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Diagnostic Dilemmas in Heart Failure and Kidney Disease

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Heart failure (HF) and chronic kidney disease (CKD) are closely linked, with overlapping pathophysiology complicating diagnosis and management. Approximately 55% of patients with HFrEF and HFpEF have CKD stage 3A or higher, contributing to increased mortality. B-type natriuretic peptide (BNP) and NT-proBNP are pivotal biomarkers in HF diagnosis. However, their interpretation in CKD is complex due to altered clearance—BNP primarily undergoes receptor-mediated degradation while NT-proBNP is predominantly cleared by kidney. Elevated levels of these markers in CKD can limit specificity, though they retain a strong negative predictive value. Moreover, comorbidities such as atrial fibrillation and obesity impact natriuretic peptide levels, further complicating interpretation. Echocardiography remains an essential imaging tool, offering critical insights into cardiac function and aiding fluid overload assessment, particularly in HFpEF. Additionally, symptom evaluation, while valuable, requires careful integration with objective measures. Kidney function markers like estimated glomerular filtration rate (eGFR) and urinary albumin-to-creatinine ratio (UACR) are increasingly recognized for their roles in diagnosing, stratifying risk, and guiding therapy in HF patients. UACR not only aids early CKD detection but also provides prognostic information relevant to cardiovascular outcomes. Therapies such as renin-angiotensin system inhibitors (RASi), sodium-glucose cotransporter-2 inhibitors (SGLT2i), glucagon-like peptide-1 receptor agonists (GLP-1RA), and non-steroidal mineralocorticoid receptor antagonists (nsMRA) require careful selection and monitoring based on eGFR and UACR levels. Understanding the dynamic interplay between cardiac and renal biomarkers, along with novel strategies in biomarker use and imaging, holds promise for improving diagnostic accuracy and patient outcomes in this high-risk population.

Keywords: Heart failure, Chronic Kidney Disease, NT-proBNP, Echocardiography, Biomarkers