



Abstract Code: ASID021-014

## **Neutropenia in patients with sepsis: neutrophil function is the predictor of recovery rather than the count**

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**Keywords:** Sepsis, ANC, MODS, NF.

### **Abstract**

**Background:** Sepsis is a clinical syndrome that has physiologic and biochemical abnormalities caused by a dysregulated inflammatory response to infection. It may lead to multiple organ dysfunction syndrome and death. Furthermore, immune diagnostic biomarkers are not available. Neutrophil plays a crucial role in the pathophysiology of sepsis.

**Objectives:** The study aimed at assessing if there is any correlation between the neutrophils count (ANC) and function (NF), and Granulocyte-Colony Stimulating Factor (G-CSF) and the stage of sepsis.

**Methods:** A descriptive cohort hospital-based study was conducted at the ICU at Soba University hospital and Omdurman Military Hospital. Patients were diagnosed using the SIRS defining variables. ANC and NF were measured using whole venous blood samples. Serum samples were separated and stored in -20°C. Data were collected at the time of admission and recovery from sepsis.

**Results:** Eighty patients and 7 healthy controls were enrolled in this study. Patients were categorized into 3 groups; severe sepsis, septic shock and MODS according to standard criteria for definition of sepsis. Seventy patients had septic shock. The mean age was  $61.3 \pm 20.1$  and male: female was 1.5:1. Seven patients had severe sepsis with a mean age of  $46.1 \pm 12.9$  and male to female ratio was 3:1. And 3 MODS patients had ANC of  $14000 \pm 8040$ , and normal NF. Fifty-nine (59/70) patients died and the remaining (11/70) recovered. Those who died showed high mean ANC ( $10400 \pm 7360$ ) whereas those who recovered showed low mean ANC ( $6200 \pm 3010$ ),  $p = 0.001$ . The NF showed increment with increasing severity of sepsis,  $p = 0.001$ .

**Conclusions:** The neutrophils function could be considered as a predictor of recovery in septic shock, unlike the ANC which is very variable. One of the study limitations is that G-CSF was not measured.