Welcome to the KDIGO Controversies Conference on Central & Peripheral Arterial Diseases in CKD
CVD SERIES OVERVIEW

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Disclosure of Relevant Financial Relationships

• Consultant: AbbVie, Amgen, AstraZeneca, Corvidia, Diamedica, FibroGen, Janssen, NxStage, Pfizer, Relypsa, Sanifit, University of Oxford

• Grant/Research support: Amgen, Bristol-Myers Squibb, NHLBI/NIDDK (NIH), Relypsa, University of British Columbia

• Honoraria: UpToDate

• Stockholder: Boston Scientific, Bristol-Myers Squibb, General Electric, Johnson & Johnson, Merck

• Employer: Hennepin Healthcare
Cardiovascular Disease in CKD Controversies Conferences: A Brief History


• Four breakout groups: CAD/MI; CHF, Cerebrovascular Disease/Stroke/AF and PAD; Sudden Cardiac Death with 80 attendees

• Equal numbers of nephrologists and cardiologists (!), with additional representation of neurologists and other specialties. Each breakout group was co-chaired by a cardiologist and nephrologist; a neurologist was included for stroke.

• Uniquely valuable experience permitting extended conversations between nephrologists and cardiologists

• Pirates of the Caribbean: On Stranger Tides filmed near conference
CARDIOVASCULAR DISEASE IN CKD CONFERENCE
HELD IN LONDON IN 2010
CONFERENCE REPORT PUBLISHED IN KIDNEY INTERNATIONAL (718 CITATIONS AS OF 2/3/20).

TABLE 1: A ROAD MAP

Cardiovascular disease in chronic kidney disease. A clinical update from Kidney Disease: Improving Global Outcomes (KDIGO)

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In October 2010, the KDIGO (Kidney Disease: Improving Global Outcomes) convened a Clinical Update Conference in London, United Kingdom, titled Cardiovascular Disease in CKD. What is it and what can we do about it? The objective was to define the current state of knowledge about cardiovascular disease (CVD) in patients with chronic kidney disease (CKD). This session reviewed the evidence for the presence of CVD in patients with CKD and provided evidence-based guidelines for the management of cardiovascular disease in patients with CKD.

Cardiovascular morbidity and mortality in patients with chronic kidney disease (CKD) is high, and the presence of CKD is a strong risk factor for cardiovascular disease (CVD). The concept of CVD in patients with CKD is associated with specific risk factors, which are emerging evidence indications that the pathogenesis and manifestation of CVD differ in the presence of CKD. During a clinical update conference convened by the Kidney Disease: Improving Global Outcomes (KDIGO), an international group of experts defined the current state of knowledge and the implications for patient care in important topic areas, including coronary artery disease and myocardial infarction, congestive heart failure, cerebrovascular disease, atrial fibrillation, peripheral arterial disease, and sudden cardiac death. Although optimal strategies for prevention, diagnosis, and management of these complications likely should be modified in the presence of CKD, the evidence base for decision making is limited. This report summarizes the evidence and recommendations for the management of cardiovascular disease in patients with CKD.

Cardiovascular disease is one of the leading causes of morbidity and mortality in patients with CKD. The presence of CVD is an important predictor of mortality in patients with CKD, and the management of CVD is critical for improving outcomes.

