

## Letter

# Gastrointestinal failure score in critically ill patients

Mette M Berger, Mauro Oddo, Jérôme Lavanchy, Corinne Longchamp, Frederik Delodder and Marie-Denise Schaller

Department of Adult Intensive Care Medicine and Burns Center, University Hospital (Centre Hospitalier Universitaire Vaudois), CHUV BH-08.660, Rue du Bugnon 46, CH-1011 Lausanne, Switzerland

Corresponding author: Mette M Berger, [Mette.Berger@chuv.ch](mailto:Mette.Berger@chuv.ch)

Published: 4 December 2008

*Critical Care* 2008, **12**:436 (doi:10.1186/cc7120)

This article is online at <http://ccforum.com/content/12/6/436>

© 2008 BioMed Central Ltd

See related research by Reintam *et al.*, <http://ccforum.com/content/12/4/R90> and related correction by Reintam *et al.*, <http://ccforum.com/content/12/6/435>

Reintam and colleagues recently proposed for the first time a score of gastrointestinal failure (GIF) [1], and confirmed its association with poor outcome. The authors should be congratulated for their attempt, and for the combination with the already existing well-validated Sequential Organ Failure Assessment (SOFA) score [2].

Organ dysfunction is an evolving state: its expression and conditions vary. An ideal score should be specific, be sensitive, be objective, reflect a comprehensive measure of the system, be inexpensive, be abnormal in one direction, and be a continuous variable [3]. The proposed items do not fulfill these criteria. In addition, the items' applicability in different diagnostic categories is questionable. Furthermore, the study population, which is small for the elaboration of a score, is not representative of a general intensive care unit population, with very few cases of respiratory failure or shock, an unusual high proportion of comas (30%), and high mortality.

Food intolerance assessment depends on unit protocols. Failure of progression should therefore be assessed as per protocol rather than as 50% of needs. Withholding feeds does not reflect the patient's physiological alterations, but is a medical decision not necessarily reflecting disease severity.

A major problem is to consider the GIF score as a continuous variable, which it is not. This oversight explains the limited impact on the receiver operating characteristic curve of the score alone or in combination. A GIF score  $\geq 3$  was associated with a sharp increase of intensive care unit mortality: this reflects the strong impact of intra-abdominal hypertension (IAH) and abdominal compartment syndrome on mortality [4]. Indeed, the fact that food intolerance alone is

not an independent predictor of outcome supports this interpretation, questioning the rationale for its aggressive prevention or treatment. The GIF score should have been used as a categorical variable, with a dichotomization ( $\geq 3$  or  $< 3$  points), enabling answering the question of whether the score itself had prognostic value or whether only IAH and abdominal compartment syndrome were independent predictors. Alternatively, testing separately IAH, abdominal compartment syndrome, and GIF as dichotomized variables in the regression model, and calculation of the odds ratio adjusting for other covariates, would have shown whether adding the GIF score to the SOFA score was contributive to prognosis. Finally please note that there is an unlucky typographic error in Table 2: several numbers  $\pm$  standard deviation should be numbers and percentages [5].

We need to better characterize gut function. The score should include a combination of variables, as the gut is involved to a variable extent in different diagnostic categories. Table 1 proposes symptoms and signs that can apply across medical and surgical conditions, and which we already use for gut assessment in our department (unpublished data). The inclusion of IAH is essential in relevant conditions (for example, major trauma/burns, major vascular surgery, transplantation) [4]. Elevated lactatemia raises the suspicion of intestinal ischemia; however, elevation of lactate is nonspecific and late. Gastric residues remain, despite methodological problems, the gold standard of feeding tolerance assessment [6]: an increasing volume is clinically relevant. Among motility, both constipation and diarrhea – two forms of gut failure – should be included. Further prospective multicentric investigation of the validity of the combination of continuous items is required to finally characterize this invisible organ.

GIF = gastrointestinal failure; IAH = intra-abdominal hypertension; LIFE = Lausanne Intestinal Failure Estimation; SOFA = Sequential Organ Failure Assessment.

