

Peer Review File

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Reviewer A

Comment 1: Does the transannular patch (TAP) you are writing mean valved? Or is it valveless? Depending on that, re-intervention for TAP may include re-intervention for degenerated valves, so it may not simply be a result of PA augmentation, right? If possible, we should exclude the re-intervention group due to reduced valve mobility in the group with valved TAP.

Reply 1: Thank you for your comment. In our study cohort, transannular patch repair was performed without additional pulmonary valve reconstruction. We added this detail to the description of our surgical technique in the method section.

Changes in the text: Transannular patch repair was routinely performed without additional pulmonary valve reconstruction (i.e., monocusp patch repair). (see Page 7, Line 146-147).

Comment 2: The authors note "at the discretion of the attending surgeon," but if possible, please note which materials tended to be used for which stenosis.

Reply 2: During the study period, there was no institutional guideline for the choice of patch material at main PA or PA branches. We used four different patch materials for pulmonary artery patch augmentation and the distribution of patch materials is described in the result section on detail (see first paragraph).

Changes in the text: No changes in the text.

Comment 3: If a part of the patch was harvested at the time of re-operation and a pathological search was performed, please also describe the results, especially in pericardium group.

Reply 3: This is a very interesting aspect. However, histological examinations of explanted patch material were not regularly performed during the study period.

Changes in the text: No changes in the text.

Reviewer B

Summary:

This study is a single center retrospective review over a 7 year period evaluating results on pulmonary artery patch augmentation in congenital heart disease patient. It is a relatively large study for pediatric population with 156 patients. These were mostly Tetralogy of Fallot patients and variants. They reviewed their outcomes using 4 different patch materials including autologous pericardium, PTFE, equine pericardium, and bovine pericardium with the primary objective of reintervention/reoperation rates.

Findings showed that patching for main pulmonary artery and transannular patch was generally successful with a freedom from intervention or reoperation of 92%. However, generally branch pulmonary artery stenosis had a much higher rate of re-intervention or re-operation with only a freedom of 25%. Rates of intervention were similar across materials except for bovine pericardium. Risk factors include younger age and weight for index surgery. Thus the authors conclude that patch augmentation for pulmonary arteries are generally safe and effectively, however bovine pericardium should be used with caution.

Comments:

The authors should be commended for their work to review their surgical outcomes to try and tease out if there is a superior or inferior patch material.

Comment 1: Can the authors please address why they combined the TAP and MPA group? Clearly in table 3, they were able to separate them. It appears that all the re-intervention and more likely re-operation in this supravalvar area was due to the use of ePTFE. The numbers easily outnumber those of the branch pulmonary arteries combined and I believe that supravalvar PS is somewhat different than use of TAP for pulmonary valve annular hypoplasia. Could this also be a caution to using ePTFE in the supravalvar and branch pulmonary arteries?

Reply 1: Thank you for your comment. We agree with the reviewer, that PV annular hypoplasia is a different entity compared to supravalvular PS and might have an impact on patch material. However, a posthoc subgroup analysis (n = 40) including only patients with supravalvular patches (no TAP) revealed no statistically significant differences in the re-intervention rate between patients with ePTFE or other patch material.

Furthermore, patch augmentation of small PA branches is more challenging and results knowingly in a higher re-intervention rate. Therefore, we looked at these patients alone to avoid statistical bias.

Changes in the text: No changes in the text.

Comment 2: It is interesting on page 10 in the discussion, that there is an in-vitro model regarding lengths of the patch in relation to the stenosis or stress placed possibly having a role to play for re-stenosis or favorable outcomes. Though this is a retrospective review, is there any data showing this in an in-vivo model or possibly showing this in the study population?

Reply 2: Thank you for your comment. In our study, we did not perform biomechanical analyses of PA patches. Therefore, we currently can't confirm the hypotheses of Lashkarinia et al..

Changes in the text: No changes to the text.

Comment 3: Please correct a typographical error on line 120. I believe it should read "...insertion to the arterial duct, were not exclusion criteria."

Reply 3: Thank you. We rephrased the sentence.

Changes in the text: Previous palliative procedures, such as shunt surgery, balloon angioplasty of the pulmonary valve, or stent insertion to the arterial duct, were not exclusion criteria (See Page 6, Line 137).

Comment 4: It is interesting to note that over a 7 year period, transposition of the great arteries was not encountered. These patients typically have issues requiring plasty of the pulmonary arteries especially the main pulmonary artery with the LeCompte.

Reply 4: Patients with transposition of the great arteries without stenosis of the pulmonary artery were excluded from the study cohort. Therefore, none of these patients are depicted in our cohort (see Page 6, line 125 – 126).

Changes in the text: No changes in the text.

Comment 5: In Table 1, please correct typographical error in the legend. “DORF” should be corrected to DORV”.

Reply 5: Thank you. We corrected this typographical error.

Changes in the text: See Table 1, table notes.

Comment 6: On line 144, there is a discrepancy. An echo peak gradient of 40 mmHg would be about 3.2 m/s much lower than 4 m/s.

Reply 1: Thank you for your comment. We rephrased this sentence.

Changes in the text: When the mean gradient was above 40 mmHg or the peak velocity was above 4 m/s, diagnostic right ventricular angiography was scheduled (see Page 7, line 159-160).

Reviewer C

I congratulate the authors on a well written and thoughtful study. It adds important information to the body of literature and has the potential to change practices. That being said, I have some minor comments:

Comment 1: - Abstract (line 26): in the objectives, the wording "limited outcomes" is ambiguous, do the authors mean there is not a lot of information about the outcomes or that the outcomes are adverse? I would suggest rephrasing for clarity.

Reply 1: Thank you for your comment. We rephrased the sentence.

Changes in the text: Treatment of pulmonary artery (PA) stenosis in congenital heart disease is associated with adverse outcomes (see Page 3, line 41).

Comment 2: - Study population (line 100): the authors don't mention if only native PAs were included. Were there any MAPCAs included in the study? They later mention that two patients underwent unifocalization, however, there is no mention of these patients in the methods or description. It is important to exclude this group for the intended question of the authors as MAPCAs are not native PAs and are inherently prone to stenosis, which could confound the results.

Reply 2: This is an important comment. All patients without native pulmonary arteries

were excluded from our analysis. We added this information to our method section. Overall, five patients with PA+VSD with MAPCAs were included in our series and all patients had native pulmonary arteries.

Changes in the text: Furthermore, patients without native pulmonary arteries (i.e., patients with pulmonary atresia with ventricular septal defect with major aortopulmonary collaterals, type c) were excluded. (see Page 6, line 127-129)

Comment 3: - Methods (line 120): minor grammar error, should say "were not exclusion criteria" or "were not excluded".

Reply 3: Thank you. We rephrased the sentence.

Changes in the text: Previous palliative procedures, such as shunt surgery, balloon angioplasty of the pulmonary valve, or stent insertion to the arterial duct, were not exclusion criteria (See Page 6, Line 135).

Comment 4: - Line 144: why were a peak gradient of 40 mmHg or peak velocity of 4 m/s were chosen? A peak velocity of 4 m/s translates to a peak gradient of 64mmHg, so which one is it? Do the authors intend to say a mean gradient of 40 mmHg?

Reply 4: Thank you for your comment. We rephrased this sentence.

Changes in the text: When the mean gradient was above 40 mmHg or the peak velocity was above 4 m/s, diagnostic right ventricular angiography was scheduled (see Page 7, line 159-160).