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Case Report

Case Report: Octreotide Associated Hyperkalemia

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Abstract

A 78-year-old female with past medical history of acromegaly. She had previously undergone resection of a pituitary adenoma. She presented to an Emergency Department (ED) with abdominal pain. The ED workup was not significant for any acute intra-abdominal abnormalities; hyperkalemia was identified. The patient was admitted to the hospital for evaluation of the cause of the hyperkalemia. It was later learned that the patient had recently been switched from octreotide injections to an oral somatostatin analogue (Mycapssa). This patient's hyperkalemia was determined to have been caused by octreotide-induced insulin suppression with resulting impaired cellular potassium uptake. Although octreotide has a wide variety of medical applications it should be used with caution as complications arising from elevated potassium that can be potentially dangerous. An awareness of the relationship of octreotide to hyperkalemia can assist the clinician encountering hyperkalemia, especially when the patient is on an octreotide regimen.

Keywords: octreotide; octreotide related hyperkalemia; octreotide and hyperkalemia

Introduction

Side effects of medications can include electrolytes abnormalities. Here we discuss the case of a patient who developed hyperkalemia in relationship to an oral octreatide regimen. Octreotide resembles somatostatin it can precipitate many of the same physiologic reactions as its hormonal counterpart. These include the inhibition of gastrin, cholecystokinin, glucagon, growth hormone, insulin, secretin, pancreatic polypeptide, TSH, and vasoactive intestinal peptide. In addition, octreotide can also reduce gastrointestinal motility and can inhibit contraction of the gallbladder and cause vasoconstriction, decrease pancreatic/intestinal fluid secretion and alleviate portal vein pressure [1].

Case Presentation

A 78-year-old patient presented to an Emergency Department at for the evaluation of left lower quadrant pain. The patient stated that her pain had been intermittent over the previous 10 days. She reported an inciting event (lifting heavy bag cat litter). She denied any overt trauma. The pain was described as "pulling" in quality. Patient endorsed that pain was exacerbated by standing and/or walking. She had a past medical history of with past medical history of pituitary adenoma, ovarian cancer, partial bowel resection secondary to diverticulitis with colostomy placement, mixed hyperlipidemia, stage 3 chronic kidney disease, and acromegaly, The ED workup including computerized tomography (CT) imaging did not reveal any acute intra-abdominal abnormality. However, she was noted to have an incidental finding of hyperkalemia. The potassium was 6.1 mmol/L. Her electrocardiogram showed no significant changes. Patient was subsequently treated with multiple boluses of intravenous saline as well as hyperkalemia treatment including insulin, dextrose and calcium gluconate. Her potassium remained elevated at 6.1 mmol/L. The patient was ultimately admitted to the hospital for cardiac monitoring and further treatment with insulin/dextrose and calcium gluconate for her elevated potassium It was later learned that that the patient had recently been placed by her endocrinologist on an oral somatostatin analogue (Mycapssa).

According to the patient, she had previously been on intravenous octreotide for treatment of refractory acromegaly status post pituitary resection. The patient's octreotide was withheld due to concern that this medication could be directly contributing to her condition. Endocrinology was consulted. Octreotide was discontinued and the patient's potassium normalized. The patient's abdominal pain resolved.

Discussion

Octreotide is a synthetic somatostatin analog that is a potent inhibitor of growth hormone, glucagon and insulin. The mechanism of inhibition is

through competitive agonism of the somatostatin receptors SSTR2 and SSTR5. Octreotide was first synthesized in 1979 by and was approved for use in the United States in 1988 [1].

Octreotide resembles somatostatin it can precipitate many of the same physiologic reactions as its hormonal counterpart. These include the inhibition of gastrin, cholecystokinin, glucagon, growth hormone, insulin, secretin, pancreatic polypeptide, TSH, and vasoactive intestinal peptide [1].

In addition, octreotide can also reduce gastrointestinal motility and can inhibit contraction of the gallbladder and cause vasoconstriction, decrease pancreatic/intestinal fluid secretion and alleviate portal vein pressure [1].

Octreotide can be used in the treatment of such endocrine disorders as acromegaly, gigantism, congenital hyperinsulinism, Grave's disease, diabetic retinopathy, and sulfonylurea-induced hypoglycemia. It can be used in the management of pituitary adenomas as well as non-endocrine malignancies such as breast, colon, prostate, lung and hepatocellular tumors.

Octreotide can be used in the treatment of refractory diarrhea, gastrointestinal hemorrhage, carcinoid syndrome and intestinal fistula [2].

There are many adverse effects of octreotide including headache, hypothyroidism, arrhythmia, abdominal cramping pain, nausea, vomiting, diarrhea and constipation. gallstones.

Hyperkalemia has been described as an adverse reaction to octreotide. The mechanism by which octreotide analogues precipitate elevated potassium levels is through the suppression of endogenous pancreatic insulin secretion with resulting impaired cellular potassium uptake [2].

It is for this very reason that octreotide can be used in the treatment of sulfonylurea toxicity.

Other causes of hyperkalemia were also considered in this patient, including factors that pertain to decreased potassium excretion (renal failure, potassium sparing diuretics, ace inhibitors, aldosterone deficiency), increased potassium load (tumor lysis, rhabdomyolysis, potassium supplementation) and cellular potassium shifts (acidosis, beta blockade, digitalis toxicity) [2].

However, no other sources for the patient's elevated potassium levels could be identified.

There is limited data regarding the safety of octreotide regarding hyperkalemia, especially in those patients who are already predisposed to having elevated levels of potassium (dialysis patients) and those taking such medications as beta blockers, angiotensin converting enzyme (ACE) inhibitors, digoxin and spironolactone. Octreotide should therefore be utilized with caution in patients with pre-existing renal disease [3].

Conclusion

Octreotide is a synthetic somatostatin analog that is a potent inhibitor of growth hormone, glucagon and insulin. Octreotide can cause hyperkalemia due insulin suppression with resulting impaired cellular potassium uptake. When faced with unexplained hyperkalemia, the clinician should review current medications.

Conflict of Interest

There was no funding related to this case report. The authors declare that they have no conflicts of interest.

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