Author’s response to reviews

Title: A summary of second systemic pulmonary shunt for congenital heart disease with pulmonary hypoxemia

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Author’s response to reviews:

Reviewer reports:

Reviewer #1:
Comment 1: I appreciate the opportunity to review this work. Briefly, the authors are describing their own experiences and learning experiences in patients undergoing systemic to pulmonary shunt operations. I'm afraid that their dissertation is very basic and at times inaccurate. This work does not add anything to the field of congenital heart surgery and therefore of very minimal interest.
Reply: Because how to improve the skills of reoperation and reduce the complications of the secondary systemic-pulmonary shunt to fully play the role of the systemic-pulmonary shunt are still difficult in the field of cardiac surgery, we summarized the experience of the secondary systemic-pulmonary shunt in our hospital in the past 10 years, hoping to provide more useful information in this field.

Reviewer #2: Thanks for your article, but I have the following observations and queries:
Comment 1: The 'Title' states as if it is the summary of a single systemic pulmonary shunt.
Reply: The Title has been revised

Comment 2: The use of term 'secondary' used here seems inappropriate, 'redo surgery' or 'repeated surgery's or even 'second surgery' would be preferred terminology.
Reply: It’s been revised as 'second surgery'

Comment 3: Definitive total intracardiac repair is the established standard mode of current surgical treatment for many of the cases described here. There is no explanation why palliative surgery was offered and then why so many redo palliative procedure.
Reply: It’s been added in the method section
Comment 4: There are contradictory statements regarding original shunt and positioning of new shunt (Page 5 sc 50-54 & pg 6 sc 31-37).
Reply: In this part, the methods were described based on different scenarios in different patients, thus they are not the same throughout this method section.

Comment 5: There are several typing errors especially missing spaces between words.
Reply: These errors are corrected.

Comment 6: Various inferences and conclusions have been drawn without statistical evidence.
Reply: The discussion is based on both the data we obtained and our experience from these operations, so some do not have specific data but have our experience to support.

Comment 7: A big chunk of the article has been unnecessarily spent describing routine safety precautions common for all operations.
Reply: This is what we considered important for second systemic pulmonary shunt in CHD children with pulmonary hypoxemia, so we added it in the discussion.

Comment 8: I don't know about any 'Septal nerve' in chest (pg 12). Did you mean 'Phrenic nerve'?
Reply: Sorry for the typo; it should be 'Phrenic nerve'

Reviewer #3: Dear Authors,

First of all, I would like to congratulate you for the work you do, and for writing an interesting article.

However, there are some drawbacks in this version of your publication.

Comment 1: The statistics revisions:
1.1. In the "Statistical Analysis" part, you state that normally distributed measurement data is expressed as a mean and standard deviation. Please provide a list of statistical methods used to test for the distribution of data.
1.2. Please revise all variables and check their normality.
1.2.1. Page 4, Line 47: age range 4 months to 18 years. Average 4 years, 8 months. With an interval this size, and a case count of 65, there is a high possibility, that this data is not distributed normally, hence, median and range or interquartile range would better represent your data.
1.2.2. Page 4, Line 50: weight from 4.5 to 58.2 kg. As well, the range is very high, there is a high possibility, that the date is not distributed normally.
1.2.3. The above statement is true for each and every continuous variable you report.
1.2.4. Page 9, Line 48: "follow-up period of 402 +/- 330 days with a median of 450 (90, 2169)..." Please explain, what the numbers in the brackets represent? Is this the minimal and maximal values? Is this the 1 & 3 quartiles?
Reply: 1.1. The statistical methods used to test for the distribution of data is added.
1.2.1 Median and interquartile range of age are added in the manuscript
1.2.2. Median and interquartile range of weight are added in the manuscript
1.2.4. They are the minimal and maximal values
Comment 2: Page 5, Line 17: "1.2.1 Patients with bypass blockage or stenosis" Please clarify what you mean by bypass blockage? It looks like you are talking about the modified B-T shunt, is that correct?
Reply: Yes, it’s the modified B-T shunt

Comment 3: Page 5, Line 49: "Under extracorporeal bypass or ..." The term cardiopulmonary bypass is more mainstream. I suggest using this term (and the abbreviation CPB) here and elsewhere in the text.
Reply: It’s updated as cardiopulmonary bypass

Comment 4: Page 8, Line 6: "... heparin was continuously pumped" Please add a space between was and continuously. I would also suggest using the term infused, instead of pumped.
Reply: The space is added and it’s updated as infused

Comment 5: Page 8, Line 7: "... the ventilator was removed and aspirin was given orally ..." Change to the patient was extubated and ...
Reply: It’s been revised

Comment 6: Page 8, Line 12: "... the heparin pumping was discontinued ..." The word pumping is not necessary. Either remove completely or change to infusion.
Reply: It’s been revised

Comment 7: page 8, Line 23: "... ventilator therapy, cardiotonic drugs, and volume enhancement ..." Please provide the routine ventilation parameters which are used for these patients in your centre, what cardiotonic drugs are used, their doses and duration, how do you evaluate the volume status, do you measure CVP or other parameters? How do you enhance the volume of the patient (that is what fluids do you routinely infuse?).
Reply: The routine ventilation parameters are added in the manuscript. The volume status was measured by CVP.

Comment 8: Page 8, Line 28: "... adjusted to maintain the PCO2 in the blood gas ..." Please clarify which blood: arterial, mixed venous, capillary blood gas?
Reply: What we used was arterial blood gas analysis and it’s clarified in the manuscript.