Table 1

**Lausanne Intestinal Failure Estimation (LIFE) based on the SOFA model including symptoms and continuous signs compared with the variables of Reintam and colleagues**

Variable	Score 0	Score 1	Score 2	Score 3	Score 4
Reintam and colleagues [1]	Normal function	EN <50% of needs of no EN at day 3	EN intolerance (residues) or IAH	EN intolerance and IAH	Abdominal compartment syndrome
IAH (mmHg)	<12	12 to 15	15 to 20	20 to 25	>25
Lactate with pH <7.25 (mmol/l)	<2	2.0 to 3.0	3.0 to 4.0	4.0 to 5.0	>5.0
Gastric residue every 6 hours (ml)	<100	200 to 300	>300	>400 or vomiting regurgitation	–
Progression of feed by day of EN	Normal		<60% of needs by day 3		<60% of target by day 4
Constipation (stools over time)	One per 1 to 3 days	Zero in 4 days	Zero in 5 days, bloating	Abdominal distension	Ogilvie syndrome
Diarrhea <sup>a</sup> (number per day)	–	–	4 to 6	6 to 10	>10
Bowel sounds	Normal	Silence	–	Tympanic	–

The different items should be considered separately as relevant for the patient's condition, the highest (that is, worst) value being the gut score. EN, enteral nutrition; IAH, intra-abdominal pressure; SOFA = Sequential Organ Failure Assessment. <sup>a</sup>Liquid stool occurring at least four times per day.

## Authors' response

Annika Reintam, Pille Parm, Reet Kitus, Joel Starkopf and Hartmut Kern

We thank Dr Berger and colleagues for their valuable comments. We agree that our GIF score is not the ideal score with regards to specificity, sensitivity and objectiveness. The shortcomings of the GIF score are also disclosed in our paper. The absence of an ideal variable to measure the gastrointestinal function, however, should not stop us making attempts with different surrogates – as also suggested by Berger and colleagues with the Lausanne Intestinal Failure Estimation (LIFE) score. Our intention was to develop the GIF score in combination with SOFA score. We are looking forward to cooperation with Berger and colleagues to develop the best GIF score. A multicenter trial together with the World Society of Abdominal Compartment Syndrome will be introduced in the near future.

We apologize for the unfortunate typographic errors in Table 2 [5], possibly leading to some misunderstanding. While questioning the representation of the intensive care unit population, Berger and colleagues overlooked the larger amount of surgical patients and concentrated on medical patients solely, responsible for only one-third of the total study population. We cannot completely agree with the argument that the sharp rise in mortality with a GIF score  $\geq 3$  is just a reflection of the strong impact of IAH, while IAH without feeding intolerance gives 2 points in our score. The difference in mortality between the patients with maximum GIF scores of 3 and 4 points is expectedly remarkable (28.1% versus 80%) due to the very high mortality of abdominal compartment syndrome patients.

We completely agree with the urgent need to explore this invisible organ.

## Competing interests

The authors declare that they have no competing interests.

## References

1. Reintam A, Parm P, Kitus R, Starkopf J, Kern H: **Gastrointestinal Failure score in critically ill patients: a prospective observational study.** *Crit Care* 2008, **12**:R90.
2. Kajdacsy-Balla Amaral AC, Andrade FM, Moreno R, Artigas A, Cantraine F, Vincent JL: **Use of the sequential organ failure assessment score as a severity score.** *Intensive Care Med* 2005, **31**:243-249.
3. Khadaroo RG, Marshall JC: **Gastrointestinal dysfunction in the critically ill: can we measure it?** *Crit Care* 2008, **12**:180.
4. Cheatham ML, Malbrain ML, Kirkpatrick A, Sugrue M, Parr M, De Waele J, Balogh Z, Leppaniemi A, Olvera C, Ivatury R, D'Amours S, Wendon J, Hillman K, Wilmer A: **Results from the International Conference of Experts on Intra-abdominal Hypertension and Abdominal Compartment Syndrome. II. Recommendations.** *Intensive Care Med* 2007, **33**:951-962.
5. Reintam A, Parm P, Kitus R, Starkopf J, Kern H: **Correction: Gastrointestinal Failure score in critically ill patients: a prospective observational study.** *Crit Care* 2008, **12**:435.
6. Berger MM, Berger-Gryllaki M, Wiesel PH, Humi M, Revelly JP, Tappy L, Chiolerio RL: **Gastrointestinal absorption after cardiac surgery.** *Crit Care Med* 2000, **28**:2217-2223.