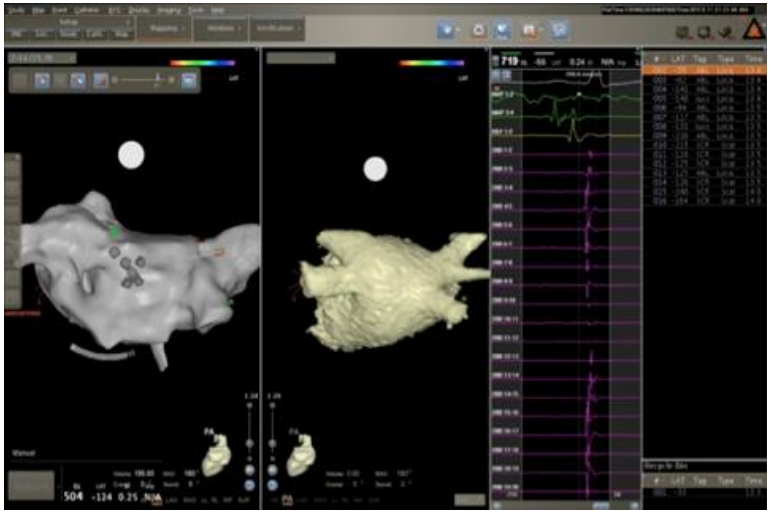


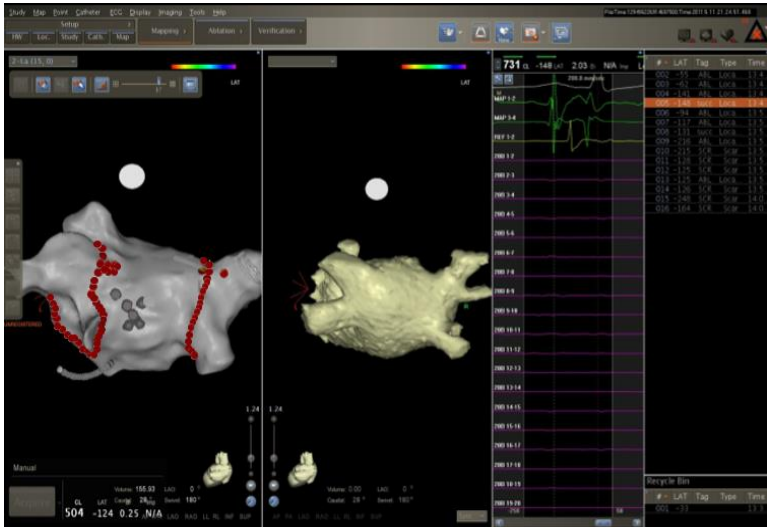


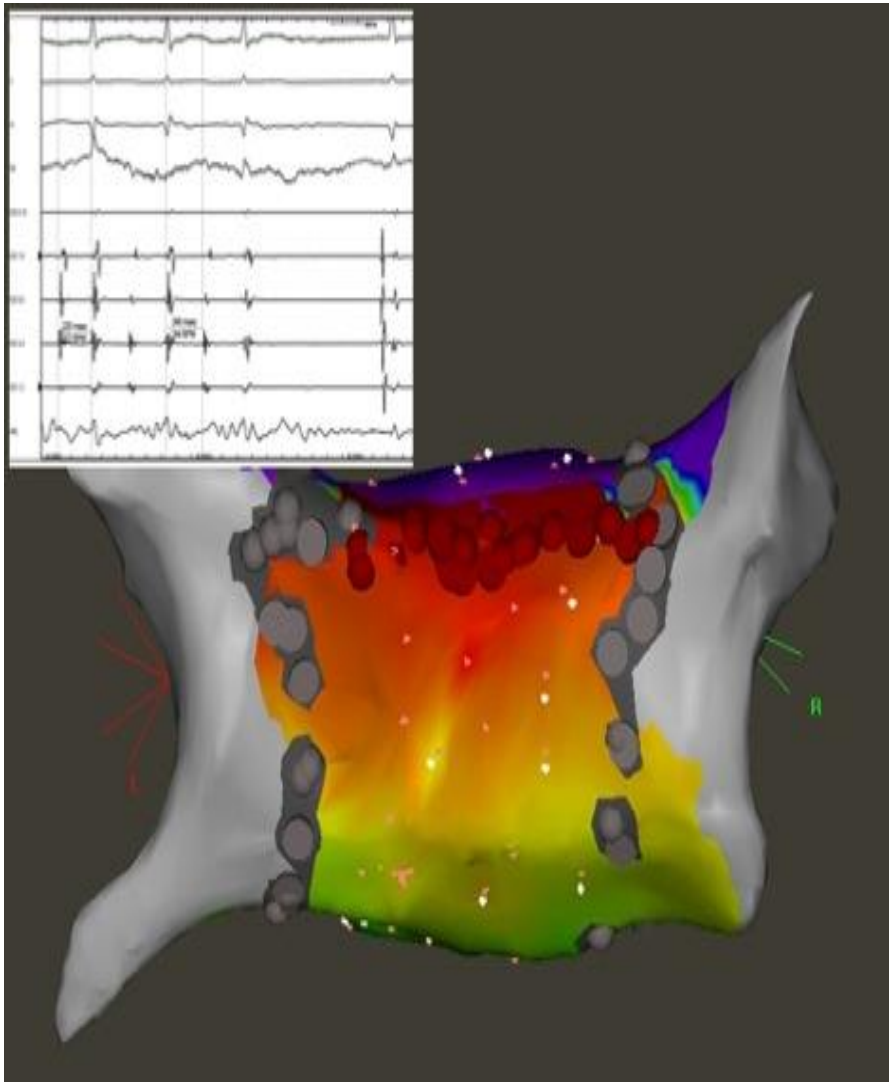




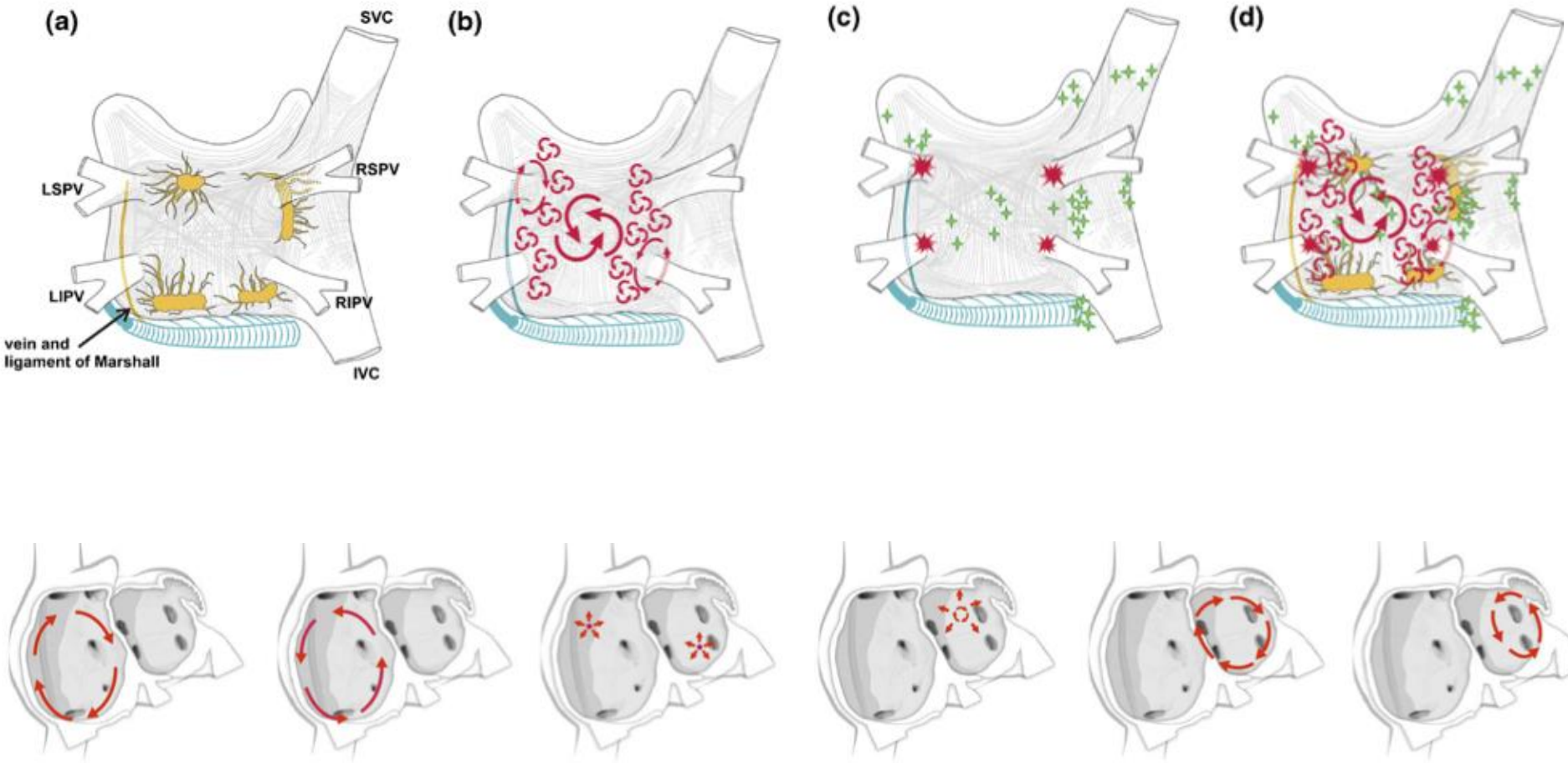
Трепетание предсердий





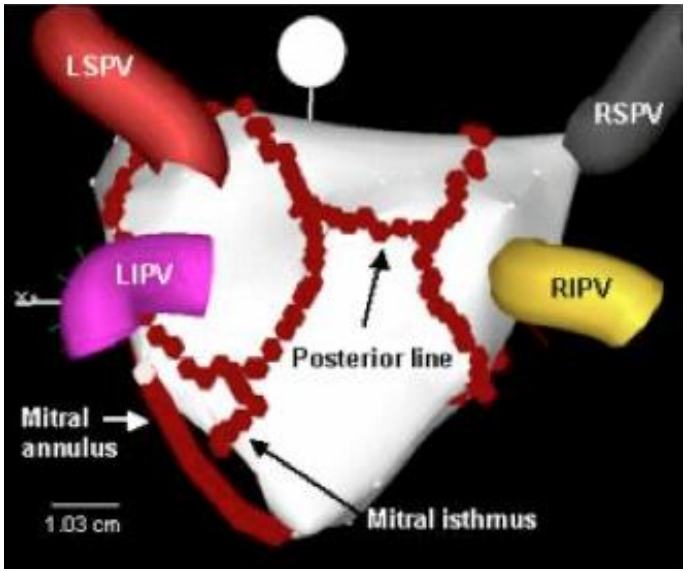


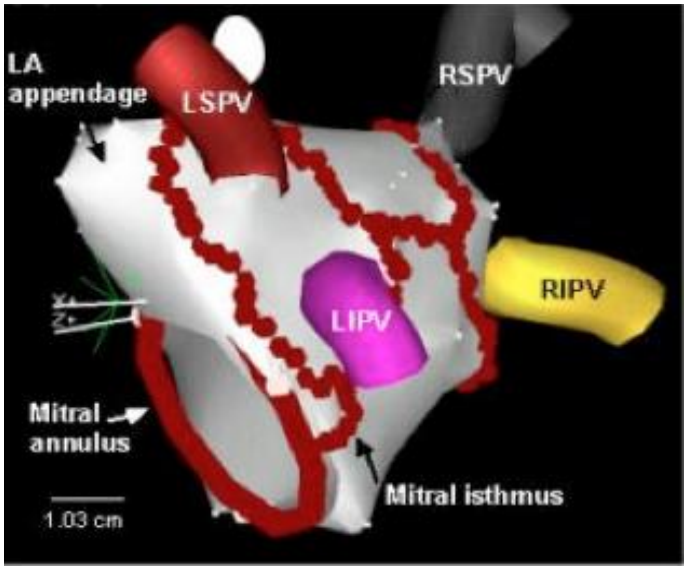
