Module 3. Non-Insulin Injectable Diabetes Medications

EDUCATIONAL OBJECTIVES

1. Discuss the role of non-insulin injectable agents for achieving treatment goals in patients with type 2 diabetes;
2. Recognize the hierarchy of non-insulin injectable agents within current treatment recommendations;
3. Define the incretin effect and how it relates to the mechanism of action (MOA) of non-insulin injectable agents;
4. Discuss the MOA, adverse effects, and potential drug interactions associated with the use of non-insulin injectable agents; and

Post-test/Rationale

1. How do glucagon-like peptide-1 receptor agonists work to control blood sugar levels in patients with diabetes?

A. By increasing levels of thyroid hormone
B. By increasing appetite
C. By mimicking incretin hormone activity ***
D. By causing excess sugar in the body to be excreted by the kidneys

Correct answer: C

Rationale (Objective #1): Glucagon-like peptide-1 receptor agonists activate natural glucagon-like peptide-1 receptors and mimic incretin hormone activity.

2. Which non-insulin injectable is dosed once weekly?

A. Liraglutide
B. Pramlintide
C. Dulaglutide***
D. Regular-release exenatide

Correct answer: C

Rationale (Objective #4): Dulaglutide is dosed only once weekly. The other glucagon-like peptide-1 receptor agonists listed are dosed daily.

3. Which of the following adverse effects is common to all non-insulin injectable medications for diabetes?

A. Upper respiratory tract infections
B. Pancreatitis
C. Weight gain
D. Nausea***

Correct answer: D

Rationale (Objective #3): All glucagon-like peptide-1 receptor agonists (GLP-1 RAs) and pramlintide cause nausea. Only GLP-1 RAs are associated with pancreatitis. Only albiglutide is associated with upper respiratory tract infections. All GLP-1 RAs are associated with weight loss.

4. How do incretins help regulate blood glucose?

A. They are released from the gastrointestinal tract and work to slow gastric emptying, promote insulin release, and suppress glucagon release***
B. They are released from the pancreas and they work to slow gastric emptying and suppress glucagon release
C. They are released from the gastrointestinal tract and they work to suppress insulin release and promote glucagon release
D. They are released from the pancreas and they work to suppress insulin release and promote glucagon release

Correct answer: A

Rationale (Objective #4): Incretins are released from the gastrointestinal tract. They bind to incretin receptors to slow gastric emptying, promote insulin release, and suppress glucagon release.

5. The GLP-1 RAs demonstrate a robust A1C reduction of about what percentage?

A. < 1%
B. 1% to 1.5%***
C. 1% to 2.0%
D. > 2.0%

Correct answer: B

Rationale (Objective #1): As a class, the GLP-1 RAs demonstrate a robust A1C reduction of about 1% to 1.5%.

6. The most common side effects associated with GLP-1 RAs are:

A. constipation and euphoria
B. nausea, diarrhea, and headache ***
C. nausea, constipation and rash
D. headache and rash

Correct answer: B
Rationale (Objective #4): The most common side effects associated with GLP-1 RAs are nausea, diarrhea, and headache, commonly experienced early in therapy but subsiding over time. These side effects can usually be reduced by initiating the medication at a low dose and titrating slowly. In addition, nausea may be reduced by eating smaller portions and reducing fat intake.

7. Which non-insulin injectable is indicated for both type 1 and type 2 diabetes?

A. Exenetide  
B. Albiglutide  
C. Liraglutide  
D. Pramlinitide ***

Correct answer: D

Rationale (Objective #2): Pramlinitide, a synthetic form of the hormone amylin, is indicated for both type 1 and type 2 diabetes. The other medications are glucagon-like peptide-1 receptor agonists, which are only indicated for type 2 diabetes.

8. Exenatide is available as:

A. Regular only  
B. Extended-release only  
C. Regular and extended-release***  
D. Exenatide is not currently on the market

Correct answer: C

Rationale (Objective #2): Exenatide is available in 2 formulations: regular (Byetta) and extended-release (Bydureon). The regular-release formulation is available as a fixed-dose prefilled pen device in two doses: 5 mcg and 10 mcg. Each pen contains 60 doses. The initiation dose is 5 mcg twice daily, to be injected 30 to 60 minutes prior to a meal. After 1 month of therapy the dose may be increased to 10 mcg twice daily as necessary and as tolerated.

Two extended-release formulations of exenatide are currently marketed, differing primarily in administration device. The original formulation, Bydureon, is available both as a single-dose, 2 mg vial requiring reconstitution with the supplied diluent and as a single-dose, prefilled pen-injector.

9. Liraglutide has been shown to reduce A1C by about what percentage?

A. >1.5%  
B. 3%  
C. 2%  
D. 1%***
Correct answer: D

Rationale (Objective #2): Liraglutide has been shown to reduce A1C by about 1%

10. How can non-insulin injectable agents such as exenatide cause potential drug interactions?

A. By slowing gastric emptying ***
B. By causing injection site reactions
C. By increasing blood sugar levels
D. By decreasing thyroid hormone secretion

Correct answer: A

Rationale (Objective #4): Many non-insulin injectable agents slow gastric emptying and, therefore, can potentially alter the absorption of other drug products.