Title: The Intersection Between Hematology-Oncology and Rheumatology: Hemophagocytic Lymphohistiocytosis and Macrophage Activation Syndrome in the Setting of Neutropenic Fever

Jamie Tran MD, James Tran MD, Lauren Campbell BS, David Nguyen BS, Monique Germain, DO
Department of Medicine, LSU Health Sciences Center

Introduction: Systemic Lupus Erythematosus (SLE) is a complex autoimmune disease with extensive clinical features that overlap with hematologic disorders. Up to 15% of patients with autoimmune disease may develop Macrophage Activation Syndrome (MAS), which is a form of Hemophagocytic Lymphohistiocytosis (HLH). MAS is described as an inflammatory response resulting in immunologic dysregulation and organ dysfunction. It is a life-threatening disorder that presents with high fever, pancytopenia, lymphadenopathy, liver dysfunction, and coagulopathy.

Case: A 27 year old man with a history of inflammatory arthritis that resolved after steroid use presented with neutropenic fever: temperature of 103°F and ANC 0.49 $x10^3$/ul. He endorsed fatigue, hair loss, and a 30lb weight loss for 3 months. Other initial findings included pancytopenia, proteinuria, transaminitis, and elevated ESR. Infectious workup was negative. Peripheral blood smear, bone marrow biopsy, and myelodysplastic panel showed hypocellularity but negative for a hematologic or malignant process. Rheumatologic workup was notable for +ANA 1:640, +dsDNA *Crithidia luciliae* 1:320, ENA with low +Sm, low C3 and C4, triple +antiphospholipid panel, and +lupus anticoagulant. Given the patient's severity of symptoms and organ involvement, workup for MAS demonstrated elevated LDH and d-dimer, hypertriglyceridemia, IL-2r 1167, 0.2% NK cells on flow cytometry, and ferritin 3,400 ng/ml.

Discussion: Based on the 2019 EULAR/ACR Classification Criteria for SLE, he scored points from all three of the immunology categories along with 5 out of 7 clinical categories. Having ≥10 points is indicative of SLE, and he totaled 33 points. Per the HLH-2004 diagnostic criteria, 5 out of 9 categories must be met; our patient presented with fever ≥38.5°C, peripheral blood cytopenia, elevated IL-2r, low/absent NK cell activity, and elevated ferritin. Given these findings and the underlying diagnosis of SLE, there is a high likelihood of MAS in this patient. Treatment of the underlying trigger, in this case SLE, is effective for MAS without the need for HLH-specific therapy.