

Very Long-Term Outcomes of Atrial Fibrillation Ablation

A 15-Year Follow-up Study on Durability and Technology Evolution

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Study Objective

To evaluate the very long-term durability of atrial fibrillation (AF) ablation in a large single-center cohort, tracking outcomes across different catheter technologies over nearly two decades.

Three Eras of Ablation Technology

Early Era (2003–2005) red line or gray

Solid Big Tip (SBT) Catheters

(N = 101 patients)

Intermediate Era (2005–2016) Blue line

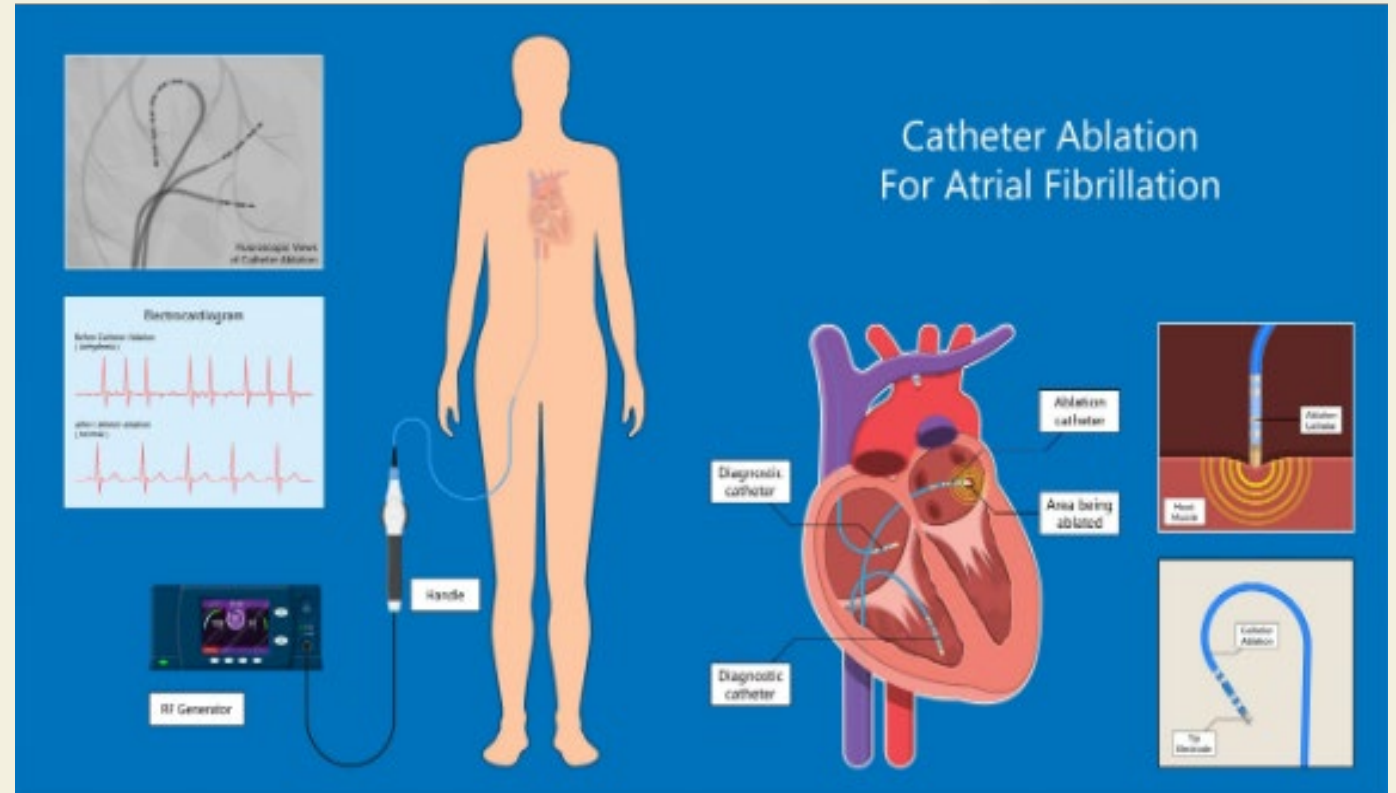
Open Irrigated Tip (OIT) Catheters

(N = 2,143 patients)

Contemporary Era (2014–2021) green line

Contact Force (CF) Catheters

(N = 2,956 patients)

