The International Journal of Transfusion Medicine
Vox Sanguinis

Vox Sanguinis (2010)

LETTER

DOI: 10.1111/j.1423-0410.2010.01357.x

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Disparate risks and effects of pooled whole blood-derived vs. apheresis platelet production require an integral view on the blood supply

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Dear Editor,

Recently, Schrezenmeier and Seifried [1] presented a review on the question whether pooled buffy-coat-derived platelet concentrates (PPCs) or apheresis PCs (APCs) should be preferred. They claimed that PPCs and APCs have comparable content of platelets (PLTs), purity, safety, and efficacy. They argued that almost all APCs could be replaced by PPCs and that PLT apheresis donations should be restricted to PLT recipients with anti-HLA and/or anti-HPA antibodies from the donor's perspective to drop the apheresis procedure-related donor risks to a 'zero' value and to optimize the use of the whole blood (WB) donation.

Some weeks ago, Vamvakas [2] gave a systematic review of disparate risks of PPCs vs. APCs. He calculated an annual increase of 1·2 (best case) to 3·5 (worst case) additional cases for HIV, 1·3 to 3·9 for HCV, and 9·0 to 27·1 for HBV transmission, if PPCs would completely replace APCs. For a novel 'HIV like' infectious agent with a prevalence of 1:10 000 donations (for comparison, the incidence of HIV in the last year before testing was ten times higher), he predicted 252·6 to 757·7 additional transmissions. From our group, a recent risk calculation was performed by Heuft *et al.* [3], Hannover Medical School. They found that an unrecognized infection with a prevalence of 1% in the donor population would result in three to four times higher infection rates for PPC recipients compared to pure APC supply. Both Vamvakas and Heuft considered shorter donation intervals, the influence of splitting apheresis donations and low numbers WB donations per PPC for their calculations.

Schrezenmeier and Seifried [1] cited both studies but voted to ignore their results because 'so far, no epidemiological study or clinical trial have demonstrated different risk of viral infections transmitted by pooled PCs compared to apheresis PCs.' This argumentation is on absolutely no account acceptable. Of course, the effects of a novel HIV-like virus cannot be proven epidemiologically or clinically before it has emerged. However, over the past decades, many previously unknown infectious agents have emerged. Recent work on the genetic distance of the two oldest currently known specimens of HIV-1 demonstrated that the first infections of humans by HIV-1 have occurred more than 100 years ago, at least two decades earlier than previously believed [4]. This clearly demonstrates that a dangerous infectious agent, which can be transmitted via transfusion and which kills recipients some years or even decades after transmission, may spread over many decades until becoming uncovered. The only way to meet this typical risk of blood transfusion is to strictly limit the donor exposure for the transfusion recipient and to replace a pooled component by a non-pooled alternative whenever possible. On the strength of past experience with the transmission of HIV and hepatitis viruses by blood and blood products, the consideration of very small and even of fictitious and yet unproven risks is common practice as well in transfusion medicine as in the legislation and the jurisdiction in all developed countries.

In addition, we want to point out another relevant, but currently neglected issue: the production of PPCs has negative effects on the overall quality of the red cell supply. WB for PPC production is often held overnight at room temperature. However, at this temperature, red cells lose 2,3-diphosphoglycerate (2,3-DPG) extremely rapidly [5]. Red cell concentrates (RCCs) from WB leukoreduced by a PLT-saving filter and stored overnight at room temperature contain remarkable levels of PLT-derived cytokines [6]. Finally, if PCs are produced by the BC method, a relevant proportion of red cells, at least ten per cent, is removed from the WB. This may result in a remarkable proportion of underfilled RCCs [7]. In summary, the production of PPCs impairs the quality of the red cell supply by red cell loss, by the rapid loss of 2,3-DPG, and by the accumulation of PLT-derived cytokines. Therefore, we strongly argue for an integral view on the blood supply that notes and considers the negative effects of PPC production from WB on the red cell supply.

In conclusion, we fully agree with Vamvakas and disagree with Schrezenmeier and Seifried. Not APCs should be replaced by PPCs, but PPCs should be replaced by APCs. The most important factor determining the PLT product choice must be the difference of the risk of transfusion-transmitted infections, particularly of the transmission of a new HIV-like agent. In addition, there is sufficient evidence

that this is also the strategy of choice to achieve an optimal red cell supply from the recipients view.

Conflict of interest

The authors declare no competing interests relevant to this article.

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Received: 15 March 2010,
accepted 14 May 2010

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