Case Report

A case report on tricyclic antidepressant induced increased blood pressure

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ABSTRACT

This is a case of antidepressant-masked high blood pressure. Administration of tricyclic antidepressants that cause raised blood pressure becomes particularly important in resistant hypertension cases. In this case, we report a case of raised blood pressure despite multiple antihypertensives. The patient also presented with electrolyte imbalances also raising the suspicion of drug side effects due to unnecessary drugs administered. Therefore, arriving at a clinical decision with minimal side effects and focused treatments requires identifying every detail of the patient, including their medical and medication histories.

Key words: Amitriptyline, Resistant Hypertension, Anti-Hypertensive, Electrolyte Imbalance

Resistant hypertension is defined as '*an above goal blood pressure despite adherence to at least three antihypertensives one of which should be a diuretic'*. Although dietary sodium restriction is an important aspect in the control of blood pressure. In the given case, a geriatric patient has presented with hyponatremia and an above goal blood pressure level [1]. While addressing hypertensive episodes among individuals on anti-depressants, it seems important to understand the rise in blood pressure due to antidepressant treatment. Antidepressants can cause variations in blood pressure through the adrenergic, cholinergic, serotonergic, histaminergic, and dopaminergic systems. Selective serotonin reuptake inhibitors have a mild effect on blood pressure and are considered relatively safe among the geriatric population. Other antidepressants, such as Venlafaxine, Bupropion, Nefazodone, Trazodone, and tricyclic antidepressants, are associated with a rise in blood pressure. Tricyclic antidepressants affect blood pressure levels by various mechanisms [2].

Amitriptyline is a tricyclic antidepressant with multiple side effects and is more prominent within the geriatric population. The common side effects of Amitriptyline are weight gain, generalised weakness, hypotension, sleepiness, alopecia, blurred vision, dry mouth, vomiting, constipation, diarrhoea, urinary retention, and dyscrasias. Hypertension is a rare side effect of Amitriptyline use, but it can occur. In the given case, the patient is already diagnosed with resistant hypertension, and introducing a molecule such as amitriptyline with the potential to cause blood pressure elevations makes the clinical situation even more challenging. It is proposed that amitriptyline works by blocking norepinephrine reuptake or increasing vascular reactivity [3]. Here we describe an elderly woman with resistant hypertension who received amitriptyline for depression and then developed high blood pressure. All procedures performed in the case report involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Informed consent was obtained from the individual included in this case report. The participant has also consented to the submission of a case report to this journal.

Clinical Case

A 68 year old female was admitted at 8 pm to the General medicine department of a primary care hospital. The patient complained of abdominal bloating for the past few days. The past medical history of the patient included hypertension (since 10 years), asthma (since 30 years) and depression. The patient's previous medication history included metoprolol succinate prolonged release tablet 50 mg (1-0-1), telmisartan 40 mg (1-0-1), torsemide 5 mg (1-0-0), moxonidine 0.3 mg (1-0-1), cilnidipine 10 mg (0-0-1), amitriptyline 10 mg (0-0-1) and inhaler formoterol fumarate 6 mcg and budesonide 200 mcg (2 puffs). The patient also underwent a hysterectomy and hemorrhoidectomy ten years ago. The patient was also previously admitted with hyponatremia and hypokalemia following usage of Tablet Chlorthalidone 6.25 mg (1-0-1), which was subsequently discontinued and replaced with Tablet Torsemide 5 mg (1-0-0). After examination of the lab reports on Day 1 it was found that the sodium and potassium levels were 128 mEq/l and 3.3 mEq/l, respectively. The erythrocyte sedimentation rate (ESR) was elevated with a value of 38 mm/hr. Likewise, the haemoglobin (Hb) level was 10.4 g/dL. Urine albumin was nil, sugar was nil, pus cells were 1-2; and RBCs in urine were 2-4. On admission, the patient had a blood pressure (BP) of 170/80 mm Hg. The BP monitoring chart has been tabulated in Table 1 below.

