

Transfusion after trauma can benefit or harm patients depending on their risk of death

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The risks and benefits of red blood cell transfusions for patients with trauma and major bleeding might vary considerably based on a patient's predicted risk of death on arrival at a trauma centre, according to new research published in this week's *PLOS Medicine*. The study by Pablo Perel, from the London School of Hygiene & Tropical Medicine, United Kingdom, and colleagues, suggests that trauma patients who have the highest predicted risk of death on arrival at a trauma centre receive the greatest benefit from red blood cell transfusions but for those with the lowest predicted risk of death at baseline red blood cell transfusion is associated with a higher chance of death.

The authors of the study used data from the CRASH-2 trial that evaluated the effect of tranexamic acid (which reduces blood loss) in patients with trauma, which included 20,127 [trauma patients](#) with significant bleeding from 274 hospitals in 40 countries. The authors evaluated the association between receiving [red blood cell](#) transfusion versus not receiving a red blood cell transfusion with deaths by all causes at 28 days post trauma. The findings were stratified by predicted risk of death based on clinical observations on arrival at the trauma centre.

The authors found that those at greatest predicted risk of dying (>50%) had a smaller chance of death from all causes if they were transfused (an odds ratio (OR) of 0.59 (95% confidence interval [CI] 0.47–0.74)), while for those in the 21%–50% risk group there was no significant

difference in their chance of dying based on whether they are transfused or not (OR 0.92, 95% CI 0.78–1.08). However, for those within the lower risk strata, transfusion was associated not with benefit but with harm. Patients at a 6%–20% chance of death had an OR of 2.31 (95% CI 1.96–2.73) for dying if they received a transfusion, while for those whose initial risk was below 6%, the OR for death associated with transfusion was 5.40 (95% CI 4.08– 7.13). In absolute figures, compared to no transfusion, RBC transfusion was associated with 5.1 (95% CI 4.3 to 6.0) more deaths per 100 patients in the patient group with the lowest predicted risk of death but with 11.9 (95% CI 7.1 to 16.7) fewer deaths per 100 patients in the group with the highest predicted risk of death.

The authors caution, "[o]ur study suggests that blood transfusion could be harmful for those [patients](#) whose predicted risk of death is low. However, as our study was observational, important biases cannot be ruled out, and we cannot claim a causal link. Therefore, this hypothesis should be prospectively evaluated in a randomised controlled trial."

In an accompanying Perspective article *PLOS Medicine* Consulting Editor Druin Burch notes, "[w]ith so many dying each year, and with deaths from injury set to rise in importance as road traffic crashes and violent injuries account for a greater portion of the global burden of disease, we have a compelling reason to improve and rationalize our transfusion strategies."

More information: Perel P, Clayton T, Altman DG, Croft P, Douglas I, et al. (2014) Red Blood Cell Transfusion and Mortality in Trauma Patients: Risk-Stratified Analysis of an Observational Study. *PLoS Med* 11(6): e1001664. [DOI: 10.1371/journal.pmed.1001664](https://doi.org/10.1371/journal.pmed.1001664)

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