Author’s response to reviews

Title: Resuscitative endovascular balloon occlusion of the aorta may increase the bleeding of minor thoracic injury in severe multiple trauma patients: A case report

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Author’s response to reviews:

Response to Reviewer:

We wish to express our appreciation to the Reviewer for insightful comments, which have helped us significantly improve the manuscript.

Comments to the Author:

1. Do you believe the case report is authentic?
   Yes

2. Do you have any ethical concerns? Please consider if local Institutional Review Board approval or ethical approval was obtained (if appropriate) and if the patient (or their parent or guardian in the case of children under 18) gave written, informed consent to publish this case and any accompanying images. A statement to this effect should appear in the manuscript.
Comments:

No ethical concerns, ethical approval was obtained, the patient provided informed consent for publication of this case report.

Answer: This case report was approved by the Kitasato University Ethics Committee, and written informed consent was obtained from the patient. This has been included in the Declarations part in the manuscript.

3. Does the Introduction explain the relevance of the case to the medical literature?

Not completely

Comments:

There is only one reference in the Introduction section related to the relevance of this article.

Answer: We are grateful for this valuable comment. Accordingly, we have added references that are closely related to this case report and have revised the Introduction section.

4. Does the article report the following information? Where information is missing, please specify.

a. The relevant patient information, including:

   - De-identified demographic information (age, gender, ethnicity) - yes, partially - the ethnicity is not provided.

   - Main symptoms of the patient – yes

   - Medical, family and psychosocial history - not provided

   - Relevant past interventions and their outcomes - not applicable
Answer: According to the Reviewer’s comment, we have added patient information regarding ethnicity and medical history.

b. The relevant physical examination findings

- some of them reported, CRT not reported = the authors report that the patient "was in a state of shock" based on feeble radial artery pulsation and cold sweat in the extremities?

Comments:

the authors do not report if any ultrasound examination was performed during the initial examination - FAST, eFAST?, they do not report what was their decision to insert a chest drain based on. Side of the chest drain insertion is not provided.

Answer: According to the Reviewer’s comment, we have added information on ultrasound examination during the initial arrival.

We decided to insert a chest drain for the diagnosis of tension pneumothorax from physical examination and vital signs.

This have been described below:

“First, a 28 Fr. chest drain was inserted in the left thoracic cavity for the diagnosis of tension pneumothorax.”

c. Important dates and times in this case (if appropriate, organized as a timeline via a figure or table); if specific dates could lead to patient identification, consider including time relevant to initial presentation, i.e. initial presentation at T = 0, follow up at T = 1 month.

Comments:

exact timeline of the case in not provided

Answer: According to the Reviewer’s comment, we have added the exact timeline of the case in Table 2.
d. Diagnostic assessments, including:

- Diagnostic methods
- Challenges (e.g., financial and lingual/cultural)
- Reasoning and prognostic characteristics (e.g., staging), where applicable

Comments:
Ultrasound examination during the initial phase is not reported or this was omitted.

Answer: According to the Reviewer’s comment, we have added information on ultrasound examination during the initial arrival.

e. Types and mechanism of intervention

The authors speculate that REBOA could cause massive left-sided hemothorax but this was not confirmed, more probable cause of injury is laceration of intercostal or other intrathoracic vessel caused by the primary injury.

Answer: Thank you for this insightful comment. REBOA is often used in highly urgent situations; therefore, the blood flow monitoring on the central side of the balloon occlusion of the aorta is insufficient. Hence, although there is no evidence that REBOA increased thoracic bleeding, other causes (such as primary lung injury or the damage of chest drain insertion) have not been confirmed by CT images and intraoperative findings of thoracotomy hemostasis. In fact, a previous report indicates that REBOA increased intracranial hemorrhage that was minor bleeding at initial examination (Reference 3 in the text).

Therefore, we have reported this case wherein REBOA may increase the pleural cavity bleeding.

f. A summary of the clinical course of all follow-up visits

Comments:
The description of clinical course of the case is incomplete. Timeline is missing.
Answer: According to the Reviewer’s comment, we have added the exact timeline of the case in Table 2.

5. Is the interpretation (discussion and conclusion) well balanced and supported by the case presented?
Comments:
It is not. Suggestion of the authors that REBOA caused the injury and subsequent hemothorax is a mere speculation.

Answer: Thank you for this insightful comment. REBOA is often used in highly urgent situations; therefore, the blood flow monitoring on the central side of the balloon occlusion of the aorta is insufficient. Hence, although there is no evidence that REBOA increased thoracic bleeding, other causes (such as primary lung injury or the damage of chest drain insertion) have not been confirmed by CT images and intraoperative findings of thoracotomy hemostasis. In fact, a previous report indicates that REBOA increased intracranial hemorrhage that was minor bleeding at initial examination (Reference 3 in the text).

Therefore, we have reported this case wherein REBOA may increase the pleural cavity bleeding.

6. Is the anonymity of the patient protected? Please consider any identifying information in images such as facial features or nametags, whether the patient is named etc. If not, please detail below.

Answer: Yes

7. Is the Abstract representative of the case presented?
Comments:
abstract is representative but too extensive.

Answer: Thank you for this insightful comment. We deleted less important information in the main point of this manuscript and summarized it more clearly.
8. Does the case represent a useful contribution to the medical literature?

Comments:

No. The authors speculate that increase in the pressure within the aorta above the clamp may increase the blood loss from the upper part of the body.

This fact is well known from any cases of thoracic aortic surgery with a cross-clamp placed on the upper abdominal or descending aorta.

Answer: As the Reviewer pointed out, this fact is well known in thoracic or abdominal aortic surgery but not in trauma. Because coagulopathy occurs frequently, particularly in severe trauma cases, REBOA may cause unexpected increase even with minor bleeding. Therefore, because REBOA has become widespread in trauma occasions, we believe that it is necessary to draw attention to that complication of increasing in bleeding in the site proximal to the aortic occlusion.

9. Additional comments for the author(s)?

Comments:

- the upper limit for blood pressure during the case (160 mmHg) seems to be very high. General recommendations say 90-100 mmHg of systolic blood pressure during persistent bleeding.

Answer: We are grateful for this valuable comment and agree with it. We intended to control systolic pressure at 90–100 mmHg. However, the hemodynamics changed greatly depending on the blood transfusion volume and the balloon inflation volume, and, in reality, systolic pressure increased to a maximum of 160 mmHg. We have added this to the main text for clarity.

Comments:

- massive bleeding into the pleural cavity could be caused also by a damage to the intercostal vessels during chest drain insertion.
Answer: We agree with the Reviewer’s comment. However, in this case, the damage of intercostal vessels was not detected by CT image after chest drain insertion and thoracotomy hemostasis. Therefore, we believe that this case report is rare and valuable.