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Letter to the Editor

Quadriplegia secondary to abiraterone-induced severe hypokalemia

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Dear Editor,

Abiraterone acetate is a commonly used hormonal therapy in metastatic carcinoma of prostate. Abiraterone causes many adverse effects including hypokalemia manifesting as weakness, muscle cramp, electrocardiographic changes, torsades des pointes, and paralysis.

A 68-year-old man known case of hypertension since 10 years diagnosed with metastatic adenocarcinoma of the prostate with bone-only metastases since December 2016. The Gleason score was 4 + 4 = 8. His body mass index is 22 and body surface area is 1.4/m^2. He underwent bilateral orchiectomy and transurethral resection of prostate in January 2017. He developed severe backache in August 2017, so fluoro deoxygenated glucose positron emission tomography scan was done, which showed metastases in left 4^{th}, 5^{th}, right 7^{th} rib, 4^{th}, and 5^{th} lumbar vertebrae and bilateral pelvic bones suggestive of the progressive disease. He was started on abiraterone (1000 mg) once daily with prednisolone 5 mg twice a day on daily schedule since August 2017. He was prescribed other supportive medication such as multivitamin, H2 receptor blocker, folic acid, calcium, zoledronic acid, and anti-hypertensive medication losartan. At the start of treatment, potassium level was 4.5 mEq/L (normal 3.5–5 mEq/L), and the same was monitored every 2 weeks. After 3 months of treatment with abiraterone, he developed mild diarrhea and vomiting followed by sudden onset weakness of all four limbs 24 hours later. Power in both upper limbs at wrist, elbow, and shoulder and in both lower limbs at ankle, knee, and hip joints was grade 0. His laboratory investigations showed serum potassium of 1.6 mEq/L (normal 3.5–5 mEq/L), serum sodium was 145 mEq/L and serum magnesium of 1.6 mg/dL (normal 1.7–2.2 mg/dL). His other renal function test, liver function tests, and fasting and postprandial sugar level were normal. His urinary potassium was 11 mEq/L, serum osmolarity was 295 mosmol/kg, and urine osmolarity was 41.19 mMol/L. The electrocardiogram was normal.

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In this patient, calculated potassium deficit was 700 meq.

Intravenous potassium chloride (20 meq/h) and oral syrup Potassium chloride 20 mL every four hourly (200 mL contain 40 meq potassium) were started and continued for 3 days. Patient's power in upper limbs started improving by the 2nd day, and the power in lower limbs started improving by the 3rd day. On the fourth day, his serum potassium was 3.2 mEq/L. Power improved to Grade 4 in both upper limbs as well as lower limbs and he was able to walk.

Abiraterone was restarted after recovery in 250 mg daily dose, increasing to 1000 mg/day. He has been tolerating the dose since the past 6 months.

Abiraterone with prednisolone is a standard of care in metastatic prostate cancer.

In April 2011, the Food and Drug Administration approved androgen synthesis inhibitor abiraterone acetate in combination with low-dose prednisone, for the treatment of men with metastatic castration-resistant prostate cancer who have received prior chemotherapy containing docetaxel.[1,2]

There are two large randomized clinical trials which demonstrated that the combination of abiraterone plus androgen deprivation therapy significantly prolongs overall survival in patients with castration-sensitive prostate cancer.[3,4]

The most common adverse reactions with Abiraterone are fatigue, backache or joint discomfort, peripheral edema, diarrhea, nausea, constipation, hypokalemia manifesting as torsades des pointes, atrial fibrillation, hypertension, glucocorticoid deficiency, increased alanine aminotransferase, aspartate aminotransferase, and cardiac disorder.[1]

Abiraterone-induced severe hypokalemia is very rare and can occur without diarrhea. Severe hypokalemia leading to quadriplegia is extremely unusual. Abiraterone causes Grade 3 and Grade 4 hypokalemia (10% and 1%, respectively).[3] We believe that this is primarily due to abiraterone as he had mild diarrhea (one or two motion only), that too 3–4 days before developing quadriplegia. He had stopped the medication during diarrhea and restarted it after 3–4 days when he presented to us with quadriplegia.

Adverse effects of abiraterone such as hypertension, hypokalemia, fluid retention, and edema occur due to increase in mineralocorticoid activity resulting from CYP17 inhibition. It should be used cautiously in cases of cardiovascular disease, uncorrected hypokalemia, adrenocorticoid insufficiency, mineralocorticoid excess, and hepatic disease.

We also believe that more frequent monitoring of serum potassium is required in certain cases such as frail patients and those with diarrhea or vomiting.

To the best of our knowledge, this is the first case of abiraterone-induced severe hypokalemia leading to quadriplegia reported in literature.

Correction of hypokalemia and control of hypertension before and during treatment is mandatory. Monitoring of blood pressure and serum potassium should be done at least once a month. Rather a broad recommendation of monthly monitoring of serum potassium, we believe more aggressive monitoring of serum potassium in the selected set of patients is required.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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