Author’s response to reviews

Title: An association between systolic blood pressure and stroke among patients with impaired consciousness in out-of-hospital emergency settings

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Author’s response to reviews: see over
Letter to Editors and Reviewers

BMC Emergency Medicine 9813724649734290R1

“An association between systolic blood pressure and stroke among patients with impaired consciousness in out-of-hospital emergency settings”

Dear Editors and Reviewers:

Thank you for your thorough review of BMC Emergency Medicine 9813724649734290R1, “An association between systolic blood pressure and stroke among patients with impaired consciousness in out-of-hospital emergency settings.”

Please find our responses to the editors’ and reviewers’ comments shown in Bold in the following response letter.

Sincerely,

Taro Irisawa
Response to Reviewer: Mohamud Daya

Thank you for your important suggestions. Our responses to your queries follow.

Compulsory

1. Abstract: Your results need to be clarified so that it is very clear that you are only referring to EMS transported patients. In some EMS systems, not every EMS encounter is transported. In this study, your population was selected from the cohort of transported cases of which XX had impaired consciousness and YY had SBP measurements done in the field.

As the Reviewer pointed out, we enrolled only EMS transported patients and revised the sentences in the Abstract as follows; “We included all patients aged 18 years or older who were treated and transported by EMS” in the Methods (Page 4 Line 7) and “During these 10 years, a total of 1,840,784 emergency patients who were treated and transported by EMS were documented during the study period in Osaka City. Out of 128,678 with impaired consciousness, 106,706 who had prehospital SBP measurements in the field were eligible for our analyses.” in the Results (Page 4 Line 13).

2. JCS stratified analysis. I believe that this is very important to your paper and would suggest you incorporate this into your figures 3 (3 lines for each LOC category). The main message here is that the strength of association between SBP and stroke type is very powerful especially with ICH and to some extent with SAH (mild, mod LOC). This is not the case with AIS. Hence, if one has a choice between a PSC and CSC (NSG, Interventional Neuro), the SBP can be an important triage guide for selected patients. Further studies using your own dataset could help identify an accurate cutoff point in this regard for SBP in conjunction with LOC. This makes the EMS triage decision more precise and reduces the risk of overwhelming CSC with patients that do not need the advanced capabilities. Please check the 0.91 in the table (your CI are 7.79 to 1.06) Should this be 0.76?

We agreed to the Reviewer comments and added the relationship between prehospital SBP and stroke occurrence by impaired consciousness level as a new Table 5 (because Figures 3 incorporated these results were too busy to see). According to these changes, we revised or revised the sentences as follows;

<Methods (Page 11 Line 1)>

In addition, the relationship between prehospital SBP and stroke occurrence by impaired consciousness level was evaluated.
Table 5 shows the relationship between prehospital SBP and stroke occurrence by impaired consciousness level. The AOR of the SBP >=200mmHg group versus the SBP 101-120mmHg group was 16.84 (95% CI 11.71 to 24.21) in mild disturbance and 11.55 (95% CI 6.70 to 19.90) in moderate disturbance among SAH patients, and 21.19 (95% CI 17.86 to 25.13) in mild disturbance, 13.58 (95% CI 10.71 to 17.22) in moderate disturbance, and 12.61 (95% CI 10.35 to 15.35) in severe disturbance among ICH patients.

Especially, the strength of association between SBP and stroke subtype by impaired conscious level was very powerful with ICH and to some extent with SAH (mild and moderate disturbances), which would suggest that prehospital SBP can be an important triage guide for selecting patients. Further studies identifying an accurate cutoff point in this regard for SBP in conjunction with level of consciousness would make the EMS triage decision more precise and reduces the risk of overwhelming comprehensive stroke centers with patients that do not need the advanced capabilities.

In addition, we apologized for our careless mistake. The number “0.76” was correct, and we revised it in Table 5.

3. Intrinsic or endogenous is an unfamiliar term. It appears you wanted to remove Obstetrical and Trauma cases and focus on just medical cases.....best to just state that.

We revised the words “intrinsic or endogenous causes” to “medical causes excluding obstetrical and trauma causes” in the Text (Page 12 Line 4) and Table 5.

4. Suggest you move the discussion about the group you chose for comparison to the methods section since it fits better there. Please clarify if this was done a priori or post-hoc.

Thank you for your suggestion. Our analyses by the group was “a priori” conducted in this study and we added the sentence in the Methods as follows (Page 10 Line 10); “The association between the occurrence risk of stroke and SBP (every 20 mmHg) was “a priori” analyzed considering its subtype (SAH, ICH, or IS).”

Minor

5. The importance of your paper is that the SBP in the patient with impaired LOC
may be a helpful guide as to where to transport a patient especially in communities that have both CSC and PSC as options.

Thank you. To further emphasize this point, we added the sentence in the first paragraph of Discussion as follows (Page 15 Line 8); “Our results also suggest that prehospital SBP measurements in the patient with impaired conscious level might be a helpful guide as to where to transport a patient especially in communities that have both comprehensive stroke centers and primary ischemic stroke centers.”

6. Selection bias: Thank you for the additional analysis. I believe that the data are important to report since you had more patients in the severe LOC group that were not enrolled. It is not clear if this would have led to a differential bias or not in terms of your findings. I suspect not. Similarly the HR was different as well between the 2 groups. If this was related to more ICH and ICP increases in that group then this might have affected your findings.

We described selection bias in this study in the Limitation, and added comparison between the 2 groups in Table 2 in line with the Reviewer’s comments. According to these changes, we added the sentences as follows;

<Methods (Page 10 Line 11)>
Patient characteristics with and without SBP measurements were evaluated with the use of the t-test for numeric variables and the chi-square test for categorical variables.

<Results (Page 12 Line 6 and Line 12)>
Table 2 shows the characteristics between 106,706 patients with SBP value and 21,972 patients without SBP value. Although there were statistically significant differences because of the very large number, the characteristics between the groups were almost similar.

Discretionary
7. Stroke mimics – there are several that are common including hypoglycemia, complicated migraine, prolonged seizures and subdural hematomas (more common in the elderly)

In line with the Reviewer’s comments, we revised the sentences in the Limitation as follows (Page 18 Line 17); “Fourth, we did not obtain information on other diagnosis that could mimic stroke such as hypoglycemia, complicated migraine, prolonged seizures, and subdural hematomas.”
Response to Reviewer: Christian Lund

Thank you for your important suggestions. Our responses to your queries follow.

My main concern to the paper: When the authors try to make "practical guidelines" regarding to which hospital patients with impaired consciousness should be referred based upon the initial blood pressure measurement, such considerations will only have "local value". In most (western) countries the large city hospitals which actually receives emergency patients are also able to perform iv. stroke thrombolysis if indicated, and in many cases also neurosurgical procedures. In rural areas and in small towns there is, however, most often only one hospital.

As this Reviewer mentioned, most large hospitals in western countries might be able to perform both t-PA administration and neurosurgical procedure. However, there are still many regions or EMS systems where emergency hospitals cannot conduct these procedures and EMS personnel have to decide where to transport these stroke suspected patients including Japan. Therefore, as the other Reviewer pointed out, the importance of our paper is that the SBP in the patient with impaired consciousness level may be a helpful guide as to where to transport a patient especially in communities that have both comprehensive stroke centers and primary ischemic stroke centers. To further emphasize this point, we added the sentence in the first paragraph of Discussion as follows (Page 15 Line 8): “Our results also suggest that prehospital SBP measurements in the patient with impaired conscious level might be a helpful guide as to where to transport a patient especially in communities that have both comprehensive stroke centers and primary ischemic stroke centers.”