KEYWORDS: atrial fibrillation, heart failure, myocardial infarction, peripheral arterial disease, stroke, sudden death.
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<tr>
<th>Condition</th>
<th>Knowledge gaps</th>
<th>Research needs</th>
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| Atrial fibrillation | • Risks/benefits of anticoagulation with warfarin for stroke prevention  
• Efficacy, safety of dabigatran in CKD G4  
• Uncertainty regarding validity of the 2005 KDOQI guidelines regarding anticoagulation in dialysis patients with atrial fibrillation | • Randomized clinical trials of warfarin and novel anticoagulants for stroke prevention in CKD G4–G5D patients with atrial fibrillation  
• Interventions to prevent atrial fibrillation: radiofrequency ablation, percutaneous closure of the left-atrial appendage, surgery |
| SCD         | • Standard risk factors derived from the general population may not apply  
• Few autopsy data  
• Dialysis patients excluded from primary and secondary prevention trials | • Disease-specific, large-scale prospective cohort studies for risk stratification  
• Study heterogeneous CKD populations at all stages using all available risk-stratification techniques  
• Remove barriers preventing data linkage to allow for population-wide cohort and case–control studies  
• Randomized trials assessing the spectrum of interventions: β-blockers (such as carvedilol), ICDs, sympathetic ablation  
• Incorporate SCD as specific outcome in registry and clinical trial data. Investigate the potential role of sleep apnea in SCD |

Abbreviations: ACEI, angiotensin-converting enzyme inhibitor; ACS, acute coronary syndrome; ARB, angiotensin receptor blocker; CABG, coronary artery bypass graft surgery; CAD, coronary artery disease; CHF, congestive heart failure; CKD, chronic kidney disease; ICD, implantable cardioverter-defibrillator; KDOQI, Kidney Disease Outcomes Quality Initiative; LDL, low-density lipoprotein; LV, left ventricular; LVH, LV hypertrophy; MI, myocardial infarction; PAD, peripheral arterial disease; PCI, percutaneous coronary intervention; SCD, sudden cardiac death.
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| CAD, MI   | • Screening may be beneficial, but data are insufficient to advocate screening asymptomatic patients  
• Evidence lacking regarding primary and secondary treatment of CAD  
• Cardiovascular trials have frequently excluded CKD patients from enrollment | • Clarify the interdependence of CKD with MI, and its relation to demographic characteristics such as gender  
• Clarify the pathophysiological relationship between development of plaque and subsequent rupture of selected plaques  
• Clarify roles of novel risk factors that are potential therapeutic targets  
• Broad-based validation of current stress and imaging modalities using coronary angiography with fractional flow reserve  
• Adequately powered CKD-specific clinical trials of aspirin, statins, novel anti-lipidemic agents, ACEIs, and ARBs  
• Define the ideal LDL cholesterol level and the role of newer antiplatelet and anticoagulant therapies  
• Randomized clinical trials comparing early invasive with conservative therapy post-ACS, and PCI with CABG |
| CHF       | • Understanding development and prevention of LVH, fibrosis, and LV dysfunction (systolic and diastolic)  
• Benefits of prolonged or quotidian dialysis  
• Absence of CKD-specific data on CHF treatment  
• Impact of sodium balance (intake, dialysate sodium concentration) | • Evaluate asymptomatic LV dysfunction, examine changes in the kidney and cardiac function over time, and incorporate kidney- and cardiac-specific biomarkers  
• Clinical studies to investigate innovative monitoring and management techniques (serial biomarkers, bioimpedance, chronic in vivo monitoring)  
• Evaluate effects of CHF-specific risk-modifying and cardio-protective therapies (ACEIs, ARBs, renin and mineralocorticoid hormone inhibitors)  
• Investigate speculative treatments (vitamin D analogs/ calcimimetics, cytokine-modulating drugs, iron-related treatments, endothelin receptor blockers, regenerative therapies) |
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| Stroke | • High-quality observational data on risk factors, precipitants, etiological subtypes, causes of death, and underlying arteriopathies  
• Risk of carotid artery stenting is undefined  
• Few data on treatment of acute stroke | • Randomized clinical trials testing interventions for secondary prevention of stroke  
• Determine safety of intravenous thrombolysis of CKD G5D patients with acute ischemic stroke |
| PAD | • Few high-quality observational data on risk factors  
• Role of ankle–brachial index vs other diagnostic techniques  
• Prospective data on non-surgical therapies  
• Data regarding percutaneous vs surgical revascularization | • Determine prevalence of preventive foot care  
• Assess regional differences in practice patterns  
• Generate management guidelines  
• Assess amputation frequency in programs that do and do not perform preventive foot care  
• Study bacteriology of diabetic patient feet |

