Reviewer's report

Title: Evaluation of the PaO2/FiO2 ratio after cardiac surgery as predictor of outcome during hospital stay.

Version: 3 Date: 19 June 2014

Reviewer: Angela Lipshutz

Reviewer's report:

In this prospective observational study, Esteve et al. evaluate the utility of PaO2/FiO2 ratio to predict mortality in a large cohort of post-operative cardiac surgery patients. The perform a robust and sophisticated analysis, and find that a P/F ratio of < 202 at 3 hours after ICU admission is associated with increased ICU mortality. Although it is not surprising that patients with a lower P/F ratio fare more poorly, this has not previously been studied, and thus represents an interesting and novel addition to the literature on this topic. I believe it would be of interest to the readers of BMC Anesthesiology, and will likely be ready for publication pending the following revisions:

Major Compulsory Revisions

-The manuscript would greatly benefit from editing by a native English speaker

-Please revise first sentence of introduction to reflect new Berlin criteria for ARDS (no longer “ALI”)

-You state (results page 6, first paragraph) that the P/F ratio is “better than the cardiac surgery scores” and “when compared with ICU scores, there are slight differences, except in the case of APACHE II score which is clearly superior.” If you compared each of the scoring systems to the P/F ratio, please provide the p-value for each comparison and include a description of this analysis in your methods section.

-It would be interesting to look at fluid administration, blood product administration, and fluid balance among the three different P/F ratio groups (could add this data to Table 3).

-Recommend including table showing results of multivariate analysis evaluating P/F ratio with outcome of ICU mortality. Is P/F ratio an independent predictor of ICU mortality, when controlling for severity of illness (using APACHE, for instance) and comorbidities (COPD, etc)? It is important to make this clear, since we know that Group 3 patients are sicker (higher severity of illness, more co-morbidities). Based on the text in your discussion section, P/F ratio is an independent predictor, but this is not obvious from your tables (Table 5 is somewhat confusing).

-How is measuring/knowing the P/F ratio at 3h post-op going to decrease ICU readmission rates? (page 8, line 20) Will you keep patients in the ICU longer if they are clinically ready for discharge if you know their P/F ratio at 3h was low?
Minor Essential Revisions

-Introduction line 9-10: I am not sure what is meant by “showing an increase in age and higher rates of comorbidities.” Is this compared to other surgical patients? Other ICU patients? Historical cohorts of cardiac surgery patients? Please clarify.

-Methods: All cases were done with moderate hypothermia and antegrade cardioplegia? No DHCA? Never retrograde cardioplegia? MAP 60 was maintained for every case?

-Results p6 line 2-4: No-survivors should be “non-survivors”; in-ICU mortality can simply be called “ICU mortality”

-Page 6 line 29-30: Please clarify statement regarding BMI. Do you mean BMI of group 3 is greater than that of patients in groups 1 and 2?

-What cost-minimization criterion are you referring to on page 7, line 33?

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, and I have assessed the statistics in my report.

Declaration of competing interests:

I declare that I have no competing interests.