Summer 8-10-2022

Representation and Outcome of Catheter Ablation for Treatment of Atrial Fibrillation Among Patients with Obesity: A Systematic Review of Randomized Control Studies

Eh M. Khaing
University of Nebraska at Omaha

Danielle Dircks
University of Nebraska Medical Center

Ahmad Aroudaky
University of Nebraska Medical Center

Muaaz Almerstandi
University of Nebraska Medical Center

James Aguto
University of Nebraska Medical Center

See next page for additional authors

Author

Eh M. Khaing, Danielle Dircks, Ahmad Aroudaky, Muaaz Almerstandi, James Aguto, Jmaylia Mimms, William Schleifer, Jason Payne, Arthur Easley, Faris Khan, John Windle, Shane Tsai, Daniel Anderson, Gleb Haynatzki, and Niyada Naksuk

UNMC
UNIVERSITY OF NEBRASKA MEDICAL CENTER

Summer Undergraduate Research Program

Representation and Outcome of Catheter Ablation for Treatment of Atrial Fibrillation Among Patients with Obesity: A Systematic Review of Randomized Control Studies

Eh Khaing[1], Danielle Dircks, BS[2], Ahmad Aroudaky, MD[3], Muaaz Almerstani, MD[3], James Aguto, BS HCB HLA[3], Jmaylia Mimms, CMA/NICT[3], William Schleifer, MD[3], Jason Payne, MD[3], Arthur Easley, MD[3], Faris Khan, MD, MS[3], John Windle, MD[3], Shane Tsai, MD, MBA[3], Daniel Anderson, MD, PhD[3], Gleb Haynatzki, PhD, DSc[3,4], Niyada Naksuk, MD[3]

[1]University of Nebraska Omaha, [2]College of Medicine, [3]Division of Cardiovascular Medicine, [4]Department of Biostatistics, University of Nebraska Medical Center, Omaha, Nebraska

Background

- The rapid rises in atrial fibrillation (AF) and obesity have been identified as global epidemics associated with increased mortality and morbidity.
- Observational studies reported 18%-30% of concomitant obesity among AF patients.
- Obesity is a known risk factor of AF incidence, progression, and recurrence after ablation.

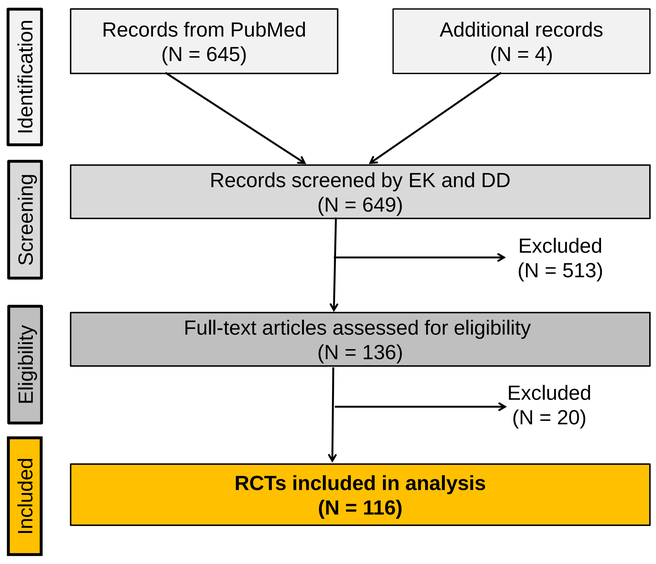
Objective:

1. Examine the proportion of patients with obesity represented in contemporary RCTs of catheter ablation for treatment of AF
2. Examine potential risks associated with underrepresentation of obese participants
3. Examine the impact of obesity on the main outcomes across RCTs

Methods

- We searched PubMed for RCTs examining management of AF mainly endocardial catheter ablation published between 01//01/2015 to 05/31/2022, Figure 1.
- Among the RCTs that did not provide the actual proportion of obese participants and when data regarding body mass index (BMI) were available, normal distribution was assumed and a z-score was used to estimate the proportion of obese participants.
- Obesity was defined as BMI>25 kg/m^2 in RCTs conducted in Asia and >30 kg/m^2 in RCTs conducted in other continents.

