

TYPE 2 DIABETES MANAGEMENT

Pre-diabetes Diagnosis

- Fasting glucose: 100-125 mg/dl or
- A1c: 5.7-6.4% or
- 2 hour Oral glucose tolerance test: 140-199 mg/dl

Diabetes Diagnosis

- Fasting glucose \geq 126 mg/dl (on two occasions) or
- A1c \geq 6.5% or
- Random glucose $>$ 200 mg/dl w/ symptoms or
- 2 hour Oral glucose tolerance test \geq 200 mg/dl

“Once type 2 diabetes mellitus is diagnosed, lifestyle management is a cornerstone of clinical care...which includes three components: dietary change that is focused on caloric restriction, increased energy expenditure through increased daily physical activity and regular aerobic activity 3 to 5 days/week, and behavior changes related to lifestyle. .”

Disease monitoring recommendations

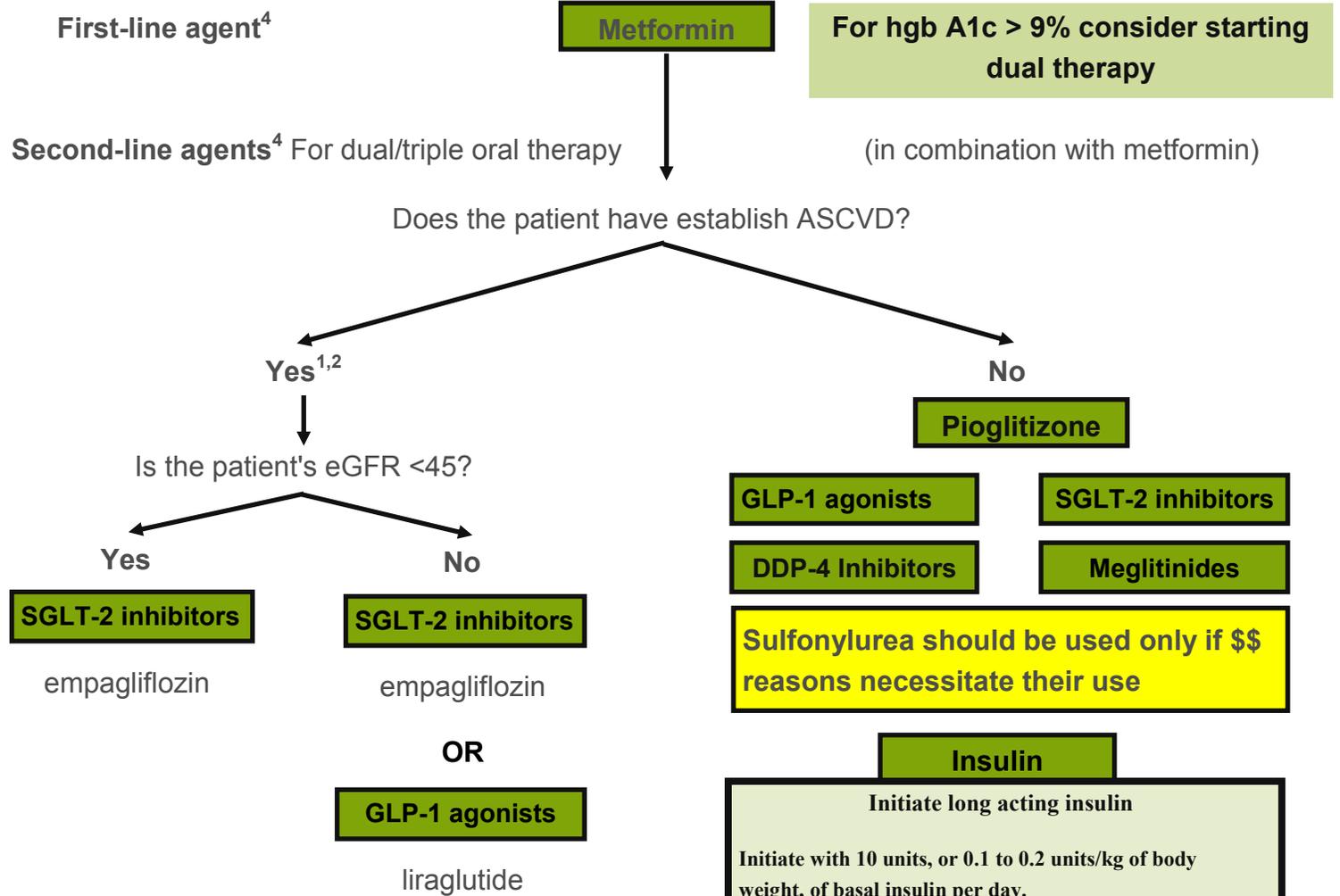
- Hgb A1c: Monitor every 3-6 months depending upon glycemic control
- Lipids: Initially at the time of diagnosis, prn to monitor medication compliance
- Retinal exam: Annually, patients without evidence of retinal disease may be tested every other year at the discretion of the Ophthalmologist.
- Urine micro-albumin and serum creatinine: Annually
- Comprehensive neurovascular foot exam: Annually

