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The Vitruvian exploration: systematic review of capillary refill time in adult critically ill patients

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Introduction: Capillary refill time (CRT) assessment is pivotal in evaluating peripheral perfusion and circulatory status in adult critically ill patients.⁽¹⁻³⁾ Prolonged CRT serves as an early indicator of compromised tissue perfusion and potential circulatory insufficiency.^(4,5)

Objective: This systematic review synthesizes current evidence on the diagnostic accuracy, prognostic implications, and correlations with lactate levels and mottling scores of CRT in adult critically ill patients.

Methods: A systematic search of PubMed, Scopus, and Cochrane Library databases was conducted for studies published from 2000 to 2023. Inclusion criteria encompassed original research and systematic reviews focusing on CRT in adult critically ill populations. Key search terms included “capillary refill time,” “critical illness,” “shock,” “perfusion assessment,” and related terms. Data extraction included study design, patient demographics, CRT measurement techniques, sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), correlation with lactate levels and mottling scores, clinical outcomes

(e.g., mortality, length of stay), statistical methods (including sensitivity and specificity analysis), and bias risk assessment. **Results:** Twenty studies met inclusion criteria, demonstrating CRT’s reliability in assessing peripheral perfusion in adult critically ill patients. Prolonged CRT consistently correlated with increased mortality rates (pooled odds ratio 2.5, 95%CI=1.8-3.4) and longer hospital stays. Sensitivity analysis showed robust sensitivity (mean 0.78, 95%CI=0.72-0.84) and moderate specificity (mean 0.65, 95%CI=0.58-0.71) for predicting adverse outcomes. Moreover, prolonged CRT exhibited a significant positive correlation with elevated lactate levels (correlation coefficient 0.50, $p<0.001$) and higher mottling scores (correlation coefficient 0.45, $p<0.01$), highlighting its utility in assessing tissue perfusion abnormalities. **Conclusion:** Capillary refill time is a valuable clinical tool for assessing peripheral perfusion and circulatory status in adult critically ill patients. Its simplicity and reliability enable early detection of circulatory compromise and timely intervention. Standardization of CRT measurement protocols and further validation across diverse patient populations are essential to optimize its clinical utility and integrate it into routine critical care practice.

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