

Whole Blood Pathogen Reduction: Which Benefit for Blood Safety in Africa?

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LETTER TO THE EDITOR

According to WHO, the global burden of disease due to unsafe blood transfusion can be reduced through an integrated approach for blood safety based on 4 strategies:

Establishment of a nationally-coordinated blood transfusion service.

Collection of blood only from voluntary non-remunerated blood donors from low-risk populations.

Testing of all donated blood, including screening for transfusion-transmissible infections (TTIs), blood grouping and compatibility testing.

Reduction in unnecessary transfusions through the effective clinical use of blood^[1].

Each of the 4 strategies is efficient in reducing risks of infection during blood transfusion. Indeed, African countries with coordinated systems, collecting blood from voluntary and non-remunerated blood donors, and/or screening TTIs through quality assured techniques have substantially lower prevalences of TTIs in blood donors^[1]. Such strategies must be based on the five quality system essentials: Organization, structure and infrastructure; Standards (references); Documentation (traceability); Education (teaching and training); Assessment (Monitoring and Evaluation). These essentials and their implementation in the vein-to-vein transfusion chain should be seriously considered before attempting to bridge the gaps with advanced and sophisticated expensive technologies and methodologies.

However, despite the current effort, residual risk of TTIs is still very high as reported by the Francophone Africa Blood transfusion research network^[2]. Viral detection through nucleic acid testing would certainly be most beneficial but it is still not feasible in most African countries due to financial and technical reasons. In addition, the efficacy of screening is limited by many factors including genetic variations, inappropriate test conditions, absence of quality assurance in many centers, and the inability to detect recently infected subjects. Systematic screening of blood donor for endemic and public health diseases such as malaria is still problematic. Moreover, it is still impossible to know or reliably predict if and when emerging and re-emerging pathogens (Chikungunya Virus, Ebola virus, dengue, etc.) will threaten the safety of the blood supply. Thus it seems logical to assume that any other strategy to eliminate the risk of infection, or reinforce the above recommendations without hampering them should be considered.

For many years, physical and/or chemical treatment of blood products has been only feasible for platelet concentrates and plasma. However, Whole Blood and Red Blood Cells are the main products used by a vast majority of clinicians in sub-Saharan African countries^[2]. With recent development of new possibilities by some

researchers, 'Inactivation Efficacy of Current Pathogen Inactivation Technologies (PIT)' needs to be considered on whole blood. *Intercept Technology* is a novel platform technology (2nd generation) that is based on the addition of the chemical compound, S-303 (0.2 mmol/L) and glutathione (GSH; 20 mmol/L) as a quencher. On the other hand, Mirasol technology uses the same riboflavin-based PIT which was successfully evaluated for platelets and plasma. The toxicology profile and pathogen inactivation efficacy have already been positively reported for both^[3]. These technologies are also accompanied by not inconsiderable costs. However, the use of pathogen inactivated Whole Blood and convalescent plasma could then These technologies are also accompanied by not inconsiderable costs. highly help in the emergency management of epidemic crisis such as the current Ebola virus in West-Africa^[4].

The use of pathogen reduced Whole Blood and convalescent plasma could highly help in the emergency management of epidemic crisis such as the current Ebola virus in West-Africa^[5].

However, there is still a need for relevant clinical evaluation and hemovigilance data in phase III of the evaluation process that will ensure not only safety but also a reproducible and user-friendly technology for resource-limited settings. Such technology should be adapted to current recommended blood safety regulations, affordable and economically sustainable for blood services.

While the availability of pathogen inactivated Whole Blood remains a challenge in Africa, nevertheless, the use of pathogen reduction of Whole Blood and Red Blood Cells is recommendable to Africa, where Whole Blood is predominantly used. Hence,

there is a dire need for researchers, international organizations and pharmaceutical companies to concentrate efforts towards developing this blood safety technology in these resource-limited settings.

CONFLICT OF INTERESTS

The authors have no conflicts of interest to declare.

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