



Scope of Work

KDIGO Clinical Practice Guideline for the Management of Heart Failure in Chronic Kidney Disease

Background

Chronic kidney disease (CKD) and heart failure (HF) are common and frequently coexist due to shared risk factors, and pathophysiological sequences with one condition often leading to the onset of the other. Each individually, and in combination, increase the risk of adverse patient outcomes. Indeed, CKD is associated with an increased risk of cardiovascular disease and in particular HF. Vice versa, CKD is one of the most prevalent comorbidities in HF, frequently complicating its management and negatively impacting outcomes. The combination of both CKD and HF results in additional challenges in monitoring and diagnosis, in the implementation of current therapies (weighing benefits versus harm), and requires a well-considered, multidisciplinary approach emphasizing shared decision-making that also includes patients and their families. Finally, following the recent increased recognition of the cardiovascular-kidney-metabolic syndrome (CKM) syndrome and rapidly evolving therapeutic landscape, systematic guidance outlining the available data on CKD and HF is relevant, timely, and much needed.

In 2024, KDIGO convened a Controversies Conference on Kidney Disease and Heart Failure where recent advances and current challenges were discussed. Following the findings from this conference, and given the recent developments for overlapping evidence-based therapies in CKD and HF, the decision to develop a KDIGO guideline on the management of HF in CKD was made, convening a multidisciplinary group of nephrologists, cardiologists, caregivers, and people with lived experience.

The goal of this guideline is to provide a useful resource for healthcare professionals across disciplines, in particular nephrology and cardiology, by providing actionable recommendations based on extensive formal systematic literature review, practice points, and figures that provide an overview of concepts and evidence. Additionally, through gaps in knowledge, research recommendations and current uncertainties in evidence will be formulated. This guideline will be designed to apply



to people with a primary diagnosis of CKD and subsequent HF, as well as vice versa. Particular focus will be given to challenges associated with the combination of both disease entities as well as people with either advanced CKD (including those on kidney replacement therapy) and/or advanced HF. Finally, where applicable, specific considerations with regards to shared decision-making, individualized considerations, as well as barriers for implementation in the real world will be discussed. This will include direct input from patient partners throughout guideline development, ensuring recommendations reflect lived experience, cultural contexts, and care preferences.

Chapter Outline

Chapter 1. Epidemiology and pathophysiology

1.1. Nomenclature of kidney disease and HF

- What are the definitions of HF with reduced (HFrEF), preserved (HFpEF), mildly reduced (HFmrEF), and decompensated HF?
- What are the definitions of AKI, CKD, and worsened renal function (WRF)
 - Acknowledge/define heterogeneity and limitation of current nomenclature.

1.2. Incidence and prevalence of HF in CKD and CKD in HF

- What is the incidence and prevalence of HF in CKD?
 - What is the incidence and prevalence of HF and HF subtypes in people across different CKD stages?
- What is the incidence and prevalence of CKD in HF?
 - What is the incidence and prevalence of albuminuria in HF?
 - What is the trajectory of kidney function over time in HF?

1.3. Overview of postulated mechanisms and risk factors linking HF and CKD

- What are mechanisms and risk factors that link HF and CKD?
- What are mechanisms and risk factors for HF that are unique in CKD?

Chapter 2. Case-finding, diagnosis, and prognosis

2.1 Case-finding and diagnosis of HF in people with kidney disease

- What are the recommended tests to detect subclinical and clinical HF in people with kidney disease?
 - Do these differ across stages of CKD?
 - Include discussion on each of the following, including the pros and cons:
 - symptoms scores,
 - cardiac biomarkers,
 - imaging (echocardiogram, right heart catheterization)
- How can current staging systems be applied to this population, including the KDIGO CKD staging system and the American Heart Association (AHA)/American College of Cardiology (ACC) staging system?

