

RESEARCH NEWS

Is massive transfusion with a high FFP:RBC ratio of any benefit when applied in a non-traumatic setting?

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Article

Association between ratio of fresh frozen plasma to red blood cells during massive transfusion and survival among patients without traumatic injury. Published in JAMA Surgery, June 2017.^[1]

Why was this research done?

Massive transfusion, defined as >10 units of red blood cells (RBC) within a 24-hour period with a high fresh frozen plasma (FFP) to RBC ratio is also called haemostatic resuscitation. This has been associated with improved survival in battlefield and trauma victims with major blood loss.^[2,3] However, this association could not be reproduced in a large randomised controlled trial.^[4] In addition, previously published battlefield studies suffer from survival bias and the survival benefit disappeared when correcting for this bias.^[5]

In-hospital massive haemorrhage occurs on a regular basis. Without much investigation, haemostatic resuscitation protocols are currently also applied on other patient categories requiring massive transfusion, for example due to gastrointestinal or perioperative blood loss.^[6] This practice may even be harmful instead of beneficial due to potential fluid overload or lung injury.

This study was carried out to investigate the extent to which haemostatic resuscitation has been adopted outside the trauma setting and whether this improves outcome.

What was the research question?

The primary goal of the study was to examine blood-component transfusion ratios in patients receiving massive transfusion. The secondary goal was to examine the effect of haemostatic resuscitation on mortality in non-trauma patients, described as 30-day survival.

How was this investigated?

In a single-centre retrospective study, conducted in an urban academic hospital, 865 massive transfusions that took place between January 2013 and December 2015 were investigated.

All massive transfusions were administered in the intensive care unit, emergency department and operation room. Patients declared dead within 30 minutes after arrival to the hospital were excluded to reduce survival bias.

Main findings

During the period of investigation, 865 massive transfusions were administered, of which 767 were received by patients admitted for a non-traumatic reason. A total of 544 massive transfusions appeared to be for intraoperative bleeding. The median FFP:RBC ratio in trauma patients was 1:1.7 and in non-trauma patients 1:1.4. Patients undergoing cardiac surgery, cardiopulmonary transplant, general surgery, liver transplant, and vascular surgery received significantly more FFP than did patients in medicine and otolaryngology. FFP:RBC-ratios were separated into three groups: high 1:0.9, medium 1:1.4 and low 1:3.0. The high group also received substantially more RBCs than did the medium and low group. In a high FFP:RBC ratio, when adjusted for age and RBC transfusion, the adjusted odds ratio for mortality was higher in medicine and general surgery and lower in vascular surgery.

It is also important to note that FFP:RBC ratios of survivors and non-survivors were nearly identical at 1:1.5 vs. 1:1.4 (1:1.1-1:1.9) ($p = 0.43$).

Conclusion and consequences for daily practice

This study shows that 30-day survival was not significantly different in patients who received a high FFP:RBC ratio compared with those who received a low ratio. Therefore (scarce) plasma could potentially be saved. Maybe patients undergoing vascular surgery could benefit from a high ratio. The optimal ratio of blood products in both the trauma and non-trauma setting will still have to be determined.

Disclosures

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