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Case Report

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A side effect that should be considered in patients using metformin: lactic acidosis

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ABSTRACT

The most serious and life-threatening side effect seen in patients using metformin is metabolic acidosis. If there is a history of diabetes in patients with high anion gap metabolic acidosis who present to the emergency department, metformin use should be questioned. In our case, metformin-related lactic acidosis was detected in a 67-year-old female patient who applied to the emergency department with a complaint of palpitations. The patient's kidney function tests were within normal range and he did not describe excessive drug intake. Despite the treatments administered in the emergency room, the patient's blood gas lactate level continued to increase and his acidosis deepened. After other causes of lactic acidosis were excluded, the patient was consulted with internal medicine and transferred to the intensive care unit. With this case report, we tried to draw attention to the fact that the patient group for which metformin will be used in the treatment should be carefully selected and that lactic acidosis, which is a fatal side effect, should be considered in the differential diagnosis and treatment should be started in those using this drug.

Keywords: Lactic acidosis, metformin, side effect

INTRODUCTION

Metformin is a drug that reduces insulin resistance and is used to lower blood sugar in patients with type 2 diabetes.[1] The most serious and life-threatening side effect seen in patients is metabolic acidosis. Kidney failure is often the cause of this lactic acidosis. Metformin is not a suitable treatment option for patients with creatinine levels above 1.4 mg/dl. If there is a history of diabetes in patients with high anion gap metabolic acidosis who present to the emergency department, metformin use should be questioned. Our case, a 67-year-old female patient, applied to the emergency department with a complaint of palpitations. His examinations revealed metabolic and lactic acidosis due to metformin. In metformin poisoning, the risk of rapid progression of acidosis and leading to death despite optimal treatment is high.[2] Therefore, caution should be exercised in the use of metformin in people with weakened kidney function and the dose should be adjusted according to GFR.[3]

CASE

A 67-year-old female patient, who had a medical history of high blood pressure, diabetes and cardiovascular occlusion, applied to the emergency room with a feeling of palpitations. He did not mention chest pain, back pain and abdominal pain in his anamnesis. There was no decrease in the patient's oral intake. On physical examination, the pulse was 106\min, SpO_2 was %98, there was bilateral pretibial edema, and no other pathological findings were detected. It was learned that the drugs he used were apixaban, verapamil hydrochloride and metformin. The ECG was in atrial fibrillation rhythm. Blood parameters, including troponin, were requested. In the first blood gas, pH: 7.48 and lactate: 4.7 mmol/L were detected. No other pathology was detected in blood parameters. The patient was hydrated. Control blood gas and troponin were taken. There was no dynamic change in the control ECG. In the control blood gas, pH:7.45 lactate: 5.5 mmol/L was detected. The patient's kidney function tests and infective parameters were within normal limits. CT angiography was performed to rule out pulmonary embolism and mesenteric ischemia, and no pathology was detected. Control troponin result was found to be negative. He was consulted with cardiology because he complained of palpitations and high lactate. As a result of echocardiography performed by the cardiologist, ejection fraction was found to be 60% and wall movements were normal. Acute cardiac pathology was not considered. Blood gas was taken again, pH:7.28, lactate: 10.8 mmol/L, HCO_3: 15 mmol\L. Since the patient's lactic acidosis continued despite hydration and the medications, he used were Mato fin (oral antidiabetic with the active ingredient

metformin), lactic acidosis due to metformin use was considered and internal medicine was consulted. The patient was transferred to the intensive care unit with a diagnosis of lactic acidosis due to metformin use.

DISCUSSION

Metformin, one of the biguanide class of oral antidiabetic agents, is one of the first drugs chosen in the initial diagnosis of the majority of patients with type 2 diabetes mellitus, unless there is a contraindication to its use, since it acts by different mechanisms. Metformin's mechanisms of action include decreasing glucose production in the liver, increasing glucose utilization in insulin-sensitive tissues such as muscle and adipose tissue, decreasing appetite and calorie intake, and decreasing intestinal glucose absorption.[4] Side effects include non-specific symptoms, confusion, nausea, vomiting and pain in the upper abdomen, as well as life-threatening symptoms including moderate renal failure, hypotension, hypothermia, respiratory failure and cardiac rhythm abnormalities may develop.[5] Metformin is a drug commonly used in the treatment of type 2 diabetes and has a safe profile in the right patients. A review of 347 studies in the literature, including 70,490 patients, found no evidence that metformin causes metabolic acidosis.[6] Our patient presented with palpitations, which is a relatively rare symptom. She did not describe any additional symptoms. Although metformin-induced lactic acidosis is expected to be more common in patients with reduced GFR, metformin may rarely cause lactic acidosis even in patients with normal renal function.[3] Our patient had no signs of renal failure and renal function tests were within normal range. Despite this, there was a rapidly deepening lactic acidosis during follow-up. Drug interactions between metformin and other medications used by patients must be evaluated. In our case, the patient was consulted with internal medicine and hydration therapy, frequent venous blood gas measurements and follow-up in the intensive care unit were recommended. The patient with deepening lactic acidosis despite hydration was admitted to intensive care unit. There is no direct antidote for the treatment of metformin-induced lactic acidosis. Parenteral $NaHCO_3$, continuous Ven venous hemodiafiltration and intermittent hemodialysis are used to correct lactic acidosis and alleviate symptoms. Hemodialysis helps to improve acidosis and also removes metformin.[4]

CONCLUSION

With this case report, we tried to draw attention to the fact that the patient group to be treated with metformin should be carefully selected and lactic acidosis, which is a fatal side effect, should be considered in the differential diagnosis and treatment should be started.

ETHICAL DECLARATIONS

Informed Consent

All patients signed and free and informed consent form.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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