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Utility of Procalcitonin in Oncology Patients with Bacteremia

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Aims: Diagnosing bacterial infections in oncology patients is challenging as symptoms are often non-specific. We aim to determine the diagnostic value of procalcitonin (PCT) in early identification of oncology patients with bloodstream infections (BSI).

Methodology: This is a retrospective study of all adult oncology patients with ≥ 1 PCT level done during their hospital admission between January 2013 and December 2014. BSI was defined as any clinically significant bacterial growth in blood cultures taken at symptom presentation or start of antibiotics. We evaluated the median of biomarkers measured at this point, using cutoffs of PCT 0.5mcg/L and CRP 50mg/L as research supports increased likelihood of bacterial infection above these values. Patients were placed in the control group if the physician deemed sepsis unlikely based on clinical and microbiological data.

Result: A total of 258 patients were included - of which 107 had BSI. Baseline PCT levels were significantly higher in those with BSI (2.0mcg/L vs 0.12mcg/L, $p < 0.001$). Of note, 80 (75%) patients with BSI but only 8 (5%) controls had $PCT \geq 0.5$ mcg/L ($p < 0.001$). BSI patients were also more likely to have elevated CRP levels - 64 (75%) had $CRP > 50$ mg/L vs 52 (50%) in patients without infection ($p < 0.001$); median CRP in BSI group was 125mg/L (IQR 50–194) vs 49mg/L (IQR 17–85) in the controls ($p < 0.001$). There was no statistically significant difference in PCT levels by causative pathogen type. In distinguishing BSI from no infection, the area under ROC curve was 0.92 (95% CI 0.88–0.96, $p < 0.001$) for PCT and 0.72 (95% CI 0.64–0.79, $p < 0.001$) for CRP. Optimal cutoffs were PCT 0.28mcg/L, with 87% sensitivity and 81% specificity; and CRP 76mg/L, with 65% sensitivity and 71% specificity. In comparison, PCT 0.5mcg/L had 75% sensitivity and 95% specificity, and CRP 50mg/L showed 75% sensitivity and 51% specificity.

Conclusion: Findings support using PCT over CRP for BSI detection in oncology patients, given its superior specificity.