

Increasing time between first diagnosis of atrial fibrillation and catheter ablation adversely affects long-term outcomes in patients with and without structural heart disease

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BACKGROUND

- Atrial Fibrillation (AF) is a common arrhythmia often comorbid with systolic or diastolic heart failure (HF).¹
- Early rhythm control approaches for AF (within 1 year of diagnosis) can improve long-term outcomes, including risk of mortality.²
- Catheter ablation is a more effective treatment for AF compared to drug therapy in general and in patients with concurrent left ventricular dysfunction, however, the optimal timing of treatment is unknown.³
- This study was undertaken to examine timing of ablation on outcomes in those with and without structural heart disease.

METHODS

- All patients that received a catheter ablation for AF (n=9,979) with 1 year of follow-up within the Intermountain Healthcare system were included.
- Patients were identified by the presence of structural disease by ejection fraction (EF): EF≤35% (n=1024) and EF>35% (n=8955).
- Recursive partitioning categories were used to separate patients into clinically meaningful strata based upon time from initial AF diagnosis until ablation: 30-180 (n = 2689), 2:181-545(n=1747), 3:546-1825(n=2941), and 4:>1825(n=2602) days.
- Multivariable Cox hazard regression analysis (SPSS, version 26.0) was used to evaluate the association of time from initial AF diagnosis to ablation with the incidence of study endpoints

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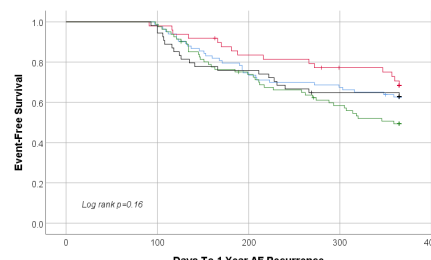
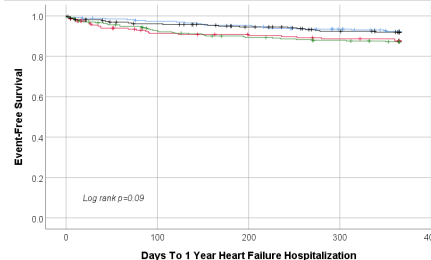
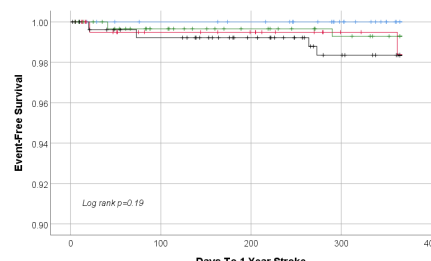
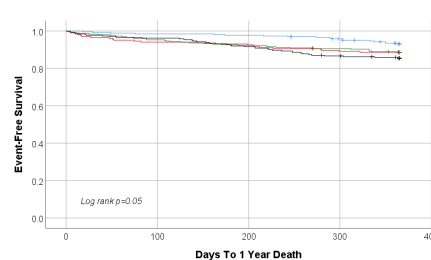
Table 1. Baseline characteristics according to timing from AF diagnosis to ablation, stratified by ejection fraction.

	30-180 days	181-545 days	546-1825 days	>1825 days	p-value
EF ≤35					
n	262	202	298	262	
Age (years)	64.4±12.4	63.2±11.7	63.9±11.4	59.7±11.8	<0.0001
Sex (males)	80.9%	81.7%	74.5%	77.1%	0.16
Hypertension	68.3%	65.8%	68.8%	50.8%	<0.0001
Hyperlipidemia	53.4%	55.9%	53.4%	46.6%	0.19
Diabetes	27.5%	28.2%	33.9%	22.5%	0.03
Heart failure	63.4%	66.8%	62.1%	43.5%	<0.0001
CAD history	47.3%	49.5%	51.3%	45.0%	0.49
Prior stroke	5.3%	3.5%	3.0%	3.8%	0.54
Prior TIA	3.4%	6.4%	3.0%	2.3%	0.10
Renal failure	17.2%	15.8%	15.4%	6.1%	0.001
Valve disease	33.6%	37.6%	31.5%	32.8%	0.55
Cardiomyopathy	42.0%	38.1%	43.6%	33.2%	0.02
Cardioversion	13.7%	13.4%	11.4%	5.7%	0.01
COPD	12.2%	11.4%	16.1%	10.7%	0.22
Sleep apnea	20.6%	18.8%	20.5%	5.7%	<0.0001
CHADS ₂ categories					<0.0001
0-1	11.1%	11.9%	12.8%	26.3%	
2-4	80.9%	78.2%	81.5%	69.1%	
>5	8.0%	9.9%	5.7%	4.6%	
ACEI/ARB	81.7%	73.8%	68.5%	62.6%	<0.0001
Anti-arrhythmic	72.5%	60.9%	64.4%	54.6%	<0.0001
Anticoagulant	92.7%	89.1%	87.6%	88.5%	0.22
BB	88.5%	78.2%	83.6%	81.3%	0.02
EF >35%					
n	2,427	1,545	2,643	2,340	<0.0001
Age (years)	65.3±12.0	64.8±11.6	64.7±11.1	61.6±10.9	<0.0001
Sex (males)	60.9%	56.8%	59.0%	57.7%	0.04
Hypertension	62.1%	65.9%	64.1%	53.6%	<0.0001
Hyperlipidemia	52.7%	56.0%	55.2%	44.1%	<0.0001
Diabetes	20.6%	21.9%	22.7%	16.5%	<0.0001
CAD history	21.2%	20.9%	21.2%	16.2%	<0.0001
Prior stroke	27.6%	31.1%	32.0%	27.6%	<0.0001
Prior TIA	4.2%	4.1%	3.4%	1.6%	<0.0001
Renal failure	5.0%	5.2%	5.2%	3.4%	0.009
Valve disease	8.0%	8.9%	7.9%	3.4%	>0.0001
Cardiomyopathy	23.4%	24.4%	25.0%	22.3%	0.15
Cardioversion	5.9%	7.6%	6.4%	5.2%	0.06
COPD	13.3%	10.2%	8.2%	5.0%	<0.0001
Sleep apnea	10.1%	11.5%	9.2%	5.9%	<0.0001
CHADS ₂ categories	17.3%	18.1%	15.3%	5.4%	<0.0001
0-1	28.0%	25.4%	25.8%	36.7%	
2-4	65.0%	68.4%	69.1%	61.0%	
>5	7.0%	6.1%	5.1%	2.4%	
ACEI/ARB	43.9%	44.4%	46.5%	48.6%	0.006
Anti-arrhythmic	50.8%	55.0%	56.4%	57.9%	0.19
Anticoagulant	90.1%	87.9%	87.8%	89.2%	0.04
BB	71.1%	64.7%	63.9%	68.2%	<0.0001

