Case Study

Life Threatening Reaction with Acetazolamide in a Glaucoma Patient: A Case Report

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ABSTRACT

Acetazolamide (Diamox) is a diuretic, anticonvulsant and antiglaucoma agent which has many adverse reactions. Common side effects include parasthesias and GIT disturbances. We report a case of a 65 year old female patient presented with multiple conditions after having started acetazolamide for an elevated IOP post cataract surgery, admitted in emergency department of our hospital with signs and symptoms of shock. Her past medical history included cataract induced glaucoma for which her IOP was stabilized with mannitol eye drops and posted for surgery. She was then prescribed with acetazolamide 250 mg twice daily. Thereafter she progressively developed loose stools, nausea, vomiting, loss of appetite, abdominal pain and finally became unconscious on the fifth day. She was severely dehydrated and her vitals were found unstable with Blood Pressure of 30/20 mm of Hg, Pulse Rate of 110/minute sinus tachycardia. The patient experienced a full recovery after having treated for 20 days and was discharged. Clinicians and Ophthalmologists should be aware of the electrolyte imbalances and glucose level disturbances in patients taking acetazolamide orally. Our case highlights the occurrence of adverse outcomes with acetazolamide therapy even in previously healthy individuals.

Keywords: Acetazolamide, adverse effects, glaucoma, life threatening reaction, shock

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INTRODUCTION

Acetazolamide (ACZ) is a sulfonamide derivative that inhibits carbonic anhydrase (CA) and was approved by the Food and Drug Administration in 1953 for its use as a diuretic, anticonvulsant and antiglaucoma agent. ACZ is rapidly absorbed, achieves a peak concentration at 2 to 4 hours, and is eliminated unchanged in the urine [1]. The diuretic action is based on inhibition of carbonic anhydrase in the renal tubular epithelium. Carbonic anhydrase catalyzes the hydration of carbon dioxide to form carbonic acid: $H_2O+CO_2 \rightleftarrows H_2CO_3$. The carbonic acid dissociates to form H^+ and HCO_3^-. Thus, the level of hydrogen ions and bicarbonate ions is affected by this enzyme. When ACZ is given, CA is blocked so that the hydrogen, sodium exchange fails to occur to the normal extent [2]. This leads to alkaline urine and an increase in the excretion of bicarbonate, sodium, potassium, and water [3]. In glaucoma, it decreases the production of aqueous humor and hence lowers the intra-ocular pressure [4]. ACZ is also used in other conditions such as metabolic alkalosis [5], peptic ulcer [6], idiopathic intracranial hypertension [7], chronic hydrocephalus [8], epilepsy [9], obstructive sleep apnea [10] etc.

We report a case of an old aged woman presented with multiple conditions after having started acetazolamide for an elevated IOP post cataract surgery.

CASE PRESENTATION

A 65 year old female patient was brought to the Emergency department of our hospital with signs and symptoms of shock. She was hospitalized before at the department of Ophthalmology with complaints of failing vision and watery eyes. On examination her eyes revealed stromal edema and elevated IOP. She was diagnosed to have cataract induced glaucoma for which her IOP was stabilized with mannitol eye drops and posted for surgery. Her pre-operative profile was normal and she underwent surgery for cataract at her right eye.

She was then prescribed with acetazolamide 250 mg twice daily. Thereafter she progressively developed loose stools, nausea, vomiting, loss of appetite, abdominal pain and finally became unconscious on the fifth day.

The patient had no history of Hypertension, Diabetes Mellitus, Obesity, Dyslipidemia, Hypothyroidism or Hyperthyroidism, Epilepsy. Her family history was clear and she is a non smoker and non alcoholic. Furthermore she had no history of allergy or hypersensitivity to either drugs or foods.

Examination: She was unconscious but responding to painful stimuli, she was cool, calm, pale and cyanotic. She was severely dehydrated and her vitals were found unstable with Blood Pressure of 30/20 mm of Hg, Pulse Rate of 110/minute sinus tachycardia. On auscultation, lungs revealed wheeze, rales, tachypnea and cardiac examination revealed murmurs.

