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Prediction Based Treatment or Point-of-Care-Based Treatment? A Short Comment for the Published Manuscript Entitled "Modified Traumatic Bleeding Severity Score: Early Determination of the Need for Massive Transfusion"

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Introduction

Massive Transfusion is an important topic in trauma resuscitation. Early administration of blood products with higher plasma and platelet ratios (Balanced Transfusion) are associated with decreased mortality [1], and 85% of major trauma centres in the United States, have instituted massive transfusion protocols to initiate the transfusion of blood products in the appropriate ratio as early as possible [2]. Past a decade, there is no clear criterion to activate a Massive Transfusion protocol, and preventable trauma death had happened due to delayed appropriate transfusion. We have developed “Traumatic Bleeding Severity Score (TBSS)” as an objective scale which accurately indicate the severity of haemorrhage, and TBSS has been expected to achieve early determination of the need for the massive transfusion.

Discussion

Triggers for Massive Transfusion

Convenient, early and accurate determination of the need for Massive Transfusion are essential for early activation of the protocol, and several scoring systems for the protocol initiation have been developed, such as the Trauma-Associated Severe Haemorrhage (TASH) score, the Prince of Wales score, the Vandromme score, the Assessment of Blood Consumption (ABC) score, the Schreiber score, the Larsen score [3], and TBSS. Scoring system is ideal to predict the need for massive transfusion, since scoring system is generally easy to use and not expensive.

In several decades, some blood tests had been used to determine the need for Massive Transfusion. The thromboelastgraphy (TEG®) [4], the rotational thromboelastgraphy (ROTEM®) [5], or the Coagucheck® [6] are representative example. These blood tests are Point-of-Care tools to diagnose the need for the Massive Transfusion, and need some cost to perform.

Prediction? or Point-of-Care?

What is the difference between the Prediction Score and Point-of-Care? Generally, Massive Transfusion Prediction Scores are tools that indicate the grade of shock, anaemia, or coagulopathy. These scores does not show the absolute value for the deficient of the clotting factors or delivery of oxygen, which is used as a target in the Goal-Directed-Therapy, but lets us imagine the estimated volume of blood products to be transfused by the completion of haemostasis. Massive Transfusion Prediction Scores PREDICTS the amount of transfusion that is needed a several hours later, as the name suggests. On the other hands, Point-of-Care test is a real-time guidance for the Massive Transfusion in trauma resuscitation. Point-of-Care test generally shows us the absolute value of the target, and Goal-Directed-Therapy can be realized by the Point-of-Care-Guidance.

The initiation of the Massive Transfusion guided by Massive Transfusion Prediction Score can be faster than that of Point-of-Care, since the Prediction Score can predict the point of the deteriorated status, which is monitored and catched by the Point-of-Care tests. Prediction Score estimates the need for the Massive Transfusion and should support the decision to activate the Massive Transfusion protocol. Point-of-Care test assesses the current status of the traumatic coagulopathy or haemorrhagic shock and should be used to review the on-going treatment plan. The role of the Prediction Scores is different from that of the Point-of-Care.

Vision of the future

The pre-hospital setting may be suitable for the use of the Massive Transfusion Prediction Score to decide the activation of the Massive Transfusion Protocol, and the in-hospital setting may be suitable for the use of the Point-of-Care tests. The Point-of-Care test should be used in the hospital to diagnose the status of the traumatic coagulopathy or haemorrhagic shock. Doctor in charge should review the current treatment using the result of the Point-of-Care test, and plan the next Goal-Directed Therapy based on the Point-of-Care-Guidance. Many Massive Transfusion Prediction Score include the variable of the

laboratory data that is generally tested in the hospital, such as base defect, haemoglobin, prothrombin time, or serum lactate. In near future, Massive Transfusion Prediction Score should be revised to use easily in the pre-hospital setting. The modification of the TBSS [7] is not only simplification of TBSS but also the first step to use it in pre-hospital setting.

Conclusion

TBSS is an objective scale that accurately indicates the severity of haemorrhage. The pre-hospital setting may be suitable for the use of the Massive Transfusion Prediction Score to decide the activation of the Massive Transfusion Protocol, and the in-hospital setting may be suitable for the use of the Point-of-Care tests and physician in charge should plan the next Goal-Directed Therapy based on the Point-of-Care-Guidance. The modification of the TBSS is not only the simplification of TBSS but also the first step to use it in pre-hospital setting.

Disclosure

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