EVALUATION OF THE CORRELATION BETWEEN PROCALCITONIN (PCT) LEVEL AND OTHER BIOMARKERS, SEPSIS DIAGNOSIS AND ANTIBIOTIC PRESCRIPTION PATTERN AT AN EMERGENCY DEPARTMENT (ED)

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Background and importance

Sepsis is a life-threatening condition that progresses rapidly and is associated with a high mortality rate. Diagnosing sepsis and initiating optimal antimicrobial therapy in a timely manner remain significant challenges for clinicians and often lead to misdiagnosis.

Aim and objectives

This retrospective observational study aimed to evaluate the relationship between the levels of biomarkers (e.g. PCT), the diagnosis of sepsis, and empirical antibiotic (AB) therapy.

Materials and methods

The study was conducted in December 2023 at a tertiary emergency department (ED) in Hungary. All adult patients with a procalcitonin level >0.1 ng/mL were included in the study. The diagnosis and severity of sepsis were determined based on the SIRS, Sepsis, and Septic Shock Criteria (MDCalc). Clinical symptoms, potential sources of infection, and performed cultures were considered. Cases were classified as misdiagnosed if patients did not meet the SIRS criteria. The analysis of empirical AB therapy was performed only for confirmed sepsis cases. Fisher's exact test and t-tests were used to examine relationships between groups.

Results

Out of 199 cases, sepsis was diagnosed in 39.2%; however, 19.6% of these cases did not meet the criteria for sepsis. Conversely, among the remaining 121 patients diagnosed with other conditions, 27.1% fulfilled the criteria for sepsis (Figure 1). The most common bacterial infections were pneumonia (46.2%), urinary tract infections (22.6%), and chronic skin and soft tissue infections (9.7%). The PCT threshold was 0.76 ng/mL in patients diagnosed with sepsis and 0.41 ng/mL in patients with other diagnoses ($p>0.05$). Moreover, significant differences ($p<0.05$) were found between the groups in C-reactive protein levels (158 vs. 122 mg/L) and white blood cell count (15.3 vs. 11.4 G/L). LDH has not shown significance (Figure 2).

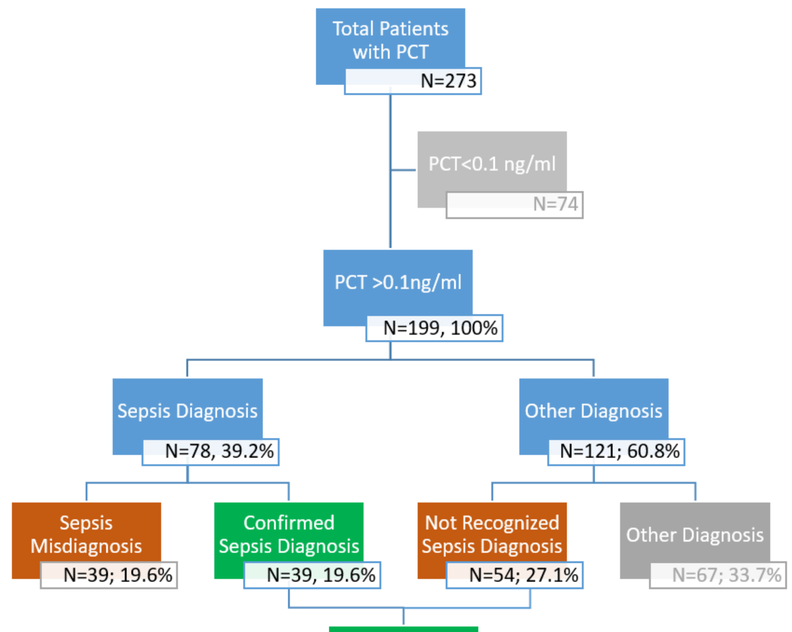
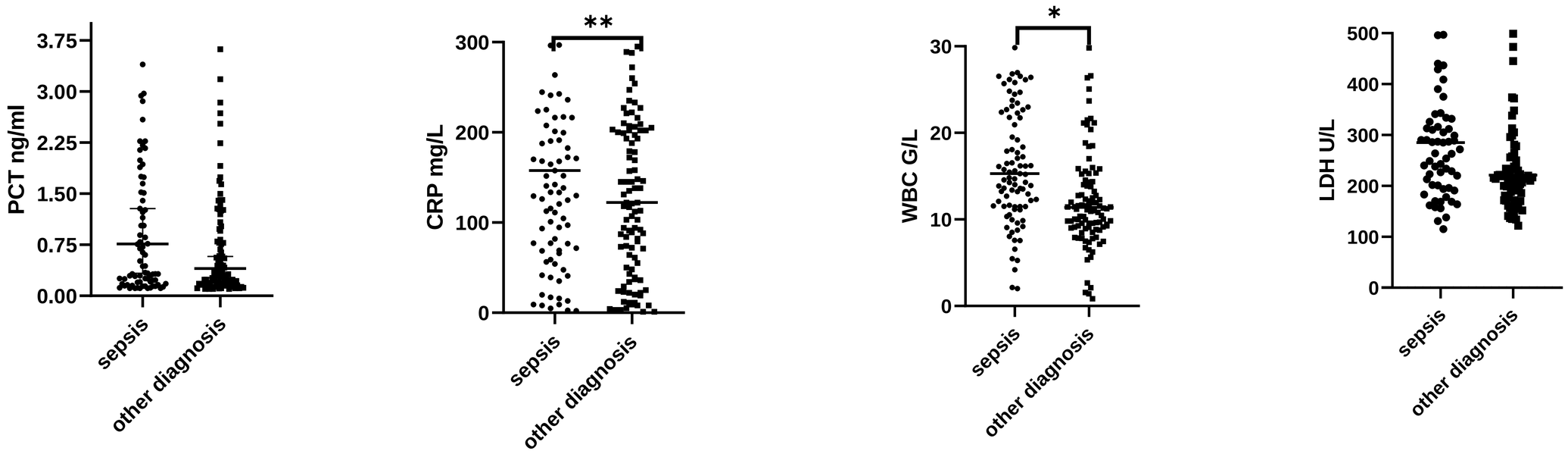


