Chapter 1

COMPREHENSIVE CARE IN PATIENTS WITH DIABETES AND CKD - RAS BLOCKADE

**KEY CONCEPTS**

 PATIENTS WITH DIABETES AND CKD are at high risk of CKD progression and heart failure. A comprehensive care strategy with RAS blockade is recommended.

* RAS blockade with angiotensin-converting enzyme inhibitors (ACEi) or angiotensin receptor blockers (ARBs) should be initiated in patients with diabetes, hypertension, and an eGFR <60 ml/min/1.73 m².
* Steroidal MRA (e.g., spironolactone) should be considered in patients with CKD and diabetes who also have heart failure, hyperaldosteronism, or refractory hypertension.
* Nonsteroidal mineralocorticoid receptor antagonists (ns-MRA) such as finerenone can be added to RASi and SGLT2i for treatment of T2D and CKD.

**WHAT THE GUIDELINE SAYS:**

**Recommendation 1.2.1:** We recommend that treatment with an angiotensin-converting enzyme inhibitor (ACEi) or an angiotensin receptor blocker (ARB) be initiated in patients with diabetes, hypertension, and an eGFR <60 ml/min/1.73 m². These medications should be titrated to the highest approved dose that is tolerated.

**Recommendation 1.3.1:** We recommend treating patients with type 2 diabetes (T2D), CKD, and an eGFR ≥20 ml/min/1.73 m² with an SGLT2i.

**PRACTICAL APPROACH TO INITIATING SGLT2I IN PATIENTS WITH T2D AND CKD**

* Once an SGLT2i is initiated, it is reasonable to continue an SGLT2i even if the eGFR falls below 60 ml/min/1.73 m².
* A modest drop in eGFR (≤30%) after SGLT2i administration should not prompt discontinuation of therapy. If the eGFR falls below 20 ml/min/1.73 m², the SGLT2i should be stopped.
* The goal for albuminuria is to reduce albuminuria (≥30 mg/g [≥3 mg/mmol]) despite maximum tolerated dose of RASi.

**WHAT THE GUIDELINE SAYS:**

**Recommendation 1.3.2:** We recommend using an SGLT2i to reduce albuminuria (≥30 mg/g [≥3 mg/mmol]) despite maximum tolerated dose of RASi.

**Recommendation 1.5.1:** We recommend that the primary assessment and monitoring of glycemic control should be done using hemoglobin A1c (HbA1c) values and should be done annually.

**WHAT THE GUIDELINE SAYS:**

**Recommendation 2.1.1:** We recommend using hemoglobin A1c (HbA1c) to monitor glycemic control in patients with diabetes and CKD. Monitoring twice per year is reasonable and can be done on an every 3-months (every 4 weeks) basis to keep track of a patient's glycemic control.
Chapter 3

In patients with diabetes and CKD, moderate-intensity physical activity for a cumulative duration of at least 150 minutes per week, or to a level compatible with their cardiovascular and physical tolerance (1D).

It is suggested that patients should engage in at least 150 minutes of moderate-intensity physical activity (4A). If patients are unable to use those medications, we recommend a long-acting GLP-1 RA (1B).

Starting dose should be initiated in patients with T2D and CKD with eGFR ≥30 ml/min/1.73 m². Dose adjustment should be made based on kidney function and needs. When eGFR declines to <60 ml/min/1.73 m², either dose should be reduced. When eGFR declines <30 ml/min/1.73 m², the drug should be stopped.

It is suggested that patients with diabetes and CKD consume <2 g (<80 mg/kg) sodium per day, and <90 mg/kg potassium per day (2C).

Patients with diabetes and CKD are advised to perform moderate-intensity physical activity for a duration of at least 150 minutes per week. Exercise should be encouraged to maintain cardiovascular, physical and mental function.

In patients with diabetes and CKD, nutrition intake should include a diet high in vegetables, fruits, whole grains, fiber, legumes, plant-based sources of protein, and low in sodium, sugar, and saturated fats. Sodium (<2 g/day) and protein (<1.2 g/kg/weight/day) should be monitored.

The treatment algorithm for selecting glucose-lowering therapies for patients with T2D and CKD includes lifestyle therapy, diet therapy, and when needed, drug therapy.

