Reviewer's report

Title: Effects of crystalloid fluids resuscitation on cardiac function in patients with severe sepsis

Version: 1 Date: 5 November 2007

Reviewer: Charles Wade

Reviewer's report:

General
The authors have conducted a study of three crystalloid solutions on outcomes of patients with sepsis. They have used well defined clinical criteria for enrollment and have conduct one of the most definitive studies to date.

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

There are a number of major questions that should be addressed in the paper. The first is the selection of the patients. The authors note that patients who required vasopressors, inotropic agents, colloids or mechanical ventilation during the first two hours were “rejected” from the study (page 5). How many patients were withdrawn from each group? These type of interventions should be a major endpoint in the evaluation of a solution as they represent inadequate resuscitation and a failure of the treatment.

Please provide a progressive break down of your patient population in the results. How many patients were screened for the study, how many did not meet the various entry/exclusion criteria, how many were rejected from each treatment group?

The authors present the percentage of patients surviving for the various solutions and show no difference. The time of death should also be included. A Kaplan-Meier plot would aid in interpretation of the data. AS the treatment period was 120 min upon initial diagnosis if patients died in the first 24 hour in contrast to 30 days later the in pact of which solution was used would be different.

In the analysis was there was an adjustment for repeated measures. However, there appears to be no group (treatment) effects but time effects. There is a question as to significance of some of the interactions. Please state the significance at the level of the interaction prior to comparison between groups at individual times.

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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)
Abstract: State what the normal solution is. From the methods it is assumed to be 0.9% saline.

Page 3, line 1: Please clarify the patient population as sepsis is a relative low cause of death in the over all population. …account for substantial morbidity and mortality in critically ill patients admitted to an intensive care unit.

Page, 3, line 32: The inference here is the data on acidosis is from a clinical study but the work sited is all from animal. The authors should make this clear.

Page 4, line 28: Please state this as a hypothesis. Was the assumption that hypertonic solutions would improve outcome?

Page 7, line 11: Figures 1 and 2 are not necessary.

Page 7, line 12: The CO was reduced from what? Please include normal values in your population if an abnormal level needs to be stated.

Page 7, line 28: The data in figures 5 and 6 are better presented in a table as there were minimal differences between treatments.

Page 8, line 14: …normal saline infusion…

Page 9, line 2: The statement that 3.5% sodium chloride of 5 ml/kg did not alter MAP is in conflict with the presentation in the results section (Page 7, line 22) and Figure 4.

Page 10, line 20: There appears to be pronounced differences in acid-base balance based on lactate concentrations and base excess in the present study. This should be developed further. For example why is the normal group so different in lactate but the BE does not change? There is a reduction in BE with sodium bicarbonate but no change in lactate? There are explanations for the data that should be presented to the reader.

Page 10, line 30: 1)…no difference between the three groups… 2) A difference in observed mortality…

Page 11, line 31: …observation, 52 months, which could not…

Page 11, line 35: …an invasive technique…

Page 12, line 11: …normal saline solution

Page 12, line 12: A statement should be made that all groups improved their CO and MAP after infusion of the solutions.

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 exceptional article

**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.