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# Relationship between serum procalcitonin values and clinical course in patients diagnosed with neonatal sepsis

## Abstract

Procalcitonin is considered to be one of the markers of bacterial infections in critically ill patients, as well as a diagnostic and prognostic aid in severe sepsis. Neonatal sepsis is still among the main causes of mortality among newborns worldwide.

**Objective:** To relate serum procalcitonin values and factors such as: sex, use of vasoactive drugs, use of glucocorticoids at supra physiological doses and clinical evolution, in neonates diagnosed with sepsis. Admitted to the neonatal intensive care unit in the period between October 2018 and January 2019.

**Methodological design:** Descriptive, retro prospective design.

**Results:** Direct relationship was demonstrated between serum procalcitonin values >2 ng/ml, the use of both vasoactive drugs and steroids, with high mortality among the patients studied.

**Conclusions:** Both male sex, as well as the use of the drugs reviewed significantly increase mortality when presenting procalcitonin values >10 ng/ml. An early diagnosis together with an integral treatment provides a better prognosis in newborns with sepsis in the neonatal period.

**Keywords:** neonatal sepsis, procalcitonin, alpha polypeptide

Volume 11 Issue 3 - 2023

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**Received:** October 19, 2023 | **Published:** December 18, 2023

## Introduction

The incidence of sepsis in the neonatal period varies according to definition, region, institution, time, etc. Studies carried out by the World Health Organization estimate that approximately 20% of newborns present a neonatal infection regardless of the etiologic causative agent.

In order to identify patients suffering from sepsis in the neonatal period, consensus has been reached and scales have been created that include risk factors, as well as clinical and laboratory characteristics associated with Systemic Inflammatory Response Syndrome. Although morbimortality due to sepsis has decreased in recent decades, severe sepsis continues to be an important cause of mortality. In recent years, knowledge of the pathophysiology of sepsis in neonates has increased. It is now known that multiple organ failure is due more to an inadequate autoimmune response than to direct tissue damage by bacteria.[1–3]

## Materials and methods

### a. Units of study

Patients between 0 days of life and 28 days of postnatal age, admitted with a diagnosis of neonatal sepsis to the Neonatal Intensive Care Unit of the Regional Hospital of Huehuetenango in the months of October 2018 to January 15, 2019.

### b. Inclusion criteria

i. Patients admitted to the Neonatal Intensive Care Unit of the Regional Hospital of Huehuetenango.

ii. Patients between 0 days of life and 28 days post natal age.

iii. Patients diagnosed with neonatal sepsis (early, late, nosocomial and acquired).

iv. Patients who underwent a serum procalcitonin study during their hospital stay.

### c. Exclusion criteria

i. Patients whose serum procalcitonin test was not performed in the hospital's clinical laboratory.

ii. Patients with no apparent clinical record.

iii. Patients who do not meet the inclusion criteria described above.

## Results and discussion

The study included 30 patients admitted to the neonatal intensive care unit with a diagnosis of sepsis who underwent serum procalcitonin (PCT) testing during the first days of hospital stay. To analyze the data obtained, serum PCT values from the clinical laboratory where the tests were performed were used. These ranges were: 0.5 - 2 ng/ml probable sepsis, 2 - 10 ng/ml severe sepsis and results >10 ng/ml corresponding to septic shock.

Of these, 37% (11 newborns) were female and the remaining 63% (19 newborns) were male. This confirms that, when talking about neonatal sepsis, male sex, together with various antepartum and intrapartum factors, predispose the newborn to sepsis. The serum procalcitonin values of the patients studied indicated that of the total number of patients studied, 23% (7 newborns) presented values between 0.5 - 2ng/ml, had moderate sepsis; another 27% (8 newborns) presented severe sepsis and finally the remaining 50% (15 newborns) presented septic shock. This indicates a total incidence of 77% of severe sepsis in admitted patients who underwent laboratory tests in the first days of hospital stay.[4–7]

The mortality rate of the newborns studied was 60% (18 newborns) in which the patients had a favorable evolution through the integral treatment of the disease, combining antimicrobial therapy and adequate hemodynamic management, as opposed to 30% (12 newborns) of the patients who died in the unit despite the therapy administered. Demonstrating a low percentage of mortality despite having presented high serum procalcitonin values at the time of diagnosis. Patients with PCT values >10 ng/ml had a 40% probability of needing vasoactive amines for hemodynamic stabilization.[8–10]

## Conclusion

1. The male sex presented higher procalcitonin values than those obtained among female newborns.
2. Of the 100% of the newborns reviewed, in more than half (70%) some type of vasoactive drug was used as part of the treatment, especially in newborns with PCT values >10 ng/ml.
3. Glucocorticoids at supra-physiological doses were used in 47% of all neonates with neonatal sepsis, predominantly in the group with PCT values >10 ng/ml.
4. It was evidenced that male patients who presented values above 2 ng/ml and who also received both vasoactive drugs and glucocorticoids at shock doses, had high mortality rates in a 3:1 ratio.

## Acknowledgments

None.

## Conflicts of interest

The authors declare no conflicts of interest.

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