**Response to Reviewer 1:**

**Dear ladies and gentlemen,**
**thank you very much for the possibility to review this very good scientific paper.**
**I have some questions and suggestions which are stated here:**

Thank you for your thorough review. Our responses to your queries are as follows.

**Lines 68/69: Were patients excluded if arrest was post arrival?**
**Response**: As described in the Methods section, patients with cardiac arrest after hospital arrival were excluded.

（Lines 65-69) "This study enrolled adult patients aged ≥20 years who underwent OHCA after a traffic collision before the arrival of emergency medical services (EMS), who were resuscitated by EMS personnel or bystanders, and were transported to medical institutions in Japan from January 1, 2013, to December 31, 2019."

**Lines 90/91: What are ELSTs not allowed to do? You could mention that they are not allowed to insert chest tubes in cases of suspicion of pneumothorax as you state in -> ll. 281/282. From my point of view this is important for this topic.**
**Response**: According to your suggestion, we have revised as follows (Lines280-284).

"In Japan, EMS personnel are not allowed to perform certain advanced interventions (for example, surgical airway, chest drain, or intraosseous access). They are not allowed to insert chest tubes even when pneumothorax is suspected. This means that EMS personnel in Japan are permitted to perform only intravenous catheter insertion and fluid infusion, intravenous epinephrine administration, and endotracheal intubation."

**Lines 265/266: required for drivers aged > 75 years to reducing MVCs *in Japan?*. (is this a requirement in Japan?)**
**Response**: In order to determine the judgement ability and memory of drivers aged >75 years, a cognitive test became obligatory in Japan. According to your suggestion, we have revised as follow (Lines 263-266);

"More recently, traffic collisions caused by older individuals have become a serious social problem, and a cognitive test for the license renewal procedure is required for drivers aged ≥75 years to reduce MVCs in Japan. The test has been obligatory since June 2009 [26], helping more elderly people to voluntary return their license."

**Lines 272-276: how do you differentiate between cardiac arrest which leads to MVC vs. trauma leads to cardiac arrest. This seems to be an important question for this paper since patients who develop acute cardiologic illnesses, e.g. PE or cardiac arrhythmias such as V-fib, can cause an MVC. In such a case it can happen that the patient suffers mild traumatic injuries only and therefore should be treated as a cardiac arrest based on the underlying condition (in these examples treatment of PE or V-fib).**

**Response**: Thank you for your insightful comment. As we received the same comment from reviewer 2, we have added the following sentence to the limitations paragraph of the Discussion section:

(Lines 320-327) "Our Utstein-based data did not include data on in-hospital treatments, such as trauma care (fluid resuscitation, emergent thoracotomy, and aortic cross-clamping) [27], post-cardiac arrest care [37], and hospital staffing. Furthermore, the autopsy data were not obtained because our data were collected in accordance with the Utstein-style guidelines by EMS personnel. Therefore, our study could not identify the detailed origin of the presumed OHCAs nor estimate OHCAs due to a medical origin (e.g., pulmonary embolism or cardiac arrhythmias, such as VF/pVT) in those caused by traffic injuries."

**Lines 285/286: permission given on a case-to-case basis or generally?**

**Response**: We apologize for the unclear expression.

"EMS personnel need permission or instructions from a medical director in each municipality to perform ALS on a case-to-case basis, which may prevent EMS personnel from providing timely treatment."

**Line 290: "mostly due to blood loss?" Not other causes such as pneumothorax, pericardial tamponade etc.? Do you have a citation for this?**

**Response**: According to your suggestion, we have added a citation as follows:

"In this study, very few patients received prehospital ALS procedures (i.e., intravenous catheter insertion, epinephrine administration, or AAM by SGA). However, in our study, intravenous access was associated with a reduction in hospital mortality among patients. This may be because traumatic OHCA is mostly due to blood loss, pneumothorax, or pericardial tamponade [27]. The etiology of cardiac arrest among the patients included in this study was blunt trauma [29]."

Reference

27: Trauma, 9th ed. D.V Feliciano, K.L Mattox & E.E Moore (eds.) Mcgraw-Hill Education 2021

29 Katayama, Y.; Kitamura, T.; Kiyohara, K.; et al. Effect of fluid administration on scene to traffic collision patients by EMS personnel: a propensity score matched study using population-based ambulance records and nationwide trauma registry in Japan. Eur J Trauma Emerg Surg 202.

**Lines 298/299: could "earlier endotracheal intubation" and "earlier epinephrine" be surrogate parameters for a team which works faster and/or is more experienced overall?**

**Response**: According to your suggestion, we have added a sentence to the Discussion section as follows:

"Recently, some studies suggested that earlier epinephrine administration and earlier endotracheal intubation contributed to improving outcomes after OHCA [25]. These earlier interventions would be surrogate parameters for a team that works faster and/or is more experienced overall."

**Lines 320/321: Should there be a discussion that paramedics should be allowed to perform other procedures in these cases, e.g. insertion of chest tubes? Or should there be emergency physicians on the scene performing it in these cases? Could this mean an advantage to EMS systems which operate with emergency physicians who work pre-clinically?**

**Response**: Thank you for your important suggestions. We have added a sentence in the discussion as follows:

"Second, our results might not be fully applicable to other countries, including the United States and Europe, which have different EMS and medical systems. Currently, procedures by paramedics on the scene are limited in Japan; there is need for them to be allowed to perform other procedures (e.g., insertion of chest tubes) to reduce the mortality rates of OHCA due to traffic collision."