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Case report

Inadvertent Sulfonylurea Overdose and treatment with Octreotide: A Case Report

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Abstract

Suicide attempts using hypoglycemic agents are uncommon but are associated with a high level of morbidity and mortality. A fifty-eight-year-old-gentleman with no history of diabetes was presented in a state of shock to the emergency room with the ingestion of 12 tablets of 2mg glimepiride. The patient was in persistent state of hypoglycemia. In such cases of sulfonylurea toxicity, goal of therapy depends on the adequate glucose supplementation to maintain normal blood glucose level. Octreotide is an effective drug in preventing rebound hypoglycemia after sulfonylurea ingestion. Octreotide in combination with dextrose should be considered for first-line therapy in the treatment of sulfonylurea-induced hypoglycemia.

Keywords: Sulfonylurea; Overdose; Octreotide

Introduction

The most common complication of sulfonylurea overdose is hypoglycemia [1]. The toxicity is caused secondary to the exertion of the sulfonylurea pharmacological properties. It reduces the glucose level by release of insulin from beta cells of the pancreas [2]. Early symptoms of hypoglycemia from sulfonylureas are characterized by weakness, hunger, diaphoresis, pallor, palpitations, sinus tachycardia, headache, irritability, and tremor. If hypoglycemia remains untreated, neuroglycopenia may develop resulting in impaired concentration and judgment, confusion, blurred vision, drowsiness, and amnesia. Further progression can result in seizures or coma, and possibly death [3].

Conventional therapy of hypoglycemia with intravenous dextrose infusions may only temporarily correct blood sugar levels as sulfonylurea and active metabolite levels may remain high for a prolonged period resulting in persistent hypoglycemia [4]. Although octreotide use has been advocated as a first line therapy, indications and dosing are not firmly established. It has also been identified that the use of octreotide may reduce the incidence of recurrent hypoglycemia that is seen with dextrose-alone therapy. Our case report discusses a patient with severe hypoglycemia resulting from suicide attempt by ingesting 24mg of glimepiride and highlights the response to treatment with octreotide after failed attempts to correct the patient's hypoglycemia with dextrose.

Case Report

A fifty-eight-old male with no previous co-morbidities was presented to was presented to the emergency room of Northwest General Hospital, Peshawar in the month of January 2019. The son reported that the patient is a non-diabetic. He ingested his spouse's 12 tablets of 2mg glimepiride as a suicide attempt. In the emergency room, the patient was tachycardic, tachypneic and diaphoretic. Initial glucose meter reading was found to be 36mg/dL and a blood glucose level on the metabolic panel was 49mg/dL. Patient serum creatinine was 2.1mg/dL. While in the emergency room, the patient received 50% dextrose intravenously eventually requiring an intravenous infusion of 10% dextrose. Despite this treatment, the patient remained persistently hypoglycemic with blood sugars less than 80mg/dL. He was admitted to the medical intensive care unit for close monitoring.

Despite giving high dose of dextrose infusion, his blood sugars remained low. A decision was made at this point to administer 50 micrograms of octreotide subcutaneously. Two hours later, the patient's blood sugar started to improve, and the intravenous 10% dextrose was discontinued. Eight hours later, the patient received another dose of 50 micrograms of octreotide and his blood sugars started improving. The dose was continued for two days and he remained consistently euglycemia.

Once stable, his insulin levels and C-peptide levels were done which were normal. Other parameters including complete blood picture, U&Es, liver function tests and urine analysis were within normal limit. Following initial correction of his low blood sugar, the patient was encouraged orally. Once stable he was discharged on normal blood sugars with advice to see a psychiatrist.

Discussion

Glimepiride is a second-generation sulfonylurea indicated for diabetes mellitus type 2. After the intake, the drug is completely absorbed, and the maximum concentration is reached in 0.7-2.8 h. It is primarily metabolized in the liver, first to its active metabolite via the cytochrome P450 and then to its dehydrogenated inactive metabolite [5]. Glimepiride was generally associated with lower risk of hypoglycemia compared to other sulfonylureas and it should be used in caution with hepatic and renal disease. It has a narrow therapeutic index. Glimepiride overdose is associated with hypoglycemia [1]. Onset of hypoglycemia may be delayed up to 12h, and duration may be prolonged for days after overdoses. Patients who are hypoglycemic experience dizziness, weakness, headache, confusion, lethargy, slurred speech, coma, and seizures. Other clinical effects include tachycardia, palpitations, nausea, and diaphoresis. Protracted hypoglycemia can result in death [2].

Several case reports are published on sulfonylurea overdose in adults. Potential for hypoglycemia associated with dosage increases is well described, especially in older patients, sometimes with fatal outcomes. Review of national poison center data found 14 sulfonylurea-associated fatalities reported between 1992 and 1996 in adults aged 18 to 79 years. Eleven cases were the result of suicides and involved contestants [6].

A potential complication of treatment of sulfonylurea-induced hypoglycemia with intravenous dextrose is recurrent hypoglycemia. Dextrose administration results in hyperglycemia which in turn potentiates insulin release from the pancreas leading to recurrent hypoglycemia. Re-administration of dextrose perpetuates this cycle, resulting in high dextrose requirements and the need for frequent monitoring of blood glucose levels.

By contrast, octreotide, a synthetic octapeptide analogue of somatostatin, effectively suppresses insulin secretion and has a very benign adverse effect profile. The long-acting, synthetic somatostatin analog, octreotide, is FDA-approved for the treatment of acromegaly, metastatic carcinoid symptoms, and vasoactive intestinal secreting tumors. It has also been used for the cessation of upper gastrointestinal bleeding and to correct refractory hypoglycemia caused by sulfonylurea overdoses. Octreotide can be administered either intravenously or subcutaneously, with both routes having equivalent bioavailability. It appears to abolish the need for hypertonic dextrose infusion, thus avoiding the need for a central line, close observation, and complications relating to fluid and electrolyte disturbances. This obviates the need for prolonged ICU admission. Octreotide is now regarded as a first line antidote for sulfonylurea poisoning with the role of dextrose confined to rapid restoration of euglycemia in the already hypoglycemic patient and maintenance of euglycemia until such time as octreotide can be sourced and administered [7].

Patients who developed hypoglycemia with therapeutic doses of sulfonylureas have been given supplemental dextrose and octreotide, with subsequent correction of the hypoglycemia. There are numerous case reports describing treatment of sulfonylurea overdoses with octreotide. In 2002, Carr and Zed described glyburide overdoses in two patients with refractory hypoglycemia despite dextrose 50% boluses and 10% infusions who demonstrated fewer hypoglycemic episodes and lower dextrose requirements with octreotide 50μg every 8h for three doses. These authors provide a summary of six previously reported cases that demonstrate the benefits of octreotide therapy [8]. Subsequent to Carr and Zed's report, there have been 13 case reports on the treatment of sulfonylurea-induced hypoglycemia with octreotide, including two cases in young children [9].

As octreotide represents the definitive management of sulfonylurea induced hypoglycemia, efforts should be made to administer it as soon as possible. If available in the remote area, it can be safely commenced according the administration regime described above. If not immediately available, efforts should be made to move the antidote to the patient as part of the management plan.

Acknowledgement

None.

Conflict of Interest

A written consent was taken, and the authors declare that there is no conflict of interests regarding the publication of this paper.

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