Racial Differences in Device-Detected Incident Atrial Fibrillation

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Background

- Despite having a greater prevalence of cardiovascular risk factors, prior research suggests Black individuals have a lower incidence of atrial fibrillation (AF) than White individuals.
- Most prior research relied on ECGs or ICD codes to determine the incidence of AF.
- Whether this paradox persists utilizing highly sensitive methods of AF diagnosis has not been well studied.

Research Objective

- To compare rates of incident AF between Black individuals and White individuals as identified by cardiac implantable electronic devices (CIEDs) capable of continuous arrythmia detection.

Methods

- Retrospective analysis of Black and White individuals with no history of AF who had a CIED implanted between 01/01/2007 and 06/01/2019 (Figure 1).
- Patient demographics were collected from the Optum® electronic health record.
- Incidence of AF was determined via the Medtronic CareLink® database – a database storing individual patients' heart rhythm data detected by their CIED.
- *Primary endpoint*: time to first device-detected AF lasting ≥ 6 minutes in one day.
- *Analysis*:
  - Kaplan-Meier survival analysis and Cox proportional hazards modelling was used to compare differences in incident AF between Black and White individuals.
  - Covariates in the adjusted models included age, sex, and comorbid conditions known to be AF risk factors, including hypertension, diabetes, heart failure, atherosclerotic cardiovascular disease, and obstructive sleep apnea.
  - Secondary analyses were performed to investigate the specific interactions between race, gender, age, and incident AF.

Figure 1: Inclusion and exclusion criteria

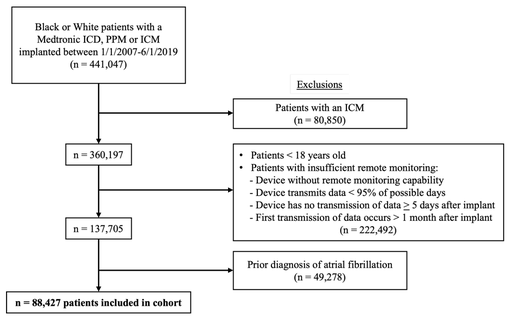


Table 1: Patient demographics

	White individuals (n = 80,382)	Black individuals (n = 8,045)	p value
Device Type			
ICD (% of respective race with ICD)	45,429 (56%)	5,949 (74%)	< 0.001
CRT-D (% of ICD cohort with CRT)	22,208 (49%)	2,448 (41%)	< 0.001
PPM (% of respective race with PPM)	35,107 (44%)	2,111 (26%)	< 0.001
CRT-P (% of PPM cohort with CRT)	3,117 (9%)	188 (9%)	0.994
Demographics			
Mean age (years)	70 ± 13	64 ± 14	< 0.001
Male sex	51,531 (64%)	4,309 (54%)	< 0.001
Comorbid Conditions			
Heart failure	25,474 (32%)	3,979 (49%)	< 0.001
Hypertension	46,166 (57%)	5,708 (71%)	< 0.001
Diabetes	21,675 (27%)	3,030 (38%)	< 0.001
Cerebrovascular disease	7,710 (10%)	1,001 (12%)	< 0.001
Peripheral vascular disease	19,281 (24%)	1,820 (23%)	0.006
Obstructive sleep apnea	8,654 (11%)	1,081 (13%)	< 0.001
Coronary artery disease	32,213 (40%)	2,864 (35%)	< 0.001
Hyperlipidemia	40,859 (51%)	4,014 (50%)	0.109

Figure 2: Crude incidence of device-detected atrial fibrillation

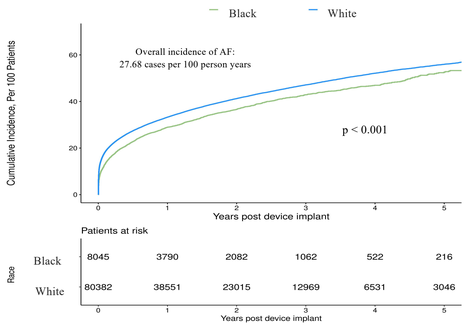


Figure 3: Adjusted hazard of device-detected atrial fibrillation

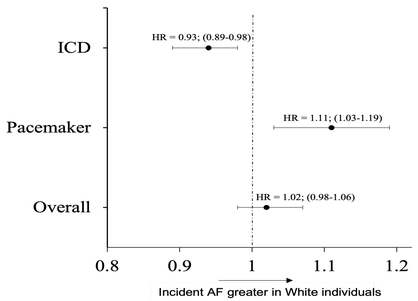
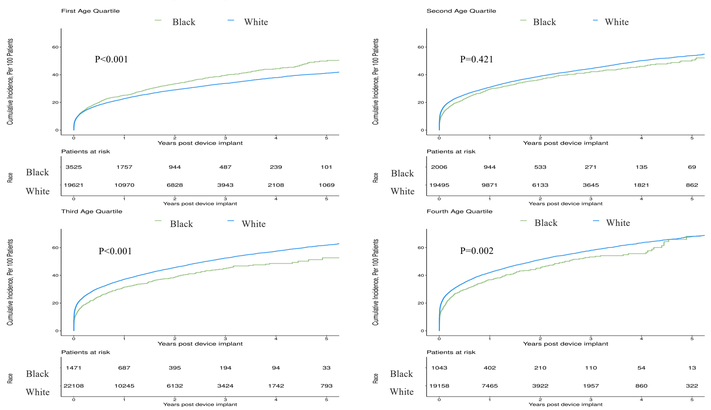


Figure 4: Age-stratified incidence of device-detected atrial fibrillation



Results

- Of 88,427 patients included in analysis (69±13 years, 63% male), there were 80,382 (91%) White individuals and 8,045 Black individuals (9%). Differences in baseline characteristics are shown in Table 1.
- Over a mean of 2.2±1.7 years of monitoring, crude incidence of AF was greater among White compared with Black individuals (27.95 vs. 24.86 cases per 100 person years, p<0.001, Figure 2).
- After adjusting for age, sex, and AF risk factors, the hazard of developing AF in the overall cohort was similar between Black and White individuals (Figure 3).
- Hazard varied by device type. In patients with ICDs, White individuals had a lower adjusted hazard of AF, but in patients with PPMs, White individuals had a greater adjusted hazard of AF (Figure 3).
- In the youngest quartile (18-62 years), Black individuals had a greater incidence of AF than White individuals. Within the second quartile (62-71 years), rates of incident AF were similar among White and Black individuals. However, among the third (71-79 years) and fourth (>79 years) quartiles of age, White individuals had a greater incidence of AF than Black individuals (Figure 4).

Limitations

- Race was categorized according to the Optum EHR categorization, which was a nonuniform process across provider organizations.
- Patients with CIEDs are a specific population with a unique risk profile, and these results may not be generalizable to the broader population.
- We did not account for variable degrees of ventricular pacing within the cohort, a factor previously shown to impact incident AF.
- While CIEDs are highly sensitive and specific for the diagnosis of AF, there was no independent adjudication of AF diagnoses in the present study.

Conclusions

- The present study demonstrates a similar adjusted hazard of incident AF between Black and White individuals with CIEDs, and a greater incidence of AF in young Black individuals.
- These results underscore the importance of appropriate inclusion of diverse populations in future AF trials and encourage clinicians to equitably consider risk of AF regardless of race.

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