Glycemic Control*

- General Goal for non-pregnant adults: Hgb A1c $<$ 7%
 - Pre-prandial glucose 80-130 mg/dL and peak postprandial glucose $<$ 180 mg/dL
- More or less stringent glycemic goals may be appropriate for individual patients. Goals should be individualized based on duration of diabetes, age/life expectancy, comorbid conditions, known CVD or advanced microvascular complications, risk for hypoglycemia, hypoglycemia unawareness, pregnancy and individual patient considerations.
- Lowering A1c by only 1% can reduce the risk of eye, kidney, and nerve damage by 40%. (Centers for Disease Control and Prevention).

* Standards of Medical Care in Diabetes-2018. Diabetes Care 2017;41(suppl.1) S1-S159.

Lifestyle Modification (diet/exercise) is the foundation of Type 2 diabetes management



GLP-1 agonist may be added to basal insulin in lieu of prandial (short acting) insulin, may also be used as an add-on to oral therapy.

Not recommended for use with DDP-4 inhibitors

For hgb A1c >10%, random glucose >300 mg/dl, or symptoms of polyuria, polydipsia or weight loss, consider combination therapy with insulin.

Self-monitoring of Blood Glucose

Encourage periodic SMBG based on the pts. goals, needs and treatment.

Individuals receiving multiple dose insulin or insulin pump therapy to perform SMBG:

- ⇒ Prior to meals and snacks
- ⇒ Occasionally after meals
- ⇒ At bedtime

Glucagon should be prescribed to patients at risk for hypoglycemia

Basal Insulin Titration

(based on minimum of 3 days of blood sugars)

Fasting Blood Glucose	Insulin titration
< 80 mg/dL	Decrease by 4 units
80-129 mg/dL	No change
≥ 130 mg/dL	Increase by 2-4 units

Add short acting insulin (if not at A1c goal)

Start with 4 units or 0.1 unit/Kg before largest meal (titrate to goal of 1 hr post prandial glucose <180 mg/dl). Add to other meals if needed.

Lipid Management²

Medication Management:

⇒ All diabetics age 40-75 with a baseline LDL 70-189=Moderate-intensity statin

- Can consider in diabetic patients ages < 40 or > 75

⇒ All adult diabetics with LDL>190, a history of ASCVD or a 10-year risk >7.5%=High-intensity statin

Moderate-intensity Statins

Atorvastatin 10-20 mg

Rosuvastatin 5-10 mg

Simvastatin 20-40 mg

Pravastatin 40-80 mg

Lovastatin 40 mg

Fluvastatin XL 80 mg

Pitavastatin 2-4 mg

High-intensity Statins

Atorvastatin 40-80 mg

Rosuvastatin 20-40 mg

Hypertriglyceridemia

For patients with fasting triglyceride levels ≥ 500 mg/dL (5.7 mmol/L), evaluate for secondary causes of hypertriglyceridemia and consider medical therapy (fibrates) to reduce the risk of pancreatitis.

Blood Pressure Management⁴

GOAL: <140/90 (<130/80 goal may be appropriate in pts. at high-risk for CVD)

Weight loss and DASH-style dietary pattern

Medications

⇒ First-line options: ACE OR ARB, Ca⁺ channel blocker or thiazide-like diuretic

⇒ Initiate dual therapy if BP >160/100

⇒ ACE or ARB 1st line in diabetic patients with micro-albuminuria or CKD

*serum creatinine/eGFR, K⁺ levels should be monitored in patients on ACE, ARB and/or thiazide diuretic

ACE + ARB combo not recommended

Aspirin Therapy⁴

Low-dose aspirin (75-162 mg/day) is recommended for those with ASCVD and is reasonable for diabetic patients with a 10-year ASCVD risk of at least 10% and without an increased risk of bleeding.

