Reviewer's report

**Title:** Prognosis of critically ill cirrhotic versus non-cirrhotic patients: A comprehensive score-matched study

**Version:** 4  
**Date:** 20 August 2014

**Reviewer:** Laleh Jalilian

**Reviewer's report:**

Major Compulsory Revisions:

1- It is unclear to me is how the authors divided their initial population into the APACHE-III and SOFA groups and then how they matched the cirrhotic and non-cirrhotic patients in the groups. Did they utilize a random system that allowed them to divide and match the patients in a way such that bias was not introduced?

2- The study design compares the ability of APACHE III, a prognostic model, to predict mortality vs SOFA, an organ dysfunction score that quantifies the burden of organ dysfunction. The authors do not touch on the fact that prognostic scoring systems like APACHE are concerned with predicting mortality, whereas organ dysfunction scores like SOFA better describe morbidity. Prognostic scoring models like APACHE III assume that mortality is affected by physiologic disturbances that occur early in the course of illness, whereas organ dysfunction scoring systems like SOFA allow determination of organ dysfunction at the time of admission and at regular intervals throughout the ICU stay, thus allowing for assessment of the change in organ function. The accuracy of mortality predictions may be improved with repeat measurements with organ dysfunction scoring systems like SOFA. While the authors have taken data only from the first day of ICU admission both for APACHE and SOFA groups and have used that in their analysis, they do not mention that one additional benefit of using a scoring system like SOFA is that it allows for sequential measurements. This better reflects the dynamic aspects of disease processes and may provide better information on mortality risk. This could be an additional support for their conclusion that SOFA is a better and easier-to-implement model for predicting mortality in cirrhotic patients.

3- In the Results Section, Subject characteristics, the authors write in the second paragraph, “In the SOFA-matched group (Table 3), the cirrhotic patients had lower platelet counts (p <0.001), a better Glasgow coma scale (GCS), better hemodynamic status, worse renal function, and a higher bilirubin level than the non-cirrhotic patients.” I’m assuming the authors made a mistake when they write “worse renal function.” Perhaps they meant “better renal function,” since they, later in several places in the paper, state that renal function in the cirrhotic group is better. For instance, the authors show in Table 3 that serum creatinine for the non-cirrhosis group is 3 vs 1.8 for the cirrhosis group. Furthermore, the RIFLE for
non-cirrhosis group is 1.9, and 1.4 for the cirrhosis group. In addition, the authors later write “The RIFLE classes, however, showed better results in cirrhotic patients than in non-cirrhotic controls (p =0.041) in the SOFA-matched group. Therefore, cirrhotic patients with higher de novo SOFA scores should have better results in the RIFLE classes to maintain similar SOFA scores as those of non-cirrhotic controls.”

4- In the Results Section, Mortality and Severity of Illness Scoring Systems, the authors write “In cirrhotic patients, a SOFA score had a similar predictive power as the APACHE III score. In contrast, the RIFLE system showed no inferior discrimination in the cirrhotic group.” I find the second sentence a bit confusing. Do the authors mean the RIFLE system showed no inferior discrimination when compared to the non-cirrhotic group, or that it had an inferior predictive power as compared to the SOFA and APACHE III scores? Please clarify.

5- In the Results Section, Mortality and Severity of Illness Scoring Systems, the authors write, “The RIFLE system had the highest specificity for prognostic prediction.” Could you be more specific in this sentence? For instance, I think you could further clarify the sentence by stating that the results demonstrate that the RIFLE system had the highest specificity for prognostic prediction in the cirrhotic group of both the SOFA-matched and APACHE III-matched groups.

6- One of the outcomes of interest was ICU length of stay, in addition to hospital mortality and hospital length of stay, yet the authors don’t discuss this much in the discussion. For both the SOFA-matched and APACHE III-matched groups, the cirrhotic patients had significantly shorter length of ICU stay as compared to the non-cirrhotic patients. Do they attribute this to mortality and poorer short-term prognosis of cirrhotic patients, or do they attribute it to the characteristics of the non-cirrhotic patients?

Minor Essential Revisions:

1- In the acknowledgments, the “k” in the kidney of the Chang Gung kidney Research Center should be capitalized.

2- In Table 5, SOFA-matched group, APACHE III Total population Overall Correctness (%) is currently written as 071. Please correct.

Discretionary Revisions:

1- In the “Background” section, the authors write, “however, detailed independent comparisons between APACHE III and SOFA scores have been performed in a limited number of studies.” Citations to these studies would be helpful for the readers.

2- In the “Definitions” section, the authors write, “Illness severity was assessed by the SOFA and the APACHE III scores, which were defined and calculated as described previously [1, 2].” This is a very minor suggestion, but I would suggest modifying the sentence to read “Illness severity was assessed by the APACHE III and SOFA scores, which were defined and calculated as described previously [1,
"which would make APACHE and SOFA be written in an order that is consistent with references 1 and 2.

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