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What are expert thoughts about the recent articles on Nitric Oxide and banked blood?

The medical director of a transfusion service in Southern California asks "What are expert thoughts about the recent articles on Nitric Oxide and banked blood?"

Neil Blumberg, Professor of Pathology & Laboratory Medicine, University of Rochester Medical Center (attribution used with permission) writes:

"I think it is well established in the scientific literature that stored red cells do weird things to the microcirculation ('functional capillary density' is decreased in animal models). It is also well established in observational studies that patients with acute coronary syndromes (e.g., MI, unstable angina) seem to do markedly worse when transfused than not transfused at similar hematocrits. Cause and effect remain hypothetical, but, in my view, very likely to be the case.

Red cells that are nitric oxide poor will presumably scavenge nitric oxide, a vasodilator, and thus cause vasoconstriction and reduced oxygen delivery, and this is an attractive partial explanation for increased MI's and such. So I think these data are probably a true bill and something that may yield clinical improvement if red cell nitric oxide and 2,3 DPG levels can be restored just prior to transfusion. And thus actually deliver oxygen acutely rather than impair its delivery, which may well be what's happening, at least initially after a red cell transfusion.

The actual papers from the Duke investigators aren't available yet on the PNAS website, so I don't know if the authors address the additional issue that non-leukoreduced red cells in particular are rich in supernatant sCD40L and other pro-thrombotic and pro-inflammatory molecules that could be deleterious to patients with vascular disease. Most of the clinical correlative studies in the literature mentioned above involve patients getting non-leukoreduced transfusions rich in inflammatory, pro-thrombotic mediators, as well as residual platelet microparticles, white cell membranes and microparticles, and Lord knows what else. So it's not clear how much either factor, nitric oxide scavenging and infusion of a mixture of deleterious mediators contributes to the clinical observations, if either. My bet is on both.

What is clear to me and some others in the field is that fewer patients should be transfused and we are doing more harm than good with our current transfusion practices in many cases."

The editors welcome additional questions or discussion. Articles on the topic include: [Banked Blood Loses Ability to Deliver Oxygen to Tissues](#) (DukeMedNews) and [Studies: Stored blood lacks nitric oxide](#) (SanLuisObispo.com) and [Why Banked Blood Goes Bad](#) (Time).

Please submit comments to the [e-Network Forum](#).

[Ira A. Shulman, MD](#)
CBBS e-Network Forum Editor & Moderator

[W. Tait Stevens, MD](#)
CBBS e-Network Forum Assistant Editor & Moderator



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Addenda: