

# Isolated Postoperative Atrial Fibrillation after Thoracic Aortic Aneurysm Repair Does Not Reduce Long-term Survival

Megan Chung (1), Cheryl Pan (1), Hideyuki Hayashi (1), Viswajit Kandula (1), Yanling Zhao (1), Dov Levine (1), Patra Childress (1), Lauren Sutherland (1), Syed Raza (1), Paul Kurlansky, MD (1), Craig Smith (1), Hiroo Takayama (1)

1. Division of Cardiothoracic and Vascular Surgery, New York-Presbyterian Hospital, Columbia University Medical Center, New York, NY
2. Center for Innovation and Outcomes Research, Department of Surgery, Columbia University, New York, NY

# Objective

- **Postoperative atrial fibrillation (POAF) has been shown to be associated with worse survival after cardiac surgery (1-4)**
- **POAF and other postoperative complications share risk factors; existing data fails to isolate the effect of other postoperative complications from POAF and long-term outcomes (4-5)**
- **Paucity of literature on POAF after elective thoracic aortic aneurysm repair, often in patients with little or no intracardiac disease**
- **Aim: identify the relationship between POAF and long-term outcomes independent from other postoperative complications after thoracic aortic aneurysm repair**

1. Woldendorp K et al. Ann Thorac Surg. 2021;112(6):2084-93.

2. Greenberg JW et al. Eur J Cardiothorac Surg. 2017;52(4):665-72.

3. Lin MH et al. Stroke. 2019;50(6):1364-71.

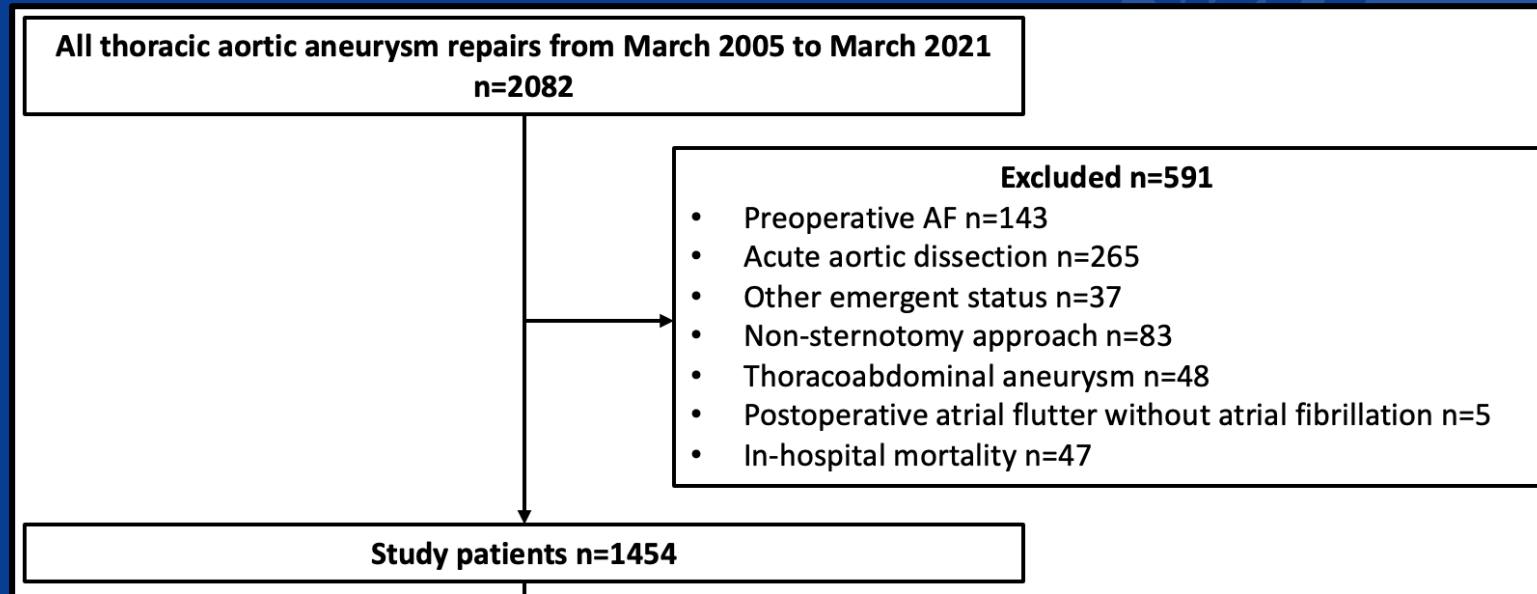
4. LaPar DJ et al. Ann Thorac Surg. 2014;98(2):527-33.

