ORIGINAL REPORT

Immune erythrocyte antibodies in adult patients with sickle cell disease and blood donors in Lagos, Nigeria: a comparative study

A.S. Adewoyin, O.A. Daramola, A.A. Ogbenna, and T.A. Adeyemo

Sickle cell disease (SCD) poses a major public health challenge in sub-Saharan Africa, including Nigeria. Blood transfusion is a mainstay in SCD treatment. Erythrocyte alloimmunization is known to complicate the transfusional care of patients with SCD. Immune alloantibodies are associated with hemolytic transfusion reactions and transfusion refractoriness. We aimed to determine the prevalence, specificities, and clinical associations/risk factors of immune erythrocyte alloantibodies among adult patients with SCD compared with healthy blood donors in Lagos, Nigeria, through a cross-sectional study. All participants were interviewed using a structured questionnaire to obtain details on bio-data, hemoglobin phenotype, blood transfusion history, and SCD history where relevant. Blood specimens obtained from each participant were subjected to antibody screening/identification using tube agglutination method. The mean age of the SCD participants and healthy blood donors was 27.92 and 29.04 years, respectively. The majority (72.5%) of the SCD participants had received at least 1 unit of red blood cell (RBC) transfusion in their lifetime, compared with only 7.5 percent of blood donors. Six SCD participants (7.5%) tested positive for atypical erythrocyte alloantibodies, with none among blood donors. Most of the antibodies (75%) belonged to the Rh blood group system. The most frequent antibody was anti-E, followed by anti-C and anti-D. Advancing age (30 years or more), recent transfusions (last 4 weeks), higher transfusion rates, and established renal disease were significantly associated with alloimmunization (p values of 0.026, 0.043, 0.002, and 0.043, respectively). This study suggests blood transfusion as a strong risk factor for RBC alloimmunization in SCD patients. Extended RBC phenotyping is recommended for all patients with SCD, especially those receiving regular transfusions. ***Immunohematology* 2021;37:131–137. DOI: 10.21307/immunohematology-2021-020.**

or autologous (autoantibodies). Immune antibodies that are frequently occurring and have capacity for *in vivo* hemolysis are described as clinically significant.[1,3]

Sickle cell disease (SCD) is a global public health challenge, with highest prevalence in West Africa, the Middle East, the Mediterranean basin, and far India.[4–6] In West Africa, Nigeria bears the greatest burden of SCD, being the most populous nation in that area. Estimates suggest SCD prevalence of 2–3 percent in Nigeria (population estimate of 170 million Nigerians).[7–9] This high burden of SCD in Nigeria is also coupled with considerable morbidity and mortality as a result of multiple factors, including low public health knowledge, delayed diagnosis, gross absence of dedicated sickle cell centers, poor access to specialized care/suboptimal care, and poverty.[10,11] Technically, the term "sickle cell disease" encompasses clinical syndromes characterized by the tendency of the intracorpuscular hemoglobin molecules to precipitate and deform the RBC to a sickle or crescent shape, resulting in chronic hemolysis and characteristic vaso-occlusive events.[12,13] SCD results from homozygous or compound heterozygous inheritance of the sickle beta hemoglobin gene (*HBB*). Homozygous disease is termed sickle cell anemia. Chronic hemolysis in SCD is associated with chronic anemia in most affected individuals, which may be interspersed by episodes of acute hemoglobin drop from several etiologies. Baseline (steady-state) hemoglobin level in SCD ranges