Figure 1: Distribution of diagnoses.

Figure 2: Cut-off levels of PCT and other biomarkers in sepsis.



AB therapy was started only at higher PCT cut-off levels (4.44 and 2.27 vs 0.33 ng/ml), however, early AB therapy resulted in better clinical outcome (Figure 3).

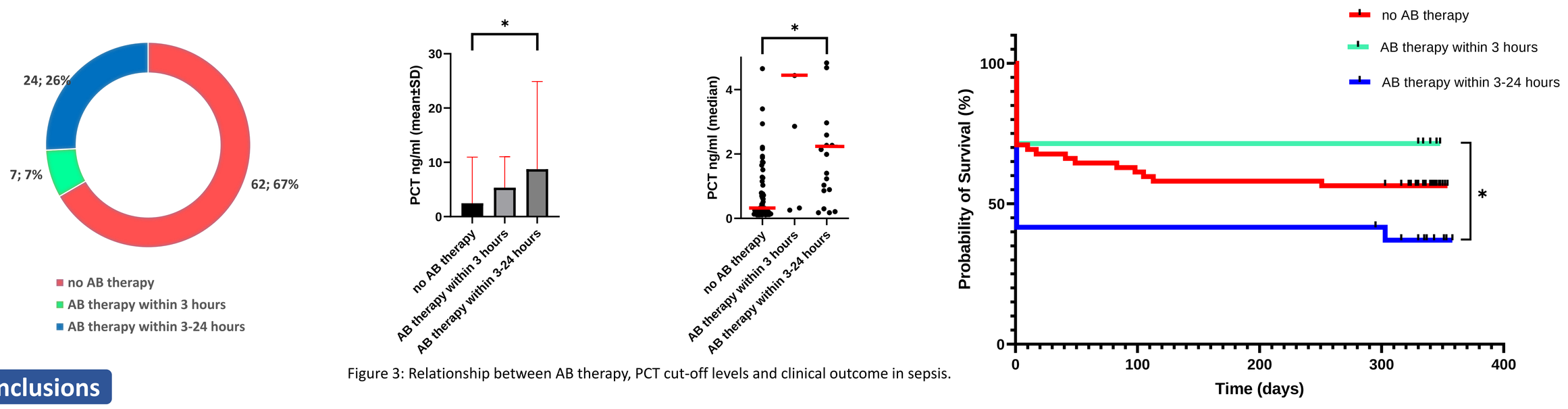


Figure 3: Relationship between AB therapy, PCT cut-off levels and clinical outcome in sepsis.

Conclusions

We found a relatively high rate of misdiagnosed sepsis. Knowing PCT and other biomarker cut-off values may help clinicians in diagnostic decision-making process. Early antibiotic prescribing increased probability of survival.

Resources

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