

# LAAOS III - Surgical Atrial Fibrillation Ablation Evaluation

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# Conflict of Interest Disclosures

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- I have received research grants from Bayer, Roche and BMS-Pfizer, unrelated to the presented work

# Atrial Fibrillation (AF) and Cardiac Surgery

- > 10% of patients undergoing cardiac surgery have pre-existing AF
- AF is associated with a higher risk of stroke and heart failure



# Concomitant Surgical Ablation of AF

- Hypothesized to reduce the risk of stroke
- Conflicting observational data
- CASTLE-AF trial suggested AF ablation may also reduce:
  - cardiovascular death
  - heart failure hospitalization



# LAAOS III Trial

- Patients requiring cardiac surgery:
  - AF and CHA<sub>2</sub>DS<sub>2</sub>-Vasc score  $\geq 2$
- Left atrial appendage occlusion vs. not
- Follow-up every 6 months
- Evaluation for stroke using a validated questionnaire
- Surgical AF ablation at the surgeon's discretion

# LAAOS III

- 4770 participants with surgery
- 105 centers in 27 countries
- Mean follow-up 3.8 years
- Stroke reduced by 34%  
( $p=0.001$ )
- 1562 (32.7%) with AF ablation



# Surgical AF Ablation Evaluation within LAAOS III

- LAAOS III participants cohort
- Pre-defined protocol and statistical analysis plan

## Primary Analysis

- Cox proportional hazards model evaluating association of surgical ablation with stroke or systemic embolism
- Analysis adjusted for:
  - Components of the CHA<sub>2</sub>DS<sub>2</sub>-Vasc score
  - LAAOS III allocation

## Secondary Analysis

- Cox proportional hazards model evaluating association of surgical ablation heart failure admissions
- Analysis adjusted for:
  - Adjusted for LVEF, hypertension, age, sex, diabetes, systolic BP, creatinine, BMI, mitral valve surgery, LAAOS III allocation

# Participant Characteristics

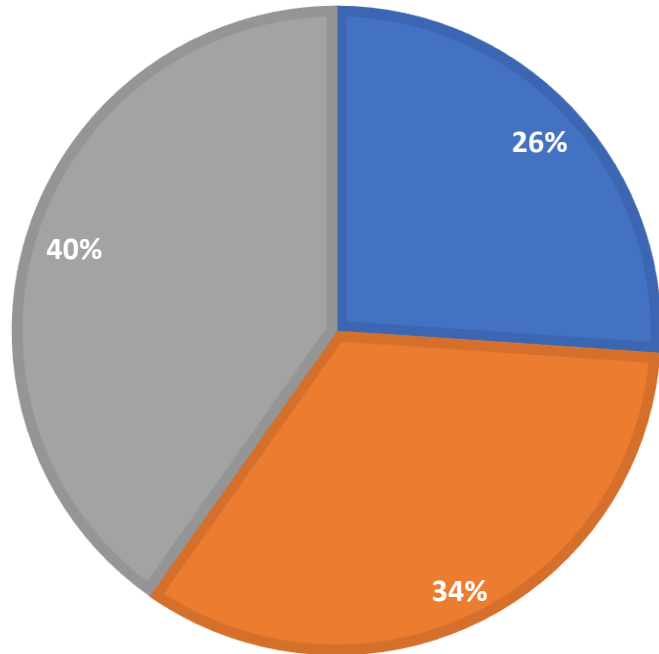
	AF ablation	No AF ablation	P- value
<b>N</b>	1562	3208	N/A
<b>Age, mean (SD)</b>	69.3 years (8.5)	72.1 years (8.1)	<0.001
<b>Male sex, n (%)</b>	1019 (65.2%)	2199 (68.5%)	0.02
<b>CHA<sub>2</sub>DS<sub>2</sub>-Vasc score</b>	4.1 (1.5)	4.3 (1.5)	<0.001
<b>Paroxysmal AF, n (%)</b>	807 (51.7%)	1479 (46.1%)	0.003
<b>Persistent AF, n (%)</b>	459 (29.4%)	626 (19.5%)	<0.001
<b>Permanent AF, n (%)</b>	296 (19.0%)	1103 (34.4%)	<0.001
<b>Any mitral valve surgery, n (%)</b>	639 (40.9%)	1056 (32.9%)	<0.001
<b>Left ventricular ejection fraction, mean (SD)</b>	53% (12)	52% (11)	0.0001



