Reviewer's report

Title: Increased cardiac index attenuates septic acute kidney injury: a prospective observational study

Version: 2
Date: 16 November 2014

Reviewer: Kenneth Shelton

Reviewer's report:

Major Compulsory Revisions

1. "A cutoff value of 10% increased CI would provide a sensitivity of 75% and a specificity of 89%" This needs further explanation/clarification. This line has grammar/spelling concerns. Why was a cutoff value of 10% used for this study? (Results, Relationship between CI changes and renal outcomes, First Paragraph)

2. "In this study, the incidence of poor renal outcomes were 44% (4/9) in patients with a CI < 3.0, 10% (1/10) in patients with a CI 3.0-4.0 and 44% (4/9) in patients with a CI > 4.0. This needs further explanation/clarification. This line has grammar/spelling concerns. It is concerning that renal protection is found within such a narrow cardiac index with renal impairment both above and below this range. Is it possible that having a cardiac index between 3.0-4.0 is an indicator of less severe sepsis and that these patients are therefore less likely to develop AKI. (Discussion, Third Paragraph)

3. "over-ambitious CI goal" This needs further explanation/clarification. As mentioned above, what other possible explanations aside from reperfusion/inflammatory damage might explain a worse outcome with higher cardiac index. Perhaps a higher cardiac index is a sign of more severe sepsis with worse oxygen extraction and higher compensated perfusion and therefore these patients are more inclined to develop AKI. Is it possible that patients with low cardiac index (low flow state) are showing signs of uncompensated sepsis? (Discussion, Third Paragraph)

4. "Finally, some patients received infusion of hydroxyethyl starch during resuscitation, which may affect renal function as well. However, there were no significant differences in portions or doses of hydroxyethyl starch between the two groups." It is well known that hydroxyethyl starch is nephrotoxic and associated with renal replacement therapy in the ICU patient population. While the two groups show no significant difference in terms of dose/portion, it would be interesting to know if those patients with a cardiac index of 3.0-4.0 and less renal impairment had the same HES exposure. (Limitations, First Paragraph)


Perner, A; Haase, N; Guttormsen, AB; Tenhunen, J; Klemenzson, G; Åneman, A;
Madsen, KR; Møller, MH; Elkjær, JM; Poulsen, LM; Bendtsen, A; Winding, R; Steensen, M; Berezowicz, P; Søe-Jensen, P; Bestle, M; Strand, K; Wiis, J; White, JO; Thornberg, KJ; Quist, L; Nielsen, J; Andersen, LH; Holst, LB; Thormar, K; Kjældgaard, AL; Fabritius, ML; Mondrup, F; Pott, FC; Møller, TP; Winkel, P; Wetterslev, J; 6S Trial, Group; Scandinavian Critical Care Trials, Group (July 12, 2012). "Hydroxyethyl starch 130/0.42 versus Ringer's acetate in severe sepsis.". The New England Journal of Medicine 367 (2): 124–34.

Minor Essential Revisions

5. “the association between the changes of cardiac index (CI)”- This needs further explanation/clarification. This line has grammar/spelling concerns. (Abstract, Background, First paragraph)

6. “general ICU”- Please specify clearly the patient population for this ICU (surgical vs medical, cardiac vs trauma, etc) (Abstract, Methods, First paragraph)

7. “We studied the association between CI changes and renal outcomes”- This needs further explanation/clarification. This line has grammar/spelling concerns. (Abstract, Methods, First paragraph)

8. “CI increased >10%”- This needs further explanation/clarification. How did you decide that a cardiac index of 10% should be used as the cutoff point? How does the PiCCO system compare to the well established thermodilution or Fick’s method of measuring cardiac index with a pulmonary artery catheter? (Abstract, Results, First paragraph)

9. “CI increased group”-This needs further explanation/clarification. This line has grammar/spelling concerns. (Abstract, Results, First Paragraph)

10. “CI un-increased group”-This needs further explanation/clarification. This line has grammar/spelling concerns. (Abstract, Results, First Paragraph)

