Reviewer’s report

Title: Outcome prediction in disorders of consciousness: the role of coma recovery scale revised

Version: 2 Date: 21 Jan 2019

Reviewer: Ronny Beer

Reviewer's report:

The manuscript by Lucca and co-workers addresses the utility of a clinical rating scale, i.e. CRS-r, in combination with a set of other prognostic indicators to predict regain of consciousness/ responsive wakefulness in a mixed cohort of patients having sustained acute brain injuries (severe TBI, HIE & cerebrovascular catastrophies). According to the authors' statistical analyses, the clinical rating scale performed best in predicting a meaningful functional improvement in patients with ABI despite a rather short neurological rehabilitation treatment of app. 2 months. Interestingly, in the studied patient cohort, 1 out of 3 patients with a serious DoC experienced a full recovery.

Though the results of this study are interesting to the providers of neurocritical care as well as neurorehabilitation, several limitations must be taken into consideration, some of which are also admitted by the authors. Importantly, the following, additional points should be elaborated in greater detail by the authors:

1. In fact, this is a retrospective study analyzing data that have been collected prospectively (see 2.2. Design and Procedure, page 4, first paragraph), and therefore, suffers from the inherent limitations of this study design - please amend.

2. Concerning treatment, the authors are encouraged to provide information on neuropharmacological interventions, which - at least in the cohort of patients with prolonged unresponsiveness after severe TBI - are established in the field of neurorehabilitation (e.g. amantadine). Some of the patients might have received centrally acting medications to mitigate states of sympathetic hyperactivity in the early post ICU period which could have negatively influenced recovery from DoC.

3. In addition, more data on the evolution of neurophysiological, especially EEG, examinations are needed, which should have been performed regularly for the objective assessment of reactivity to exogenous stimuli. Did the authors also perform f- or rsfMRI to rule out or detect clinically not identifiable recovery from coma or UWS?

4. Could the authors provide some reason to limit data analysis to the relatively short neurorehabilitation period of app. 2 months. Several experts in the field recommend rehabilitation times of at least 3 months for HIE or 6 (up to 12 months) after severe TBI before designating an unfavorable outcome. What happened to the patients who did not show signs of emergence from unresponsiveness during the respective period of time? Were these patients discharged to skilled nursing facilities or granted additional weeks of neurorehabilitation?
5. Language editing could help to streamline the flow of information, e.g. "patients of traumatic nature" should read patients with TBI or "autonomy of respiration" is better described as spontaneous breathing or fully weaned from mechanical ventilation. The same holds true for the phrase "longitudinal papers" (the authors rather refer to longitudinal studies) etc. What do you mean by "inpatient recovery period"?

6. Feed administration should be changed to route of feeding. Surprisingly, some of the patients in UWS were feed orally; the interested reader might ask whether one could achieve adequate nutrition goals?

Minor points:

Page 3, first paragraph: MSC should read MCS.

Please specify the cerebrovascular patient cohort in greater detail, do you refer to patients with (malignant) ischemic stroke, poor grade SAH and/or ICH?

**Are the methods appropriate and well described?**
If not, please specify what is required in your comments to the authors.

Yes

**Does the work include the necessary controls?**
If not, please specify which controls are required in your comments to the authors.

Yes

**Are the conclusions drawn adequately supported by the data shown?**
If not, please explain in your comments to the authors.

No

**Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?**
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

I am able to assess the statistics

**Quality of written English**
Please indicate the quality of language in the manuscript:

Not suitable for publication unless extensively edited
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