Table 1 – BP Monitoring Chart of the Patient during the Hospital stay and other lab investigations

BP MONITORING CHART					
Day 1		**Day 2**		**Day 3**	
8pm	170/80*	6am 10am 1pm 6pm 9pm	120/70 130/80 120/70 130/70 160/90	6am	130/70
LAB INVESTIGATIONS					
Parameters		**Day 1**		**Day 3**	
Hb (g%)		10.4			
ESR (mm/hr)		38			
Neutrophils (%)		52%			
Lymphocytes (%)		43%			
Eosinophils (%)		5%			
Sodium (mEq/l)		128		135	
Potassium (mEq/l)		3.3		4.4	

*All the BP measurements are in mm/Hg

On admission, the patient was started on tablet amlodipine 5mg to quickly control the elevated BP level. The following day, the patient was instructed to take Tablet Tolvaptan 30 mg once daily (1-0-0) for sodium correction, Syrup potassium chloride 2 tablespoons thrice daily (1-1-1) for potassium correction, and all previous medications (Metoprolol succinate prolonged release tablet 50mg (1-0-1), Tablet Telmisartan 40 mg (1-0-1), Tablet Moxonidine 0.3mg (1-0-1), Tablet Cilnidipine 10mg (0-0-1),The BP measurements were regularly monitored, and another routine lab investigation was conducted to examine the electrolyte level. The values have been indicated in Table 1. The patient was diagnosed with resistant hypertension with hyponatremia and hypokalemia. A suspicion of acute gastritis was also raised, for which the patient was advised to take a syrup containing a combination of magaldrate (400 mg/5 ml) and simethicone (20 mg/5 ml) thrice daily (1-1-1). Complaints of bloating resolved post-consumption of the Syrup. Upon clinical improvement, the patient was discharged with the following list of medications: – tablet tolvaptan (30 mg 1-0-0 * 4 days), tablet pantoprazole (40 mg 1-0-0*10 days), tablet amitriptyline (10 mg 0-0-1*15 days), tablet metoprolol succinate (50 mg 1-0-1 *continue), tablet telmisartan (40 mg 1-0-1 *continue), tablet moxonidine (0.3 mg 1-0-1 *continue), and tablet cilnidipine (10 mg 0-0-1*continue). On follow up after 15 days, the patient had an in-office BP of 160/90 mm Hg. Following further investigation, it was determined that Tablet Amitriptyline 10 mg (0-1) could have resulted in increased blood pressure levels. Amitriptyline is a Tricyclic antidepressant and has the potential to cause elevations in BP. During follow-up, tablet amitriptyline 10 mg 0-0-1 was discontinued and tablet etizolam 0.25 mg 0-0-1 was added to overcome generalised anxiety and depressive symptoms.

DISCUSSION

This study highlights the effect of antidepressants in the context of resistant hypertension. Often, resistant hypertension is labelled based on the number of antihypertensives prescribed and the corresponding uncontrolled blood pressure levels. Upon further examination, such as a postmenopausal woman, suggesting the involvement of sex hormones there's a chance of getting higher BP (2), other factors that can lead to an increased level of blood pressure should be investigated. Otherwise, this could result in unnecessary treatment, charges, electrolyte imbalances, and other adverse drug reactions.

In a study conducted by Breeden *et al.,* the author has highlighted the role of antidepressants in elevating the chances of incident hypertension. Tricyclic antidepressants, in particular, have been linked to an increase in blood pressure. It is also argued that this class of antidepressants also causes orthostatic hypotension [4]. Therefore, large scale studies are necessary to validate the findings obtained from an individual patient. This case also highlights the need to promptly capture the instances of electrolyte imbalance among hypertensive patients. Therefore, if there is no need for anti-hypertensive such as this case where possibly amitriptyline could have caused the raised blood pressure, the patient is exposed to a drug with no indication. Tricyclic antidepressants are not only used for depression but also for anxiety, chronic pain, insomnia, and migraine. There are multiple sections of the population that are exposed to the threat of tricyclic antidepressants. A thorough understanding of the risks and benefits of medication prescribed for each patient can help improve the clinical decision making process. Although a nonjudgmental approach was used during the medication reconciliation process, it was difficult to determine whether the patient was truly adhering to the antihypertensive medications prescribed. A formal assessment of medication adherence to the existing anti-hypertensives was not done; therefore, a conclusive diagnosis of resistant hypertension may be doubtful. Increasing age is also a factor that can make an individual resistant to treatment; thus, it cannot be ruled out in this case.

CONCLUSION

This case highlights a common clinical situation where multiple causes of a complaint can remain masked or unnoticed. In this case, a geriatric patient arrives with elevated blood pressure despite prompt treatment, but the condition remains unresolved. Amitriptyline-induced hypertension could be one explanation. Such scenarios must be highlighted in practice for better patient outcomes.

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