

Screening for intermediate and severe forms of thalassaemia in discarded red blood cells: optimization and feasibility.

Abstract

Detection and quantification of Hb subtypes of human blood is integral to presumptive identification of thalassaemias. It has been used in neonatal screening of thalassaemia and Hb variants. The use of discarded red blood cells following processing of the cord blood for stem cells provides readily available diagnostic material for thalassaemia screening. In this study, we determined the range of Hb subtypes in 195 consecutive cord blood samples collected for cord blood banking. The 'cord blood samples' analysed were those of the remaining red blood cells after the cord blood was processed for stem cell storage. Quantification of Hb subtypes by high performance liquid chromatography (HPLC) was done on BioRad Variant II Hb testing system. Only 73 (36.5%) of the samples could be analyzed neat without dilution. With a 1:300 dilution with wash solution the acceptable area as recommended by the manufacturer for reading of a C-gram within the 1 to 3 million ranges were achieved in all. Eighteen (9%) 12 showed classical Hb Barts (γ_4) prerun peaks were confirmed by Sebia Hydrasys automated Hb gel electrophoresis and quantified by Sebia Capillarys 2 capillary electrophoresis. Only 1 (0.5%) was presumptively identified with HbH disease. Due to the limited number of samples no beta-thalassaemia major, Hb E beta-thalassaemia and Hb Barts hydrops fetalis were found. The HPLC assay was possible at a cost US\$ 5 per sample and a turnover time of 10 samples per hour without technical difficulties. This study reports an effective and valuable protocol for thalassaemia screening in red blood cells which would otherwise be discarded during cord blood processing. Cord blood with severe and intermediate forms of thalassaemia can be preselected and not stored.

Keyword: Thalassaemia screening; Discarded red blood cells; Cord blood banking.