Механизмы ФП

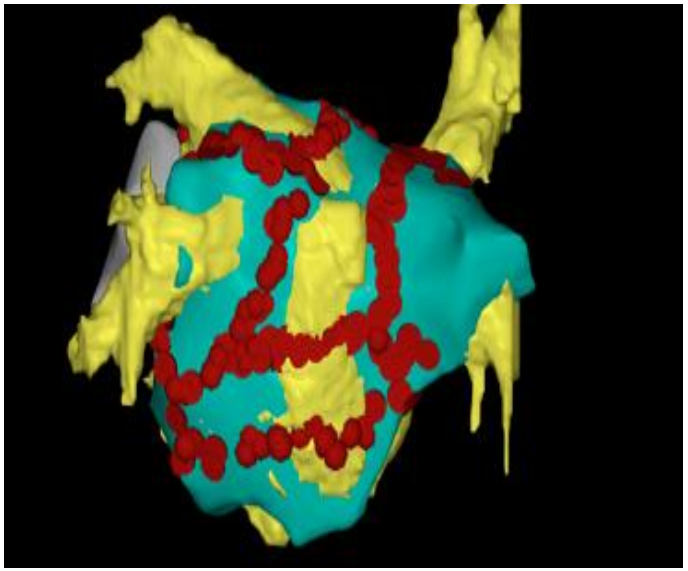


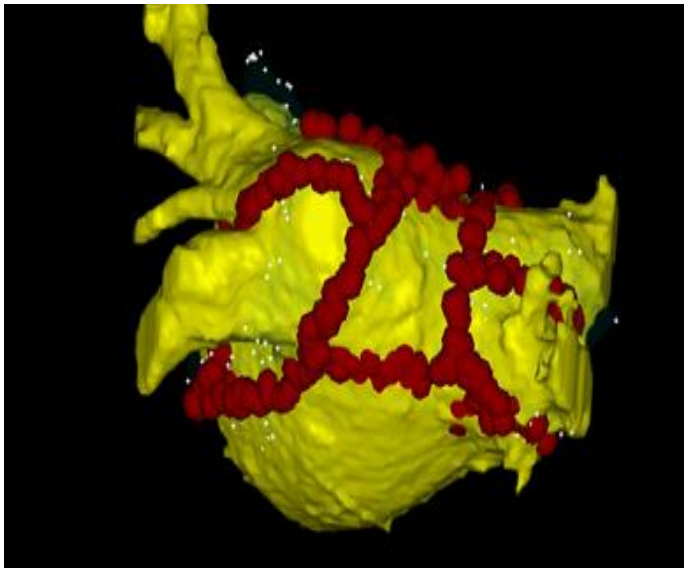
J Interv Card Electrophysiol

Катетерная РЧА ФП







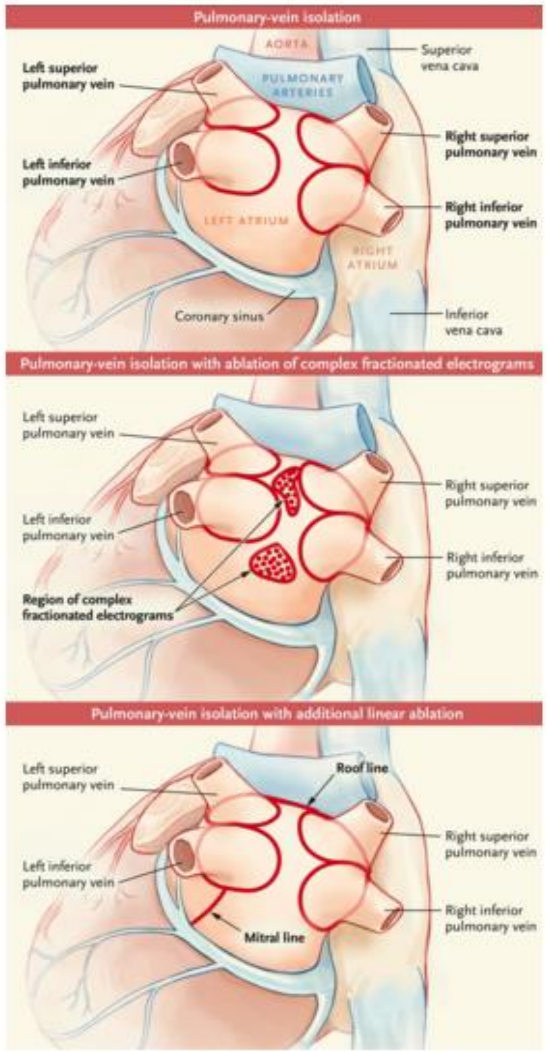


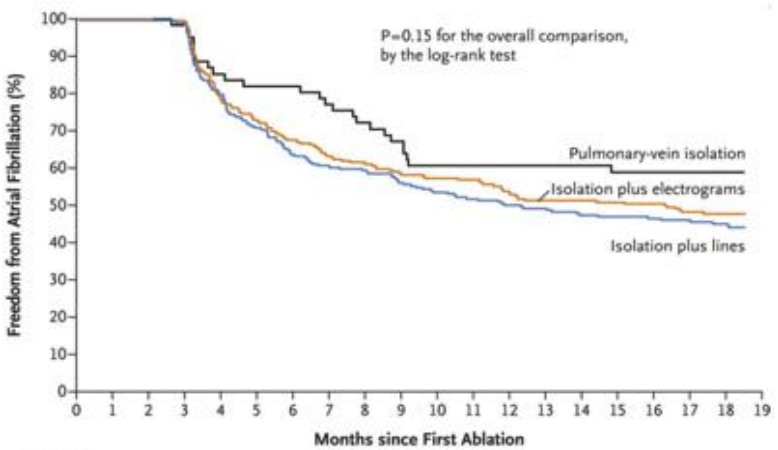
Atul Verma, M.D., Chen-yang Jiang, M.D., Timothy R. Betts, M.D., M.B., Ch.B., Jian Chen, M.D., Isabel Deisenhofer, M.D., Roberto Mantovan, M.D., Ph.D., Laurent Macle, M.D., Carlos A. Morillo, M.D., Wilhelm Haverkamp, M.D., Ph.D., Rukshen Weerasooriya, M.D., Jean-Paul Albenque, M.D., Stefano Nardi, M.D., Endri Menardi, M.D., Paul Novak, M.D., and Prashanthan Sanders, M.B., B.S., Ph.D., for the STAR AF II Investigators*

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Approaches to Catheter Ablation for Persistent Atrial Fibrillation

