

GUIDELINES FOR THE MANAGEMENT OF  
**CARDIOVASCULAR DISEASE**  
IN DIALYSIS PATIENTS

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## FOREWORD

The Kenya Renal Association (KRA) is pleased to present this first edition of the Management of Cardiovascular Disease in dialysis guidelines. It provides the user with a road map to appropriate interventions that may be needed when managing dialysis dependent patients presenting with various cardiovascular conditions.

In coming up with these guidelines, various international guidelines, articles in peer reviewed journals, nephrology texts as well as expert opinions were reviewed. The guideline development process involved extensive research and discussion by a guideline development working group of all aspects of the subject matter before arriving at consensus recommendations. These recommendations were then shared electronically with nephrologists countrywide; their input was then considered and adapted if found appropriate. The final document was then prepared.

These guidelines are deliberately simplified to make them easy to use. They are by no means exhaustive and the user must not hesitate to ask for help or consult more detailed cardiology or nephrology texts if they encounter situations not envisioned or well captured in these guidelines. These guidelines will be reviewed periodically as and when significant changes to best practice recommendations occur.

I believe that these guidelines will prove educative and practical to the user and help improve the quality of care offered to the dialysis patient.

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## ABBREVIATIONS AND ACRONYMS

ABI	: Ankle-brachial index
ACE	: Angiotensin converting enzyme
ACLS	: Advanced cardiac life support
ARB	: Angiotensin receptor blockers
CCB	: Calcium channel blockers
CHF	: Congestive heart failure
CKD	: Chronic kidney disease
CK-MB	: Creatine kinase isoenzyme MB
CVD	: Cardiovascular Disease
DM	: Diabetes mellitus
ECG	: Electrocardiogram
HbA1C	: Haemoglobin A1c
HD	: Haemodialysis
LDH	: Lactate dehydrogenase
LVH	: Left ventricular hypertrophy
MI	: Myocardial infarction
PAOD	: Peripheral arterial occlusive disease

### Definition of terms

<b>Intermittent Claudication</b>	Pain during physical activity, which is reproducible within the same muscle groups and ceases with resting.
<b>Ankle brachial index (ABI)</b>	The ratio of systolic blood pressure at the ankle to that in the arm (normal range is 0.9-1.1; <0.9 suggests PAOD).

## INTRODUCTION

The burden of cardiovascular disease (CVD) in chronic kidney disease (CKD) is very high in the haemodialysis (HD) population. The commonest CVDs seen in HD patients include: -

- Ischaemic heart disease
- Ischaemic stroke
- Left ventricular hypertrophy (LVH)
- Congestive heart failure (CHF)
- Peripheral arterial disease (PAD)

Non-traditional CVD risk factors in HD patients include: - volume overload, anaemia, mineral bone disorder, inflammation, oxidative stress.

People with CKD have a higher risk of recurrent myocardial infarction (MI), congestive heart failure (CHF) and sudden cardiac death. Optimal management of modifiable cardiovascular risk factors, such as hypertension and diabetes mellitus (DM) reduces morbidity and mortality.

### Cardiovascular disease risk reduction

Risk reduction strategies in patients on dialysis is the same as in the general population. These strategies include: -

- Cessation of cigarette smoking
- Engaging in regular physical exercises
- Weight reduction to optimal targets
- Reduction of fat intake
- Ensuring optimal diabetes control to HbA1C <7%
- Ensuring optimal blood pressure control to <140/90 mmHg
- Using antiplatelet agents for secondary prevention of ischemic events
- Correction of anemia to individualized targets
- Using statin therapy where recommended (for patients already on statin therapy at the time of starting dialysis, it is suggested that these agents be continued. However, starting statins is not recommended in statin - naïve dialysis patients).

## Acute coronary events

- It is recommended that any suspected acute coronary event be evaluated with a 12 - lead electrocardiogram (ECG) and cardiac enzymes (CK-MB, troponin T/I or lactate dehydrogenase (LDH)).
- It is recommended that dialysis unit staff be conversant with advanced cardiac life support (ACLS).
- It is recommended that acute coronary events be managed as per ACLS guidelines.

## Left ventricular hypertrophy (LVH) and congestive heart failure (CHF)

Left ventricular hypertrophy (LVH) is associated with increases in the incidence of heart failure, ventricular arrhythmias, death following myocardial infarction, decreased left ventricular ejection fraction, sudden cardiac death, aortic root dilation and cerebrovascular events. Left ventricular hypertrophy has a prevalence of approximately 40% in patients with chronic renal insufficiency and rises to about 75% by the time one progresses to ESRD. It may be diagnosed using electrocardiography (ECG) and echocardiography.

Risk factors include: -

- Old age
- Arteriovenous connections
- Diabetes mellitus
- Anaemia
- Abnormally stiff arteries
- Hypertension
- Extracellular fluid volume expansion
- Uremic internal milieu
- Abnormalities of calcium phosphate homeostasis



Management of the modifiable risk factors may retard the development and progression of LVH. Drug classes that have been shown to be associated with LVH regression (and concomitant risk reduction) include: -

- Angiotensin receptor blockers (ARB)
- Angiotensin converting enzyme (ACE) inhibitors
- Some calcium channel blockers (CCB) (including diltiazem, verapamil, amlodipine)

These agents should thus be borne in mind when making drug choices for BP control. Special caution needs to be taken to avoid hyperkalemia when using ARBs and ACEIs.

It is advised that Specialist consultation be sought when managing these patients.

## **CKD and peripheral artery disease**

It is recommended that adults with CKD be regularly examined for signs of peripheral arterial occlusive disease (PAOD). Intermittent claudication is the typical presentation of PAOD. It is suggested that adults with CKD and diabetes undergo regular foot assessment. A useful tool in assessing a patient with claudication is the ankle-brachial index (ABI). It is a non - invasive way of establishing the presence of PAOD and is calculated as the ratio of systolic blood pressure at the ankle to that in the arm (normal range, 0.9-1.1; PAOD, <0.9). Example: If systolic blood pressure at the right ankle is 140 mmHg, and that at the right arm is 130, ABI is  $140\text{mmHg}/130\text{mmHg} = 1.077$ .

The risk factors for PAOD include: -

- Diabetes mellitus
- Hypertension
- Hyperlipidemia
- Family history of PAOD
- Sedentary lifestyle
- Tobacco use
- Chronic kidney disease

Management of these conditions is important in preventing progression of PAOD. The medical management for PAOD should include Antiplatelet agents (e.g., aspirin, clopidogrel). Management of dyslipidemia using statins is important in selected individuals. Revascularization procedures may also be needed. It is recommended that Specialist consultation be sought when managing these patients.

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