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901. HEALTH SERVICES AND QUALITY IMPROVEMENT - NON-MALIGNANT CONDITIONS

Patterns of Nonadherence to Hydroxyurea in Pediatric Sickle Cell Disease

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Background: Sickle cell disease (SCD) affects an estimated 100,000 American children and adults (CDC, 2017). Hydroxyurea is the first-line disease-modifying treatment for SCD. Daily oral hydroxyurea significantly reduces the frequency of pain and serious medical complications associated with SCD, including dactylitis and acute chest syndrome (Wang et al., 2011). However, adherence to hydroxyurea is less than optimal at 74% among pediatric patients, with 20% of children who are prescribed hydroxyurea taking less than 50% of their prescribed doses (Louiselle et al., 2016). Suboptimal hydroxyurea adherence is associated with increased risk for medical complications, diminished quality of life, and higher health care costs and utilization (e.g., Badawy et al., 2017; Thornburg et al., 2010). Factors associated with hydroxyurea nonadherence in pediatric SCD include female sex, older age, more adherence barriers (e.g., difficulty obtaining refills), lower socioeconomic status, and lower parent treatment knowledge.

Purpose: This study aims to characterize trajectories of pediatric hydroxyurea adherence to identify subgroups that may be at highest risk for hydroxyurea nonadherence (e.g., sociodemographic factors), critical time periods for adherence support interventions (e.g., adolescence), and minimal adherence thresholds to optimize hydroxyurea efficacy.

Methods: Retrospective chart review across two institutions (i.e., Cincinnati Children's Hospital Medical Center and Nemours Children's Hospital, Delaware) are ongoing. Participants will include patients with SCD ages 2 to 21 years who were prescribed hydroxyurea from March 2007 to February 2017. Researchers are extracting the following data from patient electronic medical records (EMRs) to estimate hydroxyurea adherence: hemoglobin F levels (HbF), mean corpuscular volume (MCV), and absolute neutrophil count (ANC). Additional clinical information will be extracted from patient EMRs including demographic information, SCD genotype, SCD complications, acute care utilization, medical and social complexity, and concomitant medication use. Descriptive statistics will be used to summarize demographic and clinical characteristics of the sample. MCV will be the primary measure of hydroxyurea adherence and Hgb F and ANC will be secondary measures. If the final sample size is sufficiently large, we will conduct group-based trajectory modeling (GBTM) to analyze patterns of hydroxyurea adherence changes over time and identify hydroxyurea adherence trajectory subgroups. Multinomial logistic regression analyses will be used to analyze potential predictors of hydroxyurea adherence trajectory subgroup membership.

Results: Preliminary results revealed that as of February 2017, 88% of eligible patients (based on age) were prescribed hydroxyurea. Data from the first 30 completed chart reviews indicates that half of the sample was female (sex assigned at birth), all identified as Black or African American, all but two participants had HbSS, and the mean age 13.0 years ($SD=8.0$, range=2.47 to 26.81). Average MCV across an average of 21 time points ($SD=14.2$, range=5-74) was 94.3 ($SD=11.2$, range=58.4-114.2). As of February 2017, 53% of individuals had MCV values at or above 100. Specifically, 60% of 5-9 year olds, 47% of 10-15 year olds, and 46% of 16+ year olds had MCV values at or above 100. Average Hgb F across an average of 21 time points ($SD=15.3$, range=3-81) was 22.9 ($SD=9.3$, range=2.6-44.8). As of February 2017, 50% of individuals had HbF values at or above 20.0. Specifically, 55% of 5-9 year olds, 32% of 10-15 year olds, and 55% of 16+ year olds had HbF values at or above 20.0. Average ANC (at non-ill visits) across an average of 20.0 time points ($SD=13.6$, range=5-71) was 3,965 ($SD=1,227$; range=1,600-6,910).

As of February 2017, 31% of individuals had ANC values less than 3,000. Specifically, 20% of 5-9 year olds, 34% of 10-15 year olds, and 30% of 16+ year olds had ANC values less than 3,000.

Discussion: Results from this study have the potential to help researchers and clinicians better understand patterns and correlates of hydroxyurea adherence in pediatric SCD patients that can be targeted in future interventions.

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