Whole blood for transfusion in sub-Saharan Africa

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Severe anaemia is a major cause of death and morbidity in children living in sub-Saharan Africa, mainly because of high malaria prevalence which is a preventable but persistent disease. Transfusion might be lifesaving; however, blood and blood components are a scarce resource in most countries in Africa. The estimated donation rate in low-income countries is 5·0 donations per 1000 people compared with 31·5 per 1000 in high-income countries.[1] Traditionally, whole blood was used in transfusion; however, global safety initiatives suggest that donation is better leveraged when blood is separated into components. However, in *The Lancet Global Health*, Elizabeth George and colleagues[2] suggest that the use of whole blood resulted in better haematological recovery and reduced retransfusion than with the use of red cell concentrates.

The use of blood components is the conventional method that enables targeted therapy for more patients. Blood processing allows the supply of red cells for patients with anaemia, platelets for replacement therapy, and plasma for clinical use or plasma-derived medicinal products. Blood component production and fractionation require considerable investment but offer greater transfusion self-sufficiency and enable the development of new clinical services, especially for cancer and surgery. However, many countries do not have the money or logistic and laboratory infrastructure to produce blood components. Therefore, trials and guidelines should accommodate current local practices.

TRACT was an open-label, multicentre, factorial, randomised trial designed to determine transfusion and treatment strategies in sub-Saharan Africa. The primary trial addressed the optimal timing and volume of transfusion in children with uncomplicated severe anaemia (haemoglobin 40–60 g/L). Maitland and colleagues found that conservative management of uncomplicated severe anaemia was safe,[3] and that transfusion volume (20 *vs* 30 mL/kg whole blood or equivalent) had strong but opposing effects on mortality, depending on fever status (>37·5°C).[4] The outcomes of these studies and subsequent workshops is a consensus algorithm for the transfusion management of severe anaemia in African children.[5] Stakeholders supported the use of red cells and whole blood. However, evaluation of the algorithm is needed especially in a real-life setting where access to haemoglobin monitoring is limited.

The strengths of TRACT include its size, multicentre nature, and broad clinical eligibility criteria that enhance generalisability in sub-Saharan Africa. The pragmatic nature also embraced local differences in transfusion practices. The protocol included local preparations of whole blood and red cell concentrates (settled or packed cells) allowing a secondary analysis of trial data to compare the clinical effect of both. The secondary study by George and colleagues showed that children receiving whole blood had better haemoglobin recovery at 8 h, shorter time to discharge, and needed less blood overall than those who received red cell concentrates. One of the safety concerns of whole blood, with a larger volume and lower haematocrit concentration, is fluid overload. However, fluid overload in these children was rare and unrelated to blood pack type.

The TRACT study group suggest that (appropriately tested) whole blood is safe in children and makes better use of a scarce resource in sub-Saharan Africa. These findings are important, but should be interpreted with caution because the study presents a retrospective review of data from the TRACT trial designed to explore other questions. Concerns remain, and reporting of different outcomes in children with fever merits further attention. George and colleagues have yet to postulate an explanation for their findings other than carefully exploring technical differences and considering a revision of their equivalence calculations. However, the findings are plausible since unprocessed blood contains plasma and platelets. Plasma appears to repair systemic endothelial injury and dysfunction following traumatic injury.[6] Ongoing scientific studies are re-evaluating the implications for blood banking.[7]

This work invites us to review our own practice. The modern management of traumatic haemorrhage promotes balanced resuscitation using red cell concentrates and plasma.[8] The same principle applies to all forms of major haemorrhage. The use of group O whole blood, rather than multiple components, has the potential to simplify the transfusion process, reduce errors, and donor exposure.[9] However, using whole blood has limitations; its shelf-life is short and there are scientific and operational challenges to its

reintroduction alongside component therapy.[10] The considerations for each community are often finely balanced between safety, practicality, and sufficiency.

Whole blood is a simple, effective, and sometimes the only option that still meets the needs of patients and offers a reduced carbon footprint. George and colleagues provide a timely addition to the literature which informs the whole blood debate.

HAD and TAH participate in studies that explore transfusion support in trauma and emergency preparedness; neither author has collaborated with the TRACT study group. HAD worked with the Ebola CP consortium in Sierra Leone and TAH in Tanzania for more than 15 years.

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