

# Thrombocytopenia and Bacterial Sepsis among Sudanese Septic Neonates

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**Keywords:** Thrombocytopenia, neonatal sepsis, Gm –ve septicemia, Gm +ve septicemia, Sudanese neonates, Khartoum, Sudan.

**Introduction:** Bacterial sepsis occurs during the neonatal period, causing severe complications in neonates & high mortality.

**Objectives:** The study aimed to detect the effect of sepsis on circulating thrombocytes among Sudanese septic neonates in correlation with bacteria type.

**Materials and methods:** The study was carried out on 50 neonates who were admitted with clinical diagnosis of septicemia at Neonatal intensive care unit (NICU) in Omdurman Maternity Hospital (from June 2013-February 2015). 50 age matched neonates used as a control group. Of the patient group, seventeen term and 33 preterm neonates were recruited. Blood culture, Gram stain, culture and sensitivity as well as biochemical tests were used for identification of microorganism. Platelets count was done for both septic and healthy neonates, using full automated haematology analyzer (Mindray CX-21).

**Results:** Thrombocytopenia was noted in all cases where as bacterial culture was positive. Moreover, it was found that, in gram negative (Gram –ve) septicemia, thrombocytopenia was more severe as compared to gram positive (Gram +ve) septicemia.

**Conclusion:** Low count of thrombocytes (platelets) is a predictor of neonatal septicemia. Severe thrombocytopenia is more likely to be associated with gram negative neonatal septicemia.

## Introduction

The bacterial sepsis among neonates increases the cost of medical care, as it causes severe morbidities and therefore increases the length of hospitalization in neonatal intensive care units (NICU) (1, 2). Neonatal sepsis accounts over 50% of the neonatal deaths (3).

Early-onset sepsis among neonates is caused by organisms in the birth canal either when the amniotic membranes rupture or leak prior or during the delivery (4). In contrast, late-onset sepsis in neonates might be acquired from the environment (1).

Previous studies reported that, medical laboratory scientists and clinicians have faced challenges to recognize the neonatal septic (5). Accordingly, septic neonates must be diagnosed rapidly for taking the right antimicrobial medications (5-7). Moreover, some laboratory investigations should be done such as blood culture and platelet count to alleviate the medical complications of this illness (6, 8).

Low platelet count and coagulopathy may be found in most patients with sepsis and subsequently encountered as important complications among septic neonates (9). In septic neonates, haemorrhagic diathesis emerges following DIC as a result of overconsumption of thrombocytes and coagulation factors (10, 11).

In the neonatal stage particularly in the ill newborns, thrombocytopenia is encountered as one of the common haematological problems. This occurs predominantly among premature babies and neonates admitted in neonatal intensive care units and usually indicate an underlying pathologic process (10). **The** current study aimed to detect the effect of sepsis on circulating thrombocytes among Sudanese neonates in correlation with bacteria type and to know the rate of mortality and morbidity among septic neonates.

#### Materials and methods

**Populations:** Patient population of 50 septic neonates, 26 females and 24 males, defines a control group comprising 27 females and 24 males, numbers expressed as percentages on the graphics. Patient and control groups were classified into term and preterm neonates. Seventeen patient neonates were term and 33 were preterm. Of the control group, only one neonate was preterm; 49 neonates were term. Proportions are expressed as percentages in the graphics.

**Specimens and ethics:** The patient specimens were collected from Omdurman Maternity Hospital. Ethical approval for the study protocol was obtained. Informed consent was obtained individually from all subjects. **Venous** blood **was** collected from each participant and each sample was processed for both bacterial culture and platelet count.

**Bacterial culture:** Blood culture, Gram stain, culture and sensitivity as well as biochemical tests were used for identification of microorganism.

**Platelet count:** It was done for both septic and healthy neonates, using full automated hematology analyzer. This was done to know the frequency of thrombocytopenia among the study population.

#### Result

**Sepsis:** Of the patient group, 10 (20%) died as a result of neonatal sepsis, forty (80%) recovered. The patient group was also divided into early onset (0-7 days) and late onset septic neonates (7-28 days). The former accounted **in** 34% (N=17), and the latter 66% (N=33). These proportions shows classification of the patient group based on the Gram stain typing of causative bacterial agent. Gram positive was 18% (N=9) and Gram negative 82% (N=41).

**Platelets count:** The platelets count was significantly **lower** in all patients with sepsis than in control samples ( $p < 0.01$ ) in correlation with the types of bacteria. **Sepsis** in the patient group was classified into early [40% (N=20)] and late [60% (N=30)] onset sepsis. The former was found with significant lower platelet count than the late onset sepsis, ten patients in total were died

#### Discussion

This study was conducted to know the impact of bacterial sepsis among Sudanese neonates and its effect on the platelet count. It revealed that neonatal sepsis is **more common in premature neonates and could be the cause of premature delivery**, as 66% of septic neonates were preterm. This was significantly higher ( $p \text{ value} < .01$ ) in comparison with the healthy neonates, 2% of them were preterm, illustrated in Figure 2A&B. Therefore, it is worth to know the main complications of neonatal sepsis such as thrombocytopenia, which is a theme of this study.

In contrast, there is approximately 1% of women at term gestation may need organisms cultured from amniotic fluid (12), but the rate of microbial invasion of the amniotic cavity is approximately 32% in those women with preterm labor (13). Moreover, another study by De Assis Meireles and coworkers reported that the rate of microbial invasion in preterm premature rupture of membranes is higher, 75% (14).

Of the patient group, 10 (20%) died as a result of neonatal sepsis, forty (80%) recovered. This indicates that the illness of septic neonates might be rapidly developed and in some instances life threatening, as a result of neonatal sepsis complications. Therefore, neonates with confirmed or suspected early-onset bacterial sepsis must be managed quickly for avoiding morbidity and mortality among the preterm neonates.

Here, severe thrombocytopenia was found to be common in the septic neonates, especially premature newborns, as their platelets count was decreased compared to the control group,  $p < 0.01$ . In contrast, this finding is in line with Ahmed MS and coworkers (15) who reported that thrombocytopenia is a common complication of neonatal sepsis. Our finding is also typical with other published studies as they reported that thrombocytopenia is prevalent in patients with severe sepsis (16), early predictor of septicemia (10) and a common finding in sepsis (17).

Moreover, our study revealed that thrombocytopenia was more severe in patients with gram negative (Gm -ve) septicemia rather than patients with gram positive (Gm +ve) septicemia.

### Conclusion

Bacterial sepsis is a main cause of morbidity and mortality among Sudanese neonates and therefore its diagnosis and management for neonates with suspected early and late-onset sepsis are crucial. This will in alleviate the complications of bacterial sepsis such as thrombocytopenia. This might be useful to shed light on the consequences of sepsis among Sudanese neonates in order to minimize the rate of morbidity and mortality among Sudanese neonates.

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