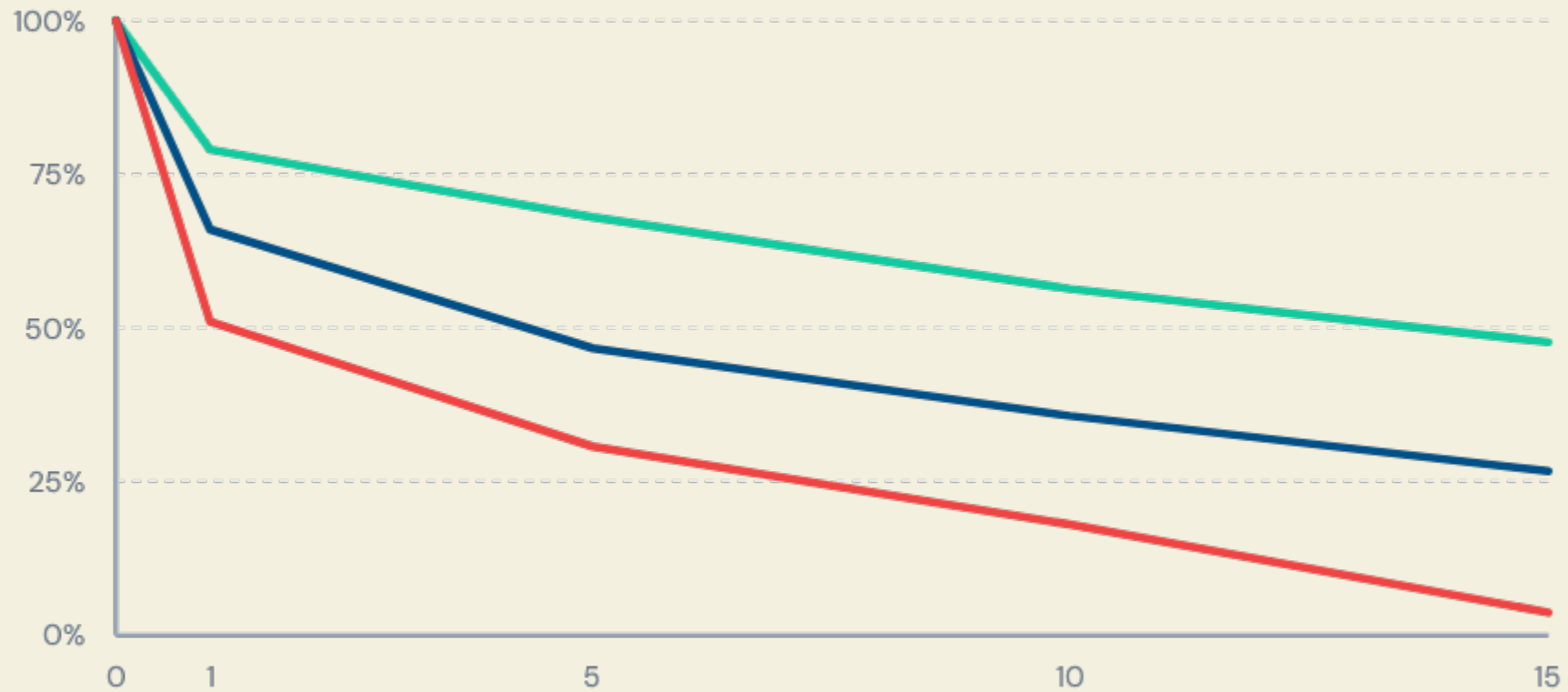


Changing Patient Demographics

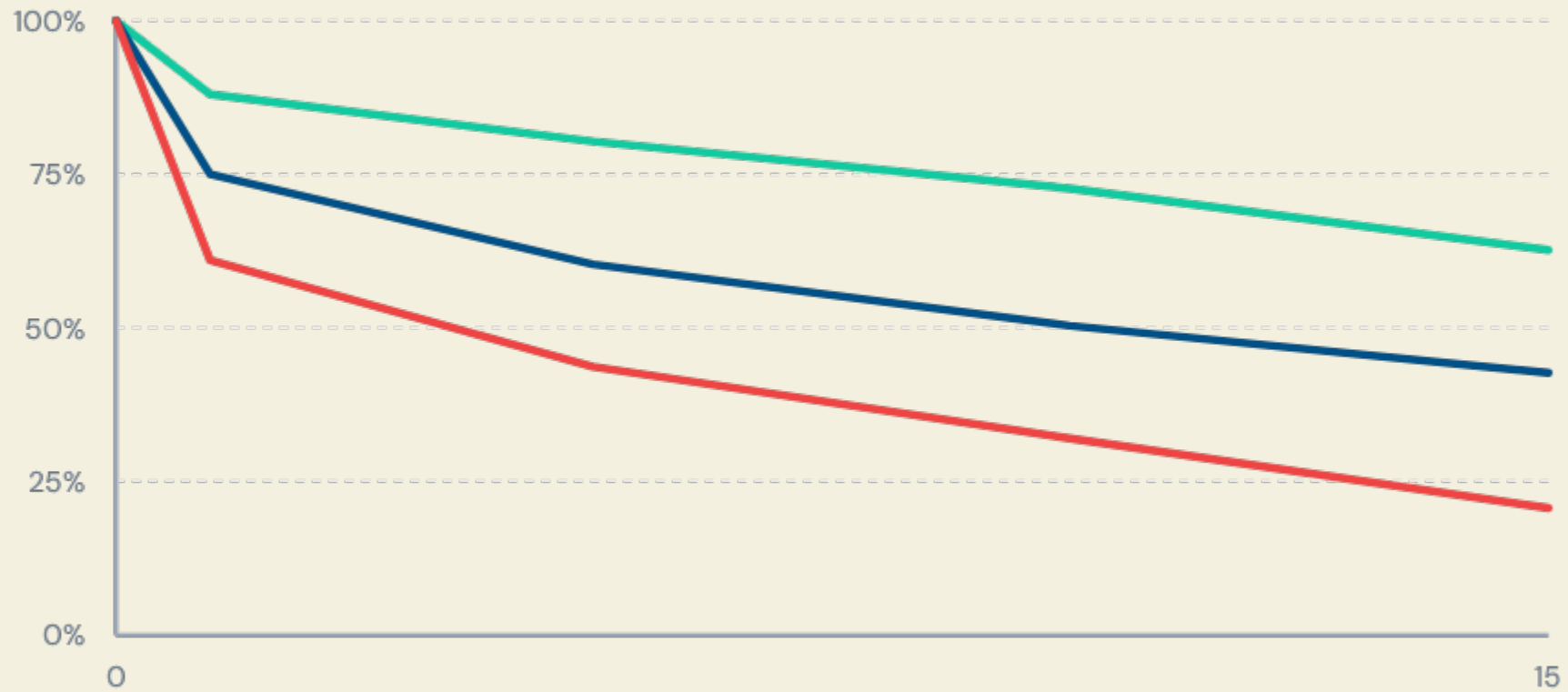
Characteristic	SBT Era (2003-05)	OIT Era (2005-16)	CF Era (2014-21)	Trend (P Value)
Age (years)	58.7	63.9	67.6	↑< .0001
Female Sex (%)	28.7%	30.5%	33.5%	↑02
CHA ₂ DS ₂ -VASc	1.30	2.06	2.75	↑< .0001
Paroxysmal AF (%)	43.6%	47.5%	52.3%	↑06
Long-standing AF (%)	22.8%	12.2%	7.8%	↓< .0001

