Author’s response to reviews

Title: Echocardiography-guided percutaneous closure of perimembranous ventricular septal defects without arterial access and fluoroscopy

Authors:

haisong bu (buhaisong@csu.edu.cn)
yifeng yang (yyf627@csu.edu.cn)
qin wu (wuqin2025@csu.edu.cn)
wancun jin (Wancunjin@126.com)
tianli zhao (zhaotianli@csu.edu.cn)

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Author’s response to reviews:

Dear Reviewers and Editor:

We appreciate the time and effort you have spent in reviewing our paper. We are glad that you found our research interesting, and also raised some insightful problems, which helped us improve the quality of our work.

Based on your comments, we have carefully revised our manuscript, and attempted to address all these issues. Our itemized response to your questions, comments, and suggestions (repeated below for your convenience) is as follows:

Reviewer reports:

Özge Pamukcu (Reviewer 1): Revision

The answers of authors are satisfactory but I also wanted the authors clarify some points that:

1. Title is too long, difficult to understand. It will be better if it is short but striking.

Answer: We have revised the Title accordingly.

“Echocardiography-guided percutaneous closure of perimembranous ventricular septal defects without arterial access and fluoroscopy”
The detailed information are provided in Title Page.

3. The authors emphasized that all procedure is done without fluoroscopy. However; I'm curious about that using TEE did not prolong the procedure. While all interventionalists are used to work with fluoroscopy, the images are familiar and easy to proceed. According to my opinion: is hard to be sure the position of the wires, delivery system and the device by TEE and it prolongs the procedure and so the duration of anesthesia. Could the authors compare the duration of VSD closure with and without fluoroscopy.

Answer: Yes, the procedure was performed in a routine operating room under TEE guidance without fluoroscopy.

1、“The mean procedural duration, post-operative mechanical ventilation duration, intensive care unit (ICU) residence, and in-hospital durations were 28.2±8.7 min (range, 12.0–42.0 min), 65.2±5.6 min (range, 56.0–78.0 min), 2.1±0.1 h (mean, 2.0–2.4 h), and 2.7±0.2 d (range, 2.5–3.0 d), respectively.”

The detailed information are provided in Results section, line 150, page 7.

2、“In an effort to reduce injury related to fluoroscopy and angiography, TEE has been used for guidance during perventricular occlusion of VSD in recent years. Intraoperative device closure of PmVSDs without radiation and CPB under guidance of TEE was first reported by Amin and colleagues, and has become an accepted modality of treatment in many cardiac centers.”

The detailed information are provided in Discussion section, line 186, page 8, and References 4, 20-22.

3、“TEE provides a clear view of vessels and routes during surgical procedures. ……TEE—performed immediately before, during, and after deployment of the occluder device—has been considered as a standard technique for this procedure. The site, size, and rims of the defect; suitability of the device; and guidance of the guidewire and sheath through the PmVSD can be precisely assessed via TEE during the procedure. Furthermore, once the device is released, TEE can provide beneficial information for occlusion; a repeat image can also be obtained to assess the effectiveness of PmVSD closure, including the device position, the presence of a residual shunt, and aortic valve regurgitation. Any dislocation or residual shunting is easy to find and further adjustments can be made immediately.”

The detailed information are provided in Discussion section, line 206, page 9.

TEE has been used for guidance during perventricular occlusion of VSD in recent years. Therefore, it is not too hard to define the position of the wires, delivery system and the device by TEE. See Reference 4-12, 23-25 for details.
4. “The mean procedural duration was 28.2±8.7 min (range, 12.0–42.0 min).”

5. “The procedure time for the fluoroscopy-free transcatheter VSD closure ranged from 12 to 42 minutes.”

6. “Although a longer operating time was needed in certain cases, especially easy in our experience, the procedure time decreased remarkably as operators gained experience. The learning curve is very short for operators.”

The detailed information are provided in Results section, line 150, page 7, and Discussion section, line 231 and line 243, page 10.

The operation time is different for different operators.

In recent years, we have been working on the use of TEE-guided percutaneous treatment of congenital heart disease, such as ASD and VSD. See Reference 23, 24 for details.

So we have accumulated a lot of experience and the operation time is satisfactory. There was no significant difference between TEE-guided and fluorescence-guided. The operation time and duration of anesthesia were not prolonged.

4. Without having arterial route how the interventionalists can feel themselves safe whether in the case of device embolism? I think that not having an arterial route puts the patient under serious risks and it is more important than having vascular injury.

Answer: The procedure was performed under TEE guidance.

1. “TEE provides a clear view of vessels and routes during surgical procedures. The vital part of percutaneous device closure is that the guidewire and delivery sheath should pass through the PmVSD under TEE imaging. TEE—performed immediately before, during, and after deployment of the occluder device—has been considered as a standard technique for this procedure.”

2. “The site, size, and rims of the defect; suitability of the device; and guidance of the guidewire and sheath through the PmVSD can be precisely assessed via TEE during the procedure. Furthermore, once the device is released, TEE can provide beneficial information for occlusion; a repeat image can also be obtained to assess the effectiveness of PmVSD closure, including the device position, the presence of a residual shunt, and aortic valve regurgitation. Any dislocation or residual shunting is easy to find and further adjustments can be made immediately.”

The detailed information are provided in Discussion section, line 206, page 9.
5. I don't agree that "Furthermore, radiation exposure in childhood may significantly increase the risk of cancer, since children have immature developing organ and tissue structures." The dosage that the patients were exposed is not too much to cause cancer also the patients are usually exposed to radiation once not repeating times. If you look in this manner the interventionalists are under much more risk than patients because they are exposed in every work day with repetitive times and they do not have radiation shields for their head, extremities like hand and foot etc.

Answer: Thank you for your advice. We have revised the article accordingly.

We deleted this sentence “Radiation exposure in childhood may increase the risk of cancer”

The detailed information are provided in Discussion section, line 181, page 8.

6. The authors could benefit from the following articles

Is it safe to close ASD with the guidance of transthoracic echocardiography in pediatric population "ten years' experience of a single center". J Interv Cardiol. 2015 Apr;28(2):172-9


Answer: Thank you very much. Through reading the above literature, we have benefited a lot. We have revised the References accordingly.

See Reference 1, 24 and 25 for details.

The detailed information are provided in References section.

Thank you again.