Case Report

Symptomatic neuroglycopenia secondary to oral hypoglycemic agents: A case report

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ABSTRACT

We present the case of a 55-year-old man with Type 2 diabetes mellitus who developed symptomatic neuroglycopenia due to oral hypoglycemic agents (OHAs). He presented with confusion and disoriented speech after taking his usual morning dose of medication following a period of poor adherence. The laboratory evaluations confirmed hypoglycemia and ruled out other potential causes, including liver disease. He was successfully managed with intravenous dextrose (10%; 75 mL/h), and then supportive care was initiated after discontinuing OHA's. This case highlights the increased risk in diabetic patients on sulfonylurea-based regimens, especially with renal dysfunction and poor adherence.

Key words: Adverse drug reaction, Diabetes mellitus, Neuroglycopenic hypoglycemia, Oral hypoglycemic agents

Hypoglycemia is a common, potentially serious adverse reaction of oral hypoglycemic, particularly sulfonylureas [1]. Neuroglycopenia is the term related to the impaired brain function due to glucose deficiency, that is, when blood glucose falls below the threshold (<50–60 mg/dL). This neuroglycopenia can be manifested as confusion, slurred speech, seizures, or coma [2], and requires prompt recognition and management. Certain factors, such as renal dysfunction, advanced age, and poor adherence to therapy, may increase the risk of hypoglycemia. According to a recent South Indian study, hypoglycemia is common in 57.4% diabetes patients, with 10.7% experiencing severe episodes requiring medical attention [3]. The most recent consensus states that sulfonylureas still pose a significant risk of both neurogenic and neuroglycopenic symptoms in Indian patients [4].

Here, we describe a case of symptomatic neuroglycopenic hypoglycemia secondary to oral hypoglycemic agents in a middle-aged diabetic patient with poor medication adherence. The rationale of this study is that the case highlights the occurrence of prolonged neuroglycopenia secondary to sulfonylurea used in a patient with mild renal dysfunction. Although sulfonylureas are widely prescribed for Type 2 diabetes, their metabolism and excretion are altered in renal impairment, increasing the persistent and severe hypoglycemia with only a few reports in the literature. This report emphasizes the importance of cautious drug selection in patients with impaired renal function and provides a valuable reminder for clinicians to consider safer alternatives and closely monitor the high-risk individuals.

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CASE PRESENTATION

A 55-year-old male patient, a known case of Type-2 diabetes mellitus for 2 years, presented to the emergency department with complaints of confusion and disoriented speech on the morning of admission day. Previously, he was on a fixed dose combination of Voglibose (0.2 mg), Glimepiride (2 mg), and Metformin (500 mg), orally once daily for glycemic control. He reportedly took a regular dose around 10:00 am and was apparently normal until about 10:30 am. His family noted that he had become confused with slurred and irrelevant speech. There was no history of seizures, trauma, or overdose.

On examination, he was drowsy but arousable, and his random blood glucose was 44 mg/dL at presentation, which marks hypoglycemia; however, his vitals were stable with a blood pressure of 110/80, pulse rate of 90, and temperature was afebrile. Systemic examination of the cardiovascular system showed S_1, S_2+RS: B/LAE+, central

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nervous system: Glasgow coma scale was performed, and score is $E_4V_5M_6$=15/15, which was unremarkable.

Laboratory investigation showed hemoglobin A1C of 8.5, mild proteinuria, urea was 58 mg/dL, creatinine was 3.0 mg/dL, and renal function tests were performed. Computed tomography (CT) scan of the brain showed middle-aged-related changes in the brain. A CT scan was done to differentiate between metabolic hypoglycemia and intracranial pathology. All remaining values were in the normal range, so we excluded those values (Table 1). As evidence for this reaction, it was essential to provide clinical evidence supporting the diagnosis and causality of the adverse drug reaction (ADR). Naranjo scale [5] was used to determine how likely the drug is responsible for this ADR (Table 2).