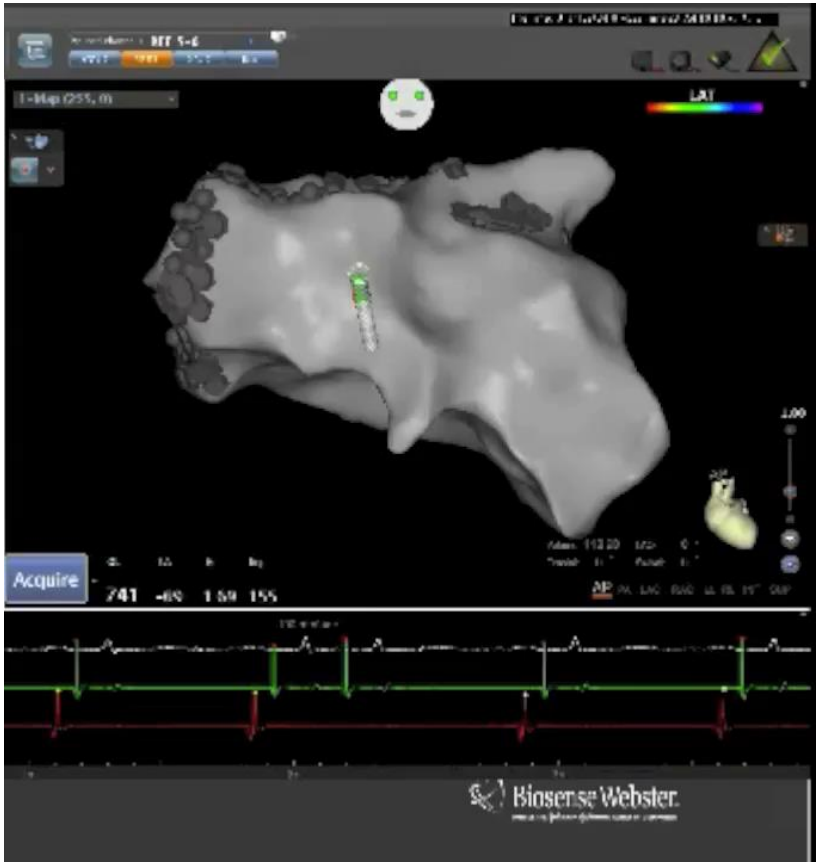


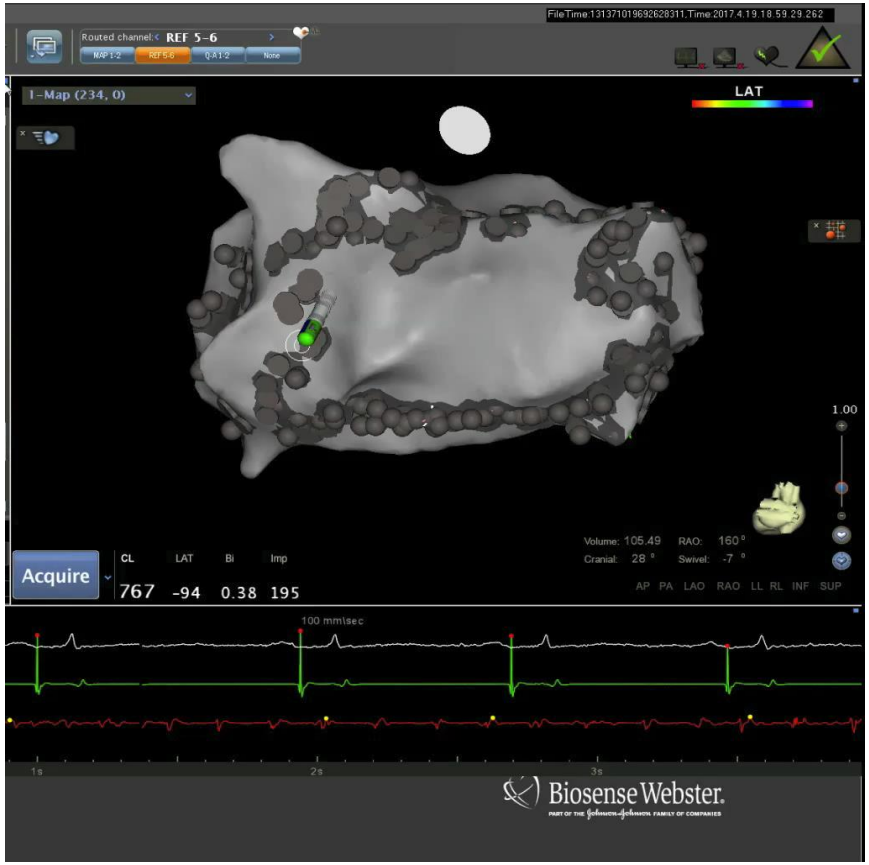


No. at Risk						
Pulmonary-vein isolation	61	60	50	41	36	23
Isolation plus electrograms	244	242	161	137	124	72
Isolation plus lines	244	240	152	133	115	57

