



## Can procalcitonin and C-reactive protein determine treatment in blood stream infections?

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### OBJECTIVES

- Blood stream infections (BSI) exhibit high mortality and morbidity if antimicrobial therapy is delayed.
- Early, appropriate and agent-targeted antimicrobial therapy must therefore be initiated following rapid diagnosis.
- Determination of insufficiency of treatment initiated is important in terms of prognosis.
- The purpose of this study was to investigate the relation between antimicrobial therapy in BSIs and procalcitonin (PCT) and C-reactive protein (CRP) kinetics.

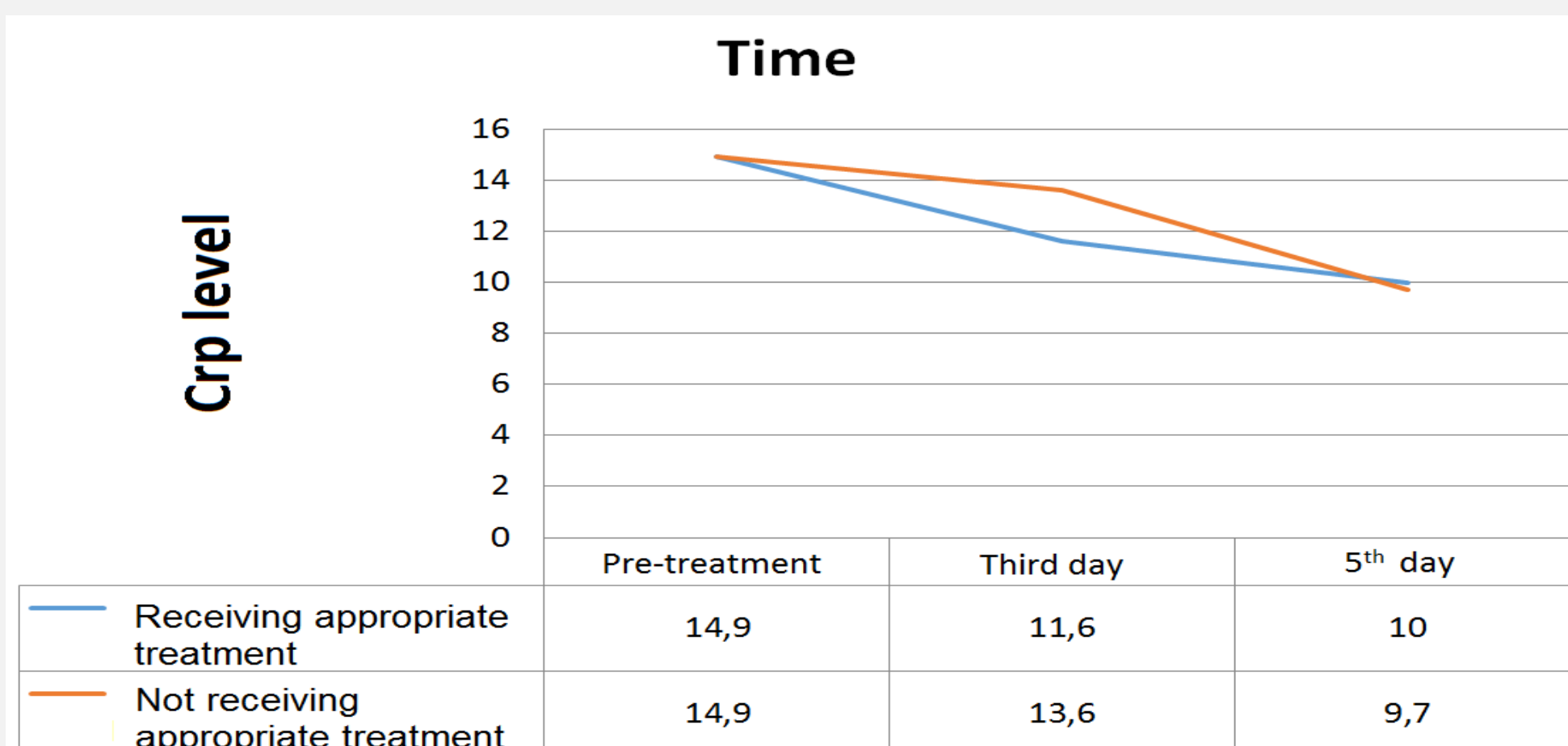
### METHODS

- This study was performed retrospectively with patients hospitalized in our hospital's anesthesiology and reanimation intensive care unit between 01.01.2014 and 31.12.2015 and diagnosed with BSI.
- Patients' demographic and clinical characteristics and PCT and CRP before starting antibiotic therapy, on the 3<sup>rd</sup> and 5<sup>th</sup> days and at the end of treatment were obtained from infection control committee and department of infectious diseases and clinical microbiology consultation forms.
- The kinetics of these biomarkers were evaluated according to the agent micro-organisms in BSI and the appropriateness of antimicrobial therapy.
- Appropriateness of antimicrobial therapy was defined as sensitivity to treatment of the micro-organism agent and no change being made to treatment.
- Success of BSI treatment was determined as mortality or survival.
- The data obtained were transferred onto SPSS software for analysis. Statistical significance was set at  $p < 0.05$ .
- Results were expressed as mean  $\pm$  standard deviation or mean (interquartile range).

