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False positive Glucose-6-phosphate dehydrogenase deficiency screening test (Brewer's test) with haemoglobin E

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Glucose 6-phosphate dehydrogenase (G6PD) deficiency is the commonest enzymopathy causing haemolytic anaemia in humans. Haemoglobinopathies also contribute towards haemolytic anaemia in Sri Lanka. The laboratory investigations of chronic haemolytic anaemia include, screening test (Brewer's test) and enzyme assay to exclude G6PD deficiency. Haemoglobinopathies and thalassaemic syndromes are excluded by haemoglobin electrophoresis. Even though G6PD enzyme assay is indicated for diagnosis of G6PD deficiency, due to lack of reagents all the government hospitals in Sri Lanka employ only the screening test (Brewer's test) for the diagnosis.

The aim of the study is to observe the effect of different haemoglobins on screening test for G6PD deficiency. We investigated the patients (*n* =76) and carriers for commoner haemoglobinopathies (Hb E, Hb S, Hb D) and thalassaemias using G6PD deficiency screening test as well as G6PD enzyme assay. The haemoglobinopathies and thalassaemic syndromes were confirmed by electrophoresis at alkaline and acidic medium.

The results show that Haemoglobin E present in Haemoglobin E/□ thalassaemia, Haemoglobin E trait and Haemoglobin E disease, give false positive results with G6PD screening test, even though their G6PD enzyme levels were normal. Two subjects showed low enzyme levels with positive screening test. Only three out of forty nine (6.2%) were negative for G6PD screening test. Haemoglobin S (n=7) and Haemoglobin D (n=2) did not show any effect on the screening test for G6PD deficiency. Haemoglobin E is the commonest haemoglobinopathy in Sri Lanka, with high prevalence in Kurunegala, Anuradhapura and Chilaw districts. The patients with Haemoglobin E are likely to be labeled with G6PD deficiency, while having normal enzyme levels, if only the screening test is utilized. This implies the necessity for employing an enzyme assay method for the diagnosis of G6PD deficiency, at least in districts with high Haemoglobin E prevalence.

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