SUGGESTED APPROACH TO ADDRESS PHYSICAL AND CKD IN PATIENTS WITH DIABETES

KEY CONCEPTS

Chapter 4

GLUCOSE-LOWERING THERAPIES IN PATIENTS WITH T2D AND CKD

KEY CONCEPTS

The treatment algorithm for selecting glucose-lowering therapies for patients with T2D and CKD includes lifestyle therapy, diet therapy, and when needed, drug therapy.

Dose adjustment

SGLT2i . Increase monitoring when eGFR <60 ml/min/1.73 m² and consider additional drug therapy as needed for glycemic control.

GLP-1 RA has shown to promote intentional weight loss and may be useful in patients with T2D and CKD (2C).

It is suggested that patients with diabetes and CKD should reduce protein intake to ≤0.8 g/kg body weight per day or <1.5 g protein/kg body weight per day if on dialysis.

Sodium intake should be <2 g per day (2C).

Nutrition intake should include a diet high in vegetables, fruits, whole grains, fiber, legumes, plant-based sources of protein, and low in sodium, sugar, and saturated fats. Sodium (<2 g/day) and protein (<1.2 g/kg/weight/day) should be monitored.

Patients with diabetes and CKD should avoid consumption of tobacco and alcohol (2C).

Recommended interventions for patients with diabetes and CKD include the following: (1) lifestyle therapy; (2) nutrition intake; (3) drug therapy; (4) medication adjustment; (5) self-management education program; (6) patient empowerment.

A structured self-management education program is recommended for the care of people with diabetes and CKD, with contributions paid to local cultural contexts, and availability of resources.

Chapter 5

APPROACHES TO MANAGEMENT OF PATIENTS WITH DIABETES AND CKD

KEY CONCEPTS

A structured self-management education program is recommended for the care of people with diabetes and CKD, with contributions paid to local cultural contexts, and availability of resources.

High objectives of effective diabetes self-management education include:

Chapter 6

2022 DIABETES IN CKD GUIDELINE HIGHLIGHTS

Guideline highlights:

GLP-1 RA:

- GLP-1 RA has shown to promote intentional weight loss and may be useful in patients with T2D and CKD (2C).

- GLP-1 RA should not be combined with DPP-4 (dipeptidyl peptidase-4) inhibitors.

- A long-acting GLP-1 RA is recommended for patients with T2D and CKD who have not achieved glycemic targets despite use of metformin and sulfonylureas. The choice of GLP-1 RA should be based on the individual patient's needs, preferences, and tolerability. Cautions of available GLP-1 RA is provided below.

- GLP-1 RA should be avoided in patients with type 1 diabetes or patients on dialysis.

- GLP-1 RA should be used in patients with T2D and CKD when eGFR ≥20 ml/min/1.73 m².

- For such patients, metformin is a safe, effective, and inexpensive drug to control blood glucose and reduce diabetes complications.

- GLP-1 RA have been shown to be generally well tolerated by patients with diabetes, and results should be interpreted with caution. 1000 mg of GLP-1 RA was administered to patients with T2D and residual albuminuria. They were randomized to receive GLP-1 RA or placebo. The primary endpoint was change from <6.5% to <8.0%.

- Patients with diabetes and CKD who have not achieved individualized glycemic targets despite use of metformin and SGLT2i (2C), should be considered for additional drug therapy as needed for glycemic control.

- If patients still do not meet glycemic targets after lifestyle therapy, nutrition therapy, and metformin and SGLT2i, GLP-1 RA are generally preferred. Other classes of antihyperglycemic agents can be considered based on patient factors and preferences, including:

- Metformin:

- SGLT2i:

- RAS blockade:

- GLP-1 RA:

- DPP-4 inhibitors:

- Sulfonylureas:

- Insulin:

- Sodium-glucose cotransporter 2 inhibitors (SGLT2i):

- Non-glucose-dependent insulinotropic agents (GLP-1 RA):

- Thiazolidinediones (TZDs)

- Biguanides

- Pancreatic beta-cell stimulants

- Multiple risk factors, and structured education in self-management to provide comprehensive care in the context, cultures, and availability of resources. Every healthcare professional making use of these recommendations is responsible for evaluating the resources, and limitations unique to an institution or type of practice. Every healthcare professional making. It is not intended to define a standard of care and should not be interpreted as time of publication. This Guideline is designed to provide information and assist decision-making. A structured self-management education program is recommended for the care of people with diabetes and CKD, with contributions paid to local cultural contexts, and availability of resources.