Comment 9: Page 8, Line 34: "Finally, cardiotonic drugs ..." Again, please list what drugs, what doses and for how long were they used?
Reply: It’s been added in the manuscript

Comment 10: Page 9, Line 3: "... blood oxygen saturation (SpO2)..." SpO2 is an abbreviation for Pulse-oximetry. A noninvasive method used to find out blood oxygen saturation. Please clarify, if this is the case. If the number here is from arterial blood gas analysis the correct abbreviation would be SaO2, and SvO2 for mixed venous blood saturation.
Reply: It’s been revised.

Comment 11: Page 9, Line 3 &amp; 4: "... from (61.5 +/- 10.2)% before the operation to (81.7 +/- 9.2)% after ..." Neither set of brackets are necessary. Please remove them.
Reply: It’s been revised.
Comment 12: Page 12, Line 1 "... cardiac dissociation includesthe aorta firstsince..." I guess that you use the word dissociation for the term dissection (the act of dividing tissue). And please add a space between includes and the, and first and since.
Reply: It’s been revised.

Comment 13: Page 12, Line 23: "... the protection of the septal nerve ..." You probably mean the phrenic nerve. The nerve that provides neural impulses to the diaphragm?
Reply: It’s been revised.

Comment 14: Page 12, Line 28: "... secondary damages are relatively mild and the septal nerve..." change to phrenic nerve (here and elsewhere in the text).
Reply: It’s been revised.

Comment 15: Page 12, Line 31: "... Extracorporeal circulation ..." Maybe use the term cardiopulmonary bypass (CPB for short?).
Reply: It’s been revised.

Comment 16: Page 13, Line 39: "... shunts can be performed under off-pump procedures." Change to "shunts can be performed off-pump".
Reply: It’s been revised.

Comment 17: Page 13, Line 56: "If the accuracy of the shunt operation is compromised due to concerns about the side effects of extracorporeal circulation, the investigators consider that it's not worth it." This sentence does not make sense. Please revise the whole sentence.
Reply: It’s been deleted.

Comment 18: Page 14, Line 2: "In the reoperation of the systemic-pulmonary shunt, most of the operations were performed under extracorporeal circulation, which was due to this concern". This sentence does not make sense. Please revise the whole sentence.
Reply: It’s been revised.

Comment 19: Page 14, Line 20: "It is important to note ..." This sentence does not make sense. Please revise the whole sentence.
Reply: It’s been revised.

Comment 20: Page 14, Line 31: "The view of the investigators ... After the first systemic-pulmonary shunts". The whole paragraph does not make any sense. Please revise the whole paragraph.
Reply: It’s been revised.

Comment 21: Page 18, Line 9: "When the oxygen saturation is ..." Which saturation: noninvasive, arterial, mixed venous? Please revise the whole sentence.
Reply: It’s been revised.

Comment 22: Page 18, Line 47: "... of PCO2 in blood gas analysis ..., the SpO2 was..." please specify which blood (arterial or mixed venous, or just venous) was analyzed and use the correct abbreviations.
Reply: It’s been revised.
Comment 23: Page 19, Line 42: The abbreviation list is not complete. Please follow the guidelines of the journal and revise the list of abbreviations.
Reply: The abbreviation list has been revised.

Comment 24: Page 19, Line 32: "... of skills inthe..." Please add a space between word in and the.
Reply: It’s been revised.

Comment 25: Page 11, Line 20: "In order to prevent ventricular fibrillation ... we routinely place an external defibrillation electrode". By itself the external defibrillation electrode plate does not prevent ventricular fibrillation, but they provide an easy access to use a defibrillator if the ventricular fibrillation would occur. I believe that this was what the authors thought. Please revise this sentence.
Reply: It’s been revised.

Comment 26: The authors conclude the article with these conclusions:
"In summary, systemic-pulmonary artery shunt can promote pulmonary vascular development, improve cyanosis symptoms, and increase the chance of radical treatment in children with congenital heart disease, pulmonary blood deficiency, and pulmonary vascular dysplasia. With the continuous improvement of skills in the reoperation process, a secondary systemic-pulmonary shunt is safe and feasible. While ensuring the patency of the shunt channel, early intensive monitoring and comprehensive treatment after the operation ensures successful surgery outcomes".

In these conclusions the authors state the well known truth: increasing blood flow in the pulmonary circulations helps those patients who have insufficient pulmonary blood flow and the more skillful is the surgeon the successful outcome is more likely. In page 14, line 55, the authors mention, that in their experience, an early radical correction of the congenital defect leads to a longer hospitalization, higher mortality and higher costs, but they do not provide any data. I would suggest the authors to revise this article (or maybe write a companion article) and to provide a more detailed analysis of this problem.

In my opinion, there are two principle points, that are left out of this publication:
Firstly, the authors do not provide an insight why do they not perform a radical correct in elder patients. Why do the authors choose to redo a shunt in a patient, that weights 6.1 kg (the weight of the patient that is provided in page 13, line 17 example of shunt size selection for a patient). The authors state, that they choose the shunt size depending on the patient weight and age (page 13, line 3). Could the authors please provide a detailed explanation, why do they choose not to do a radical correction for patients who weight more then 5 kg? I could reason of doing a primary shunt for these patients, but is it necessary to do a secondary shunt in patient who weights more than 5 kilograms? Wouldn't it be more beneficial to do a complete repair in these patients? How many of these secondary shunt patients underwent a complete repair? What were the reasoning? What were the primary diagnoses of said patients?
Secondly, the authors do not provide any insight why the shunts have occluded or stenosed in the first place? Are the patients treated with antiagregants / anticoagulants after discharge? Is there any possibility of pro-thrombotic factors (genetic, epigenetic) present?
I suggest the authors do add these to points to the discussion section in this article.
Lastly, despite the fact of a long list of revisions that I suggest, I think that this is an article whose findings are important to those with closely related research interests and after revisions and extensive editing by a professional English language editor.
Reply: We have added these points in the discussion and language is revised.