Reviewer's report

Title: Gastrointestinal failure in intensive care: a retrospective clinical study in three different intensive care units in Germany and Estonia.

Version: 3 Date: 26 March 2006

Reviewer: Manu Malbrain

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General

I read with interest the article by Annika Reintam and colleagues on the impact of gastrointestinal failure on morbidity and mortality in ICU patients. Although the English could sometimes be improved, the article is well written, short, straightforward and to the point.

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

Please add an abstract? Or is this not necessary for BMC?

Introduction:
Good introduction and clear identification of the goals of the study. The authors should however at least somewhere mention the relation between intraabdominal pressure and gastrointestinal failure. Was IAP measured? If not in all patients try to provide soma data. If IAP was not measured then this should be discussed as a major limitation of the study and as a possible goal for future studies. I suggest that they add some references in the introduction on IAP, abdominal hypertension and the abdominal compartment syndrome. They could link this to the consensus definitions available at the website (www.wsacs.org).

Materials and methods:
The definitions for food intolerance, ileus and hemorrhage as they are given are quite vague, they should be better defined. With these definitions it will be difficult to do further studies on GIF because they allow subjective interpretation. AN objective quantification would be better in this regard. Some suggestions:
- food intolerance: many patients in modern ICU’s have nasojejunal feeding tubes or jejunostomy, so they won’t have food intolerance because postpyloric feeding usually works well, but they may have gastroparesis… so maybe food intolerance should be defined as gastric residuals < 300ml or a above a certain daily amount (eg > 1000ml/day). Hemoorhage could be identified by endoscopic findings,… Ileus has not been defined. Ileus will probably go along with food intolerance… what is the difference, please define, and as a last point IAP could be measured. I understand that it will probably impossible to re-analyse the data according to new definitions, but the drawbacks of the definitions used should be discussed. I assume that with the current GIF definition depending on the examiner patients may either have or have not GIF…

Statistics:
I suggest to re-analyse the data as follows:
- tables 1 to 5 should be replaced by only 2 new tables
- first do a univariate analysis (either ANOVA, student t test or mann whitney U) comparing the
different variables in survivors versus nonsurvivors and in GIF vs non GIF patients.
- table 1 should provide the results of the analysis with demographic data (age, gender, scores, BMI, SOFA…), % ventilation, duration of ventilation and ICU stay, … with the following columns: whole population, survivors and nonsurvivors with p-values
- table 2 should provide the same results in GIF vs non GIF patients with p-values
- identify the dependent variables for either outcome or GIF development on univariate analysis (p<0.01)
- enter these highly predictive parameters into the multiple logistic regression model to identify independent predictors for mortality or GIF development
- as far as I know ROC analysis should only be performed on variables that are independently predictive for either mortality or GIF. What about combining SOFA + GIF and looking for mortality as an endpoint – I assume that the AUROC would even be better… Maybe you could quantify GIF by giving some point as with SOFA subscores; eg no GIF factors = zero points, 1= 1point, etc – problem is that there are only 3 determinants so you'll need to find out what condition gets 4 GIF points.
- by doing so the results can be presented in a much more concise way and the 2 new tables can contain all the information that is now given in 5 tables.
- I also strongly suggest to omit any differentiation between Berlin and Tartu in the manuscript, you performed a multiple center study so the data should be treated as such! You could do a subgroup analysis afterwards and just explain in a few sentences in the text the results of that. As an example, on page 7 bottom it looks like there were no CPR patients in Berlin, is this correct? These kind of confusing statements can be avoided if you treat the patients as 1 whole group.
- please stratify patients according to admission groups: elective surgery (cardiac and other), emergency surgery (cardiac and other), medical instead of pooling medical and emergency surgery together. How many CABGs were emergencies?
- page 6: omit the formulas for RR and OR.

Results:
Page 9, second paragraph: It seems logic that GIF development was more often in patients who did not receive enteral nutrition since it is part of the definition (food intolerance and ileus); this statement should be omitted
Page 9, paragraph 3: Please put the results of the regression analysis here, state the independent predictors for mortality and GIF according to the results of the analysis as pointed out above.

Discussion
Nicely addresses the problem of the lack of acceptance of GIF in current scoring systems. The issue of IAP needs to be addressed here at some point!
Discuss the option to add the GI tract into the current SOFA score since as is nicely pointed out the GI tract is NOT included into current organ failure scoring systems… However GI failure will lead to hepatosplanchnic hypoperfusion, bacterial translocation finally triggering a vicious cycle leading to MOF…

Conclusion:
In conclusion, this is a very interesting and great study, we definitely need a GI tract scoring system. I want to congratulate the authors for performing this analysis. Maybe the authors can make the manuscript even better by re-analysing their data taking into account the statistical recommendations, and by discussing more the option of incorporating a GIF evaluation into the SOFA score.

Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)
References:
Many references are form books – please try to identify some recent articles from peer reviewed journals as well.
Please add reference of the ESICM abstract since the data were presented in part at last ESICM meeting.

Figures:
Please add a figure showing the GIF incidence for the whole group during the first week.
Please also provide figures for SOFA evolution in survivors vs nonsurvivors during the first week.

Minor comments:
-page 8 second paragraph: replace incidence of GIF with the development of GIF…
-page 8, paragraph 4: replace periods of mechanical ventilation with duration of MV
-page 8, par 5, line 4: replace described by found

What next?: Accept after minor essential revisions

Level of interest: An article of importance in its field

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

Statistical review: No

Declaration of competing interests:
I declare that I have no competing interests

I'm the founding president of the world society on abdominal compartment syndrome (www.wsacs.org) and as such any further characterisation of GI failure is of paramount importance