

Researchers seek to understand the biology of sepsis in neutropenic patients

20 May 2014, by Lee-Ann Donegan

(Medical Xpress)—Sepsis comes with serious consequences. The blood infection, most commonly caused by bacteria, can lead to septic shock, organ failure, loss of limbs, and even death. Patients whose immune systems are already compromised are at even greater risk.

Nuala J. Meyer, MD, an assistant professor of Pulmonary, Allergy and Critical Care in the Perelman School of Medicine at the University of Pennsylvania examined the effects of sepsis on neutropenic [patients](#). She will present her findings in the poster discussion session at the American Thoracic Society meeting, Monday, May 19, in San Diego.

Neutropenia, a condition in which patients have a low number of infection-fighting [white blood cells](#), can occur as a result of anemia, certain cancers or chemotherapy treatment, and other hereditary disorders.

Meyer looked at a single-center cohort of patients who presented to the emergency department or medical ICU with [severe sepsis](#). Of the 1,269 patients studied, nine percent were neutropenic; 75 percent had hematologic malignancy; 15 percent had metastatic solid organ malignancy, and 15 percent were [organ transplant recipients](#). Neutropenic patients had a higher incidence of shock and were more likely to die within 60 days, a retrospective review of their electronic health record found. Meyer and her team set out to understand why this occurs.

"We hypothesized that the neutropenic patients would have higher levels of the growth factor angiopoietin 2, a vascular growth factor and marker of injured [blood](#) vessels, and that these would serve as biomarkers for the most severe cases of neutropenic sepsis," says Meyer. Increased levels of angiopoietin is known to lead to an increase of permeability of the blood vessel, which allows the contaminated blood to travel more

easily from the vessel to the rest of the body and vice versa.

Contrary to this, the study showed that the neutropenic patients not only had lower than expected levels of angiopoietin 2, but they also had high levels of inflammatory cytokines, specifically interleukin-8, a protein important to the body's immune response. "The neutropenic patients, despite a low white blood cell count, surprised us with the increased number of cytokines compared to the immunocompetent patients," Meyer said.

This led the team to believe that mortality risk for sepsis patients might be associated with high cytokine levels independent of severity of illness, and that anti-inflammatory medications targeting interleukin-8 specifically, might be helpful, even among neutropenic patients, as interleukin-8 is highly associated with mortality. "In the future, testing for interleukin-8 in septic patients could lead to early intervention with inflammatory medication, and possibly, better outcomes for patients," says Meyer.

Provided by University of Pennsylvania School of Medicine

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