Variable	Isolation Alone (N=61)	Isolation plus Electrograms (N=244)	Isolation plus Lines (N=244)	P Value
		number (percent)		
Freedom from documented atrial fibrillation after one procedure, with or without antiarrhythmic drugs	36 (59)	119 (49)	112 (46)	0.15
Freedom from documented atrial fibrillation after one procedure, without antiarrhythmic drugs*	29 (48)	90 (37)	81 (33)	0.11
Freedom from documented atrial arrhythmia after one procedure, with or without antiarrhythmic drugs	30 (49)	100 (41)	90 (37)	0.15
Freedom from documented atrial arrhythmia after one procedure, without antiarrhythmic drugs*	25 (41)	81 (33)	71 (29)	0.08
Freedom from documented atrial fibrillation after two procedures, with or without antiarrhythmic drugs	44 (72)	146 (60)	142 (58)	0.18
Freedom from documented atrial arrhythmia after two procedures, with or without antiarrhythmic drugs	37 (61)	122 (50)	117 (48)	0.24
Documented atrial flutter or tachycardia after one procedure, with or without antiarrhythmic drugs	7 (11)	27 (11)	34 (14)	0.57
Documented atrial flutter or tachycardia after two procedures, with or without antiarrhythmic drugs	7 (11)	32 (13)	29 (12)	0.98
Patients undergoing a second ablation procedure	13 (21)	63 (26)	81 (33)	0.10

