Reviewer’s report

Title: Mild Traumatic Brain Injury with CT scan abnormality: which patients are safe for discharge? A protocol for the development of a prediction model in a retrospective cohort

Version: 0 Date: 01 Feb 2018

Reviewer: Eric Peter Thelin

Reviewer's report:

English language: Adequate throughout, some minor spelling mistakes highlighted in this peer-review.

Main aims: This is a protocol depicting a planned study. The planned study will include two major trauma centers in the UK which will include retrospective mild TBI (GCS 13-15) patients from 2007-2017 (estimated around 2000 patients) and see which parameters that are associated with a clinical deterioration.

Main issues:

- In exclusion criteria, why do you exclude patients that are transferred from other EDs when they diagnosed an injury? Or you doing this as to avoid having more "severe" TBIs in your group?

- Why "intravenous therapy" as an outcome metric? What is "intravenous therapy" here? Osmotic agents to reduce intracranial pressure or are we talking about nutrition? I know many centers who have it as standard therapy of fasting patients with TBI as they "might" need surgery, is this why? Please elaborate.

- Marshall CT classification was constructed on patients that were unconscious when they arrived to the hospital (thus not optimal for your study), and is not an ordinal score that is suitable for outcome prediction. If you are thinking of including the rather outdated Marshall, I would strongly include other CT classification systems such as the Rotterdam-, Helsinki- and Stockholm CT scores as they have shown to be better outcome predictors (PLoS Med 2017; 14(8):e1002368).

- You are likely to have problems scoring "frailty" index in these patients, with a lot of missing variables (similar with Charlson Comororbidity Index). There is also a strong
likelihood that there will be confounding factors towards patients that were admitted for a longer period of time or that have comorbidities requiring previous hospitalization to have notes that will allow you to calculate these scores. Younger patients with no or little time spent in the emergency department will probably have a lot of missing/uncertain data here. Will you do a subcohort analysis of elderly patients for your frailty index?

- I would recommend that a special group of investigators assess the CT scans and that this group is blinded to outcome, as this would increase the quality and decrease the risk of bias in the study.

Minor issues:

Abstract: Page 2, Line 14: Remove "and" (or "so").

Introduction: Page 3, Line 19: I would include in regards to clinical deterioration "due primarily to intracranial hematoma progression"

M&M: Page 5, Line 17: "whist" = whilst


Summary: This is an important study that would be potentially valuable to the field. Some smaller revisions are here suggested as to further improve the quality of the study.

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