PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	Prehospital trauma death review in the State of Victoria, Australia: a study protocol
AUTHORS	Mercier, Eric; Cameron, Peter; Smith, Karen; Beck, Ben

VERSION 1 – REVIEW

REVIEWER	David Bar-Or Swedish Medical Center, Trauma Research Department, Colorado, USA
REVIEW RETURNED	11-Mar-2018

GENERAL COMMENTS	The protocol designed by Beck et al aims at providing an epidemiological study on prehospital deaths of traumatized patients in the Victoria state in Australia. This phase of early trauma death, whether preventable or not is very important and has not received adequate attention in the past, therefore this study is very timely and important. The study protocol is appropriate to address the study subject matter for this population. It is somewhat surprising however, that given the investigators backgrounds, that no statistical analysis plan section is presented.

REVIEWER	Dr. Ed Barnard FRCEM FIMC RCSEd 1. Academic Department of Military Emergency Medicine, Royal Centre for Defence Medicine (Research & Academia), UK 2. Emergency Department, Addenbrookes Hospital, Cambridge University Hospitals NHS Foundation Trust, UK
REVIEW RETURNED	23-Mar-2018

GENERAL COMMENTS	Dear Authors, Thank you for your study protocol for prehospital trauma death review in the State of Victoria, Australia. I agree that there is an international requirement for higher-quality data on traumatic cardiac arrest, and am really pleased to see that you are pursuing this with a well-conceived study protocol. I only have two areas of questions, aimed at strengthening the protocol: 1. I will start with an assertion in your Discussion (Page 16, Line 44) – You say that this study will provide a large, comprehensive, population-based data set. I have no doubt that it will be large, but with two notable exclusions (patients in whom a full post-mortem was not done, and patients attended to by EMS but without a

	resuscitation attempt) I do not think you can say it will be comprehensive. Furthermore, to be a true epidemiological study of TCA you would 1) need to include patients that were not attended at all by EMS – I am unsure the frequency of this occurrence in your region, but would normally require cross-reference with other agencies (Police, Fire, Coroner, etc.); 2) define the patient population, for example only including those who reside in the State of Victoria (excluding those who have a TCA while visiting the state, and also including those Victorians who have a TCA while out of state). I think that this level of study is outwith your plans, but wonder whether you should re-phrase this line of the Discussion to better reflect your aims and methods? 2. Table 3 – It might be beneficial to clarify what you mean by "On-scene thoracotomy". You include REBOA in the table, so I assume that you mean thoracotomy for penetrating thoracic wounds with a suspicion of pericardial tamponade, or would you also include other aetiologies, for example: blunt tamponade, lung injury, proximal vascular control? It would be usual to refer to this technique (thoracotomy at initial patient contact without anaesthesia) as 'resuscitative thoracotomy' – you might consider using this term, together with a brief explanation of the indicated aetiologies. Also in Table 3, it would be highly unusual to consider needle pericardiocentesis as an appropriate therapeutic intervention for pre-hospital TCA – will you be commenting on the potential use of this intervention in situations where RT was preferred but not available, or are you suggesting there are other circumstances where it would be appropriate over RT?

VERSION 1 – AUTHOR RESPONSE

Reviewer: 1

The protocol designed by Beck et al aims at providing an epidemiological study on prehospital deaths of traumatized patients in the Victoria state in Australia. This phase of early trauma death, whether preventable or not is very important and has not received adequate attention in the past, therefore this study is very timely and important.

The study protocol is appropriate to address the study subject matter for this population. It is somewhat surprising however, that given the investigators backgrounds, that no statistical analysis plan section is presented.

A statistical analysis plan has been added, and reads as follows:

"STATISTICAL ANALYSES

Descriptive statistics will be used to describe the sample using percentages for categorical variables and median and interquartile range (IQR) for non-normally distributed continuous variables. Comparisons between those with and without a full autopsy, and comparisons between potentially preventable/preventable deaths and non-preventable deaths will be made using $\chi 2$ test or Kruskal-Wallis tests. Data analysis will be performed using Stata (Version 14.2, StataCorp, College Station, TX). A p-value <0.05 will be considered significant."

Reviewer: 2

Thank you for your study protocol for prehospital trauma death review in the State of Victoria, Australia. I agree that there is an international requirement for higher-quality data on traumatic cardiac arrest, and am really pleased to see that you are pursuing this with a well-conceived study protocol.