5. Cole OM et al. J Cardiothorac Vasc Anesth. 2020;34(7):1783-90.

# Methods

- ⑩ Single-center retrospective study of patients who underwent thoracic aortic aneurysm repair between March 2005 and March 2021
- ⑩ POAF was defined as new-onset atrial fibrillation (AF) that developed during the index hospital stay
- ⑩ Postoperative complications (POC) included: reoperation for bleeding, respiratory failure, acute renal failure, and stroke
- ⑩ Factors associated with POAF were identified with multivariable regression
- ⑩ In patients without POC, propensity score matching for baseline and intraoperative characteristics was used to create well-matched groups of patients with and without POAF
- ⑩ Long-term survival was analyzed by the method of Kaplan and Meier and compared using the log rank test
- ⑩ Factors associated with 10-year survival were assessed using Cox regression

# Study Cohort

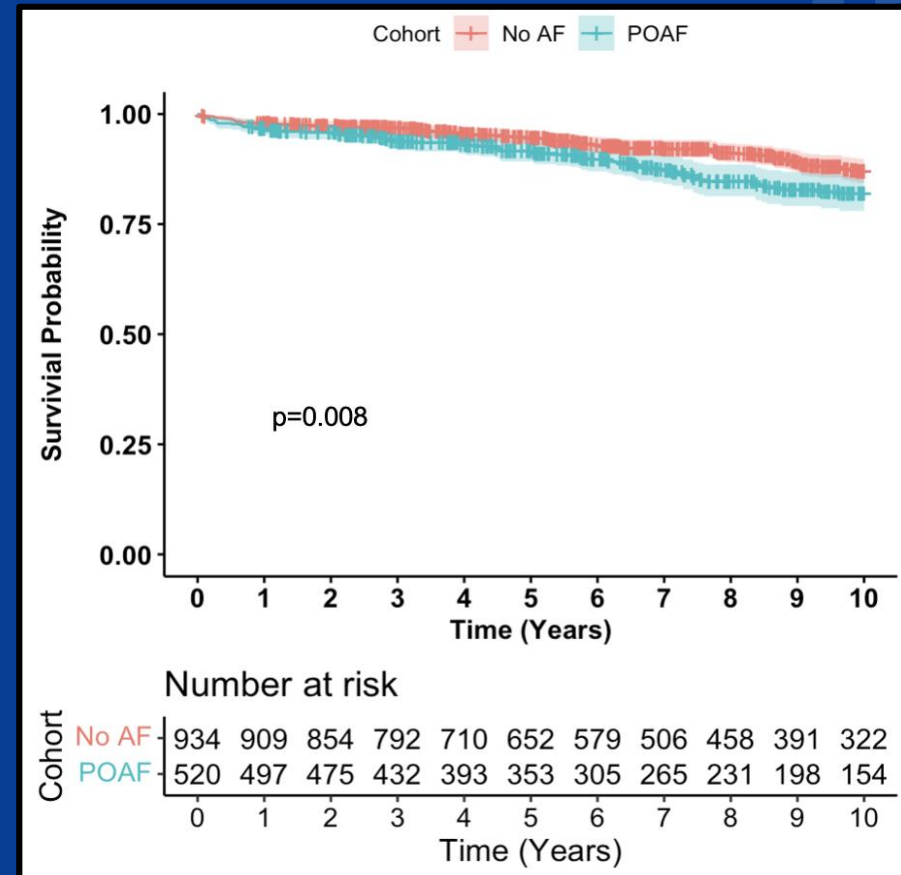


**POAF occurred in 520 (35.8%)**

# Postoperative complications are associated with POAF on multivariable regression

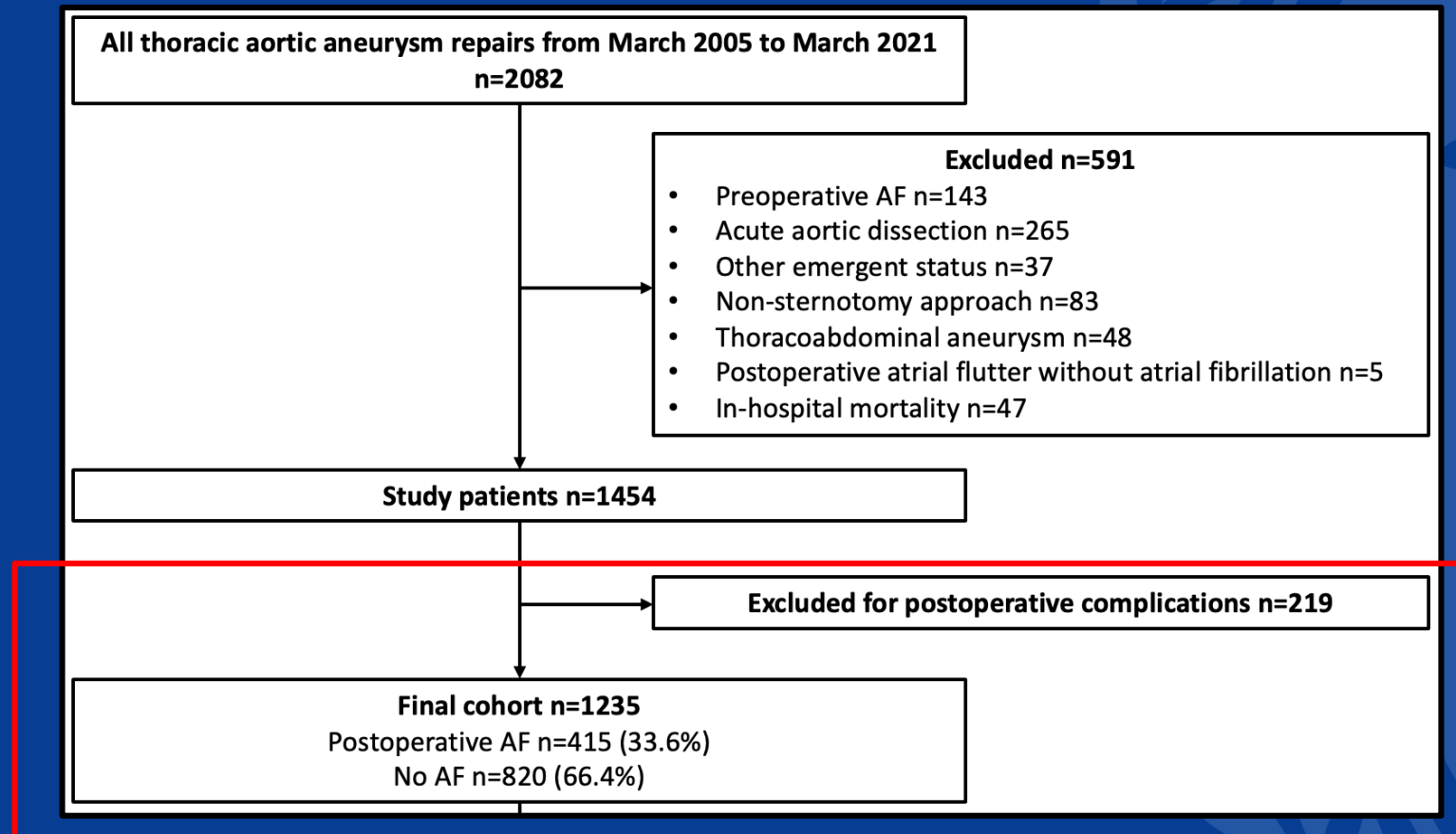
Variables	Multivariable Analysis		
	Odds Ratio	95% CI	P-Value
Age, years	1.05	1.04 – 1.06	<0.001
Diabetes	1.06	0.75 – 1.51	0.74
Dyslipidemia	1.05	0.82 – 1.34	0.73
Hypertension	0.87	0.65 – 1.17	0.36
COPD	1.40	0.93 – 2.10	0.11
Renal dysfunction	0.99	0.72 – 1.36	0.97
Preoperative beta blocker use	1.07	0.85 – 1.36	0.57
Reoperation	0.73	0.52 – 1.03	0.07
Lowest body temperature	1.06	1.02 – 1.10	0.001
IABP use	22.48	2.67 – 189.01	0.004
Bentall procedure	1.00	0.78 – 1.27	0.97
Concomitant CABG	1.07	0.78 – 1.46	0.68
Postoperative complications	1.63	1.18 – 2.24	0.003

# 10-year survival is compromised in patients with POAF



Patients with POAF had lower ten-year survival probability than patients without AF (p=0.008).