- How can diagnostic information and risk scores be communicated in patient-friendly ways to support shared decision-making?
- 2.2 Case-finding and diagnosis of CKD/AKI in people with HF
- What is the best measure of kidney function for diagnosis and prognosis (e.g., serum creatinine [SCr], cystatin C, estimated glomerular filtration rate [eGFR], measured GFR [mGFR], urine albumin-to-creatinine ratio [ACR], urine tubular markers) in HF, both in the acute and ambulatory setting?
 - What is the best method of kidney function assessment/screening in the decompensated HF?
 - How can diagnostic information and risk scores be communicated in patient-friendly ways to support shared decision-making?
- 2.3 Screening for kidney disease in people with HF
- Should people with HF be screened for kidney disease?
 - What is the population attributable risk (considering cost-effective approaches to screening and implementation)?
 - If so, who, when and how, including what test and what setting (e.g., home or hospital)?
 - How can diagnostic information and risk scores be communicated in patient-friendly ways to support shared decision-making?
- 2.4 Risks for poor clinical outcomes in HF and CKD
- What are the key clinical outcomes in people with HF and CKD (e.g., mortality, kidney failure, cardiovascular disease [CVD], major adverse kidney event [MAKE], major adverse cardiovascular events [MACE+], death, hospitalizations)?
 - What are alternative kidney endpoints (eGFR slope, urine ACR change)?
 - What are the important patient-reported outcomes in people with HF and CKD (e.g., Standardised Outcomes in Nephrology [SONG], Kansas City Cardiomyopathy Questionnaire [KCCQ], Patient-Reported Outcomes Measurement Information System [PROMIS] measures, caregiver burden)?
- 2.5 Risk equations to prognosticate outcomes in people with HF (both chronic and decompensated settings) and CKD

- Which models are available to predict incident CKD in HF populations and HF in CKD populations (e.g., include measures of eGFR and urine ACR)?
 - Which have been externally validated?
 - What are the most accurate models?
 - What is the methodological quality of these models?
- In those with prevalent HF, are there models available to predict HF clinical outcomes, such as mortality, that include measures of kidney function (eGFR and urine ACR)?
 - Which have been externally validated?
 - What are the most accurate models?
 - What is the methodological quality of these models?

Chapter 3. Pharmacological treatment (guideline-directed medical therapy [GDMT] + others) for chronic HF Pharmacological therapies (GDMT + others including angiotensin-converting enzyme inhibitors [ACEi]/angiotensin II receptor blocker [ARB], sodium bicarbonate) in people with CKD not requiring dialysis and HF

- What pharmacologic therapies have the best efficacy and safety profile to improve outcomes (mortality, CVD, HF, and kidney) in people with CKD not receiving dialysis and HF?
 - What are the differences in approaches for HFpEF/HFmrEF versus HFrEF?
 - How can adverse events of GDMT + others be mitigated (e.g., potassium binders)?
 - What combinations of therapies are most effective?

3.2 Pharmacological therapies (GDMT + others) in people with CKD requiring dialysis/kidney failure and HF

- What pharmacologic therapies have the best efficacy and safety profile to improve outcomes (mortality, CVD) in people with kidney failure and HF?
 - What are the differences in approaches for HFpEF/HFmrEF versus HFrEF?
 - What adverse effects are unique in this population?
 - What combinations of therapies are most effective?
 - Does dialysis therapy itself affect the efficacy, safety, and timing of the medication?

- Include discussion on modalities and dialysis prescription

3.3 Considerations related to available therapies

- What changes in kidney function can be expected with initiation/up-titration of GDMT?
 - What are thresholds for changes/declines in kidney function where effectiveness and/or safety of therapy is unsure/unknown?
 - What are thresholds for changes in kidney function that are associated with worse outcomes?
 - How do patients perceive the balance of benefits and risks?

Chapter 4. Management of acute decompensated (ADHF) or worsening HF and kidney failure requiring dialysis/CKD not requiring dialysis/AKI

- What pharmacological management should be used in people with ADHF and kidney disease?
 - How does the approach differ with kidney failure versus CKD not requiring dialysis versus AKI?
 - What are differences in efficacy and safety of pharmacological management in this population versus the general ADHF population?
 - Loop diuretics
 - Combination diuretic therapy
 - Vasodilators/inotropes
 - GDMT (renin-angiotensin system inhibitors [RASi], mineralocorticoid receptor antagonists [MRA], beta blockers, sodium-glucose cotransporter-2 inhibitors [SGLT2i], and others)
- What is the best approach (including diagnostic test and timing) to guide decongestive therapy in people with ADHF and kidney disease?
 - Weight/urine output/urinary sodium/natriuresis
 - Echo parameters, point-of-care ultrasound [POCUS], invasive hemodynamic measures, etc.
- What is the evidence to support nonpharmacological therapy for treatment of ADHF in people with kidney disease?
 - Ultrafiltration, peritoneal dialysis

