Peer Review File

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Reviewer A

Comment 1: Studying the impact of ICE on catheter ablation is not really new in literature. Only this specific population could be the novelty factor.

Reply 1: Thanks for the comment. We understand that there is existing literature on the impact of ICE on catheter ablation. For our study, the novelty factor lies in the technique innovation of atrial transseptal puncture during the procedure, where we combined ICE with T3D. Our findings indicate the potential of this procedural technique for achieving a zero-fluoroscopy procedure without intraoperative complications. We supplemented the discussion section with relevant descriptions and references.

Changes in the text: Page20, Line 371-379

Comment 2: The study is relatively small, which limits conclusions regarding procedural safety and efficacy.

Reply 2: Thanks for the comment. This study is a single-center study, and the application of ICE in China has not yet achieved widespread use, hence the sample size was limited. The primary aim of this study is to showcase the practical application of ICE in the usual care setting and to provide further evidence for the feasibility of some innovative procedures. We added suggestions for future research methodologies.

Changes in the text: Page 21, Line 406-407

Comment 3: The follow up time is short, there was no structural rhythm follow up (e.g., Holters), and there was 33% incomplete follow up, which limits the conclusions regarding procedural efficacy. Consider writing about 'SYMPTOMATIC arrhythmia recurrence' as these were the only recurrences that could have been recorded, in absence of structured follow up methods.

Reply 3: Thanks for the comment and suggestion. All patients reporting recurrence during the follow-up in our study were assessed using electrocardiogram or Holter monitoring, meeting the criteria for recurrence. Therefore, the term of 'SYMPTOMATIC arrhythmia recurrence' might not be entirely appropriate. We have supplemented relevant descriptions concerning the determination of reported recurrences during the follow-up.

Changes in the text: Page 13, Line 244-246;Page 14, Line 257-259

Comment 4: As noted by the authors, the non-random, operator-led selection of ICE may have led to selection bias. This limits the generalizability of the outcomes.

Reply 4: Thanks for the comment. In our study, the non-random, operator-led selection of ICE may indeed introduce bias. However, the baseline characteristics of the patients

included in this study showed no differences with good comparability. Additionally, all procedure included in the study were performed by the same operator, thereby minimizing bias in the study results due to operator's experience. Since our research center is a large tertiary hospital, the skill level of operators is similar to those who can perform ICE in China. Therefore, we believe that the results have good general applicability. We added more description in the discussion.
Changes in the text: Page 21, Line 395-404

Comment 5: The relevance of zero fluoroscopy in this population is unclear to me (the relatively low fluoroscopy dose is not expected to be really harmful in these patients?), it would benefit the manuscript to include this in the introduction or discussion.
Reply 5: Thanks for the comment. Achieving zero fluoroscopy during procedure is undoubtedly a safer treatment option for patients, especially for special groups such as pregnant women and children. For operators, zero fluoroscopy can avoid back pain and neck discomfort associated with wearing lead aprons. Zero fluoroscopy could also reduce the risk of complications e.g., skin damage and cancer, due to prolonged exposure to a radiation environment. We added the description in the discussion section.
Changes in the text: Page 19, Line 346-357

Comment 6 : The authors state that ultrasound plays a very important role in interventional diagnosis and treatment of arrhythmia. How can ultrasound be used to diagnose arrhythmia? I think that the role of ultrasound is not VERY important for interventional treatment of arrhythmia (many centers perform ablation without ultrasound guidance)
Reply 6: Thanks for the comment. Our original languages were just a general statement. To be more precise, ICE plays a significant role in thrombus screening and atrial fibrillation treatment. We have made modifications to the introduction section to reflect this.
Changes in the text: Page 5, Line 78-86; Page 6, Line 88-104

Comment 7 : The T3D technology is unclear to me. Especially the aspect of the crocodile clip. I recommend to provide more figures or refer to a prior publication on this technology/technique.
Reply 7: Thanks for the comment. In our manuscript, we mentioned the combination of ICE with T3D, which is an innovative application of atrial transseptal puncture procedures. Further details related to ICE combined with T3D-guided atrial transseptal puncture have been supplemented in the procedure section. We also added the reference.
Changes in the text: Page 10, Line 182-190; Page 11, Line 191-203; Page 20, Line 375-377

Comment 8 : The rationale behind the Subgroup analysis by AF diagnosis is unclear to me. Why would this have an effect on the procedure times? Consider removing this section. (Also the claim that a higher proportion of patients received right atrial ablation in the ICE group is NOT statistically significant by the specified cut off point of 0.05)

