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Foetal haemoglobin, blood transfusion, and retinopathy of prematurity

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Stutchfield et al. have recently demonstrated that low foetal haemoglobin (HbF) levels predict retinopathy of prematurity (ROP) [1]. There is an increasing awareness that red blood cell (RBC) transfusions are independent risk factors for all prematurity-associated diseases (PAD) [2]. Since adult haemoglobin (HbA) releases oxygen more efficiently than HbF, autologous cord blood (CB) transfusion has been attempted, with limited results due to the low volume of CB collected [3]. We have shown that allogeneic CB RBC concentrates obtained from healthy full-term babies can fulfil transfusion requirements of preterm neonates (PNs) with gestational age ≤30 weeks and/or birth weight ≤1500 g, in their first 28 days of life [4]. At first transfusion episode, PNs received ABO-Rh(D) matched CB-RBCs if available, or adult RBCs if CB units were not available. At subsequent transfusions, the same regimen was adopted, unless CB-RBCs were unavailable. Overall, 9 patients received CB-RBCs and 11 adult-RBCs; 6 patients (3 in each group) died before ROP assessment. Table 1 illustrates ROP findings in 14 surviving patients. All PNs receiving adult-RBCs developed ROP, while two of six patients in the CB-RBC group did not. Stage 3 ROP was observed in four heavily transfused extremely PNs: three of them were transfused only or mainly with adult-RBCs (patients 8,10 and 14, respectively; Table 1).

Transfusions contribute to the overwhelming oxidative burden caused by infections, oxygen therapy and inflammatory diseases in PNs. Unfortunately, to monitor in these patients lipid peroxidation products or other biomarkers of the oxidative stress, requires sophisticated methodologies and exceeding volume of biologic samples. Hence, these investigations are so far confined to the research field [5]. In this regard, the study of Stutchfield et al. suggests that monitoring HbF levels in PNs might be a feasible and reliable tool to figure out to what extent transfusions might favour PAD development.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no competing interests.

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Table 1 ROP findings in preterm neonates receiving adult-RBC or CB-RBC transfusions

Patients	Gestational age (weeks)	Birth weight (grams)	ROP (stage)	Transfusion regimen	Number of transfusions
1	30.7	1430	No	Cord blood	1
2	28.1	860	Yes (1)	Adult	1
3	23.3	580	Yes (3)	Cord blood	5
4	27.3	1000	Yes (1)	Adult	1
5	28.1	1170	Yes (2)	Adult	1
6	26.6	860	Yes (1)	Adult	1
7	27.6	700	Yes (1)	Adult	1
8	26.1	650	Yes (3)	Adult	4
9	27.6	1060	Yes (2)	Adult	1
10	25.6	745	Yes (3)	Adult	4
11	30.9	825	No	Cord blood	1
12	26.0	570	Yes (2)	Cord blood	2
13	27.1	910	Yes (1)	Cord blood	2
14	28.4	770	Yes (3)	Cord blood	5[a]

[a]This patient received two CB-RBC units and three adult-RBC units. Abbreviation as indicated in the text

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We read the work of Teofili et al with interest. In our study we found an association between low foetal haemoglobin levels (HbF) levels and retinopathy of prematurity, but further work is required to identify a causal or predictive link. In addition, to optimising initial haemoglobin levels through delayed cord clamping when possible, managing anaemia with HbF-rich cord blood transfusions is an interesting proposition.

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