

ORAL HYPOGLYCEMIC DRUGS

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A 46-year-old woman with type 2 diabetes mellitus, hypertension, and hyperlipidemia presents for a follow-up appointment. Since her diagnosis of type 2 diabetes 4 years ago, her hemoglobin A1c levels have been in the range of 7 to 8

Her hemoglobin A1c level today is 7.596 despite trying to maintain a strict diet (<100 g carbohydrate per 24 hours), an exercise regimen (moderately intense exercise 30 minutes a day, 6 days a week), and metformin therapy.

Current medications are

metformin, 1000 mg twice daily; lisinopril, 10 mg daily; and atorvastatin, 40 mg daily.

She has no history of significant alcohol or acetaminophen use.

On physical examination, her blood pressure is 128/ 72 mm Hg, pulse rate 50 beats/min. Her height is (165 cm), and weight is (79.5 kg) (BMI = 29 kg/m²). She has skin tags and acanthosis nigricans. No violaceous striae are visible. The rest of the examination findings are normal.

- Lab test :Comprehensive metabolic panel:normal (except for AST and ALT)
- AST = 80 U/L (20-48 U/L), ALT = 25 U/L (10-40 U/L) , γ -Glutamyltransferase = 20 U/L (2 -30 U /L)
- Viral hepatitis screen: negative, Antinuclear antibodies: normal,Albumin = 4.0 g/dL (3.5-5.0 g/dL) ,
- Plt count = 300 ,Estimated GFR = 92 mL/min per 1.73 m² (>60 mL/min per 1.73 m²)
- Alb-to -cr ratio = 14 mg/g cr (<30 mg / g cr)
- Her Fibrosis-4 (FIB-4) score is 2.45. She undergoes liver biopsy, which confirms nonalcoholic steatohepatitis with moderate fibrosis.
- On the basis of this patient's presentation, which of the following medications should be added as the best next step in her management ?
- A. Obeticholic acid
- B. Canagliflozin
- C. Vitamin E
- D. Sitagliptin
- E. Pioglitazone

A 59-year-old man returns for management of type 2 DM , which was diagnosed 15 years ago. He was initially treated with oral agents, but he has been receiving insulin therapy for 5 years. His hemoglobin Alc level has ranged from 7.0% to 9.0% over the past few years, and his most recent hemoglobin Alc measurement was 8.4% . He has a history of CAD and had 2 coronary drug-eluting stents placed 2 years ago. He has chronic kidney disease and macroalbuminuria. Peripheral neuropathy is well controlled with pregabalin. He also has hypertension and hyperlipidemia.

Current medications:

Metformin, 1000 mg twice daily ,Insulin aspart, 20 units before meals (3 times daily),insulin degludec, 40 units at bedtime, Lisinopril, 20 mg daily ,Aspirin, 81 mg daily ,Clopidogrel 75 mg daily, Metoprolol 25 mg twice daily ,Chlorthalidone 25 mg once daily ,Rosuvastatin 20 mg once daily

On physical examination, his blood pressure is 136/82 mm Hg and PR is 74 beats/min. His height is 172.7 cm, and weight is 102.3 kg,BMI = 34 kg/m². He has 1+ pitting edema and 2+ dorsalis pedis pulse in the bilateral lower extremities. His lungs are clear to auscultation, and his heart has a regular rate and rhythm with no audible murmur.

There is decreased sensation to 10-g monofilament testing on the distal plantar aspect of his feet bilaterally.

Laboratory test results:

Electrolytes, normal

Cr = 1.5 mg/dL (0.7-1.3 mg/dL)

Estimated GFR = 50 mL/min per 1.73m²

Hg Alc = 8.4% (4.0%-5.6%)

Albumin-to-creatinine ratio = 520 mg/g cr

- **Which of the following medications should be started as the best next step in this patient's treatment ?**
- A. Exenatide LAR
- B. Aliskiren
- C. Pioglitazone
- D. Canagliflozin
- E. Losartan

A 53-year-old woman with a 13-year history of type 2 diabetes has known chronic kidney disease. Her kidney function has been deteriorating, and at the last clinic visit, metformin was discontinued.

Her glucose concentrations have increased despite adding glimepiride and continuing canagliflozin. She has an estimated GFR of 25 mL/min per 1.73 m².

Which of the following medications/ class of medication used to treat type 2 diabetes mellitus would be

contraindicated in this setting?

- A. Detemir insulin
- B. Exenatide
- C. Pioglitazone
- D. SGLT-2 inhibitors
- E. Sulfonylureas

A 59-year-old man with newly diagnosed type 2 diabetes mellitus presents to you. He has hyperlipidemia and hypertension. He does not smoke cigarettes. He is taking benazepril, 20 mg daily, and atorvastatin, 40 mg daily.