I only have two areas of questions, aimed at strengthening the protocol:

1. I will start with an assertion in your Discussion (Page 16, Line 44) – You say that this study will provide a large, comprehensive, population-based data set. I have no doubt that it will be large, but with two notable exclusions (patients in whom a full post-mortem was not done, and patients attended to by EMS but without a resuscitation attempt) I do not think you can say it will be comprehensive. Furthermore, to be a true epidemiological study of TCA you would 1) need to include patients that were not attended at all by EMS – I am unsure the frequency of this occurrence in your region, but would normally require cross-reference with other agencies (Police, Fire, Coroner, etc.); 2) define the patient population, for example only including those who reside in the State of Victoria (excluding those who have a TCA while visiting the state, and also including those Victorians who have a TCA while out of state). I think that this level of study is outwith your plans, but wonder whether you should re-phrase this line of the Discussion to better reflect your aims and methods?

We acknowledge the limitations with respect to those patients who did not have a full autopsy, patients attended by EMS who did not have attempted resuscitation and those not attended by EMS. For clarity, we have added a 'Limitations' section that reads as follows:

"**LIMITATIONS**
Amid declining autopsy rates, the availability of full autopsies may limit the proportion of cases that can undergo detailed review. Furthermore, a proportion of trauma deaths that are not attended by EMS, or are attended by EMS but do not undergo attempt resuscitation, may be preventable from a systems perspective, but will not undergo expert panel review."

We agree with the comment on ascertaining the proportion of trauma deaths attended by EMS. We are currently in the process of determining that proportion through cross-referencing with coronial records.

Given the suggestions from the reviewer, we have amended the Discussion to read as follows:

"This state-wide study will provide novel and detailed data on the epidemiological profile of death occurring in the prehospital and early in-hospital phases. This is a unique opportunity to capture of relevant trauma case fatality information and use expert panellists to review the system of care provided to these patients."

2. Table 3 – It might be beneficial to clarify what you mean by "On-scene thoracotomy". You include REBOA in the table, so I assume that you mean thoracotomy for penetrating thoracic wounds with a suspicion of pericardial tamponade, or would you also include other aetiologies, for example: blunt tamponade, lung injury, proximal vascular control? It would be usual to refer to this technique (thoracotomy at initial patient contact without anaesthesia) as 'resuscitative thoracotomy' – you might consider using this term, together with a brief explanation of the indicated aetiologies. Also in Table 3, it would be highly unusual to consider needle pericardiocentesis as an appropriate therapeutic intervention for pre-hospital TCA – will you be commenting on the potential use of this intervention in situations where RT was preferred but not available, or are you suggesting there are other circumstances where it would be appropriate over RT?

Thank you for these valuable comments. We agree that the term *"resuscitative thoracotomy"* would be preferable over "on-scene thoracotomy". This was modified in Table 3. The indications for which this procedure would be considered potentially useful will be determined by and during the expert panel

review meetings looking at specific cases. We do not want to provide a restrictive framework for these interventions as this is exploratory and based on multidisciplinary expert panel opinions.

Although the potential therapeutic benefit of needle pericardiocentesis during traumatic cardiac arrest is likely low, the indication we had in mind was as a temporising measure where resuscitative thoracotomy was not available following a pericardial effusion. This will be discussed during the expert panel reviews.

VERSION 2 – REVIEW

REVIEWER	David bar/or Swedish Medical Center, Englewood, Colorado, USA
REVIEW RETURNED	11-May-2018

GENERAL COMMENTS	Very nice work

REVIEWER	Dr. Ed Barnard 1. Academic Department of Military Emergency Medicine, Royal Centre for Defence Medicine (Research & Academia), Birmingham, UK. 2. Emergency Department, Cambridge University Hospitals NHS Foundation Trust, Hills Road, Cambridge, CB2 0QQ, UK.
REVIEW RETURNED	07-Jun-2018

GENERAL COMMENTS	Dear Authors, Thank you for your edited study protocol for prehospital trauma death review in the State of Victoria, Australia. As I previously wrote, there is an international requirement for higher-quality data on traumatic cardiac arrest, and am really pleased to see that you are pursuing this with a well-conceived study protocol. In previous review, I had two areas of questions: Whether you were able to assert that your work would be a “comprehensive, population-based data set”, and a suggestion to change the term “on-scene thoracotomy” to ‘resuscitative thoracotomy’ (as well as a query as to the inclusion of “needle pericardiocentensis”). I can see that you have addressed both of these satisfactorily. Best of luck with your study – I very much look forward to seeing the results.