



KDIGO Controversies Conference on CKD & Arrhythmias

- Breakout Group Discussion Questions -

GROUP 1. Epidemiology of Atrial Fibrillation (AF) and Stroke in Kidney Disease

- What is the global disease burden of AF, stroke and CKD? What is the overlap among them?
- What are the risks for, and what is the significance of developing a new AF or a stroke in the presence of CKD?
- What is the significance of developing CKD in the presence of established AF or stroke?
- Are there interactions between these conditions? For example, does AF or stroke cause CKD incidence/progression? Does CKD increase stroke occurrence/recurrence? Do they exacerbate other adverse outcomes (death)?
- Should screening for AF be performed in patients with CKD? How do prior and ongoing AF screening studies apply to patients with CKD? What is the best method of screening? (e.g., opportunistic, short- and long-term non-invasive ECG monitoring, implantable loop recorder, mobile app).
- Should stroke risk scores be estimated in patients with CKD to guide therapy? Do existing risk scores apply to patients with CKD? What is the best risk score to assess in these patients?

GROUP 2. Stroke Prevention in Atrial Fibrillation and CKD

Pathogenesis of AF in CKD

- What is the relation between AF and cardioembolic stroke in CKD? Is it causal or a marker of vascular risk/non-embolic stroke risk?

Assessment of trade-offs regarding anticoagulation

- CKD increases both risk of ischemic stroke in AF and risk of major bleeding (and intracranial hemorrhage) with oral anticoagulation. Is risk stratification for



thromboprophylaxis in AF different for CKD populations (i.e., do CHA₂DS₂-VASc and the various bleeding scores apply)?

Thromboprophylaxis

- What are the stroke prevention options in CKD 3/4 vs CKD 5D patients? What is the state of evidence in clinical trials for stroke prevention with direct oral anticoagulants in CKD and ESRD?
- How should clinicians choose among the various options: warfarin, direct oral anticoagulants, and left atrial appendage occlusion among CKD patients?

Special factors in CKD

- Since albuminuria is a risk factor for stroke in CKD populations, how does it affect the benefits and risks of antithrombotic therapies for AF?
- How does erythropoietin therapy interact with antithrombotic therapy for AF?

Pharmacokinetics of anticoagulants

- What are the implications for perioperative management of anticoagulation in patients with CKD?
- What are the implications regarding reversal?
- How can we address safety signals regarding anticoagulation with novel oral anticoagulants (NOACs) among CKD patients? Data on NOACs vs warfarin in CKD?

Future directions

- What are the important evidence gaps and what do the ongoing trials address?
- What are most important endpoints for trials in patients with AF and CKD?

GROUP 3. Risk Prediction and Prevention of Sudden Cardiac Death (SCD) in CKD

- What are the incidence and etiologies of SCD in CKD and ESRD populations?
- What are the CKD-related risk factors for SCD? (e.g., electrolytes, autonomic imbalance, left ventricular hypertrophy and fibrosis, atherosclerosis, endothelial dysfunction, acidosis, uremia, etc.)
- What are the roles of cardiac biomarkers (e.g., troponins) as risk predictors for SCD?



- What is the prognostic significance of incidentally detected arrhythmias in CKD and ESRD? (e.g., non-sustained ventricular tachycardia, premature ventricular complexes, bradyarrhythmias)
- What is the prognostic significance of syncope and the appropriate work-up?
- Balancing risk of SCD and competing risks in ESRD: What is the role of ICDs for primary prevention and secondary prevention of SCD in ESRD?
- What are the treatment options for primary prevention of SCD with implantable defibrillators in CKD and ESRD? (Discuss transvenous ICDs, subcutaneous ICDs, and wearable cardioverter defibrillators)

GROUP 4. Potassium Homeostasis and Handling in CKD and Dialysis

- Do electrolyte abnormalities increase risk of cardiovascular or arrhythmic events? In addition to potassium, what is the role of phosphorus in contributing to arrhythmia risk in dialysis patients?
- What is the role and treatment options for potassium homeostasis (particularly hyperkalemia)? How do new treatments for hyperkalemia enable the use of RAAS blockers in patients with CKD or CKD and CVD?
- What is the role of dialysate and dialysis parameters for prevention of arrhythmic events in ESRD?
- Should dialysis patients be monitored via cardiac telemetry during dialysis?
- Does intradialytic hypotension play a role in predisposing patients to cardiac arrhythmias?
- Should there be guidelines regarding dialysis characteristics in patients with arrhythmias?

GROUP 5. Rate versus Rhythm Control in Atrial Fibrillation in CKD

- What is the current evidence regarding rate vs. rhythm control in general? What recommendations are available for the general population?
- What is the specific evidence for rate vs. rhythm control in CKD?
- What are the considerations in deciding on rate versus rhythm control for an initial AF treatment strategy?
- What are the considerations for anti-arrhythmic drug selection in CKD?



Global Action. Local Change.

- What is the role of catheter ablation for AF in CKD and what are the data on its safety and effectiveness?
- How effective is risk factor modification (e.g., weight loss, exercise, sleep apnea treatment) for reduction of AF severity in CKD?