Point-of-care quantitative measure of G6PD enzyme activity

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Abstract

Quantitative measurement of G6PD enzyme activity using Hb normalization OSMMR2000D G6PD assay method has been introduced as routine service in UKMMC since 2011. However, it requires expensive laboratory equipment and skilled personnel. A rapid, mobile and reliable quantitative tool would be ideal especially in centers that depend solely on FST to detect G6PD deficiency. In this study, we evaluated the performance of two rapid POCT G6PD assay kits; Carestart Biosensor (single kit) and Carestart Biosensor 1 (combo kit), and compared the findings to OSMMR2000D G6PD assay method. Cord blood samples in EDTA tube from 153 neonates (91 normal and 62 deficient) measured by OSMMR2000D G6PD assay method in Haematology Unit, UKMMC were used to evaluate both POCT kits. The G6PD enzyme activity was then calculated and expressed in U/gmHb. The enzyme activities measured by each method were then compared with OSMMR2000D G6PD assay method. All deficient samples were analysed for underlying G6PD genetic mutations by Hybribio Flow-through hybridization. The correlation study of both POCT with OSMMR2000D showed strong Spearman correlation coefficient; 0.783 for the single kit and 0.769 for the combo kit. Both POCT kits also showed strong agreement with OSMMR2000D G6PD assay method, as illustrated by kappa value of 0.805 and 0.795 for single and combo kit respectively. Ten G6PD gene mutations were identified; namely Viangchan, Mediterranean, Vanua Lava, Mahidol, Kaiping, Coimbra, Chatham, Orissa, Union and Canton. This study has shown that the G6PD enzyme activities measured by both POCT kits were comparable to the established method, OSMMR2000D G6PD assay method.

Keywords: POCT, G6PD activity, quantitative measurement

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