CLINICAL VIGNETTE

Accidental Semaglutide Overdose

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Case Presentation

A 42-year-old female with a history of depression presented to the emergency room with nausea. She reported purchasing semaglutide online from a peptide store without a prescription for weight loss. She reconstituted the full 5 mg and injected it subcutaneously in her abdominal area and then noticed the recommended dose was 0.25 mg. Two hours later, she developed nausea, vomiting, lightheadedness, blurred vision, and diaphoresis. She denied facial swelling, rash and suicidal ideation. There was no history of diabetes. Her home medications were sertraline, bupropion, and lamotrigine. She denied taking any other weight loss drugs. She smoked one cigarette per day, consumed two alcoholic drinks per day, and had history of methamphetamine abuse but no use in over a year. She continued to have nausea and vomiting with inability to tolerate PO intake, and presented to the emergency room.

The patient's initial vital signs were temperature 36.7°C, heart rate 76 beats per minute, blood pressure 120/66 mm Hg, respiratory rate of 16, and room air oxygen saturation of 100%. Weight was 54.4 kg and BMI was 18.25 kg/m^2. On physical examination, her abdomen was soft, nondistended, and nontender to palpation. Laboratories included a normal basic metabolic panel (BMP), complete blood count (CBC), liver function tests (LFTs), amylase, and lipase. Her initial blood glucose was 91 mg/dL.

Toxicology was consulted and blood glucoses were monitored every two hours and ranged from 79 to 105 mg/dL. She did not require any dextrose infusions. She was given ondansetron, metoclopramide, and trimethobenzamide as needed for nausea. By hospital day two, she was tolerating oral intake and was discharged home.

Discussion

Glucagon-like peptide-1 receptor agonists (GLP-1RAs) mimic the GLP-1 hormone that is released in the gut in response to eating, leading to insulin secretion, slowed gastric emptying, and reduced appetite. Semaglutide, a GLP-1RA with an extended half-life of approximately one week, was initially approved by the Food and Drug Administration (FDA) in December 2017 for the treatment of T2DM in adults under the brand name Ozempic.[1] In June 2021, the FDA approved semaglutide for long-term weight management in obese adults with a BMI above 30 kg/m^2 or overweight adults with a BMI above 27 kg/m^2 with obesity-related complications under the brand name Wegovy, the second GLP-1RA to be approved for weight loss after liraglutide.[2] The popularity of semaglutide has soared over the past year from social media influencers and advertisers, leading to shortages of Wegovy and Ozempic. Price is another concern. Most insurance plans do not cover semaglutide for weight loss, and it can cost more than $1350 a month. This has led to many buying unregulated generic or compounded versions of semaglutide online without a prescription, which can lead to adverse events.

The most common side effects in patients taking GLP-1RAs are gastrointestinal. Nausea, vomiting and diarrhea are most commonly reported, with respective incidences of 15–30%, 5-10% and 10–15%, and 5–10%.[3] These symptoms are transient, mild to moderate in severity, and occur during initiation and uptitration. Higher doses are associated with more frequent and more severe GI side effects. The risk of hypoglycemia with therapeutic doses is low, as studies have shown no increase in hypoglycemic events with semaglutide compared to placebo but do show an increased risk of hypoglycemia when combined with sulfonylurea or insulin therapy.[4] The data for semaglutide overdose is limited, so experts recommend monitoring for GI symptoms and hypoglycemia with close observation in the hospital setting if symptoms are severe. The starting dose of Ozempic is 0.25 mg once weekly to reduce GI side effects and is gradually uptitrated to 2.4 mg once weekly if tolerated. This patient received a dose twenty times higher than the recommended starting dose with significant but transient GI side effects but no hypoglycemia.

The treatment of semaglutide overdose is supportives.[5] The time to max concentration of semaglutide can be up to one to three days. Given its long half-life, GI side effects and hypoglycemia can persist for up to a week. This patient had blood glucose levels checked every two hours without evidence of hypoglycemia. Her nausea was controlled with antiemetics. When her symptoms improved and she could tolerate a diet, she was safely discharged home.

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