Reviewer's report

Title: Myocardial topical negative pressure of -25 mmHg increases myocardial microvascular blood flow

Version: 1 Date: 4 October 2007

Reviewer: frank W. sellke

Reviewer's report:

General

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Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)

This is an interesting study entitled "Myocardial topical negative pressure of -25 mmHg increases myocardial microvascular blood flow" in which the authors examined the effects of suction, or negative pressure, on myocardial blood flow under ischemic and non-ischemic conditions. I have several questions and comments.

Major Compulsory Revisions:

1) The conditions are somewhat artificial, in that the study was performed on cardiopulmonary bypass with the LAD occluded at times for 20 min. However, the findings are interesting, although rather descriptive and not mechanistic. Can the authors defend their model. Granted that mediastinal wound infection is a major problem after cardiac surgery, but using a cardiac surgery model for testing the increased blood flow may not be justified. Do the authors not use a beating heart model? In addition, LAD occlusion produces severe ischemia in the pig myocardium which may not be reflective of infected tissue.

2) What is the mechanism for increase acute blood flow? The long term consequences of negative pressure probably relate to angiogenesis and new collateral formation. This has nothing to do with the acute increase in perfusion.

3) Did the authors examine expression of VEGF, FGF or other growth factors during and before application of negative pressure? This may give some indication of why this may improve wound healing and increase blood flow chronically.

4) LAD occlusion often results in ventricular fibrillation in the pig. Did the author give lidocaine or some other drug to prevent this? Did they see this problem? And how did they deal with it?

5) The paper overall is well written. There are probably too many references.

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Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)

Discretionary Revisions (which the author can choose to ignore)

**What next?:** Unable to decide on acceptance or rejection until the authors have responded to the major compulsory revisions

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

**Statistical review:** Yes, and I have assessed the statistics in my report.

**Declaration of competing interests:**

'I declare that I have no competing interests.'