Reviewer's report

Title: Head CT is of limited diagnostic value in critically ill patients who remain unresponsive after discontinuation of sedation

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Reviewer: Nicolas Bruder

Reviewer's report:

Major comments

This manuscript is a retrospective analysis of the usefulness of head CT in case of delayed recovery after prolonged sedation. I agree that having a patient unresponsive several days after interruption of sedation is disturbing for the ICU team and may lead to diagnostic testing in order to rule out cerebral complications. However, I do not understand clearly the rationale for performing this retrospective study. Firstly, it would be useful to know whether a sedation scale was used routinely to assess the depth of sedation or not. It has been well demonstrated that using a clinical monitoring of sedation reduced the incidence of delayed recovery and the duration of mechanical ventilation. Benzodiazepine overdose may easily explain delayed awakening if no monitoring of sedation were used. Secondly, altered consciousness may be due to multiple causes in ICU patients, not detected by head CT (metabolic complications, epilepsy, encephalitis, cerebral anoxia, small brainstem lesions). Finally, the finding that head CT was of limited value in 42 patients does not mean that it will not be useful in all patients. Thus, the hypothesis tested in this study needs to be clarified.

The methodology is not really appropriate in my opinion. Although statistical testing is reported in the methods section, there is no statistical comparison performed in the study. If the aim of the study is to assess the yield of head CT to detect cerebral complications, the authors have to perform a power analysis and a cost/benefit assessment. This has been done for patients suffering minor head injury for example but usually requires enrolment of a large number of patients. It seems clear to me that a screening head CT in patients without any focal neurologic symptoms cannot give much positive results. Thus, the conclusion from this study is that the diagnostic value of head CT in the author’s population and with their ICU management is less than 2 %. This is interesting but a low rate of true positive values is commonplace for screening tests. What the authors demonstrate in my opinion is that delayed awakening is frequent in ICU patients. The main interest of the study is probably not whether head CT is indicated or not, but the factors associated with prolonged sedation. The strength of the manuscript is the exclusion of neurologic causes with head CT, lumbar puncture …, allowing to link delayed awakening to sedation. I would suggest to review the database to search for factors associated with delayed awakening after ruling out neurologic causes with head CT. A case control study using matched controls
awakening in less than 48 hours would be appropriate in my opinion.

Finally, although the authors are cautious in their conclusion, I am not sure that the message of this study is completely true. The authors choose 48 hours as the cut-off value for delayed awakening. This depends obviously on the sedation technique used. On a clinical point of view, it seems to me that, after ruling out metabolic, septic, anoxic or epileptic causes, and after using a validated sedation scale to avoid drug overdosage, a head-CT may be indicated when recovery of consciousness is unusually long. A significant neurosurgical diagnosis, even in less than 2% of cases, may justify the examination.

Level of interest: An article of limited interest

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:

I declare that I have no competing interests.