

# MANAGING PATIENTS WITH DIABETIC KIDNEY DISEASE

## MANAGEMENT OF GLYCEMIA IN CKD<sup>1-4</sup>

Intensive treatment of hyperglycemia can prevent diabetic kidney disease (DKD) and may slow the progression of established CKD.

- The target HbA<sub>1c</sub> for all patients with diabetes, with or without CKD, should be <7%.
- Pharmacologic options for glycemic control are limited in patients with advancing CKD (stages 3 to 5) because drugs excreted even in part by the kidney will accumulate (**Table**).
  - Discontinue or avoid: metformin, most sulfonylureas, nateglinide,  $\alpha$ -glucosidase inhibitors, GLP-1 receptor agonists.
  - Reduce dosage of DPP-4 inhibitors.
  - Glipizide, repaglinide, and TZDs can be used safely (undergo hepatic metabolism and/or clearance).

## BLOOD PRESSURE MANAGEMENT IN CKD<sup>1-4</sup>

Treatment of hypertension slows the progression of CKD by reducing the rate of GFR decline and the time to end-stage renal disease and renal transplantation.

- Target BP in diabetes and CKD stages 1-4 is <130/80 mm Hg.
- Individuals with diabetes and hypertension in CKD stages 1-4 should be treated with an ACE-I or an ARB, usually in combination with a diuretic (**Table**).
- Other agents, such as calcium channel blockers, and  $\beta$ -blockers, may be used to further lower BP in patients already taking an ACE-I or ARB.

## LIPID MANAGEMENT IN CKD<sup>1-4</sup>

- The LDL-C goal should be <100 mg/dL, with a level <70 mg/dL as a therapeutic option (**Table**).
- Statin therapy is recommended for diabetic patients with CKD stages 1 to 4 and an LDL-C >100 mg/dL.
- The NKF advises against statin therapy in patients with type 2 diabetes on maintenance hemodialysis therapy who do not have a specific CV indication for treatment.

## NUTRITIONAL MANAGEMENT IN DIABETES AND CKD<sup>1-4</sup>

- The recommended daily allowance of dietary protein for individuals with diabetes and CKD stages 1 to 4 is 0.8 g/kg body weight.

## REFERENCES

1. National Kidney Foundation. KDOQI Clinical Practice Guidelines for Diabetes and Chronic Kidney Disease. *Am J Kidney Dis*. 2007;49(2 Suppl 2):S1-S180.
2. National Kidney Foundation. KDOQI 2007 Update of Hemoglobin Target. [http://www.kidney.org/professionals/KDOQI/guidelines\\_anemiaUP/index.htm](http://www.kidney.org/professionals/KDOQI/guidelines_anemiaUP/index.htm). Accessed August 30, 2010.
3. Seaquist ER, Ibrahim HN. *J Clin Endocrinol Metab*. 2010;95:3103-3110.
4. American Diabetes Association. *Diabetes Care*. 2010;33(Suppl 1):S11-S61.
5. National Kidney Foundation. KDOQI Clinical Practice Guidelines for Bone Metabolism and Disease. *Am J Kidney Dis*. 2003;42(4 Suppl 3):S1-S206.

**TABLE. MANAGEMENT OF DIABETIC NEPHROPATHY BY STAGE OF RENAL FUNCTION<sup>3,5</sup>**

Stage and Description	GFR (mL/min per 1.73 m <sup>2</sup> BSA)	Management Recommendations	Pharmacologic Recommendations
1: Renal damage with normal or mildly increased GFR	≥90	<ul style="list-style-type: none"> <li>• HbA<sub>1C</sub> goal: ~7%</li> <li>• BP goal: &lt;130/85 mm Hg</li> <li>• LDL goal: &lt;100 mg/dL</li> </ul>	<ul style="list-style-type: none"> <li>• Add ACE-I/ARB if urine microalbumin ≥30 mg/g creatinine</li> </ul>
2: Renal damage with mildly decreased GFR	60-89	<ul style="list-style-type: none"> <li>• Same glucose, BP, and lipid goals as stage 1</li> </ul>	<ul style="list-style-type: none"> <li>• ACE-I/ARB recommended for all patients</li> </ul>
3: Moderately increased GFR	30-59	<ul style="list-style-type: none"> <li>• Same glucose, BP, and lipid goals as stage 1</li> <li>• Refer to nephrology to prepare for impending renal failure if not meeting treatment goals</li> <li>• Monitor for anemia</li> <li>• Monitor for secondary hyperparathyroidism</li> </ul>	<ul style="list-style-type: none"> <li>• ACE-I/ARB recommended for all patients</li> <li>• Discontinue metformin, all sulfonylureas except glipizide, nateglinide, α-glucosidase inhibitors, GLP-1 analogs</li> <li>• Reduce doses of DPP-4 inhibitors</li> <li>• Add erythropoietin if Hgb &lt;9 g/dL</li> <li>• Add ergocalciferol when 1.25-dihydroxyvitamin D is &lt;30 ng/mL or when PTH &gt;2 x ULN</li> </ul>
4: Severely decreased GFR	15-29	<ul style="list-style-type: none"> <li>• Same glucose, BP, and lipid goals as stage 1</li> <li>• Refer to nephrology to prepare for impending renal failure and consideration of shunt placement</li> <li>• Monitor for anemia</li> <li>• Monitor for secondary hyperparathyroidism</li> </ul>	<ul style="list-style-type: none"> <li>• ACE-I/ARB recommended for all patients with careful monitoring of serum potassium</li> <li>• Insulin therapy recommended for most patients</li> <li>• Add erythropoietin if Hgb &lt;9 g/dL</li> <li>• Add ergocalciferol when 1.25-dihydroxyvitamin D is &lt;30 ng/mL or when PTH &gt;2 x ULN</li> </ul>
5: End-stage renal failure	<15 or dialysis	<ul style="list-style-type: none"> <li>• Dialysis or kidney transplantation</li> </ul>	

ACE-I = angiotensin-converting enzyme inhibitor; ADA = American Diabetes Association; albumin-creatinine ratio (ACR); ARB = angiotensin receptor blocker; BSA = body surface area; BP = blood pressure; CKD = chronic kidney disease; CVD = cardiovascular disease; DPP-4 = dipeptidyl peptidase-4; GFR = glomerular filtration rate; GLP-1 = glucagon-like protein-1; HbA<sub>1C</sub> = glycosylated hemoglobin; Hgb = hemoglobin; LDL = low-density lipoprotein cholesterol; NKF = National Kidney Foundation; PTH = parathyroid hormone; TZDs = thiazolidinediones; ULN = upper limits of normal.