# Final Cohort: patients without postoperative complications

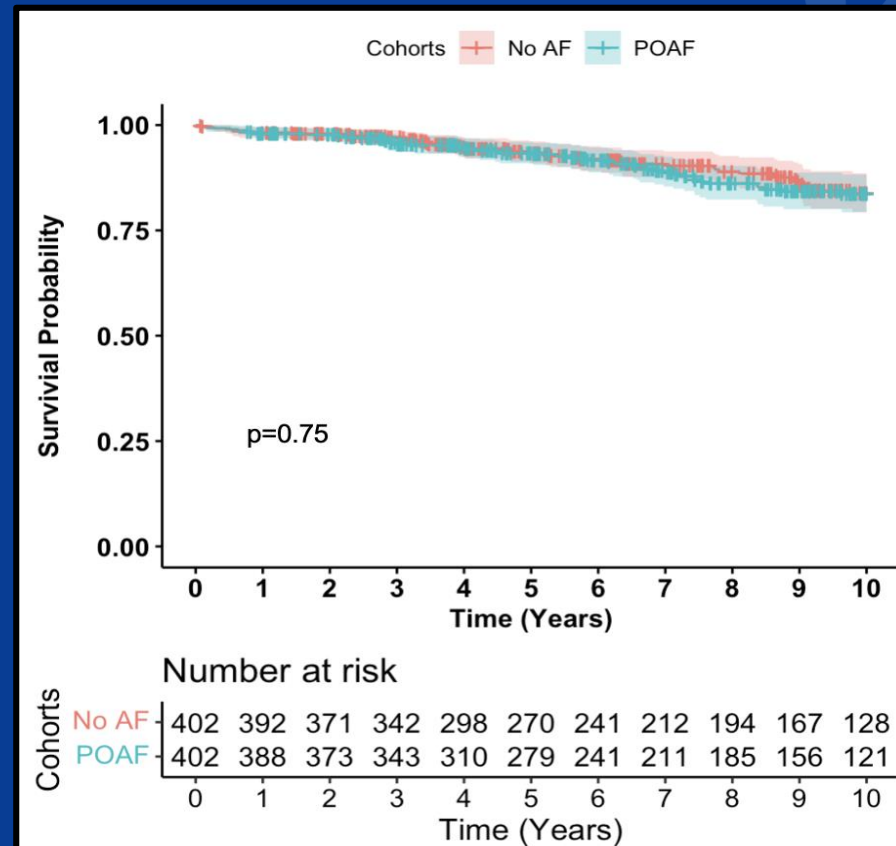


# Characteristics of patients without POC

Variables	Unmatched Cohort (n=1235)		P-Value
	No AF (n=820)	POAF (n=415)	
Patient Age, years	57 [46, 66]	65 [58, 73]	<0.001
Female sex	185 (22.6)	97 (23.4)	0.80
Body Mass Index, kg/m <sup>2</sup>	27.2 [24.3, 30.3]	27.2 [24.8, 31.1]	0.23
Diabetes	76 (9.3)	51 (12.3)	0.12
Dyslipidemia	382 (46.6)	242 (58.3)	<0.001
Dialysis	1 (0.1)	1 (0.2)	1.00
Hypertension	531 (64.8)	312 (75.2)	<0.001
Endocarditis	14 (1.7)	7 (1.7)	1.00
COPD	51 (6.2)	40 (9.6)	0.04
Peripheral vascular disease	87 (10.6)	58 (14.0)	0.10
Cerebrovascular disease	60 (7.3)	29 (7.0)	0.92
Renal dysfunction	100 (12.2)	68 (16.4)	0.05
Previous myocardial infarction	33 (4.0)	21 (5.1)	0.49
Marfan Syndrome	24 (2.9)	6 (1.4)	0.16
LV ejection fraction, %	55 [54, 60]	55 [53, 58]	0.09
Bicuspid aortic valve	274 (33.4)	138 (33.3)	1.00
Elective status	705 (86.0)	360 (86.7)	0.78
Reoperation	144 (17.6)	47 (11.3)	0.005



# After propensity score matching, no difference in survival in patients without POC



In a matched cohort of patients without postoperative complications, the 10-year survival of patients without AF was similar to those with POAF ( $p=0.75$ ).

# On multivariable Cox regression, POC but not POAF was associated with 10-year mortality

Variables	Multivariable Analysis		
	Hazard ratio	95% CI	P-Value
Age, years	1.05	1.03, 1.06	<0.001
Gender	1.43	0.99, 2.05	0.06
Diabetes	1.14	0.72, 1.79	0.58
Hypertension	0.79	0.53, 1.17	0.23
COPD	1.6	1.04, 2.47	0.03
PVD	1.54	1.02, 2.32	0.04
CVD	1.48	0.93, 2.36	0.10
Preoperative renal dysfunction	1.12	0.76, 1.66	0.56
Prior MI	3.01	1.77, 5.13	<0.001
Preoperative LVEF, %	0.98	0.97, 1.00	0.03
Circulatory arrest	1.46	1.01, 2.10	0.046
Total arch	1.43	0.96, 2.14	0.08
Concomitant AVR	1.31	0.84, 2.04	0.24
Concomitant CABG	1.39	0.95, 2.02	0.09
Postoperative atrial fibrillation	1.04	0.74, 1.45	0.84
Postoperative complications	1.47	1.00, 2.15	0.05

# Limitations

- ⑩ Retrospective, single-center, high volume aortic center limits generalizability
- ⑩ Excluded in-hospital mortality
- ⑩ Used STS definition of POAF and did not differentiate between subtypes of AF

# Conclusions

- ⑩ **POAF is common after open proximal thoracic aortic aneurysm repair (35.8%)**
- ⑩ **Patients with POAF have higher rates of POC than patients without AF, and POC was associated with POAF on multivariable regression**
- ⑩ **Patients with POAF in the absence of other major complications have equivalent long-term survival when compared to patients who do not have POAF**