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DON'T PLAY WITH YOUR NODULE: CASE REPORT OF TACHYCARDIA AND OTHER ADVERSE REACTIONS FROM MANIPULATION OF AN EXENATIDE INJECTION SITE NODULE

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Abstract—Background: Type II diabetes mellitus (DM) is an increasingly prevalent cause of morbidity and mortality among U.S. adults, with increasing prevalence in emergency department (ED) visits. Multiple medications, such as exenatide, a glucagon-like peptide-1 agonist, have been developed in the past decade to combat this growing problem. This medication is well documented to cause gastrointestinal upset and skin nodules at the injection site. However, currently no documented cases exist regarding manipulation of injection nodules causing increased absorption or reports demonstrating an increase in adverse drug reactions. **Case Report:** We report an interesting case of an adult male patient who likely experienced increased systemic absorption of exenatide by manipulating an injection nodule, which ultimately resulted in nausea, retching, diarrhea, and a tachycardic heart rate of 130–140 beats/min. These symptoms are known side effects of exenatide. **Why Should an Emergency Physician Be Aware of This?:** Given the high frequency of DM patients presenting to the ED, emergency physicians should be familiar with diabetic maintenance medications and their adverse reactions. Treating these side effects and properly educating patients can alleviate discomfort, prevent future adverse reactions, and decrease return visits to the ED. © 2018 Elsevier Inc. All rights reserved.

Keywords—Bydureon®; Byetta®; exenatide; GLP-1 agonists; tachycardia; nodule; adverse reaction; nausea; gastrointestinal

INTRODUCTION

Type II diabetes mellitus (DM) is an increasingly prevalent cause of morbidity and mortality among U.S. adults, with an estimated 29 million Americans currently living with diabetes (1). Unfortunately, these estimates are growing annually, and emergency department (ED) visits are likely to increase as well (2,3). For every 100 diabetic patients, there is an average of 56 ED visits per year (4). In 2010, there were 12.1 million encounters—9.4% of all ED visits—in which diabetes was listed as a diagnosis or chronic medical condition (3).

The well-established sequelae of long-term uncontrolled diabetes continue to be a primary concern and burden in health care. The risk of cardiovascular disease itself is two to four times greater, and remains the leading cause of death in American adults with diabetes (5). The American Diabetes Association recognizes multiple medications and treatment regimens, and recent data suggest that diabetic agents are a leading cause of adverse drug reactions seen in the ED, primarily in older adults, making it imperative for emergency physicians to be knowledgeable on treatment regimens and adverse drug reactions in patients with diabetes (6,7).

CASE PRESENTATION

A 50-year-old white man presented to the ED for palpitations. He reported that he had been watching television at home and squeezing a nodule on his thigh, trying to express the contents for about an hour, when he began to feel palpitations associated with nausea, dry-heaving, diarrhea, mild dull diffuse chest discomfort, and lightheadedness. He denied exercise and unusual food or caffeine consumption that morning. He denied fever, headache, breathing difficulty, or abdominal pain. The patient stated he had self-discontinued exenatide for treatment of his diabetes 1–2 weeks prior due to recurrent nausea, diarrhea, and abdominal pain, as well as the formation of injection site nodules. His medical history consisted of Type II DM, hypertension, hyperlipidemia, and renal calculi. His only past surgery was a tonsillectomy. His medications included atorvastatin, lisinopril, sitagliptin, metformin, and aspirin. He denied tobacco, alcohol and drug use, including cocaine, and had no known allergies.

On examination, the patient appeared slightly anxious, but in no acute distress. Vital signs were as follows: blood pressure of 163/93 mm Hg, heart rate of 137 beats/min, respiratory rate of 16 breaths/min, oxygen saturation at 97% on room air, and a temperature of 37°C. The patient's lung expansion was symmetrical, and clear to auscultation. Tachycardia was present, with a regular rhythm without murmurs, rubs, or gallops. Lower extremities lacked edema and calf tenderness. Multiple 0.5 to 1.5-cm raised nodules were present on the anterior thighs bilaterally. These nodules lacked tenderness, fluctuance, and erythema, except for the erythematous, tender nodule on the patient's left thigh that he had been manipulating.

Initial electrocardiogram demonstrated sinus tachycardia at a rate of 133 beats/min (Figure 1) and minimal ST-segment depression in II, III, and aVF. Laboratory analysis, including complete blood count, renal function, electrolytes, urinalysis, liver enzymes, thyroid studies, lipase, troponin, and D-dimer were all within normal limits, except his blood glucose level was 180 mg/dL. A portable chest X-ray study was negative for effusions, pneumothorax, pneumonia, or cardiomegaly. Bedside ultrasound imaging of the nodules revealed numerous 0.5- to 1.5-cm fluid-filled areas in the subcutaneous tissue of his thigh. Aspiration of the largest nodule was attempted without success, and the nodule was subsequently incised without obvious fluid drainage.

The patient was given 2 L of normal saline and continuous telemetry monitoring. After 4 h, the patient's heart rate decreased to 103 beats/min, and depression on electrocardiogram resolved. Internal Medicine was consulted and examined the patient at the bedside. The Internal Medicine service agreed this was most likely a side effect of exenatide and that the patient was safe for discharge with follow-up in 24 h. The patient was discharged with return precautions as well as a recommendation to completely discontinue exenatide. The patient followed up in the primary care clinic 24 h later, and was symptom free. The nodules slowly resolved over 2–3 months, and the patient had no repeat episodes of palpitations in the 6 months after discontinuation of exenatide.

DISCUSSION

GLP-1 Agonists

One of the more recently developed classes of DM medications, glucagon-like peptide-1 (GLP-1) agonists have

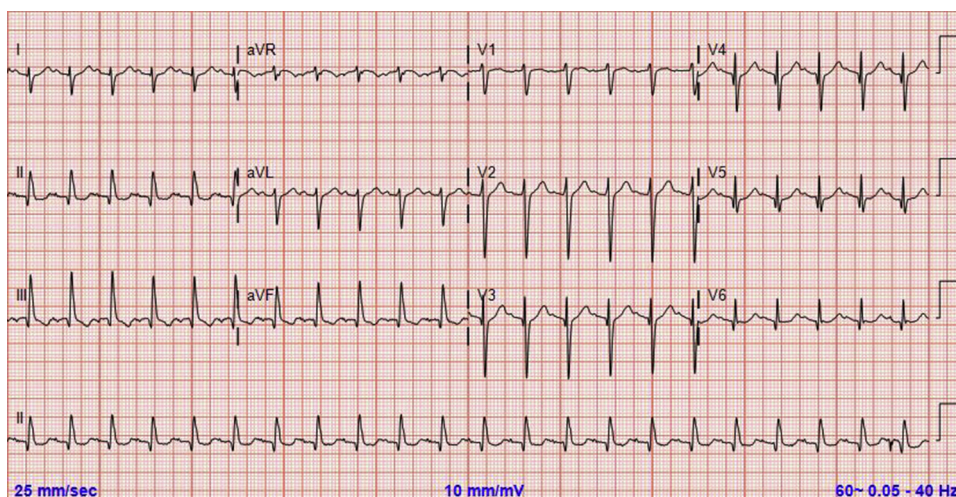


Figure 1. Initial electrocardiogram: sinus tachycardia with a rate of 133 beats/min, regular rhythm, right axis deviation, and minimal depression in II, III, and aVF.

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