

Peer Review

Review of: "Cardiac Adipose Tissue, Imaging Segmentation, and Quantification for Cardio-Vascular Disease Assessment – A survey"

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The manuscript titled "**Cardiac Adipose Tissue, Imaging Segmentation, and Quantification for Cardio-Vascular Disease Assessment – A Survey**" presents a comprehensive and technically detailed review of the role of cardiac adipose tissue (CAT) in cardiovascular health, with a strong focus on imaging-based segmentation and quantification methods. The paper is generally well-written and informative. Below is my evaluation:

Strengths:

The review offers a **thorough and up-to-date overview** of key imaging modalities—MRI, CT, and echocardiography—for the assessment of CAT.

The structure is **logically organized**, with clear classification of fat compartments (EAT, PAT, PcAT, PvAT) and disease associations (CAD, HF, AF, etc.).

The paper presents a **solid technical discussion of AI-based methods**, particularly deep learning approaches (CNNs, U-Nets), supported by quantitative performance metrics and relevant tables.

The inclusion of **figures, tables, and visual comparisons** adds clarity and enhances the reader's understanding.

Weaknesses:

The manuscript contains **repetitive content**, particularly in the discussion of EAT's association with multiple cardiovascular conditions. **Section 3** contains repeated statements linking increased **epicardial adipose tissue (EAT)** volume/thickness to multiple cardiovascular diseases (HF, CAD, AF, etc.) through similar mechanisms such as inflammation, oxidative stress, and fat infiltration. More concise summaries in these sections would improve readability.

The **clinical limitations and implementation challenges** of imaging and segmentation techniques are not explored in sufficient depth. Key issues such as cost, processing time, patient compatibility, and data bias should be better addressed.

There is a **disproportionate emphasis on EAT**, while other fat compartments (e.g., PcAT, PvAT) are underrepresented, despite emerging clinical relevance.

The review **lacks a critical discussion on protocol standardization** and dataset availability, which are essential for the clinical adoption of automated segmentation tools.

Suggestions for Improvement:

Add a **comparative summary table** covering clinical feasibility, cost, acquisition time, and patient suitability for MRI, CT, and ultrasound imaging.

Reduce **over-citation** in sections where more than five references support a single point.

Include a more **analytical conclusion**, ideally offering a position on which methods currently show the most promise for practical application.

Declarations

Potential competing interests: No potential competing interests to declare.