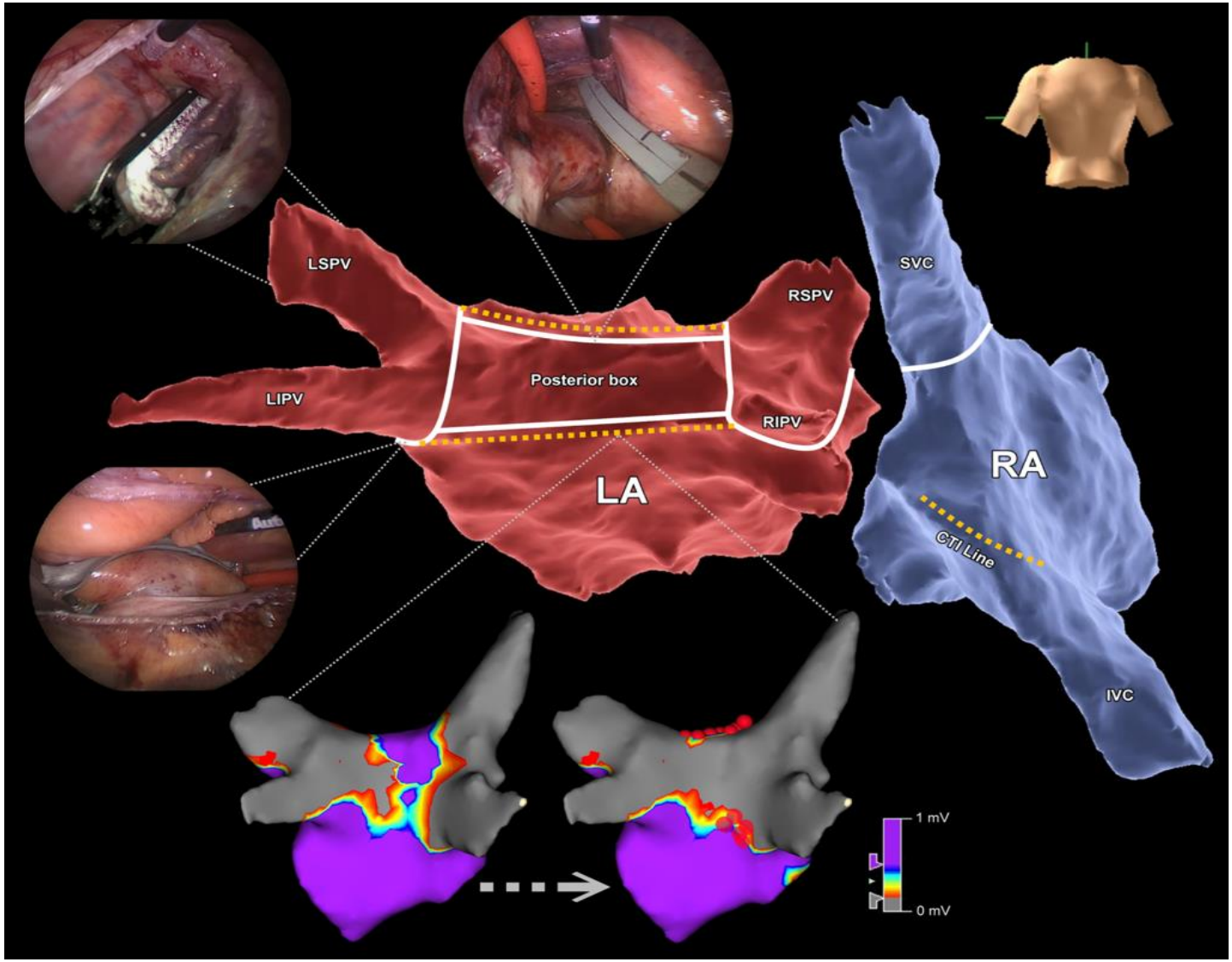
Изоляция задней стенки ЛП





3D
TOTALLY THORACOSCOPIC AF ABLATION

Гибридный подход в лечении ФП



Netherlands Heart Journal

ВЫВОДЫ

- Торакоскопическая абляция ФП является безопасным, легко воспроизводимым методом
- Процедура обеспечивает приемлемую свободу от рецидивов предсердных аритмий в среднесрочной перспективе
- Требуется более длительное наблюдение и большой размер выборки

Торакоскопическая абляция для лечения пациентов с изолированной формой фибрилляции предсердий в России

© О.Ю. Пиданов [1], А.В. Богачев-Прокофьев [2], Д.А. Елесин [2], Э.А. Иваницкий [3], О.А. Бобровский [3], П.А. Шиленко [4], П.А. Дурыгин [5], А.С. Зотов [6], С.А. Вачев [6], В.Е. Вайкин [7], С.Е. Мамчур [8], О.В. Сапельников [9], Д.О. Быстров [10]