Abbreviations: ACEI, angiotensin-converting enzyme inhibitor; ACS, acute coronary syndrome; ARB, angiotensin receptor blocker; CABG, coronary artery bypass graft surgery; CAD, coronary artery disease; CHF, congestive heart failure; CKD, chronic kidney disease; ICD, implantable cardioverter-defibrillator; KDOQI, Kidney Disease Outcomes Quality Initiative; LDL, low-density lipoprotein; LV, left ventricular; LVH, LV hypertrophy; MI, myocardial infarction; PAD, peripheral arterial disease; PCI, percutaneous coronary intervention; SCD, sudden cardiac death.
Cardiovascular Disease in CKD Controversies Conferences: A Brief History (Volume 2)

• 12/2015: I accept a new invitation from KDIGO to help organize a series of CVD/CKD Controversies Conferences modelled on the London 2010 conference, but each with a narrower focus.

• 1/26/2016: KDIGO Co-Chairs, Profs. Wolfgang Winkelmayer and David Wheeler, KDIGO staff, and I meet in the Tangley Room of the Hilton Paddington in London to plan 4 or 5 CVD/CKD Controversies Conferences spanning the next 3 to 5 years.

• Much of the 2010 London conference would be revisited in the light of new knowledge, with new areas of discussion added----with a broad international representation of the nephrology and cardiology communities.

• The overall conference series was entitled “KDIGO Cardiovascular and CKD Conference Series on the Kidney, Heart, and Vasculature”.

CKD & ARRHYTHMIAS
CONFERENCE
HELD IN BERLIN IN 10/2016

SUDDEN CARDIAC DEATH AND
AF/ANTICOAGULATION HIGHLIGHTED

REPORT PUBLISHED IN THE
EUROPEAN HEART JOURNAL

Chronic kidney disease and arrhythmias: conclusions from a Kidney Disease: Improving Global Outcomes (KDIGO) Controversies Conference

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Accepted: 13 October 2017; revised: 8 December 2017; final version published: 25 January 2018.
Heart failure in chronic kidney disease: conclusions from a Kidney Disease: Improving Global Outcomes (KDIGO) Controversies Conference

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The incidence and prevalence of heart failure (HF) and chronic kidney disease (CKD) are increasing, and as such a better understanding of the interface between both conditions is imperative for developing optimal strategies for their detection, prevention, diagnosis, and management. To this end, Kidney Disease: Improving Global Outcomes (KDIGO) convened an international, multidisciplinary Controversies Conference titled Heart Failure in CKD. Breakout group discussions included (i) HF with preserved ejection fraction (HFpEF) and systolic CKD, (ii) HF with reduced ejection fraction (HFrEF) and non-dialysis CKD, (iii) HFpEF and systolic-dependent CKD, (iv) HFrEF and systolic-dependent CKD, and (v) HF in kidney transplant patients. The questions that formed the basis of discussions are available on the KDIGO website http://kdigo.org/conferences/heart-failure-in-ckd/, and the deliberations from the conference are summarized here.

Heart International (2016) 93, 1104–1137; https://doi.org/10.1111/hin.13064

KEYWORDS cardiovascular disease; chronic kidney disease; congestive heart failure; hemodialysis; transplantation

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Heart failure and CKD independently predict chronic disease epide- mics.1 Both conditions have increasing incidence and prevalence in older age groups as well as persons with hypertension, diabetes mellitus, or other cardiovascular and kidney disease risk factors.2 The presence of one condition appears to accelerate the progression and prognosis of the other; having both conditions increases the risk of hospitalization, rehospitalization, need for intensive care or kidney replacement therapy, and death.3 In addition, patients with HF and CKD may fail to respond as predicted to conventional therapies or experience increased toxicity to them.4,5
Chronic kidney disease (CKD) is a major risk factor for cardiovascular disease (CVD). As well as their high prevalence of traditional CVD risk factors, such as diabetes and hypertension, patients with CKD are also exposed to other non-hormonal, urinary-related cardiovascular disease risk factors, including inflammation, oxidative stress, and abnormal calcium-phosphorus metabolism. CKD and end-stage kidney disease not only increase the risk of CVD, but they also modify clinical presentation and cardiovascular outcomes. Management of CKD is complicated by CKD patients, due to their lack of awareness of complications and potential for site effects during interventions. This summary of the Kidney Disease: Improving Global Outcomes (KDIGO) Controversies Conference on CAD and VHD and the latest developments in understanding the pathophysiology, epidemiology, and treatment of CVD in CKD will address this important clinical issue.

