Author's response to reviews

Title: Triage vital signs predict in-hospital mortality among emergency department patients with acute poisoning

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Author's response to reviews: see over
Reviewer's report
Title: Triage vital signs predict in-hospital mortality among emergency
department patients with acute poisoning
Version: 2 Date: 31 May 2012
Reviewer: Alan Jones
Reviewer's report:
This manuscript is a retrospective observational analysis of the value of the
triage vital signs to predict in-hospital mortality among ED patients with acute
poisoning. There are several points for consideration.

Major Compulsory Revisions
1) After reading the manuscript it is unclear exactly what the importance of the
message is or how to incorporate it into clinical practice. If it is simply that
abnormal vital signs predict worse outcome in poisoned patients, that
information is neither novel or useful. Therefore, it is not clear what the authors
feel is contributing to the advancement of knowledge or the medical literature
through this report. Further justification as to why this is a suitable report for
publication should be made.

Response:
Most of the previous research focused on the relationship between a single
specific poison and prognostic factors, such as tachycardia in
glyphosate-surfactant intoxication or low body temperature in paraquat
intoxication. Several scoring systems were also developed in an intensive care
unit for herbicide intoxication. However, all of these might not be suitable for
use with general acute poisoning patients in an emergency department (ED)
setting. Patient with acute poisoning in ED may have mixed drug intoxication or
have changes in consciousness and be unwilling or unable to give an exact
history. Besides, it may be difficult to make further decisions regarding these
poisoned patients. Knowing the relationship between initial vital signs and
in-hospital mortality of acute poisoning patients may alert ED physicians and
aid in decision-making. In this study, we developed a severity model of acute
poisoning that predicts in-hospital mortality via ED triage vital signs.
In another aspect, the prognosis of acute poisoning depends on the exposure
toxin, the amount of toxin ingestion and the physiology compensation. We
verified that the initial vital signs at ED triage, which stood for physiology
response after acute poisoning, served as a reliable indicator of in-hospital
mortality. Therefore, it is reasonable that our research contributes to the
advancement of knowledge and clinical importance.
2) There is a great lack in detail regarding the methods of patient data abstraction. There have been many previous publications on strategies to improve accuracy and minimize inconsistencies in medical chart reviews. These include a minimum of the following steps:
(1) Training of chart abstractors,
(2) Case selection,
(3) Definition of variables,
(4) Abstract forms standardized,
(5) Meetings,
(6) Monitoring,
(7) Blinding,
(8) Testing of inter-rater agreement.
It is critically important to the validity of the report that all of the issues above be addressed in detail.

Response:
Thank you for this important comment. The details of charts review will be addressed in “Methods” section.
Trained study assistants who were blinded to the study purpose performed the chart review and data abstraction using standardized template with clear definition and code. Data was retrieved via ED electronic medical records. The first authors performed a quality improvement feedback after the data analysis during the study by holding periodic meetings with assistants.

3) There is a significant lack of detail in the statistics section leaving one to question the validity of the analyses. Some of the issues include, not providing test for normality for continuous data and using the appropriate follow up test (t test or M-W-U test), no detail whatsoever about the logistic regression analysis (including the variables included in the analysis, the number of outcomes, the statistics of the model fit, etc), not reporting AUC for the ROC analysis, etc.

Response:
The statistics section will be addressed in detail.
Kolmogorov-Smirnov test was used to determine the normality of data. Continuous data are presented as means ± standard deviation (SD) or median with interquartile range (IQR) when appropriate. Categorical data are reported
as number and percentage (%). The comparison between the surviving and fatal group was analyzed with a $t$-test or Wilcoxon rank-sum test for continuous variables and the Pearson chi-square test or Fisher’s exact test for categorical variables when appropriate.

4) There is no good justification for why the paraquat poisoned patients were excluded. This would seem to greatly impact the results and without a strong justification this should not be done. Why not just control for this ingestion in the LR?

Response:
We excluded the patients with paraquat intoxicated for several reasons:
1. Identifying the paraquat itself had a higher predictive value than the vital signs. We expected that the patients with a mouthful or more of paraquat ingestion may be fatal even the triage vital signs were within normal limits.
2. Of all the 70 fatal cases, the paraquat poisoning patients contributed to 32 fatalities. Forty-seven percent (32/68) of paraquat poisoning patients are dead. The odds ratio of paraquat was 28.6 versus the odds ratio of vital sighs (range from 1.2~3.6, table 3).

