Reviewer's report

Title: Midline shift in relation to thickness of traumatic acute subdural hematoma predicts mortality. A retrospective cohort study.

Version: 2
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Reviewer: Joachim Oertel

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Head trauma remains the main cause of the death and disability among the young adults, and the acute subdural hematoma used to be an indicator of the most severe forms of traumatic brain injury. In their study, Bartels et al. addressed a very important issue of additional cerebral parenchyma damage, potentially accompanying the mechanical compression of the brain by the hematoma mass. They made here a very perceptive observation, that the size of mass lesion in some cases does not justifies the much more advanced midline shift and they hypothesized, that this discrepancy may serve as a predictor for the poor outcome. Using a adequate statistic method (correlation analysis between mortality and calculated discrepancy between midline shift and hematoma thickness in stratified groups) they stated, that the difference of 3 mm or more clearly forecasted the death. The data are obtained in a fair number of patients (59 subjects), the results are sound and they are discussed in a proper way, solidly based on the previous reports trying to establish different variables as predictors for TBI outcome. The authors clearly recognize the limitations of their study. One of it is the limited amount of predictors analyzed. It would be interesting to prove, if the additional variables (e.g. difference in pupil size, GCS etc.) could refine the prognostic value of the discussed new parameter. Despite of authors' concern, I do not think, that such an expansion of analysis would obscure the main message of the study. The authors also have raised an objection about providing the analogous analysis in settings of prospective study. I don't really agree to that point. Since all patients (save one lost case) underwent surgeries for hematoma evacuation, the main goal of such prospective study would not be necessarily the comparison between performed surgical therapy and withdrawal of it. In fact, prospective design would mean only comparison between the initially predicted outcome and the virtual one, which is completely justifiable from ethical point of view.

Summarizing: Bartels et al. elaborated a very promising new parameter, which may help to identify head injury patients, unsalvageable due to ultimate severity of brain damage. I believe, that the current goal should be to prove this radiological predictor in context of other outcome-determining factors. Providing a
prospective observation in large population of patients would be the best opportunity for such analysis.

Minor issues not for publication (all of them save 14 are minor essential revisions, point 14 is a discretionary revision):

I very appreciate the efforts made by authors (and Dr. Guiot) in order to improve the linguistic side of the paper. However during my review I've found at least a few spots requiring further correction:

Chapter "Background":
1. I would change the composed description: "a difficult to predict..." for : "with a clinical outcome, which is difficult to predict, ranging between.." being easier to read
2. I would replace the phrase "....then brain swelling is present." with "...the brain swelling should be supposed." in order to show respect for the complexity of neurophysiologic changes in traumatized brain not always directly related to brain oedema.
3. I would replace the expression "eventual hematoma" with "potential" or "possible". I believe that this two alternative words suit better to the context than "eventual" (meaning "final" or "end-stage")

Chapter "Methods":
4. The phrase "for which neurosurgical treatment..." should be replaced by "for whom neurosurgical treatment..."
5. I would change the sequence "evacuation hematoma" for "hematoma evacuation" (or, alternatively "evacuation of hematoma")
6. In the phrase "....and also CT scans" I propose "as well as the CT scans" for improved readability
7. Please consider the revision of the whole passage describing the calculation of differences between MLS and hematoma thickness. It may be understandable for the person devoted for neurotrauma research, however a naive reader may be distracted by your way of explanation.

Chapter "Results"
No changes required

Chapter "Discussion"
8. I would change the expression "...trauma produced more than..." by "...trauma resulted in more damage than..."
9. The expression "...prediction models..." is used twice in the same phrase. I would replace it by using "...since modern ones as...".
10. I would moderate the expression "and therefore incorrect measurement of the actual thickness of the hematoma..." for the favor of "and therefore measurement of the actual thickness of the hematoma could be incorrect."
11. Due to repetition I would replace "...can estimate total volume of brain shift..." by "...can estimate this variable..."

12. I would replace the phrase "The current findings are valid for adult patients only" by "Since the analysis was performed in exclusively adult patients, the results cannot be extrapolated on pediatric population". I would also put this sentence in the passage describing limitations.

13. I would simplify a discussion, removing "...Secondly, and even...", starting with "More importantly..."

14. Please consider my comment about possibility of performing a prospective study by revising that passage (see main review).

15. I would accentuate the phrase "...in our institute MLS..." like: "...in our institute MLS by itself..."

16. Please replace "severity of eventual multiple injuries" by "severity of potential multiple injuries"

17. I would remove the part of the phrase "...since in first instance we were interested in the investigated relationship". It has been described previously. My proposal: start here with "However, for this study we purposed to address explicit...". I will also refine the next sentence this way: "Thus, we think, that additional analyses will obscure the main message. For further studies, however, the more extensive analyses in larger population are mandatory"

Chapter "conclusions"

18. I would put "was found" in the first phrase on the end of the sentence.

19. My proposal for second phrase is: "All patients with MLS exceeding the thickness of the hematoma by 3 mm or more died".

Illustrations and Tables

20. In all tables I would replace the term "alcoholic abuse" by "alcohol abuse".

I believe that the proposed changes would make your manuscript more "reader-friendly" than it already is.

Level of interest: An article of importance in its field

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

Statistical review: Yes, and I have assessed the statistics in my report.

Declaration of competing interests:

I declare that I have no competing interests