Author's response to reviews

Title: A review of patients who suddenly deteriorate in the presence of paramedics

Authors:

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Author's response to reviews: see over
A review of patients who suddenly deteriorate in the presence of paramedics

Reviewers Comments & Authors Reply

Reviewer #1
Reviewer’s Comments
I have read the paper by Boyd and believe it to be fair, consistant and well written. I saw no need to make any changes and can fully recommend its publication

Authors Reply
Thank you.
Reviewer #2
Reviewer’s Comments
1. This paper needs to be more focused and would benefit from some heavy editing. It presents a lot of information but tends to stray from its main purpose of describing trauma patients who deteriorate during EMS transport.

Authors Reply
Changes have been made and inconsistencies fixed.

Reviewer’s Comments
2. The abstract does not stand on its own as a summary of this paper. The results presented must support the conclusion; in particular the percent of calls the 2,893 represents needs to be stated and there is no data in the results to support the last two sentences of the conclusion. These statements should be removed or that data added. The country where the ministerial review took place should be stated and an abbreviated definition of sudden deterioration provided.

Authors Reply
This has been changed.

Reviewer’s Comments
3. The definition of “sudden deterioration” seems problematic. The defined drops seem appropriate, but the cut points are confusing since they closely match the trauma triage guidelines for EMS providers shown in figure 1. It is unclear if a patient whose systolic blood pressure was 86 at the time of EMS arrival would be considered to have suddenly deteriorated, if their second SBP reading was 88. Further, would a patient whose SBP was 92 and then a second reading was 88 be considered to have suddenly deteriorated? Further, the quoted MROTESV calls for patients who “severely deteriorate” and are in “immediately life threatening situation during transport” it is unclear that this group represents those patients. Justification should be provided for why this definition is appropriate and the definitions should be more clearly stated.

Authors Reply
As there was no scientific evidence located to guide the definition of “sudden deterioration” and likewise there were no specific criteria identified, eg what drop in blood pressure signified sudden deterioration, the definitions were developed by consensus using a project steering committee consisting of three experienced EMTs and three emergency physicians. The sudden deterioration narrative “A person’s condition is said to have suddenly deteriorated if there is a decrease in any of the physiological status components from the last recorded observations to the most recent. This deterioration is in light of ongoing management of the patient’s overall condition. This time frame between the observations would normally be about fifteen minutes”, we believe covers the issue of time and condition changes using the criteria listed.
Reviewer’s Comments
4. There should be some discussion as to whether these patients really needed the closest hospital or the trauma center. There is no discussion of the data from papers like:


which showed a 25% improvement in survival when trauma patients are treated at a level 1 trauma center. The question of who needs to divert to the closest hospital seems much more complex than what is discussed here and what the definition of sudden deterioration used in this paper would allow. Again you must discuss what hospital based intervention these patients needed immediately so it can be weighed against the risk of delayed arrival at the trauma center. Especially given that some of your deterioration criteria are the same as the trauma center criteria used by EMS.

Authors Reply
Due to the conditions of the ethics approval we did not have access to specific hospital management, ED procedures, etc, we only had access to data about the hospital major trauma criteria - major surgery within 24 hours (yes/no), ICU admission and ventilated for 24 hours or more (yes/no), died in hospital (yes/no).

Additional statements have been added.

Reviewer’s Comments
5. The discussion is very broad and tends to stray from the study questions. For example, the discussion of gender and age seems unrelated, as does the identification of major trauma in the field.

Authors Reply
The discussion has been modified to better reflect the study question.

Reviewer’s Comments
6. I am troubled by the confounding effects of EMS provided pharmaceuticals that could have caused a change in vital signs. Is that really a group of patients who should be diverted to the closed hospital because of unstable vitals? Please justify their inclusion and the effect of diverting or not diverting these patients.

Authors Reply
Patients who met the sudden deterioration criteria following drug administration, e.g. morphine for pain relief, were included as this was an unexpected finding and we thought it needed reporting. Given that the majority of these patients did not experience an additional fall in BP following the drug administration diverting was probably not considered by the paramedics. Most paramedics in rural areas do not bypass their local hospital for a distant higher level hospital due to distance and not wanting to leave “their town” without paramedic cover.

We retrospectively only identified 28 incidents of documented hospital bypass with these due to the hospital ED being on bypass and unable to accept more patients by ambulance. We were not able to retrospectively identify any incidences where paramedics diverted to
a closer hospital due to a patient deteriorating. This issue of a lack of hospital bypass and diversion documentation has been raised with the EMS providers.

**Reviewer’s Comments**
1. It would be useful if this report included some information on destination decision and the effect of this decision. What was the difference in transport time when by-passed hospitals were available? What was the immediately needed intervention these patients needed that EMS could not provide? Ultimately this paper should focus on if these patients, who were destined for a trauma center, might benefit from receiving interventions at a lower level hospital before treatment at the trauma center. It is not clear that this study includes that group of patients nor is it clear what stabilizing intervention these patients needed that they were not getting from EMS.

**Authors Reply**
As stated above, we were not able to identify data about hospital diversion and bypass on the PCRs and therefore cannot comment about it.

Hospitals are penalized by the state government for going on ambulance bypass hence the information is not easily available. This information was not available retrospectively due to hospital confidentially issues. The only way to ascertain data on hospital bypass would be in a prospective study.

**Reviewer’s Comments**
1. Introduction: please define the fist use of all abbreviations including: MICA in the 3rd paragraph and ASV in the next to last paragraph

**Authors Reply**
“MICA” has been expanded.

As “ASV” is in a direct quote it has not been expanded but an abbreviations section has been added with this included.

**Reviewer’s Comments**
2. Methods: please report how many charts had insufficient information.

**Authors Reply**
This is reported in the results section.

**Reviewer’s Comments**
3. Methods: RR, sensitivity, specificity, positive predictive value calculations are not provided in the results. Please report these findings or remove them from your methods

**Authors Reply**
These have been removed.
Reviewer’s Comments
4. Results: It is not clear why the time intervals are presented or how they relate to the study question.

Authors Reply
The time intervals, scene time, transport time, and total incident time, were included to ascertain if EMS crew were spending too much time on scene, what the transport times were and query, if they seemed appropriate, and whether the patients were being delivered to an appropriate trauma facility within a reasonable timeframe.

A statement has been added in the discussion section as well.