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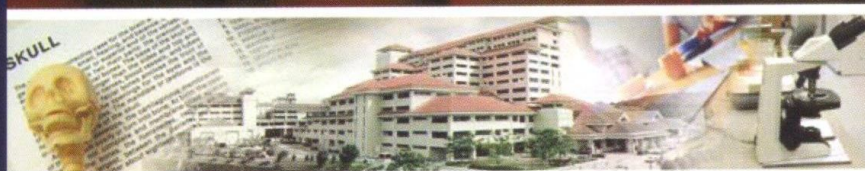


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THE HbA₂ LEVELS IN NORMAL, B -THALASSAEMIA AND HAEMOGLOBIN E HETEROZYGOTES AND HAEMOGLOBIN E (HbE) LEVEL IN HbE HETEROZYGOTES BY CAPILLARY ELECTROPHORESIS SYSTEM

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Background:

Capillary electrophoresis (CE) is a technology that has recently been applied to thalassaemia screening and diagnosis. It utilizes the technique of electrokinetic separation of molecules in eight electrolyte buffer-filled capillaries. Our study aimed to establish the normal ranges of HbA₂ and HbF in normal population and to quantify the values of HbA₂ and HbE in the β-thalassaemia and haemoglobin E (HbE) heterozygous states.

Methodology:

A total of 173 normal individuals, 218 β-thalassaemia trait and 92 HbE trait cases were selected. All samples were analysed by both CE and High Performance Liquid Chromatography (HPLC) techniques.

Results:

Our results showed that the mean HbA₂ and HbF were 2.75% (SD 0.25%) and 0.06% (SD 0.24%) respectively, which was significantly lower than that of HPLC, 2.88% (SD 0.25%) and 0.31% (SD 0.61%) ($p < 0.001$ for both results). For β-thalassaemia heterozygotes, the HbA₂ level was slightly higher than that of HPLC, where CE recorded values of 5.23% (SD 0.63%) versus 5.14% (SD 0.55%) by HPLC ($p < 0.001$). The HbA₂ level for HbE heterozygotes was 3.61% (SD 0.44%), which was significantly higher than normal but lower than that of β-thalassaemia heterozygotes ($P < 0.00$ for both). Peculiar to CE, the HbE level in HbE heterozygotes was determined as 25.41% (SD 3.38%). The correlation of HbA₂ levels between both methods was excellent ($R^2 = 0.99$).

Conclusion:

The CE system was a practical option for medical laboratories for analysis of thalassaemia and haemoglobinopathies. We established the ranges of HbA₂ for the normal population, β-thalassaemia and HbE heterozygotes. Unique to the CE system, the HbE level was also able to be ascertained.

Keywords:

Capillary electrophoresis, HPLC, beta thalassaemia, HbE, HbA₂