The patient was immediately admitted and treated for symptomatic hypoglycemia with oral glucose followed by a 10% dextrose infusion (with an infusion rate of 75 mL/h), which rapidly improved his neuroglycopenia symptoms. All oral anti-hypoglycemic agents were discontinued, given the suspected ADR and underlying renal dysfunction, which increased sulfonylurea-related hypoglycemia risk. Supportive care, including fluid management and electrolyte monitoring, was provided to the patient, and he was monitored for recurrent hypoglycemia, and dietary counseling was given. Renal function was closely observed, and long-term diabetic management was shifted to linagliptin therapy.

Over the next 24 h, his sensorium improved, and blood glucose levels were stabilized. He was discharged with follow-up advice. These events were described in chronological order in Table 3.

DISCUSSION

This case typifies sulfonylurea-associated neuroglycopenia precipitated by renal dysfunction in chronic kidney

Table 1: Detailed laboratory investigations related to case report

Laboratory tests	Day-1	Day-2	Day-3	Normal range
Capillary blood glucose	44 mg/dL	58 mg/dL	144 mg/dL	70–99 mg/dL
HbA1c	8.5%	-	-	<%
Serum creatinine	2.6 mg/dL	2.6 mg/dL	2.6 mg/dL	0.6–1.2 mg/dL
Blood urea	58 mg/dL	49 mg/dL	40 mg/dL	10–50 mg/dL
Aspartate transaminase	49 U/L	-	-	10–40 U/L
Alanine transaminase	151 U/L	-	-	40–130 U/L
24 h urine protein	315 mg/day	-	-	21.3–119 mg/day
CT brain	Mild age-related changes and small vessel diffuse cerebral atrophy			

HbA1c: Hemoglobin A1C, CT: Computed tomography

Table 2: Depicting the adverse drug event using Naranjo scale [5]

Question	Yes	No	Don't know	Answer	Score
Is there any previous conclusive report on this reaction?	+1	0	0	Yes	1
Did the adverse event appear after the suspected drug was given?	2	−1	0	Yes, developed after morning dose	2
Did the adverse reaction improve when the drug was discontinued or a specific antagonist was given?	1	0	0	Yes, oral hypoglycemic agent withheld+dextrose	1
Did the adverse reaction reappear when the drug was readministered?	2	−1	0	No, not re-challenged	0
Are there any alternative causes that could have caused the reaction?	−1	2	0	No, not trauma, and no other drugs	0
Did reaction appear with placebo?	−1	1	0	No	0
Was the drug detected in any fluid in toxic concentration?	1	0	0	No	0
Was the reaction more severe when the dose was increased or less severe when the dose was decreased?	1	0	0	Not clearly documented	0
Did the patient have a similar reaction to the same or similar drugs in the past?	1	0	0	No	0
Reaction confirmed by the objective evidence?	1	0	0	Yes, hypoglycemia neuroglycopenia was observed and recorded	1
Interpretation of the score					
9 Definite ADR					
5–8 Probable ADR					
0–4 Possible ADR					
0 Doubtful					
So, as the score is 5, it is probable adverse drug reaction					

ADR: Adverse drug reaction

Table 3: Chronological order of events

Day	Event	Outcome
Day 1	Patient presented with altered sensorium Initial investigations done OHA's withheld and Supportive care given	Drowsy, confused Normal CBC, hypoglycemia noted Blood glucose monitoring initiated And sensorium improved
Day 2	Supportive care continued	Patient condition gradually improved
Day 3	Patients was alert and oriented Discharged with counselling on drug use and follow up	Advised on OHA modification

OHA: Oral hypoglycemic agents, CBC: Complete blood count

disease (CKD). Several mechanisms amplify the risk including reducing renal clearance of the sulfonylurea and their active metabolites, impaired renal insulin degradation, and diminished renal gluconeogenesis. These physiological factors prolong the insulin action and blunt the counter-regulation, predisposing to recurrent and sometimes severe hypoglycemic episodes [6].