Freedom from AF: Initial Ablation

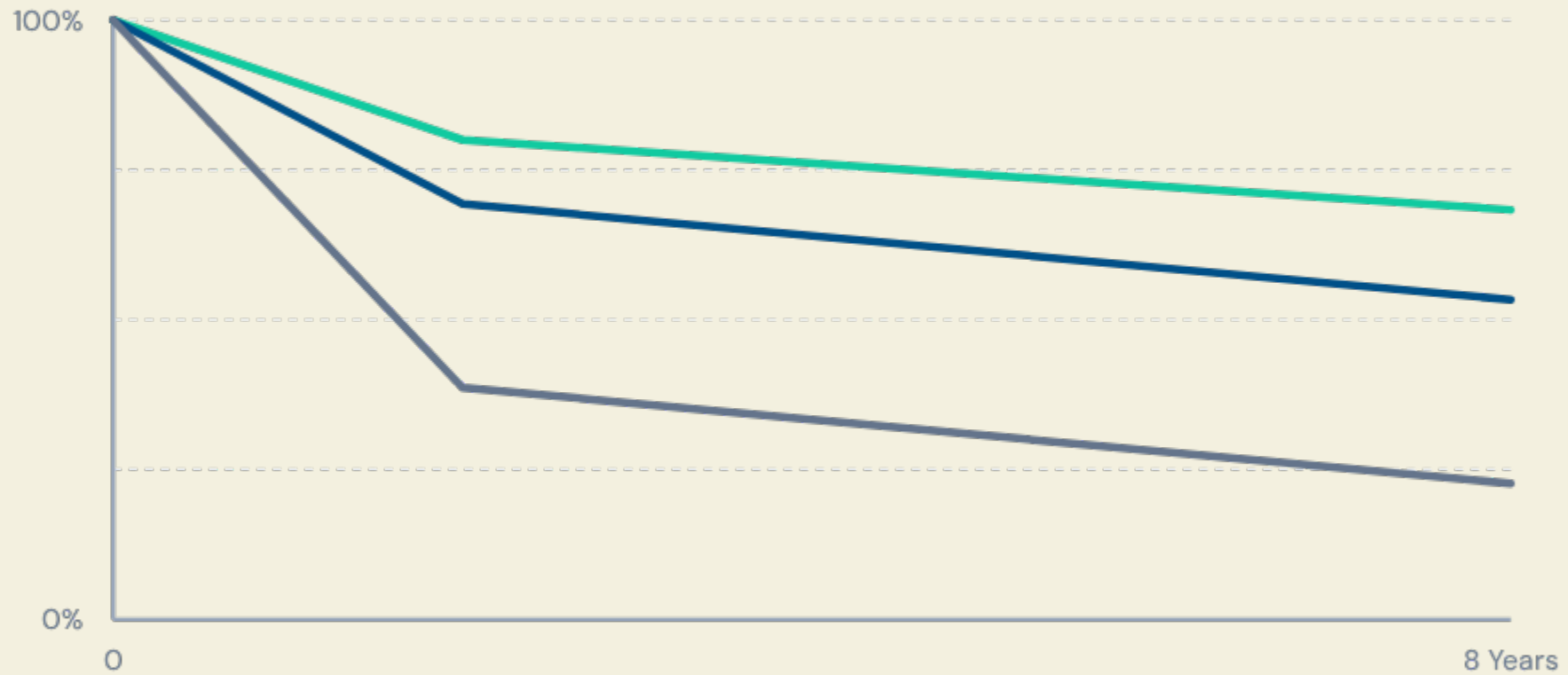
(x axis in years for all slides)



Freedom from AF: Final Ablation



Impact of Technology: Paroxysmal AF



Technology Impact: Persistent AF

Persistent AF (PeAF):

Similar to Paroxysmal AF, outcomes significantly improved with each era. Contact Force catheters demonstrated better durability compared to Open Irrigated and Solid Big Tip catheters.

Long-standing AF (LsAF):

Unlike other types, technology advances yielded **minimal improvement**. Recurrence rates remain high across all eras, highlighting the need for new strategies beyond standard ablation.

Predictors of AF Recurrence



Positive Predictors

Younger Age

Male Sex

Smaller Left Atrium



Clinical History

Shorter AF Duration

Fewer Failed Anti-arrhythmics

Lower CHA₂DS₂-VASc Score



Procedural Factors

Use of Contact Force Catheter

More Recent Procedure Era

Procedural Efficiency & Safety

114

Avg Procedure Time (min)
(Down from 217m
in SBT era)

13

Avg Fluoro Time (min)
(Down from 113m
in SBT era)

1.6%

Major Complication Rate
(stable across eras)

Key Conclusions

1. Recurrence is Continuous: After year 2, there is a steady ~2% annual recurrence rate for all AF types. There is no "cure" plateau.

2. Technology Matters: Contact Force ablation provided the best outcomes for Paroxysmal and Persistent AF.

3. The Challenge of Longstanding AF: Long-standing AF outcomes remain poor despite technological advances.

4. Indefinite Follow-up: Patients require lifetime monitoring due to the linear late recurrence risk.



We are now in the process of evaluating the outcomes using the 4th technological advance, pulsed field ablation. We have used this for AF ablations since US approval in March 2024.

We would be happy to answer any questions at your visit