The Effect of Co-Existing Iron Deficiency on Hb A2 Level and The Diagnosis of Beta Thalassemia Trait

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The diagnosis of beta-thalassemia carrier state (BTT) is based on elevation of the HbA2 level>3.5% and is usually determined by HPLC or CE technology. HbA2 level is affected by many factors, including iron deficiency anaemia (IDA). Whether the IDA affects the accurate diagnosis of BTT is still controversial. Those who are with borderline HbA2 values will be at a higher risk of being misdiagnosed. This study was designed to determine the effect of IDA on the diagnosis of BTT in thalassaemia screening using IDA patients with both normal and borderline HbA2 values. This was an interventional study in which 92 individuals (males;15.2%, females;84.8%), aged between 12–57 years, who had low MCV (≤80 fl) and MCH (≤27 pg) with HbA2 levels<3.5% during thalassaemia screening were further analyzed for iron deficiency using iron parameters. People with serum ferritin<30 ng/mL were prospectively analyzed for changes in HbA2 level after three to six months of iron treatment. Those who had increased HbA2 levels>3.5% after the iron treatment were further analyzed by using the Sanger sequencing method for mutations. Dysfunctional uterine bleeding (35.9%) was the major aetiological factor for the IDA of this cohort. All hematological parameters (Hb in g/dL; 9.73±1.26, 12.26±0.98) HbA2 (2.36±0.43%, 2.63±0.37%) and iron parameters (Serum ferritin in ng/mL; 11.09±7.00, 46.60±16.11) were significantly increased after iron treatment. However, the increase in HbA2 level (3.40±0.92%, 3.43±0.20%) in the borderline group was not statistically significant (P>0.05). Only 3 out of 8 samples exceeded the value of 3.5% after iron treatment, but none had beta mutations. Further, there was a positive relationship between Hb and HbA2 levels (r (92) =0.388, p=0.000). In conclusion, iron therapy for IDA patients increases the HbA2 level significantly, but the impact the elevation could have in true borderline and genetically proven BTT iron deficient individuals could not be ascertained from this study.

Keywords: Beta Thalassaemia Trait, Iron Deficiency Anaemia, HbA2, Borderline

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