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Epicardial Adiposity in people with atrial fibrillation modified by physical activity: an umbrella review

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Introduction

Atrial Fibrillation (AF) affects 30% of the world's population and accounts for 3 million deaths annually, and current management pathways often result in poor outcomes in recurrence of AF with up to 50% reoccurring post pulmonary vein isolation cardiac ablation (PVICA). Epicardial Adipose Tissue (EAT) is a metabolically active substrate implicated in the pathogenesis of AF. Increased levels of EAT thickness have been associated with the risk of developing AF and has also been associated with poorer outcomes and increased likelihood of AF recurrence after PVICA.

Objectives

The aim of this work was to explore current knowledge on levels of EAT in people with AF, post cardiac ablation, taking account of physical activity (PA).

Objectives: Three research questions were set:

- Does volume of EAT contribute to the pathogenesis and severity of AF?
- Does any kind of PA modify EAT volumes?
- Does PA improve outcomes in patients with AF who have undergone PVICA?

Methods

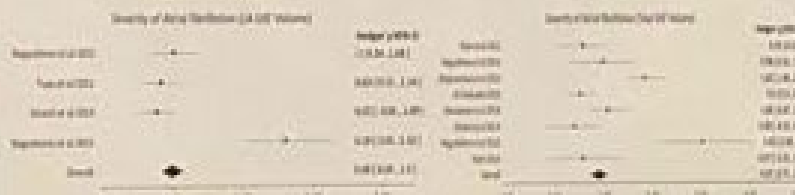
An umbrella review format was adopted with eligible studies from PubMed, EMBASE, the Cochrane Central Register of controlled trials (CENTRAL), Ovid MEDLINE, CINAHL, and Scopus and registered on Prospero CRD42021224902. Results were reported adhering to Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA). Quality assessment evaluation involved the AMSTAR 2 tool and risk of bias evaluated using the ROBIS tool. No ethical issues were identified for this review.

Results: EAT and AF

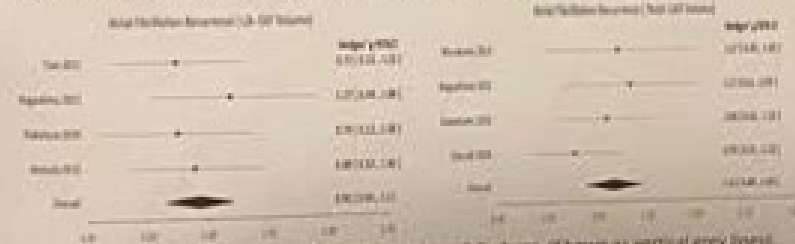
Ten reviews were eligible for inclusion in the analysis. Five examined the relationship between EAT and AF occurrence, three examined EAT modifications with PA and two examined the effect of PA on AF outcomes. The quality of the studies was high, with a low risk of bias.



Increased EAT volumes were associated with a large effect size for the development of AF Hedges' $g=0.9[0.79,0.92]$ for Total EAT volume and Hedges' $g=1.3[1.16,1.47]$ for Left Atrial (LA) EAT volume.



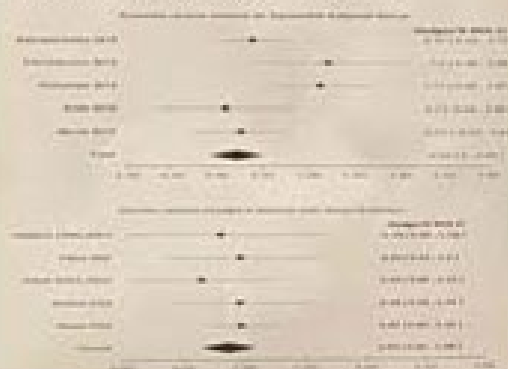
Elevated EAT volumes were also associated with a large effect size for the severity of AF Hedges' $g=0.9[0.71,1.02]$ for Total EAT volume and Hedges' $g=1[0.89,1.12]$ for LA EAT volume, and recurrence post PVICA Hedges' $g=0.9[0.65,1.2]$ and Hedges' $g=1.3[0.88,1.47]$



N.B. Hedges' g Effect sizes: 0.2 = small, 0.5 = medium, 0.8 = large. (Shown as vertical grey lines)

Results: Role of PA

The overall impact of PA showed a small to medium effect in modulating EAT volumes and reducing in reducing AF frequency, duration and severity and risk of mortality and serious adverse events in the intervention groups. EAT volumes Hedges' $g=-0.2[0.0,0.46]$. Despite this PA was shown to significantly improve exercise capacity outcomes Hedges' $g=0.9[0.66,1.08]$



Conclusions

Higher levels of EAT are associated with AF after PVICA but the influence of PA is unclear. This review highlights the need for further research evaluating the impact that physical activity has on EAT volume reduction and recurrence of AF post PVICA

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Authors declare no Conflict of Interest