Thank you for your suggestion and we will analysis the different variables (include paraquat) and the outcome of overall poisoning. We found that there was no major difference in cut-off values of triage vital signs to predict in-hospital mortality. Although excluding the paraquat poisoning patients change the variation of "Triage viral signs", we found the impact of a individual poison did not make major change of the result.

**Level of interest:** An article of insufficient interest to warrant publication in a scientific/medical journal

**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:**
None

Reviewer's report
**Title:** Triage vital signs predict in-hospital mortality among emergency
The authors want to analyze the relationship between triage vital signs and in-hospital mortality among emergency department (ED) patients with acute poisoning. They concluded that triage vital signs could predict in-hospital mortality among ED patients with acute poisoning.

Minor Essential Revisions
The analysis included 997 acute poisoning patients, with 70 fatal cases (6.7%). However, there were 32 fatalities due to paraquat poisoning. The authors found the paraquat itself had a higher predictive value than the vital signs. To diminish the impact of paraquat in this study, they excluded the paraquat poisoned patients in the further analysis. Therefore, the results and conclusion of this article should be revised to address this exclusion. Did the triage vital signs predict the outcome of paraquat poisoning patients? The authors should further analyze the population of paraquat poisoning patients (N=68) to answer this question.

Response:
We re-constructed analysis for total poisoning population and found that there was no major difference in cut-off values of triage vital signs to predict in-hospital mortality. Although excluding the paraquat poisoning patients change the variation of "Triage viral signs", we found the impact of a individual poison did not make major change of the result.

Level of interest: An article of importance in its field
Quality of written English: Needs some language corrections before being published
Statistical review: Yes, but I do not feel adequately qualified to assess the statistics.
Declaration of competing interests: I declare that I have no competing interests.
Reviewer: Tzeng Jih Lin

1. On line 3, paragraph 3, session of results:
The most lethal agent associated with high in-hospital mortality was paraquat (OR 20.8, 95% CI, 11.7-37.0), followed by carbamate (OR 9, 95% CI 1.5-55.1), amphetamine O(R 6.8 95% CI, 1.2-37.7), and digoxin (OR4.7 95% CI, 8-12.3). Why did the poison agents of data with “OR” represent the in-hospital mortality but not the fatalities do in Table 2?

Response:
Thank you for this comment. Case fatality means in-hospital mortality in this study. It will be addressed in tables.

2. Excluding the paraquat changes the variation of “Triage vital signs” in Table 1. Excluding different characters of poison agents may also change the variation of “Triage vital signs”. Some poison agents have characters of bradycardia such as calcium channel blocker, beta blocker and cholinergic drugs. The other poison agents have characters of tachycardia such as amphetamine, cocain and TCA. The comparison of HR between fatalities and survivors in Table 1, Table 3, Figure 2 and Figure 3 may be influenced by the numbers of the different characters of the poison agents. There are the same points in blood pressure, temperature and respiratory rate. The bias should be considered.

Response:
This study demonstrated that not only a specific poison agent but also patients physiology response presented with abnormal vital signs at triage predicts in-hospital mortality. Indeed, bias and variables influence each other did occurred. Therefore, we demonstrated that vital signs at triage remained significant associated with in-hospital mortality after adjusting for specific agents by logistic regression in Table 3. We agree with the reviewer that the causal relationship would be biased in this kind of association, and we did not intend to evaluate this kind of relationship in this manuscript. The prediction itself, however, would not be influenced in this study. However, we cautioned the readers to evaluate their population before generalizing the results of this manuscript in their practice. We also address this generalizability issue in the discussion part.
3. The authors should show the percentage of mixed drugs in this article in Figure 1. The reader can understand the validity of the study. In the table 2 and table 3, the cases with mixed poison agents should be deleted. Otherwise the results can not be represented for the poison agents.

Response:
We identified the patient with mixed agent poisoning and took them into statistical analysis and be one of the variable. The mixed agent poisoning accounted for ten percent of population in this study. The fatal group has less mixed agent poisoning (n=3, 4.2%) compared with the surviving group (n=106, 11.4%) but there is no significant difference (p=0.073). The three fatal cases were intoxicated by paraquat and amphetamine, organophosphate and benzodiazepine, and organophosphate and caustic agents. In the table 2 and table3, the cases with mixed poison agents had been deleted.

Level of interest: An article whose findings are important to those with closely related research interests
Quality of written English: Acceptable
Statistical review: Yes, but I do not feel adequately qualified to assess the statistics.
Declaration of competing interests:
'I declare that I have no competing interests'