Figure 1. Diagram of RCT selection and inclusion process



Results

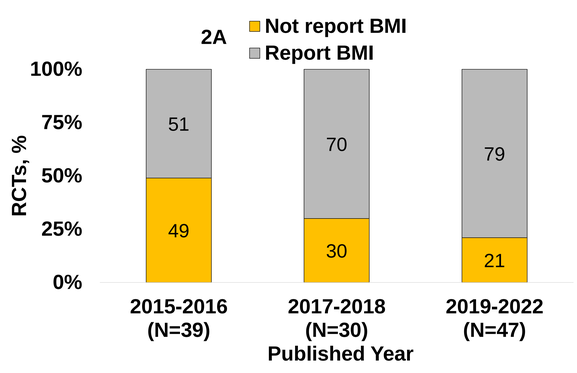
Reporting data regarding obesity and BMI

- We included 116 RCTs comprised of 25,219 participants.
- 112 (96.6%) trials did not report the proportion of obese participants
- 2 RCTs investigating cryoballoon ablation excluded BMI>35 kg/m^2
- 75 (64.7%) trials reported BMI of study participants.

Estimated representation of obese participants

- Using BMI info, we estimated the proportion of obese participants varied greatly, ranging from 5.8% to 71.9% (median, 38.6%, IQR 28.8%, 50.0%) across AF RCTs.
- The trends of providing the BMI information had improved over time (P=0.02), Figure 2A.
- However, the proportion of obese participants continued to varied across the years, Figure 2B.

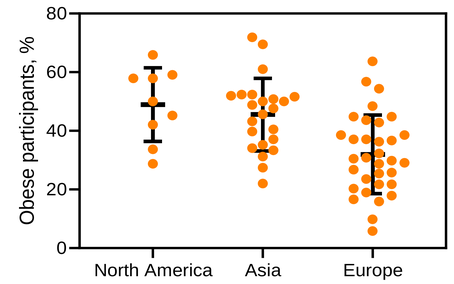
Figure 2. While the numbers of RCTs reporting obesity or BMI data improved over the years (P=0.02, 2A), the estimated proportion of obese participants remained varied and not improved, (2B)



Representation of obese participants according to RCT characteristics

- There was no evidence of difference in the proportion of obese participants between government-support trials vs. industrial-support trials or single-center vs. multi-center trials.
- Study size or the registration record status was not associated with greater proportion of obese participants.
- Representation of obese participants was higher in trials from North America (49.8%) and Asia (45.0%), as compared to Europe (31.3%), P<0.001, Figure 3.

Figure 3. Estimated proportion of obese participants by regions of RCTs (P<0.001)



Subgroup analysis of obese participants or analysis adjusting for BMI

Additional analysis regarding BMI or body weight was conducted in 11 (9.5%) RCTs; **4 (36.4%) of these suggested that BMI or body weight affected their main findings.**

Author year	Interventions	Primary Results	Obesity, %	Results of subgroup analysis for obesity	Effects of BMI on results
Verma 2015	PVI vs. PVI+ Fractionated Electrograms vs. PVI +Linear ablation	No difference in freedom from AF recurrence	Not reported	Forest plot: In BMI≤29 kg/m^2, PVI alone was better than PVI + lines. In BMI>29 mg/m^2, no difference in freedom from AF recurrence.	Yes
Scherr 2015	Posterior vs. Anterol6ateral mitral isthmus ablation	No difference in bi-directional MI conduction block	36%	Obesity (BMI>30 kg/m^2) had higher failure of MA block (64% vs. 25%; P=0.03).	Yes
Prabhu 2017	Adenosine 12 mg vs. 18 mg vs. 24 mg	Higher dose increased desirable effect (dormant conduction and atrioventricular block)	Estimated 44.8%	BW ≥90 kg had a significantly attenuated response. BW ≥110 kg had significantly reduced in desirable effect (atrioventricular block).	Yes
Kirchhof 2020	Early rhythm control vs. Usual care	Early rhythm control decreased CV mortality, stroke, HF/ACS hospitalization	Estimated 37.1%	Forest plot: BMI≥40 kg/m2 favored early rhythm control. However, early rhythm control did not benefit in other BMI groups.	Yes

Conclusion

- Most catheter ablation of AF RCTs underreported the proportion of obese participants and its impact on the main outcomes.
- Using available BMI data, we estimated ~ 39% of AF patients had concomitant obesity.
- BMI/ body weight affected the main outcomes among 36% of these contemporary AF trials.
- Our systematic review of AF RCTs confirmed that obesity is a common comorbidity among AF patients. However, enrollment of obese participants and its impact on results in AF RCTs are underreported.

Relevance and Future Directions

- Although some limited information regarding BMI of study participants were made available in AF trials, our present systematic review suggested that RCTs have continued to underreport such information.
- A standardized system that encourages adequate representation of obese participants and transparency in reporting such information in AF research is needed to ensure applicability of results to obese patients with AF.

Funding: The Jensen Family Research Funding, Division of Cardiovascular, UNMC
Disclosures: None