In this case, the glimepiride, for instance, undergoes hepatic metabolism to active metabolites with predominantly renal elimination. Their accumulation in renal impairment is linked to prolonged hypoglycemia. Similar cases in the literature describe persistent neuroglycopenic hypoglycemia in CKD patients exposed to sulphonyl urea, reflecting the physiology of sustained drug-driven insulin secretion [7]. Our patients present with recurrent neuroglycopenic symptoms despite standard therapy aligned with these published experiences.

Contemporary diabetic guidelines emphasize minimizing the hypoglycemic risk in CKD by reassessing or discontinuing the agents with higher hypoglycemia liability, particularly sulfonylureas, in favor of medications with kidney safety profiles. Dipeptidyl peptidase-4 (DPP-4) inhibitors are attractive in CKD because they carry a very low risk of hypoglycemia that does not require dose adjustment owing to the minimal renal excretion [8]. Importantly, American Diabetes Association standards prioritize sodium-glucose cotransporter-2 (SGLT-2) inhibitors and glucagon-like peptide-1 (GLP-1) receptor agonists for organ protection against low intrinsic hypoglycemic risk for the patient with both CKD and cardiac indications [9].

Elderly individuals and those with impaired renal function are at higher risk of reduced renal clearance and impaired regulatory mechanisms [10]. Similar findings have been reported in the literature emphasizing the importance of choosing safer drugs such as DPP-4 inhibitors and GLP-1 agonists in high-risk patients [11].

CONCLUSION

This case highlights the risk of neuroglycopenic hypoglycemia in diabetic patients on sulfonyl-based regimens, particularly those with renal dysfunction. As in CKD, the sulfonylurea exposure can precipitate prolonged neuroglycopenia through decreased drug clearance and impaired gluconeogenesis. Hence, clinicians should avoid sulfonylureas in CKD patients and rather prioritize and select the safer alternatives like DPP-4 inhibitors and SGLT-2 inhibitors when indicated in patient education in closed post-discharge monitoring, and essential to prevent recurrence.

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REFERENCES

1. Amiel SA, Dixon T, Mann R, Jameson. Hypoglycemia in Type 2 diabetes. Diabetologia 2008;51:1926-35.
2. Cryer PE. Hypoglycemia, functional brain failure, and brain death. J Clin Invest 2007;117:868-70.
3. Valliyot B, Sreedharan J, Muttappallymyalil J, Valliyot SB. Prevalence of hypoglycemia among patients with type 2 diabetes mellitus in a rural health center in South India. Indian J Community Med 2019;44:348-52.
4. Kalra S, Ghosh S, Unnikrishnan AG, Sahay R, Baruah MP, Das AK, *et al*. Expert consensus recommendations on the evaluation and management of hypoglycemia in diabetes in India. J Obes Diabetes 2024;15:6-15.
5. Alsahli M, Gerich JE. Hypoglycemia in patients with diabetes and renal disease. J Clin Med 2015;4(5):948-64.
6. Holstein A, Plaschke A. Clinical pharmacology of sulfonylureas in renal impairment. Clin Pharmacokinet 2015;11(4):840-848.
7. American Diabetes Association. Standards of Medical Care in Diabetes-2025. Diabetes Care 2025;48(Suppl 1):S181-206.
8. McGill JB, Sloan L, Newman J, Patel S, Sauce C, von Eynatten M, *et al*. Linagliptin in patients with type 2 diabetes and renal impairment. Diabetes Care 2013;36:237-44.
9. Ilippatos TD, Elisaf MS. Sulfonylureas and hypoglycemia in CKD. World J Diabetes 2014;5(5):651-655.
10. Krentz AJ, Patel MB, Bailey CJ. Oral antidiabetic agents: Current role in type 2 diabetes mellitus. Drugs 2008;68:2131-62.
11. Zelniker TA, Wiviott SD, Raz I. Cardiovascular and renal outcomes with SGLT2 inhibitors and GLP-1 receptor agonists. Lancet 2019;393(10166):31-39.

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