# Ablation Characteristics

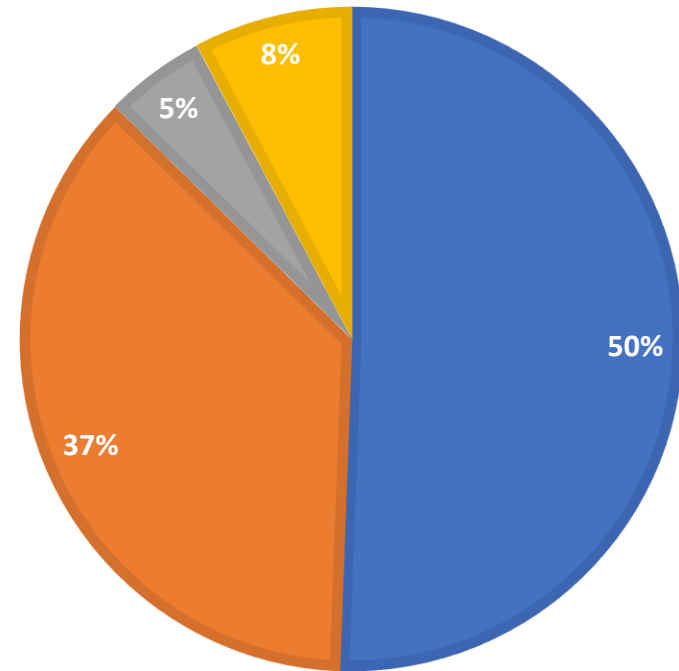
## LESION SETS

- Pulmonary vein isolation
- Left atrial ablation
- Bi-atrial ablation
- 



## ENERGY TYPE

- Radiofrequency
- Cryoablation
- Cut and sew
- Other



14.4% assessed for exit block

# Rhythm Outcomes

	AF ablation	No AF ablation	P-value
<b>N</b>	1562	3208	N/A
<b>Sinus rhythm at discharge</b>	993 (63.6%)	1148 (35.8%)	<0.001
<b>No episodes of AF at 30 days</b>	751 (50.2%)	813 (26.6%)	<0.001
<b>No episodes of AF at 6 months</b>	597 (41.5%)	644 (22.0%)	<0.001
<b>No episodes of AF at 1 year</b>	502 (35.7%)	547 (19.4%)	<0.001

# Efficacy Outcomes

	AF ablation	No AF ablation	Adjusted HR	P-value
Ischemic stroke or systemic embolism*	85 (5.4%)	197 (6.1%)	0.94 (0.72-1.21)	0.61

\* Adjusted for CHA<sub>2</sub>DS<sub>2</sub>-VASC, LAAOS III allocation



# Efficacy Outcomes

	AF ablation	No AF ablation	Adjusted HR	P-value
Ischemic stroke or systemic embolism*	85 (5.4%)	197 (6.1%)	0.94 (0.72-1.21)	0.61
Rehospitalization for heart failure**	96 (6.2%)	232 (7.2%)	0.93 (0.73-1.20)	0.59
<u>Total</u> rehospitalizations for heart failure**	113	280	0.86 (0.69-1.08 )	0.20
All-cause mortality ***	293 (18.8%)	782 (24.4%)	0.90 (0.78-1.04)	0.15
Cardiovascular mortality ***	176 (11.3%)	465 (14.5%)	0.88 (0.74-1.06)	0.18

\* Adjusted for CHA<sub>2</sub>DS<sub>2</sub>-VASc, LAAOS III allocation

\*\* Adjusted for LVEF, hypertension, age, sex, diabetes, systolic BP, creatinine, BMI, mitral valve surgery, LAAOS III allocation

\*\*\* Adjusted for age, sex, creatinine clearance, PAD, diabetes, NYHA class, LVEF, aorta surgery, combined procedure, LAAOS III allocation

# Safety Outcomes

	AF ablation	No AF ablation	Adjusted HR	P-value
Mortality at 30 days*	55 (3.5%)	129 (4.0%)	1.08 (0.77-1.51)	0.66
Reoperation for bleeding <48 hrs**	52 (3.3%)	137 (4.3%)	0.74 (0.53-1.03)	0.07
New permanent pacemaker at hospital discharge***	87 (5.6%)	130 (4.1%)	1.48 (1.12-1.98)	0.007

\* Adjusted for age, sex, creatinine clearance, PAD, diabetes, NYHA class, LVEF, aorta surgery, combined procedure and LAAOS III allocation

\*\* Adjusted for creatinine, type of surgery, BMI, age, CPB time, LAAOS III allocation

\*\*\* Adjusted for age, any valve procedure, LAAOS III allocation

# Strengths and Weaknesses

- Multicenter, international cohort
- Systematic stroke assessment
- Observational design
- Limited rhythm assessment



# Conclusions

- Concomitant surgical AF ablation was not associated with a reduced risk of stroke, or systemic embolism at a mean follow-up of 3.8 years
- Trials evaluating surgical ablation of AF should focus on other patient-important outcomes