

Erythrophagocytosis in Sepsis

Keywords: muscular dystrophy, mechanical ventilation, reticulocyte count, bacterial infections, *Proteus mirabilis*

Abbreviations: UTI, urinary tract infection; WBC, white blood cells; LDH, lactate dehydrogenase; ICU, intensive care unit; RBC, red blood cells

Introduction

A 39 year old female with past medical history of severe mental retardation, muscular dystrophy, tracheostomy with chronic mechanical ventilation presented to the emergency department with confusion for 4days, cough, increased secretions from tracheostomy site and foul smelling urine for three days. She was hypotensive in the emergency department with blood pressure in 80/50mmHg and was admitted to the ICU due to septic shock secondary to severe pneumonia and urinary tract infection (UTI). Physical examination was notable for bilateral crackles on lung examination. Laboratory studies showed leucocytosis to 16,800 cells per μL with 12% band forms, hemoglobin was 13gm/dL and platelet count was 257,000 cells/ μL . Basic Metabolic Panel was significant for elevation in serum creatinine to 1.7mg/dL. Urine analysis showed 38 white blood cells (WBC), 3+ leukocyte esterase and nitrites. She was started on Vancomycin and Piperacillin/Tazobactam for pneumonia and concomitant UTI. Blood cultures grew *Proteus mirabilis* sensitive to Piperacillin/Tazobactam (Figure 1).

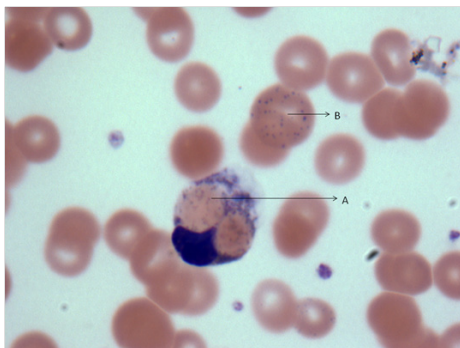


Figure 1

- A. Demonstrating phagocytosis of red blood cells by a granulocyte
- B. Basophilic stippling with in a red blood cell which can be seen in severe sepsis.

During her hospital course, her hemoglobin dropped to 9gm/dL in five days with no obvious evidence of bleeding. Hemolytic anemia was ruled out with normal reticulocyte count, LDH, serum haptoglobin and serum bilirubin. The patient had anemia of inflammation/anemia of critical care illness secondary to septic shock. There could also be a dilutional component to anemia given fluid resuscitation prior to administration of pressors. She received one unit of packed red blood cell transfusion during her ICU course. She responded well to blood transfusion and her blood counts remained stable since then.

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Leucocytosis trended down with appropriate management of septic shock. Interestingly, peripheral blood smear prior to blood transfusion showed granulocytes phagocytosing red blood cells, vacuolations and toxic granulations in the neutrophils. The erythrophagocytosis seen on the peripheral blood smear is probably related to the patient's septic shock. The patient recovered well from septic shock with IV fluid resuscitation, pressors and antibiotics.

Erythrophagocytosis is defined as ingestion of red blood cells (RBC) by polymorphonuclear leucocytes or macrophages. This phenomenon occurs when RBC complete their life cycle and macrophages ingest them for iron recycling. However phagocytosis by granulocytes is a rare phenomenon. This can be seen in various viral, parasitic or bacterial infections.^{1,2} In this case, it is associated with *Proteus mirabilis* septicemia and there is no obvious evidence of hemolysis. This phenomenon can also be seen in myelodysplastic syndrome, paroxysmal cold hemoglobinuria, venomous snake bites, certain medications like cefotetan and sickle cell anemia.^{3,4} Therefore in all these situations, it is important to consider this process as a cause for anemia.

Acknowledgements

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Conflict of interest

The author declares that there is no conflict of interest.

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