Low hemoglobin (Hb) levels indicative of anemia have been shown to be associated with the risk of stroke in children with sickle cell disease (SCD). Transcranial Doppler (TCD) velocimetry is a non-invasive tool used to measure blood flow velocities in the brain, which can help identify patients at risk for stroke. In this study, 399 patients with sickle cell anemia were screened for TCD levels before initiating hydroxyurea (HU) therapy, a medication used to reduce the risk of stroke in SCD. HU was initiated at a dose of 150 mg/kg/day if the conditional TCD level was 300 cm/s or higher, or if the conditional TCD level was between 170-299 cm/s and the patient's Hb level was worse than 8.3 g/dL. The study aimed to determine the correlation between TCD levels and Hb levels and whether changes in Hb levels during HU therapy could predict conversion to abnormal TCD levels.

The results showed that 75% (297/399) of patients had conditional TCD levels of 300 cm/s or higher, and 92.2% (368/400) of patients had conditional TCD levels of 170-299 cm/s. The mean age of the study population was 10.6 years, and 59.6% (238/399) were female. At BL, the mean Hb level was 8.3 (0.7) g/dL, and the mean conditional TCD velocity was 250 (80.2) cm/s. The most significant factor influencing TCD levels was age, with younger patients having higher TCD velocities.

The study found that patients with conditional TCD levels of 300 cm/s or higher at BL had a significantly higher risk of developing abnormal TCD levels compared to those with conditional TCD levels between 170-299 cm/s. Patients with conditional TCD levels between 170-299 cm/s had a 49% chance of developing abnormal TCD levels, compared to a 100% chance for patients with conditional TCD levels of 300 cm/s or higher.

The study concluded that conditional TCD levels can be predictive of the risk of developing abnormal TCD levels, and that changes in Hb levels during HU therapy can help identify patients who are at risk for developing abnormal TCD levels. The study also highlighted the importance of early intervention with HU therapy to reduce the risk of stroke in patients with high-risk TCD levels.