ПАТОЛОГИЯ КРОВООБРАЩЕНИЯ И КАРДИОХИРУРГИЯ

ЕЖЕКВАРТАЛЬНЫЙ РЕЦЕНЗИРУЕМЫЙ ЖУРНАЛ С 1997 ГОДА

Рис. 1. Количество торакоскопических абляций в Российской Федерации

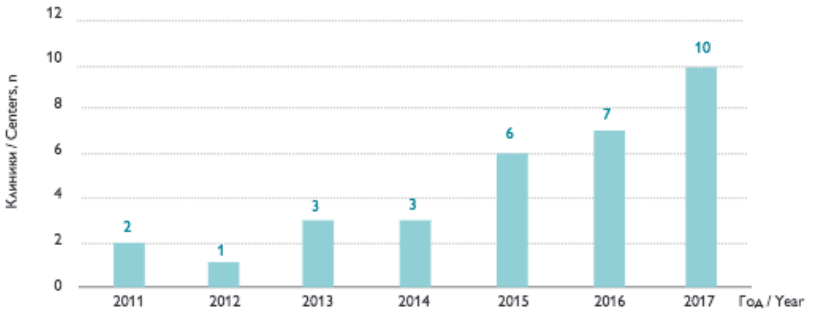
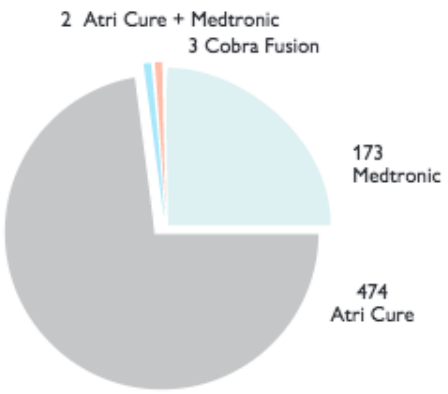


Рис. 2. Количество кардиохирургических центров, в которых выполняют торакоскопическую абляцию

Распределение пациентов по форме фибрилляции предсердий



Инструменты для выполнения торакоскопической абляции


kin National Medical Research Center
birsk, Russian Federation
НОВОСИБИРСКИЙ НАУЧНО-ИССЛЕДОВАТЕЛЬСКИЙ
ИНСТИТУТ ПАТОЛОГИИ КРОВООБРАЩЕНИЯ
имени академика Е.Н.Мешалкина
Спасибо