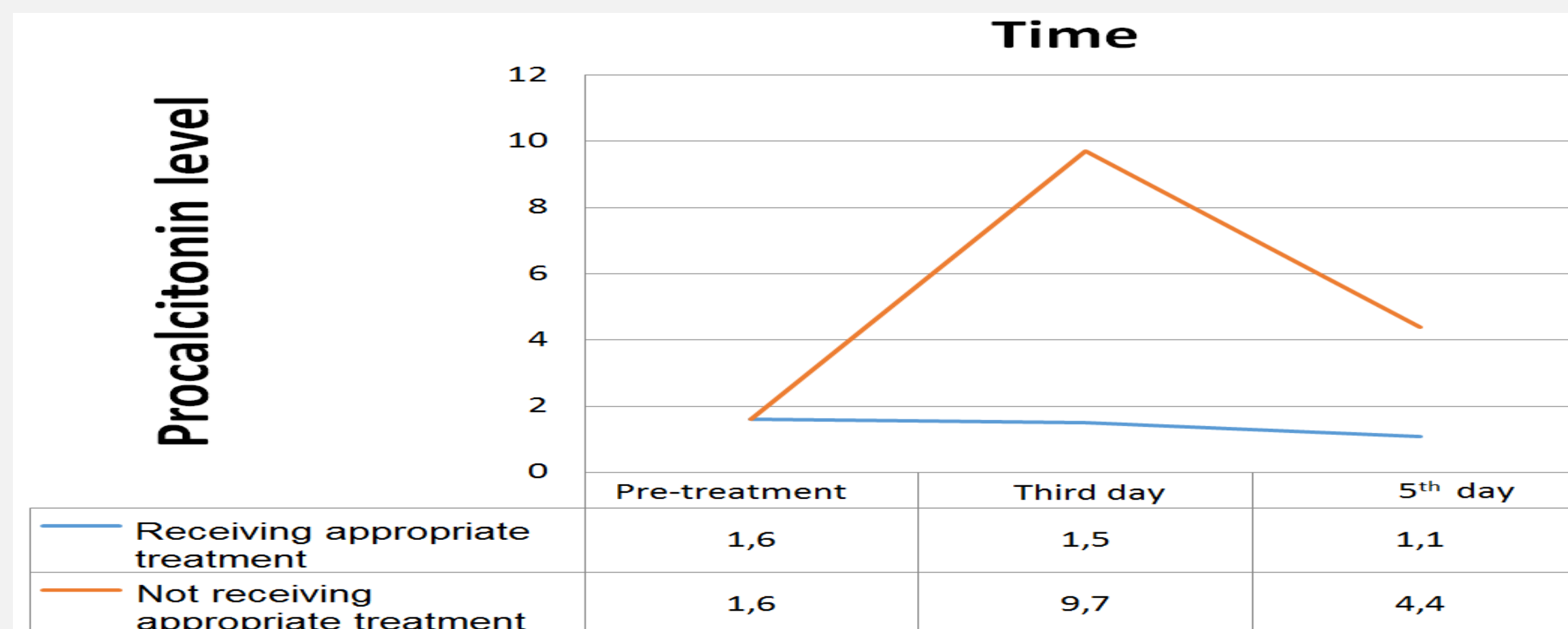
### RESULTS

- 78 patients with BSI were enrolled.
- Mean age of patients was  $47.8 \pm 24.6$  years, and 41% were female.
- Initial antimicrobial therapy was appropriate in 59 patients, and was adjusted due to being inappropriate in 19.
- Pre-treatment PCT levels were 1.6 (0.6-10.5).
- On the third day, PCT levels were 1.5 (0.7-4.5) in patients receiving appropriate treatment and 9.7 (0.8-29.2) in those not receiving appropriate treatment ( $p=0.039$ ).
- On the 5<sup>th</sup> day, PCT levels were 1.1 (0.5-3.2) in patients receiving appropriate treatment and 4.4 (0.6-11.9) in those not receiving appropriate treatment ( $p=0.039$ ).
- Fifth day PCT levels were 3.1 (0.3-7.1) in the event of appropriate modification in patients not receiving appropriate treatment on the third day ( $n=13$ ), and 20.8 (7.9-52.2) in those with inappropriate modification ( $n=6$ ) ( $p=0.003$ ).
- Pre-treatment CRP levels were 14.9(8.2-20.0).
- On the third day, CRP levels were 11.6 (7.0-17.0) in patients receiving appropriate treatment and 13.6 (9.4-22.9) in those not receiving appropriate treatment ( $p=0.314$ ).
- Fifth day CRP levels were 10.0 (5.7-17.4) in patients with appropriate treatment and 9.7 (7.0-18.2) in those with inappropriate treatment ( $p=0.775$ ).
- Fifth-day CRP levels were 8.4(5.2-14.5) in the event of appropriate modification in patients not receiving appropriate treatment on the third day ( $n=13$ ) and 14.7 (7.2-31.9) in those subjects with inappropriate modification ( $n=6$ ) ( $p=0.244$ ).
- The mortality rate was 19.2%.
- Comparison of surviving and non-surviving patients revealed no significant difference in PCT values on days 0 and 3 ( $p > 0.05$ ).
- PCT values decreased with treatment in surviving patients, but increased in those with a mortal course.
- PCT was approximately 1.5 times higher ( $p=0.092$ ) in mortal patients on the third day compared to pre-treatment, and 4 times higher on the fifth day ( $p=0.011$ ). (Graphic1-2)

**Graphic1:** The relationship between treatment response and the level of PCT



**Graphic 2:** The relationship between treatment response and the level of CRP



### CONCLUSION

- Persistence of elevation in PCT values on the third day of treatment suggests a modification of treatment by suggesting that current treatment is inappropriate.
- If elevation in PCT persists on the fifth day despite modification in patients receiving it, this may suggest that the modification is also inappropriate.