- Novel interventions, such as Fluid Management of Acute Decompensated Heart Failure With Relieve Decongestion Management System (FASTR) device
- What are expected changes in kidney function (and how best to measure these changes) during treatment for ADHF?
 - What degree of change is associated with poor outcomes?
 - What degree of change should prompt dose deescalation, discontinuation, or consideration of kidney replacement therapy?
- What are therapies to support treatment of worsening HF at home in people with CKD?
- How should diuretics be used after decompensation?
- How to manage GDMT during and after decompensation?

Chapter 5. Invasive treatment for acute and chronic HF

- What evidence supports use of the following interventional treatments for HF in people with CKD and kidney failure, considering both efficacy and safety?
 - What is the efficacy and safety (quality of life [QoL], effect on valvular dysfunction, HF events, complications) profile of valvular interventions for HFrEF and HFpEF/HFmrEF have in people with HF and concomitant CKD?
 - Mitraclip
 - Triclip
 - Transcatheter aortic valve replacement (TAVR)
 - What treatment of brady- and tachyarrhythmias for HFrEF and HFpEF/HFmrEF have efficacy and safety (QoL, mortality, HF events, complications) profiles in people with HF and concomitant CKD?
 - Cardiac resynchronization therapy (CRT)
 - Implantable Cardioverter-Defibrillator (ICD)
 - Ablation
 - Pacing – chronotropic incompetence
 - What congestion monitoring strategies for HFrEF and HFpEF have efficacy and safety (QoL, HF events, complications) profiles in people with HF and concomitant CKD?
 - Cardiomeems

- Novel devices such as cordella, implantable inferior vena cava management system

Chapter 6. Lifestyle interventions for acute and chronic HF in people with kidney disease

- How effective are nonpharmacological, noninterventional therapies in improving outcomes in people with acute and chronic HF and kidney disease?
 - Sodium intake
 - Fluid intake
 - Exercise
- How can patients and caregivers be supported to adopt these interventions sustainably?
 - What are barriers (e.g., cost, fatigue, access)?

Chapter 7. Management of advanced HF in people with kidney disease

7.1 Screening for advanced HF

- How should people with HF and kidney disease be assessed for potential eligibility for advanced HF therapies?
- What assessments can be performed to determine kidney function (and reversibility) in this population?

7.2 Therapies for advanced HF

- How does the consideration of advanced HF therapies differ in the presence of CKD not requiring dialysis and kidney failure including the following below?
 - Short-term mechanical support (impella, extracorporeal life support [ECLS])
 - Long-term mechanical support (LVAD)
 - Heart transplant
 - Combined heart/kidney transplant
- What are the possible benefits versus risks of each of these therapies?
 - What are the effects on short- and long-term kidney and HF outcomes as well as survival?

Chapter 8. Special populations of people with kidney disease and HF



- What data are available to understand the epidemiology and management of HF and CKD in children/adolescents?
- What data are available to guide diagnosis and management of HF and CKD in older adults, including consideration of frailty and sarcopenia, cognitive function, polypharmacy, goals of care; and sex/gender differences in therapeutics risk and benefits?
- What are the data for HF management in kidney transplant recipients?
- How does the therapeutic approach differ across geography, considering low- and middle-resource settings?

Chapter 9. Optimal models of care, self-management, and shared decision-making

- Are there examples of successful interdisciplinary models of combined HF/kidney care?
 - What are the barriers and facilitators of implementing such models across different care settings for different populations?
- What are the available self-management tools and their role in HF/kidney care?
 - Include focus on practical patient tools, symptom diaries, decision aids, educational materials, to link the science to everyday care.
- What are the best approaches for shared decision-making with patients and caregivers in acute and ambulatory HF/kidney care?