Thank you for providing your insightful feedback on our manuscript. We appreciate the time and effort you have invested in reviewing our work, and we value the opportunity to address the comments raised in this report.

Here, we have provided detailed responses for each commentary.

Comment #1
"Electrophysiological Ablation – it is better to trim this to AF ablation as in the majority of cases AF ablation is an anatomical not electrophysiological procedure"

We agree and we modified as suggested.

Comment #2
"A therapeutic strategy has been developed to reduce the burden of arrhythmogenic mechanisms through the local application of cold or heat" – actually lesion creation can be achieved with many energy sources such as RF energy, cryoenergy, laser, ultrasound or even radiation. Moreover "cold or heat" sounds unprofessional. Furthermore those energy may be delivered with linear, balloon or other catheters.

We appreciate your recommendation and have modified the text as suggested.

Comment #3
"This technique involves mapping the sites where AF trigger foci are located for initial identification, followed by the elimination of these arrhythmogenic substrates through physical methods" - in the majority of cases AF ablation does not involve the mapping of trigger foci but it is the totally empirical isolation of pulmonary veins. However extra PV triggers can be mapped.

Thanks for this comment. We agree that there is a discrepancy between the stated technique, involving the mapping of AF trigger foci for identification and elimination, and the predominant empirical isolation of pulmonary veins (PVs) in most AF ablation cases. The reviewer's insight has helped us recognize the need to revise and clarify our statement to accurately reflect the current practices in AF ablation procedures.

We will amend the manuscript to explicitly emphasize that the standard approach in most AF ablation cases involves empirical isolation of PVs as the primary method. The empirical isolation of PVs has shown considerable success in achieving arrhythmia termination and is widely regarded as a cornerstone of AF ablation procedures. However, we also recognize the significance of mapping extra-PV triggers in specific cases, which can enhance the success rate of ablation procedures and improve patient outcomes.

Finally, we added new references related to this topic.

Comment #4

"However, it is a technique that is challenging to access, expensive, and requires advanced training. Despite these challenges, in experiences at high-volume patient centers, second-generation cryoballoon ablation significantly reduces the learning curve for junior residents."- provide the success rate of AF ablation that is totally the same for the different strategies. Cryoballoon ablation is not superior to other techniques.

When discussing ablation as a technique in AF, the advantages and disadvantages of its use are debated. Among the latter, economic and sociodemographic variables are highlighted for their impact on its applicability, noting that this aspect may not be advantageous when considering it as a treatment option. In this context, cryoablation is introduced, as this technique has demonstrated a slightly less steep learning curve compared to other methods. This characteristic could potentially expedite its availability in the future, as suggested by another reviewer. It is essential to clarify that the goal of this section is not to delve into the individual success rates of each ablation modality itself. Instead, the focus lies on examining broader factors affecting the application of ablation and exploring how cryoablation's shorter learning curve may positively influence its adoption.

Comment #5

It must be highlighted that PVI is the cornerstone of all ablation strategies in AF (IA) and other strategies have low level of recommendation (IIB)

We have highlighted this as suggested in the text.

Comment #6

"Techniques for obtaining permanent PVI could be achieved with balloon technologies under X-ray or under 3D electroanatomical guidance"

We added a brief paragraph related to this topic. We appreciated this comment to improve our manuscript.

Comment #7

"Substrate modification – it refers to targeting detected areas of fibrosis, based either on voltage mapping or on MRI. CFAEs or rotors are functional phenomena so it is functional ablation"

Thank you for your valuable comments on our manuscript. Regarding the term "substrate modification," we appreciate your input in clarifying its meaning and distinction in the context of AF ablation. You correctly point out that substrate modification typically involves targeting areas of fibrosis identified through voltage mapping or MRI. In light of this clarification, we agree that areas containing complex fractionated atrial electrograms (CFAEs) or rotors should indeed be considered functional ablation targets rather than substrate modifications.

Based on your feedback, we have made the necessary revisions to accurately reflect the functional nature of CFAEs and rotors in our manuscript. We separated this topic into new paragraphs, specifically addressing "substrate modification" and "functional ablation". This ensures that our readers have a clear understanding of the terms used and the rationale behind choosing specific ablation techniques. Finally, we added new references related to this topic.

Comment #8

Additional (to PVI) ablation strategies has been developed to improve the outcomes of ablation such as targeting detected areas of fibrosis, mapping and ablation of rotational activity, localization and ablation of left atrial ganglionated plexi, dominant frequency mapping, renal denervation and finally nonablative strategies. All of them should be included in the manuscript.

We appreciate your insight into the additional ablation strategies developed to enhance the outcomes of atrial fibrillation (AF) ablation. We acknowledge the significance of these strategies in the context of AF ablation and their potential to improve patient outcomes.

Based on your thoughtful comments, we incorporated a comprehensive section in Section 5.3 that covers these additional ablation strategies. This section provides a thorough overview of each technique, including the rationale behind their application, the evidence supporting their use, and their potential benefits in AF ablation procedures.

By including these strategies in our manuscript, we aim to present a more comprehensive and up-to-date review of the various approaches to AF ablation. This will be valuable for readers seeking a comprehensive understanding of the current state-of-the-art in AF management.