Acquired hemophagocytic lymphohistiocytosis (HLH) is a life-threatening and rare disease in which there is a massive inflammatory response resulting in an uncontrollable cytokine storm. This can result in findings such as pancytopenia, hepatosplenomegaly, fever, altered mentation, and multi-organ failure. In addition to mimicking the presentation of septic shock, ambiguous diagnosis criteria and the relatively new understanding of this disease process can impede establishing the diagnosis of HLH which delays the initiation of treatment and negatively impacts survival. Increasing awareness of this pathology, can increase early diagnosis and treatment ultimately preventing the misdiagnosis of a purely septic episode which improves patient outcomes. We describe two cases of patients with hematologic malignancies that presented to the Intensive Care Unit (ICU) with symptoms of septic shock, but were ultimately diagnosed with and treated for HLH.