Reviewer’s report

Title Investigating the physiology of normothermic ex vivo heart perfusion in an isolated slaughterhouse porcine model used for device testing and training

Version: 0 Date: 24 Mar 2019

Reviewer: Darren Freed

The authors present a limited experience using the PhysioHeart platform to 'revive and resuscitate' hearts procured from a slaughterhouse. This is presented as an analogous situation to the DCD context. While investigations on ex situ heart perfusion are topical given the current context of donor heart shortage, this report suffers from the fundamental flaw of an appropriate control group. Without comparing these results to those obtained from carefully procured hearts, one cannot conclude anything meaningful on the suitability of hearts procured from the slaughterhouse in this manner.

Other comments

1) Why were hearts paced at the RVOT rather than atrial pacing?

2) Page 6 line 20 - do the authors mean 'atrial' pressure rather than 'arterial’?

3) The authors have conducted an elegant analysis of surface ECG; how does this compare to a 'normal' heart?

4) The authors describe 'unphysiologically' high electrolyte concentrations. It appears from the system photographs that the apparatus is not enclosed. Was this high concentration due to evaporation of free water? Was any attempt made to restore homeostatic values? If not why not?

5) The authors describe a steady increase in plasma free hemoglobin. What was the source of hemolysis? Clearly the system needs optimization.

6) Was the 10L blood acquired from alternate animals filtered and leukocyte reduced? If not, how did immunocompatibility affect preservation of function, inflammation etc?

7) Although the authors have presented a method for research on ex situ heart perfusion, there appear to be a number of opportunities for optimization of the procurement protocol, the perfusion system/hardware, and perfusion protocol that need to be done to prove whether the changes presented are an artifact of the overall protocol vs a real phenomenon that occurs during ESHP generally.
Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

No

Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.

No

Are the conclusions drawn adequately supported by the data shown?
If not, please explain in your comments to the authors.

No

Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

I am able to assess the statistics

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