- 1) Zinman B, Wanner C, Lachin JM, et al.; EMPA-REG OUTCOME Investigators. Empagliflozin, cardiovascular outcomes, and mortality in type 2 diabetes. *N Engl J Med* 2015;373:2117-2128
- 2) Marso SP, Daniels GH, Brown-Frandsen K, et al.; LEADER Steering Committee; LEADER Trial Investigators. Liraglutide and cardiovascular outcomes in type 2 diabetes. *N Engl J Med* 2016;375:311-322
- 3) Stone NJ, Robinson J, Lichtenstein AH, Bairey Merz CN, Blum CB, Eckel RH, Goldberg AC, Gordon D, Levy D, Lloyd-Jones DM, McBride P, Schwartz JS, Shero ST, Smith SC Jr, Watson K, Wilson PWF. 2013 ACC/AHA guideline on the treatment of blood cholesterol to reduce atherosclerotic cardiovascular risk in adults: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. *Circulation*. 2013;00:000-000.
- 4) Standards of Medical Care in Diabetes-2018. *Diabetes Care* 2017;41(suppl.1) S1-S159.

Class	Drug	Starting Dose	Generic	Common Side Effects/sub-population benefits	30-day Cost
Biguanides	Metformin	500mg 2x/day OR 850mg 1x/day	X	GI sx, B-12 deficiency, Contraindicated in renal insufficiency GFR <30 mL/min/1.73 m ²	\$4.99
Sulfonylureas	Glipizide XR	2.5mg 1x/day	X	Hypoglycemia, weight gain	\$12.21
	Glimepiride	1-2mg 1x/day	X		\$4.99
	Glyburide	2.5mg 1x/day	X	Glyburide not recommended with CKD	\$13.77
TZD	Rosiglitazone/Avandia	4mg 1x/day		Weight gain, edema, bone fx, heart failure	\$137.00
	Pioglitazone	15mg 1x/day	X		\$14.71
GLP-1	Liraglutide/Saxenda	0.6mg 1x/day		Nausea, and vomiting, (esp. with short acting agents) weight loss, increased heart rate, medullary thyroid cancer	\$1,440.50
	Exenatide/Bydureon	2mg 1x/week			\$839.72
	Albiglutide/Tanzeum	30mg 1x/week		Liraglutide: Consider in pts with cardiovascular disease to reduce mortality.	\$626.40
	Dulaglutide/Trulicity	.75mg 1x/week		Exanatide: Dose adjust in CKD	\$876.24
DPP-4 inhibitors	Sitagliptin/Januvia	100mg 1x/day		Nasopharyngitis, UTI, headache, arthralgia	\$515.52
	Saxagliptin/Onglyza	2.5-5mg 1x/day			\$389.88
	Linagliptin/Tradjenta	5mg 1x/day			\$523.41
	Alogliptin/Nesina	25mg 1x/day			\$234.00
Meglitinides	Repaglinide	0.5 mg 3x/day before meals	X	Hypoglycemia, weight gain	\$51.84
	Nateglinide	120mg 3x/day before meals	X		\$79.38
SGLT-2 inhibitors	Canagliflozin/Invokana	100 mg		UTI, dehydration, euglycemic diabetic ketoacidosis, risk of amputation (canagliflozin)	\$557.49
	Dapagliflozin/Farxiga	5 mg			\$590.88
	Empagliflozin/Jardiance	10 mg		Empagliflozin: Consider in pts with cardiovascular disease to reduce mortality.	\$591.42
	Semaglutide/Ozempic	0.25 mg			\$875.28
	Lixisenatide/Adlyxin	20 mcg			\$744.22

Insulin

Insulin		Onset	Peak effect	Duration of Action	30 day Cost (Vials/Pen)
Insulin Lispro	HumaLOG, Admelog	5-15min	45-75 minutes	2-4 hours	\$329.64/572.85 \$541.01 (pens)
Insulin Aspart	NovaLOG, Fiasp				\$347.23/603.55 \$670.61 (pens)
Insulin Glulisine	Apidra				\$323.89/625.70
Regular	HumuLIN R, NovoLIN R	~30min	2-4 hours	5-8 hours	\$178.44 (vial)
NPH	HumuLIN N, Novolin N	~2 hours	4-12 hours	18-28 hours	\$178.44/565.55
Insulin glargine	Basaglar, Lantus	~2 hours	No peak	20 to >24 hours	\$306.25/391.61
Insulin detemir	Levemir	~2 hours	3-9 hours	6-24hours	\$352.50/447.30
Insulin degludec	Tresiba	~2 hours	No peak	>40 hours	\$581.66 (pen)