On physical examination, his blood pressure is 128/78 mm Hg, pulse rate is 87 beats/min, BMI is 30.8 kg/m

Laboratory test results:

Hemoglobin A1c = 7.8% (4.0%-5.6%)

Plasma glucose (fasting) - 148 mg/dL (70-99 mg/dL)

Serum creatinine - 1.17 mg/dL (0.7-1.3 mg/dL)

Total cholesterol - 136 mg/dL (<200 mg/dL)

LDL cholesterol - 72 mg/dL (<100 mg/dL)

HDL cholesterol : 40 mg/dL (>60 mg/dL)
Triglycerides : 180 mg/dL (<150 mg/dL)
Urinary alb to-cr ratio: 32mg/g
Basic metabolic panel, normal
CBC:normal

According to the online risk estimator of the American College of Cardiology and the American Heart Association his 10-year calculated cardiovascular disease risk is 14.1 %,

which of the following should be recommended:

- A. Empagliflozin
- B. Liraglutide
- C. Metformin
- D. Sitagliptin

A 46-year-old woman returns for a second opinion regarding her diabetes care. She had gestational diabetes during the last 2 of her 4 pregnancies and was noted to have a BS of 231 mg/dl, 6 years ago (she was asymptomatic at the time).

Initially, metformin was prescribed in combination with lifestyle modifications, and her Hg A1C level subsequently decreased from 8.6% to 6.8%. 2 years ago she lost her health insurance and although she has continued metformin, 1000 mg twice-daily, she has not seen a physician. When she recently obtained new health insurance, she returned to her

Primary care physician who noted her hemoglobin A1C level to be 8.3%. Her medical history is notable for hypertension, seasonal allergies, and recurrent urinary tract infections. Her primary care physician documented normal electrolytes and kidney function and no albuminuria, Retinal photography was interpreted to be unremarkable.

On physical examination, her blood pressure is 126/78 mm Hg and BMI is 30 kg/m².

She has no evidence of peripheral neuropathy

Her primary care physician gave her a prescription for sitagliptin, but the price much higher than she expected.

She is wondering whether this is a good choice for her

- Besides cost, which of the following is the biggest concern with the use of sitagliptin in this patient?
 - A. Increased risk for arthritis
 - B. Increased risk for nasopharyngitis
 - C. Increased risk for nephrotoxicity
 - D. Increased risk for urinary tract infection
 - E. Insufficient potency

A 67-year-old woman presents with questions about new treatments for type 2 DM. Since her diagnosis 6 years ago, she has been treated with a sulfonylurea because of intolerance to metformin. She is now taking glipizide, 10 mg twice daily, and she documents blood glucose values that are generally less than 150 mg/dL with home glucose monitoring.

However, since starting therapy, she has gained (6.8 kg) and is frustrated with her inability to lose weight. Findings on hepatic ultrasonography performed last year were consistent with steatosis.

She recently saw an ad in a magazine touting empagliflozin and is very interested in a "diabetes pill that causes weight loss." She takes hydrochlorothiazide and

Lisinopril for hypertension and atorvastatin for elevated cholesterol. She has no history of diabetes-related complications. On physical examination, her weight is (94.5 kg) (BMI- 35 kg/m²), and blood pressure is 136/84 mm Hg. She has no signs of neuropathy

Laboratory test results

Fbs:166 mg/dL (70-99 mg/dL)

Hemoglobin A1c: 8.4% (4.0%-5.6%)

Triglycerides = 217 me/dl (<150 mg/dL)

LDL cholesterol = 92 mg/aL (<100 mg/dL)

Creatinine : 1.9 mg/dL (0.6-1.1 mg/dL)
Estimated glomerular filtration rate - 38 mL/min
AST - 47 U/L (20-48 U/L)
ALT- 41 U/L (10-40 U/L)
Albumin - 3.9 (3.5-5.0 g/dL)
Calcium - 8.9 mg/dL (8.2-10.2 mg/dL,
Phosphate - 3.7 mg/dl (2.3-4.7 mg/dL)
TSH =2.3 mIU/l (0.5-5.0 mIU/L)
urinary albumin-to-cr ratio - 110 mg/g cr (< 30 mg/g cr)
The patient is eager to start an SGLT-2 inhibitor

In this patient, empagliflozin's main limitation would be that it would.

1. Cause only transient weight loss with weight regain in 1 to 2 months
2. Exacerbate Hepatic steatosis
3. Improve proteinuria but worsen estimated glomerular filtration in the long-term
4. Interfere with the effectiveness of her antihypertensive regimen
5. Not sufficiently decrease blood glucose level

A 48-year-old woman has new-onset type 2 DM. Nonalcoholic steatohepatitis was recently diagnosed after routine testing showed abnormal liver function test.

Subsequent workup, including a liver biopsy, revealed nonalcoholic steatohepatitis with pathologic evidence of steatosis, lobular inflammation, hepatocellular ballooning, and fibrosis. There is no evidence of cirrhosis. Her BMI is 32 kg/m².

Laboratory test results

Hg A1C :8.0% (4.0%-5.6%)

Cr:0.8 mg/dL (0.6-1.1 mg/dL)

ALT - 89 U/L (10-40 U/L)

TSH - 2.5 mIU/L (0.5-5.0 mIU/L)

The hepatologist suggests prescribing an antidiabetic agent that would also improve her liver histology

- Which of the following medications would be the best choice given these concerns?
- A. Dapagliflozin
- B. Dulaglutide
- C. Metformin
- D. Pioglitazone
- E. Sitagliptin