11. “with an odd ratio”- This line has grammar/spelling concerns. (Abstract, Results, First Paragraph)

12. “had a moderate accuracy”- This line has grammar/spelling concerns. (Abstract, Results, First Paragraph)

13. “with a sensitivity of” - This line has grammar/spelling concerns. (Abstract, Results, First Paragraph)

14. “the CI increased by 10% can be used as a valid tool”-This needs further explanation/clarification. This line has grammar/spelling concerns. (Abstract, Results, First paragraph)

15. “right shift of renal auto-regulation, the renal hypo-perfusion”-This needs further explanation/clarification. (Background, First paragraph)

16. “therefore decrease renal blood flow on the contrary” This needs further explanation/clarification. This line has grammar/spelling concerns. (Background, Second Paragraph)

17. “as a remarkable sign of adequate blood supply”- This needs further explanation/clarification. This line has grammar/spelling concerns. (Background, Third Paragraph)
18. “Moreover, retrospective studies shown that the patients...suggests the cardiac output” This line has grammar/spelling concerns. (Background, Third Paragraph)

19. “general intensive care unit (ICU)”. Please specify clearly the patient population for this ICU (surgical vs medical, cardiac vs trauma, etc)

20. “Patients who and demand aggressive fluid”- This needs further explanation/clarification. This line has grammar/spelling concerns. (Methods, Second Paragraph)

21. “Patients who had already reach the EGDT” This line has grammar/spelling concerns (Methods, Third Paragraph)

22. “obtaining blood culture” This line has grammar/spelling concerns (Study Protocol, First Paragraph)

23. “administarting of antibiotics for reach patient” This line has grammar/spelling concerns (Study Protocol, First Paragraph)

24. “physician implied the EGDT according to the guidelines” - This needs further explanation/clarification. (Study Protocol, First Paragraph)

25. “stabilizing for 30 minutes, the hemodynamic parameters were re-recorded” - This needs further explanation/clarification. What is meant by stabilizing for 30 minutes? What criteria were used? (Study Protocol, First Paragraph)

26. “CI un-increased group” This needs further explanation/clarification. This line has grammar/spelling concerns. (Results, First Paragraph)

27. “The age, hypertension, or diabetes mellitus” This line has grammar/spelling concerns. (Results, First Paragraph)

28. “CI un-increased” This needs further explanation/clarification. This line has grammar/spelling concerns. (Results, First Paragraph)

29. “The present study demonstrated that the un-increased CI” This needs further explanation/clarification. This line has grammar/spelling concerns. (Discussion, First Paragraph)

30. “cardiac output may benefit the organ perfusion” This needs further explanation/clarification. (Discussion, Third Paragraph)

31. “of myocardial myocardial contractility” This line has grammar/spelling concerns. (Discussion, Fourth Paragraph)

32. “but more evidences are still” This line has grammar/spelling concerns. (Discussion, Fourth Paragraph)

33. “equipping itself with good applicable value in critical care departments” (Discussion, Fifth Paragraph)

34. “we found that CI increased during EGDT was associated with better renal outcomes”. This line has grammar/spelling concerns. (Conclusion, First Paragraph)

35. “Probability of no poor renal outcome” This line has grammar/spelling concerns. (Figure 3)
36. “probability of no poor renal outcome %” This line has grammar/spelling concerns. (Figure 1)

Discretionary Revisions

37. It should be stated within the abstract what criteria you are using to establish AKI (RIFLE/AKIN/KDIGO/etc) (Abstract)

38. “hyperdynamic circulation” This needs further explanation/clarification. What is considered hyperdynamic in this study? (Background, Third Paragraph)

39. “Average level of the same age bracket of Chinese population was used to assess underlying renal function” Is it accurate to assume that the patients in this study (septic ICU patients) have baseline renal function similar to the general population? Please specify. (Outcome Measures, First Paragraph)

40. “However, we should stress that inflammatory damage may aggravate with increased renal blood flow and an excessive target of CI can be harmful” This needs further explanation/clarification. The inflammatory damage mentioned in this line needs further explanation and references. (Discussion, Third Paragraph)

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