Clinical studies on platelet transfusion

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pediatric patients with life-threatening hemorrhage. Additional studies with larger sample sizes, specifically designed to assess the incidence of AKI and adjust for relevant confounders, would provide more robust evidence regarding the potential risks and benefits of EACA and TXA in this patient population. It is crucial to consider these limitations and address them in future research to ensure accurate risk assessment.

CONFLICT OF INTEREST STATEMENT

The authors have disclosed no conflicts of interest.

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Clinical studies on platelet transfusion: Time to consider methodological issues related to platelet counting

Dear editor,

Major uncertainty exists regarding prophylactic platelet transfusions in intensive care unit (ICU) or in hematological patients with thrombocytopenia. This results in heterogeneous platelet transfusion practices and potentially unnecessary platelet transfusions.

A limited number of prospective randomized clinical studies have addressed the issue of the appropriateness of prophylactic platelet transfusion in case of thrombocytopenia. The latest is van Baarle et al.[1] one, showing that not transfusing platelets before central venous catheter placement in hematology or ICU patients with, a 10,000–50,000/μL platelet count resulted in more bleeding events than transfusing platelets.

As it is unfortunately always the case, data were reported neither on the method used for platelet counting nor on the diagnostic algorithm for troubleshooting platelet count abnormalities. That is a crucial issue though, since patients with a platelet count seemingly above the threshold could actually have a much lower platelet count due to interferences, and thus potentially deserving prophylactic platelet transfusion.

The reference method for platelet counting is the immunological method,[2] which is not typically used with automated hematology analyzers. Other platelet counting methods are impedance and optical, and may differ from one brand to another.[3] The platelet count is generally

15%–30% higher with the impedance mode than with the optical mode.[3]

Further, many interferences could bias platelets counts:

- hemolysis due to samplings performed on catheters (common practice in ICU and hematology)[4];
- small fragments generated from circulating malignant cells (either blastic or lymphomatous cells)[5];
- very small red blood cells or fragments thereof (ICU: thrombotic microangiopathy, extensive burns)[5];
- small particles (extracellular vesicles, lipids, cryoglobulins, microorganisms);
- large circulating environmental pollutants.

In these scenarios, platelet counts could actually be <10,000/μL as documented with the gold standard method (flow cytometry),[2] when withholding platelet transfusion would be detrimental.

In our expert opinion:

- If platelets are <20,000/μL (or in case of PLT abnormal distribution, giant platelets), the fluorescence mode of a hematology analyzer should always be used instead of the optical or the impedance mode of the same analyzer.
- In some rare situations (especially high level of circulating blasts, severe hemolysis), the analysis of PLT histograms shows the inaccuracy of the fluorescence mode of a hematology analyzer and flow cytometry should be preferred in this situation.

A thorough reporting of the procedure for platelet counting is mandatory and we offer a set of features that would enable an accurate interpretation of the upcoming studies in the field (Table 1).

We urge investigators to fully document how platelet counting was performed and journal editors to demand that crucial information. Moreover, international initiatives should be considered to survey and foster implementation of common rules.

Regarding the feasibility, we are aware that it will not be easy to manage this change, but this approach is already applied to other fields of medicine (for example, minimal residual disease in hematology and oncology, methodology of which is much more complex than that of platelet counting). To make this change, the collaboration between specialists in transfusion and specialists in laboratory medicine should be extended to define and standardize all the elements mentioned in Table 1 before the start of the clinical trial.

TABLE 1 Minimal information when reporting platelet counts in clinical studies on platelet transfusion.

Preanalytical step	Filling of the tubes	Minimum level for sample rejection
	Homogenization	Number of inversions of the tube (immediately after collection, after removing the blood collection device, before running the sample on the instrument)
	Sampling technique	Catheter, straight needle or butterfly (and check for hemolysis)
	Order of draw	Should be specified (the recommended order of draw is as follows 1. Blood culture tube 2. Citrate tube 3. Plain tube or tube with clot activator 4. Heparin tube 5. EDTA tube 6. Glycolysis inhibitor tube 7. Other tubes)
	Type and concentration of anticoagulant	Reference: K_2EDTA
		Options if platelet clumps: Sodium citrate, CTAD, magnesium sulfate
	Time interval between sampling and analysis	Should be specified (the maximum time interval depends on the type of anticoagulant)
Analytical step	Ruling out causes of inaccurate platelet counts	Pseudothrombocytopenia, platelet satellitism, interference from blood-borne parasites such as *Plasmodium malariae*
	Method for platelet counting	Brand of automated hematological analyzer or flow cytometer
		Optical/impedance/fluorescence and/or flow cytometry
Demographic data	Type of patients	Hematological patient (disorder, associated platelet function disorder?)
		ICU patient (thrombotic microangiopathy?)
	Other laboratory data	Mean corpuscular volume of red blood cells (MCV)
	Circulating blasts	Yes/no

Abbreviations: CTAD, citrate theophylline adenosine dipyridamole, ICU, intensive care unit.

CONFLICT OF INTEREST STATEMENT

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