Biomarkers in CKRT Discontinuation

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Continuous kidney replacement therapy (CKRT) is essential for critically ill patients with acute kidney injury (AKI), yet determining the optimal timing for CKRT discontinuation remains challenging. Effective biomarkers and clinical indicators are crucial for predicting renal recovery and successful weaning from CKRT. Urine output has emerged as the most consistent predictor, with various studies highlighting thresholds ranging from approximately 400 ml/day to over 1700 ml/day prior to CKRT discontinuation. Despite this variability, pooled data indicate a moderate predictive ability with sensitivity and specificity of approximately 66% and 74%, respectively. However, the predictive value of urine output can be significantly influenced by diuretic use, underscoring the complexity in interpreting this parameter. Renal biomarkers such as cystatin C, neutrophil gelatinase-associated lipocalin (NGAL), IL-18, and osteopontin have also been evaluated, with cystatin C showing promising predictive potential. Studies suggest cystatin C levels ranging from 1.85 to 2.98 mg/L are associated with successful CKRT discontinuation, though clinical heterogeneity and varying measurement times limit their widespread application. Several multivariate models combining clinical variables (e.g., urine output, creatinine clearance, and disease severity scores) have demonstrated superior predictive accuracy, highlighting the importance of integrating multiple clinical and biochemical parameters. Notably, models incorporating kinetic estimated glomerular filtration rate (keGFR) with urine output provide a robust predictive framework. Future research must prioritize validating these biomarkers and multivariate models prospectively and externally, focusing on defining clear thresholds and standardizing measurement protocols. Enhancing our understanding of these biomarkers will significantly improve clinical decision-making, optimize patient outcomes, and reduce CKRT-related complications.