The theme of the conference was divided into two major sections: CKD and VHD. The first section focused on the relationship between CKD and VHD, while the second section covered the management of patients with both conditions. The conference was attended by leading experts in the field, including cardiologists, nephrologists, and other specialists.

The presentations covered a wide range of topics, including the epidemiology of CVD in CKD, the role of inflammation in the development of CVD, and the management of patients with both CKD and VHD.

The conference also featured a panel discussion, in which experts discussed the implications of the latest research and how it could be applied in clinical practice. The panelists highlighted the importance of early detection and management of CVD in CKD patients, and the need for further research to improve outcomes for these patients.

In conclusion, the conference provided a valuable opportunity for experts to share their knowledge and insights on the complex relationship between CKD and VHD. The presentations and discussions will be of great interest to clinicians who work with patients with these conditions, and will contribute to the development of new strategies for managing these patients.

For more information, please visit the KDIGO website at https://www.kdigo.org/and search for the conference proceedings.
KDIGO Central and Peripheral Arterial Disease Conference: Dublin, 2020

- Originally entitled “Non-Coronary Vascular Disease”
- Breakout groups: aortic, cerebrovascular, renovascular, and peripheral arterial disease
- Interventional Radiologists represented (first time) with other specialties

Thanks to everyone attending the “final” KDIGO Cardiovascular and CKD Conference on the Kidney, Heart, and Vasculature. (Let’s work on the road map for the next decade).
**AGENDA AND AIMS**

- Cerebrovascular Atherosclerotic Disease (except intracerebral)
- Aortic Disease (from root to bifurcation)
- Renovascular Disease
- Lower Limb Atherosclerotic Disease

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<th>Pathology</th>
<th>Management (diagnostics and therapy)</th>
<th>Special issues</th>
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<td></td>
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<td>Acute Kidney Injury</td>
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<td>Fibromuscular Dysplasia (FMD)</td>
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The goal of this KDIGO conference is ...

• to determine best practice and summarize areas of uncertainty
• review key relevant literature
• address ongoing controversial issues
• and propose a research agenda to address any gaps in knowledge.
E.G. LOWER LIMB ATHEROSCLEROTIC DISEASE: EPIDEMIOLOGY

Fowkes FG et al. Nat Rev Cardiol. 2016 Nov 17
TYPE AND LOCATION OF PAD

- Predilection of Occlusion

- Upper extremity:
  - Diabetic: 9.4%
  - Non-Diabetic: 11.4%

- Iliac arteries:
  - Diabetic: 3.1%
  - Non-Diabetic: 20.4%

- Fem-pop segment:
  - Diabetic: 18.8%
  - Non-Diabetic: 45.5%

- Tibio-peroneal:
  - Diabetic: 68.7%
  - Non-Diabetic: 22.7%
E.G. LOWER LIMB ATHEROSCLEROTIC DISEASE: INHOSPITAL OUTCOMES

Data from 2009: 483,961 patients. Of those, 132,993 (27.5%) had CKD.

Figure 2. In-hospital mortality among hospitalized patients having peripheral arterial disease (PAD) without and with known chronic kidney disease (CKD).
E.G. LOWER LIMB ATHEROSCLEROTIC DISEASE: LONGTERM OUTCOMES

Data from 2009-2012: 41,882 patients. Of those, 8,470 (20.2%) had CKD.