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114.SICKLE CELL DISEASE, SICKLE CELL TRAIT AND OTHER HEMOGLOBINOPATHIES, EXCLUDING THALASSEMIAS: CLINICAL AND EPIDEMIOLOGICAL

Correlation between Disease Biomarkers and Hemoglobin F Levels in Sickle Cell Patients

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Introduction

Sickle cell disease (SCD) is a hemoglobinopathy that impacts 100,000 people in the United States (Kavanagh, 2022). SCD is associated with various complications, some of which include stroke, venous thrombosis, cholelithiasis, and liver damage. Different biomarkers can be measured that can be useful in assessing the presence and progression of these complications including T.bili, LDH, AST, ALT, and albumin. Hydroxyurea is a tremendously important drug in the management of patients with sickle cell complications due to its ability to stimulate production of fetal hemoglobin (HbF). It has been proven to reduce the frequency of sickle cell crisis (Osunkwo, 2020). Limited research exists that correlates hemoglobin F values to these biomarkers. The aim of this study was to determine if there is a correlation between HbF levels and these biomarkers in patients with SCD.

Methods

A database of 496 SCD patients at the Center for Blood Disorders in Augusta, Georgia was analyzed in this cross-sectional study. Among the information extracted were data surrounding common clinical complications of SCD (i.e.thrombotic events, pulmonary hypertension, avascular necrosis, etc), anticoagulant use, disease biomarkers (i.e. D-dimer, T. bili, LDH, ALT/AST), history of COVID-19, and percentage of HbF and HbS. In patients with no history of thrombotic event, the most recent data was extracted. Pearson's correlation coefficient and Fisher's z-test were used to test the association between HbF and LDH, T.bili, AST, ALT, and albumin levels using R version 4.2.3

Results

483 of the 496 patients had a recorded T.bili level. The mean HbF for patients with a normal T.bili was 8.51 (SD 9.58). The mean HbF for patients with an elevated T.bili was 9.55 (SD 9.59). A two-sample t-test comparing the two yielded a p-value of 0.4066. 200 of the 496 patients had a recorded LDH. The mean HbF for patients with a normal LDH was 7.65 (SD 7.64). The mean HbF for patients with an elevated LDH was 9.74 (SD 8.32). A two-sample t-test comparing the two yielded a p-value of 0.1306. 482 of the 496 patients had a recorded AST level. The mean HbF for patients with a normal AST was 9.70 (SD 10.89). The mean HbF for patients with an elevated AST was 8.69 (SD 7.35). 483 of the 496 patients had a recorded ALT level. The mean HbF for patients with a normal ALT was 9.11 (SD 9.72). The mean HbF for patients with an elevated ALT was 10.34 (SD 9.77). 127 of the 496 patients had a recorded albumin level. The average HbF for patients with a normal albumin was 9.30 (SD 9.66). The average HbF for patients with a low albumin was 8.70 (SD 8.92).

Conclusion

Laboratory biomarkers such as LDH, T.bili, AST, ALT, and albumin are used to monitor various complications associated with SCD such as cholelithiasis and liver damage, respectively. Although there have been prior studies that demonstrate higher levels of HbF are correlated with better patient outcomes, we observed that there is no significant relationship between HbF and biomarker levels of T.bili, LDH, AST, ALT and albumin in these 496 SCD patients. These findings suggest that there may be factors other than HbF levels that play a role in the presence and progression of complications in patient with SCD.