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## Monitoring Hydroxyurea Treatment of Sickle Cell Anemia

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### ABSTRACT

Sickle cell is a hereditary disease affecting more than 100,000 people in the United States alone that causes hemoglobin in red blood cells to polymerize and turn the cell into a sickle shape, resulting in severe vaso-occlusive crises and ischemic attacks. Sickle cell patients often suffer from pain crises, with the number of pain crises linked to their prognosis, especially at a younger age. Currently, the drug hydroxyurea (HU) is used to treat the disease, with a measure of red blood cell volume (RBC MCV) as monitor for treatment progression. However, physicians have to wait atleast 120 days to identify treatment efficacy due to the amount of time it takes RBCs to reach a steady state volume after starting treatment. Therefore we propose measuring the volume of reticulocytes (MCVr), immature RBCs in the blood, as a marker for treatment efficacy, as the faster dynamics should allow for measurement of treatment efficacy after only 10 days. Data from 127 patients with various diagnoses (sickle cell, thalassemia, various forms of anaemia) and treatments (hydroxyurea, transfusions, no treatment) were analysed to establish relationships between MCVr and HU treatment, MCVr and RBC MCV, and other factors such as gender and time. The results suggest that there may be a correlation between MCV and MCVr for sickle cell patients treated with hydroxyurea versus other forms of treatment. Therefore, a prospective study should be planned to expand on the findings of this study.

### KEYWORDS

Anemia, Sickle, Hydroxyurea, Mean Corpuscular Volume, Reticulocytes, Vaso-occlusive, thalassemia,