Reviewer's report

Title: Intraaortic balloon pump counterpulsation and cerebral autoregulation: an observational study

Version: 1 Date: 12 December 2009

Reviewer: Stavros Drakos

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- Major Compulsory Revisions:

In this observational study the authors attempted to evaluate the effects of IABP and its inflation ratio weaning on cerebral autoregulation and variability of cerebral blood flow. The study included 20 patients requiring IABP. Real time and beat to beat comparison of peak CBFV (measured by transcranial Doppler) and aortic BP were performed at a 1:1 IABP inflation ratio and during progressive reductions of inflation ratio to 1:3. They noted that during weaning IABP augmentation ratio from 1:1 to 1:3, a significant deterioration in cerebral autoregulation occurs.

This study evaluates an interesting area of IABP, which has received recent attention. There are a few things that need to be addressed:

1. The study evaluates cerebral autoregulation without first establishing baseline disturbance in autoregulation in the subjects. It also fails to review the autoregulation function immediately after the IABP is successfully weaned off.

2. The study design is limited by the fact that it does not account for factors known to affect cerebral autoregulation like:

   a. Use of pressors, various pressors have different effect on cerebral autoregulation, like dobutamine is known to increase the CBFV while dopamine has a dose dependent effect.

   b. Use of anesthesia. Various anesthetic agents are known to have different effects on CBFV and also may potentially interact with pressor agents to alter cerebral autoregulation mechanisms, e.g.: propofol is known to offset the effects of increased CBFV induced by pressors.

   c. CBFVs in only one hemisphere are monitored; this may lead to a potential error by not accounting for regional or inter-hemispherical autoregulation of cerebral blood flow.

3. The study design is centered at evaluating the autoregulation of cerebral blood flow without any evaluation of actual cerebral oxygenation. Compromise in cerebral oxygenation is the main cause of adverse outcomes in patients with hemodynamic compromise or patients undergoing cardiac bypass surgeries.

4. They should discuss previous studies regarding the impact of IABP on end organ failure in patients with shock.
5. The abstract needs to be re-written. In its current form it produces confusion. The endpoints / results should be clearly presented. The authors need to take into consideration that the vast majority of the readers of the journal are not IABP and cerebral circulation experts. For this reason the methods and results need to be self-explanatory (i.e. make sense without the need to read the corresponding sections in the manuscript’s full text). Finally, the conclusion of the abstract needs to be modified in order to reflect clearly the main findings (and any implications) of the study.

6. The authors provide no data on the clinical significance of their findings (clinical outcomes etc)

- Minor Essential Revisions:
  Please consider improving the limitations section.

- Discretionary Revisions:
  The figures need more description for readers not familiar with IABP and TCDs (consider adding an explanatory mechanistic diagram).

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

**Quality of written English:** Needs some language corrections before being published

**Statistical review:** Yes, but I do not feel adequately qualified to assess the statistics.

**Declaration of competing interests:**

I declare that I have no competing interests