Reply 8: Thanks for the comment. Different types of AF may lead to varying clinical outcomes when subjected to the same treatment. Thus, we conducted the subgroup analyses to explore whether different types of atrial fibrillation would have an impact our clinical outcomes as well as reduce the potential selection bias. We deleted the description of "a higher proportion of AF patients received right atrial ablation in the ICE group" as the P-value did not reach statistical significance.
Changes in the text: Page 16, Line 305-308; Page 16, Line 312; Page 17, Line 313-314

Comment 9 : The authors speculate that ICE could shorten and flatten the learning curve of catheter ablation. I would argue for the opposite, as operation of the ICE catheter requires additional skills. I recommend to remove this or to substantiate the claim with other sources.
Reply 9: Thanks for the comment. Current clinical guidelines have relevant descriptions in this regard, and there is existing literature indicating that ICE helps shorten the learning curve for beginners. Furthermore, the procedure of atrial transseptal puncture involving the innovative combination of ICE with T3D can also smooth a better learning curve for beginners in mastering transseptal puncture. We added the description in the discussion section.
Changes in the text: Page 20. Line 379-385; Page 21, Line 386-390

Comment 10 : The additional price of the ICE catheter is not regarded in the manuscript. I personally doubt whether the cost of the ICE catheter weigh up to the potential benefit of zero fluoroscopy ablation.
Reply 10: Thanks for your comment. We indeed did not factor in the cost of ICE catheters in our study. Therefore, we cannot assess whether the advantages for patients using ICE catheters can offset their high treatment costs. We have included a description in the discussion section suggesting considerations for future research.
Changes in the text: Page 22, Line 413-417

Comment 11 : The difference between the Chinese study population and other priorly studied populations is unclear, it would benefit the manuscript to include this in the introduction
Reply 11: Thanks for the comment. The patients included in our study were general atrial fibrillation patients and not a specific subset, aligning with previously published studies on Chinese atrial fibrillation patient populations. Our study results indicate that using ICE in general atrial fibrillation patients can achieve zero-fluoroscopy procedures safely and effectively. Therefore our findings support ICE as a safer choice for special populations such as children and pregnant women. On the other hand, our research involves the application of newer procedural techniques, providing broader insights for future clinical practice. We added the description.
Changes in the text: Page 7, Line 116-118

Comment 12 :A description of the procedure in patients without ICE-guidance is missing(e.g., was transoesophageal echocardiography used to guide the procedure or just fluoroscopy?). It would benefit the manuscript to include this in the methods section.

Reply 12: Thanks for the comment. We added the more description.
Changes in the text: Page 11, Line 212; Page 12, Line 213-222

Comment 13 : The conclusion is too strong given the limitations of this study. I would recommend to limit the 'strength' of the conclusion. For example, consider including 'in this retrospective study that included 97 Chinese patients, …'
Reply 13: Thanks for the suggestion. We made the revision.
Changes in the text: Page 22, Line 422

Comment 14: The STROBE checklist contains some questionable answers

About some textual recommendations: - Item No 9 is answered: "NA …", while the authors report possible selection bias in their limitations; - Item 12c is answered: "NA No missing data", while the authors report 33% of patients without full follow up data.
- Item 14c is answered: "NA it is retrospective". Follow up time can be provided in retrospective study. If a study reports AF recurrences at follow up, it is relevant to know whether patients were followed up for 1 day or the full 6 months.
Reply 14: Thanks for the suggestion. We have made correction about the STROBE checklist.
We also added how we addressed missing follow-up data and the description of follow-up time in the paper.
Changes in the text: Page 13, Line 238-240

Comment 15: About the some textual recommendations.
Reply 15: Thanks for the suggestions and we made the revisions as recommended.

Reviewer B

1. Highlight box:
   Please answer the question "What is known and what is new?" with two points separated.
   Reply: Thanks for comments. We made revision.
   Changes in the text: Page 4, Line 70-77.

2. It is suggested to indicate the specific institution name of "the hospital".

174 ***Study design and study population***

175 We conducted a single-center retrospective study in a tertiary hospital in China,

176 which is one of the earliest institutes adopting ICE technology for cardiac

   Reply: Thanks for comments. We made revision.
   Changes in the text: Page 8, Line 146-147.

3. All abbreviations in figures and legends should be explained. ICE in Figure 1 for example. Please check all your figures.

Reply: Thanks for comments. We made revision.

Changes in the text: Page 12-20, Line 211-268.