Investigations: Hemoglobin- 10.5g/dl.; sodium- 126mEq/l.; potassium- 3mEq/l.; calcium- 6 mg/dl.; Random Blood Sugar- 55mg/dl.; Blood Urea Nitrogen- 37mg/dl.; ECG- premature atrial complexes, left ventricular strain, 2D Echo Cardiogram- atrial fibrillation.

Treatment: The patient received Intravenous Isotonic fluids (Normal Saline) with minimal response and subsequently required vasopressor agents such as Dopamine (10mcg/Kg/min in 50 ml NS at 3 ml/hr) to restore adequate Blood Pressure. Intravenous Calcium gluconate (10 ml in 100 ml NS at 1.5 ml/hr) and oral digoxin (0.25 mg) were administered for the following 24 hours. The patient experienced a full recovery after having treated for 20 days and was discharged.

DISCUSSION

Acetazolamide is indicated for adjunctive treatment of edema due to congestive heart failure, drug-induced edema, centrencephalic epilepsies and chronic simple (open-angle) glaucoma. The anticonvulsant activity of acetazolamide may depend on a direct inhibition of carbonic anhydrase in the CNS, which decreases Carbon dioxide tension in the pulmonary alveoli, thus increasing arterial oxygen tension [11]. Inhibition of CA in red blood cells or vascular endothelial cells may cause carbon dioxide retention and tissue respiratory acidosis and thereby stimulate increased ventilation. Other therapeutic actions of ACZ include reduction in the number of bedtime arousals (apnea-associated hypoxemia) and improvement in the quality of sleep [1].

Diamox is not without its adverse reactions. Common side effects include parasthesias and GIT disturbances, while occasional side effects are transient myopia, photosensitivity, urticaria, melena /hematuria etc. Diamox has certain rare but fatal complications as well which include Steven Johnson Syndrome, erythema multiforme, toxic epidermal necrolysis, metabolic acidosis, anaphylaxis, acute delirium and depression [12].

There have also been a few reports of serious adverse reactions however.

Acetazolamide has been known for many years to cause renal calculi, which are frequently calcium phosphate [13]. Furthermore, there are several reports of calcium phosphate kidney stones apparently induced by the chronic use of ACZ [1]. In 1975, one case of acute renal failure induced by acetazolamide therapy for glaucoma was reported. The patient had a full recovery after the administration of oral fluids and sodium bicarbonate [14].

In 1978, 2 cases of “acute hemorrhagic anuria” following courses of ACZ (500 mg per day for 4 days and 1000 mg per day for 3 weeks to reduce intra-ocular pressure following cataract extraction and epilepsy, respectively) were reported [15].

Vogiatzis I et al [16] reported an 80 year old female who developed reversible anaphylactic shock and pulmonary edema after a single oral dose of Acetazolamide. Riquelme et al [17] described a 33-year-old man who presented with hypotension and acute heart failure 30 minutes after acetazolamide assumption .Our patient had no history of receiving Acetazolamide in the past and therefore hypersensitivity to sulfur based drugs [18] has been excluded. Also, there was no concomitant drug use during acetazolamide therapy and hence the suspicion of this adverse reaction to other drugs or by drug interaction mechanism may be exempted. The relation between acetazolamide and these complications was highly probable as assessed by Naranjo’s causality assessment scale [19].

In 2007, Tayyab Afghani (12) described three case reports where use of diamox in an eye care set up proved fatal. Kristinsson. A [20] reported a case of fatal reaction attributable to acetazolamide. This case would have been another death report if the patient had not been managed symptomatically at the emergency department.

CONCLUSION

Patients should be counseled with adequate information regarding the side effects of acetazolamide and advised to report back to physician if any noxious feeling is experienced. Clinicians and Ophthalmologists should be aware of the electrolyte imbalances and glucose level disturbances in patients taking

acetazolamide orally. Additionally, it is of primary importance to identify patients who are under strict rejection to acetazolamide and monitor them carefully.

Our case highlights the occurrence of adverse outcomes with acetazolamide therapy even in previously healthy individuals.

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