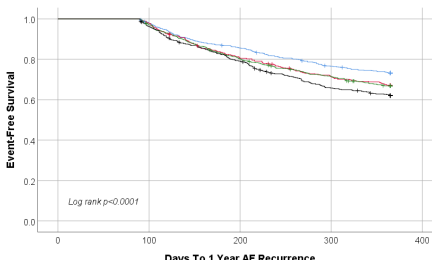
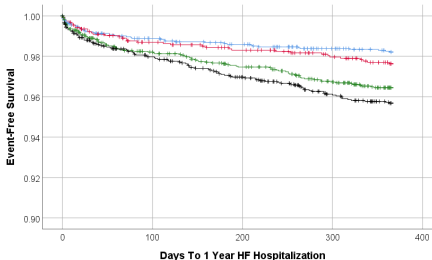
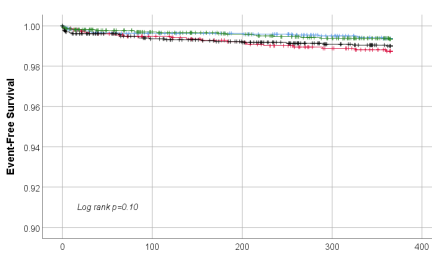
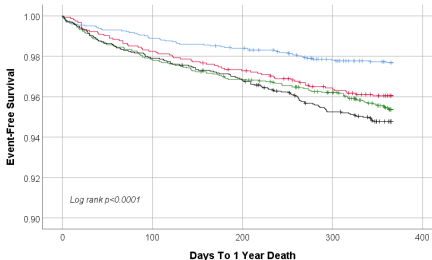
The mean time from AF diagnosis to first ablation was 3.5 ± 3.8 years (EF >35%: 3.5±3.8 years, EF ≤35%: 3.4±3.8 years, p=0.66).

RESULTS

Kaplan Meier survival curves for (a) death, (b) stroke, (c) HF hospitalization, and (d) AF recurrence among patients with an EF ≤35 stratified by time to ablation from AF diagnosis. Blue line=30-180 days, red line=181-545 days, green line=546-1825 days, and black line=>1825 days.



Kaplan Meier survival curves for (a) death, (b) stroke, (c) HF hospitalization, and (d) AF recurrence among patients with an EF >35 stratified by time to ablation from AF diagnosis. Blue line=30-180 days, red line=181-545 days, green line=546-1825 days, and black line=>1825 days.



LIMITATIONS

- Data are observational, and although they provide interesting insights into the importance of early treatment, they do not have the conclusive power of a randomized controlled trial
- Patients that chose to pursue ablation early after diagnosis may have been more biased to pursue aggressive treatment for other AF-related risk factors.

CONCLUSIONS

- Delaying treatment of AF patients with left ventricular dysfunction resulted in decreased procedural success, particularly for patients with an EF >35%.
- All-cause mortality was more common in both groups of patients with increased time from AF diagnosis to treatment, but those that underwent earlier ablation experienced lower mortality rates in both groups.
- Delaying catheter ablation also resulted in increased HF-related hospitalization and AF recurrence for the EF >35% group.
- Neither group demonstrated a significant change in stroke occurrence related to time of treatment, which may reflect the low incident rates of stroke and high rates of anticoagulant medication use.
- These data support early treatment of AF with catheter ablation in patients with left ventricular dysfunction and suggest this can reduce negative disease outcomes and progression, particularly, but not exclusively, in those patients with a baseline EF >35%.

References
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