

Peer Review File

Article information: <https://dx.doi.org/10.21037/jxym-21-32>

Reviewer A:

Comment 1: please comment on spatial resolution of 3D printed models. Is the resolution equivalent to the acquisition method, e.g. 0.5 mm with CT

Reply 1: Even though resolution in the 3-D printed models are not exactly comparable to the CT scan, the models can be printed with a resolution between 14- 27 microns (0.00055 - 0.001 inches)

Comment 2: please comment on IRB approval:

Reply 2: The study did not require IRB approval and individual consent for this retrospective analysis was waived. We have included this in the Ethics section

Reviewer B:

This manuscript presents a single-center case series of 9 patients with various clinical conditions. This study demonstrated exactly what 3D printing does best -- preoperative planning in difficult, rare cases with complex anatomy, e.g. in cardiac surgery. Case selection is interesting and images are good quality. There are three areas of improvement that I think would make this manuscript even more interesting to potential readers:

Comment 1: Descriptions of benefits of using 3D printed models.

1A. Phrases like "improved anatomical understanding", "made the surgery easier", "was used for preoperative planning" are too vague to most readers. It would be better if you added information e.g. which anatomical areas were easier to understand on the physical 3D printed model than on CT? This is especially important because in nearly all cases of complex cardiac, hepatic surgeries surgeons already plan their procedures with volume rendering straight from CT scans. How did 3D printed models offer benefit? Did cardiac surgeons test different device sizes etc. If surgeons only evaluated the model visually and felt more confident after looking at it, that's OK, but please phrase it that way.

1B. You cannot claim that your model "decreased operating room time" (p.7) "led to better outcomes for the patient" (p.7), etc., because there is no proof to support that. In general, I believe that in Table 1 column "Benefit to patient" should be removed as well as phrases that make better outcome claims throughout the manuscript.

Reply 1: Thank you for clarifying and suggesting the wordings to accurately describe the study. We have changed in all parts of the manuscript to reflect this to the best of our knowledge

Comment 2: 3D printing methodology description. This is currently very vague. I understand that this should be primarily a clinically-oriented case series, but technical details should be provided for future meta-research and for anyone who

is trying to replicate the results. For example, it would be beneficial to describe how long each segmentation took, what segmentation method did you use (fully manual, semi-automatic, if yes which algorithms). When you were printing on J750, how long was the printing time, what were estimated costs, which resins did you use. If not in the main manuscript, a table in supplementary materials would be nice. This table could also contain information which CT sequences were used for segmentation.

Reply 2: Thank you for suggesting this. We have included this as a supplement

Comment 3: References. I think the manuscript would be stronger if it captured state of the art better. E.g. RSNA guidelines for clinically relevant 3D printing. There is one document that captures congenital heart disease (10.1186/s41205-018-0030-y) and one that captures hepatic cases (10.1186/s41205-020-00065-6). Also, there are already studies that show actual patient benefit in prospective studies, e.g. 10.1007/s00330-019-06511-2 for hepatic surgery, 10.4097/kja.21114 for otolaryngology or 10.1002/jmri.27426 for congenital heart disease.

Reply 3: Thank you for suggesting these great articles. We have included all of these references except the last one, since the last paper was in relation to MRI guided left and right heart catheterization.