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Tamsulosin-Induced Life-Threatening Hypotension in a Patient with Spinal Cord Injury: A Case Report

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Abstract

BACKGROUND

Tamsulosin, a selective α1-adrenergic receptor antagonist, is commonly used for treating neurogenic bladder in patients with spinal cord injury (SCI). No severe adverse events have been described with such tamsulosin use. To our knowledge, we report the first case of severe life-threatening hypotension as an adverse effect of tamsulosin in a person with SCI. Therefore, we report this case to inform that this severe adverse effect of tamsulosin can occur when treating patients with SCI.

CASE SUMMARY

A 59-year-old woman was diagnosed with cervical spinal cord myelopathy and was classified as American Spinal Injury Association Impairment Scale D, neurological level of injury C3. Because she suffered from voiding difficulty due to neurogenic bladder, we prescribed tamsulosin. Her vital signs remained stable, but occasional hypotensive symptoms followed defecation. We reduced the dose of tamsulosin, but after administering tamsulosin for 9 days, she experienced life-threatening hypotension with no evidence of hypovolemic shock, neurogenic shock, cardiogenic shock, or septic shock. A hypotensive condition induced by tamsulosin was the suspected cause, and her symptoms could be associated adverse effects of tamsulosin. As symptoms resolved after stopping tamsulosin, and no other reason was found, we concluded that tamsulosin was the cause of her symptoms.

CONCLUSION

Caution for severe hypotension is needed when administering tamsulosin for neurogenic bladder in a patient with SCI.

Key Words: Tamsulosin; Neurogenic bladder; Spinal cord injury; Hypotension; Vasovagal symptoms; Case report

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Core Tip: Voiding difficulty is a common symptom of SCI due to neurogenic bladder. Tamsulosin is commonly used for treating neurogenic bladder. However, this case demonstrated that tamsulosin can cause severe life-threatening hypotension. Thus, clinicians should be aware of this possible condition when treating neurogenic bladder in a patient with SCI.

INTRODUCTION

Tamsulosin is a selective α1-adrenergic receptor antagonist that is widely used for benign prostatic hypertrophy (BPH). It also is effective against and commonly used for treating neurogenic bladder in patients with spinal cord injury (SCI). The usual dosage of tamsulosin is 0.2, 0.4, or 0.8 mg per day[1-3]. In Korea, tamsulosin is approved by insurance in both men and women who have neurogenic bladder as well as BPH. Furthermore, tamsulosin is an effective treatment for relief of lower urinary tract symptoms in women by improving the average flow rate and the residual volume after voiding[4-5].

Classically, α1-adrenergic receptor antagonists have been used for treating arterial hypertension. Among the three α1-adrenergic receptor subtypes (α1A, α1B, and α1D), α1B is thought to have an effect on vasoconstriction. The α1A-adrenergic receptor subtype is more specifically involved in the human prostate[1]. Tamsulosin is an α1-adrenergic receptor antagonist with high selectivity for α1A-adrenergic receptors and low selectivity for α1B-adrenergic receptors.

Well-known adverse effects of tamsulosin are dizziness, abnormal ejaculation, and asthenia[3,6]. Hypotension is another possible but rare adverse event[1-3,6]. Previous cases of severe hypotension induced by tamsulosin were people with BPH or undergoing a general anesthetic procedure[6,7]. To the best of our knowledge, there are no reported cases of tamsulosin-induced severe hypotension in people with SCI. Here, we present a

unique case of a woman with SCI who suffered life-threatening hypotension caused by tamsulosin.

CASE PRESENTATION

Chief complaints

A 59-year-old woman suffering from tetraparesis due to cervical spinal cord myelopathy presented with a sudden drop in blood pressure (BP) after tamsulosin use for 9 days.

History of present illness

A cervical spine magnetic resonance imaging (MRI) study was performed. The patient was diagnosed with cervical spinal cord myelopathy at the C3-C6 Level and fractures at the C4-C6 Level. She was classified as C3 AIS D (American Spinal Injury Association Impairment Scale). After surgery, she was transferred to the rehabilitation medicine department after Foley catheter insertion for urination.

Considering her completeness of injury (AIS D), we removed her Foley catheter to identify residual urine using clean intermittent catheterization (CIC). On the day of removal, she was able to self-void, but residual urine was in the range of 160-200 mL. On suspicion of voiding difficulty due to neurogenic bladder, a complication of her SCI, we scheduled a urodynamic study, but the patient refused due to discomfort. In the absence of a urodynamic study, we prescribed the recommended dose of 0.4 mg tamsulosin once daily[1,2]. For bladder management, we planned CIC at least 4 times/day, followed by self-voiding. Because she had been diagnosed with cervical spinal cord myelopathy, we encouraged total fluid intake of approximately 2000 mL/day to prevent orthostatic hypotension[8].

After administering tamsulosin for 6 days, we reduced the dose to 0.2 mg once daily as her residual urine remained less than 200 mL. In addition to voiding difficulty, tamsulosin use produced other symptoms. Though her blood pressure (BP) remained stable, she experienced occasional dizziness, likely due to orthostatic hypotension. She

also experienced constipation and post-defecation symptoms such as nausea, lightheadedness, and sweating. We attributed these symptoms to orthostatic hypotension due to cervical myelopathy aggravated by tamsulosin[9]. We reduced the dose of tamsulosin to 0.2mg and expect resolution of the symptoms.

After tamsulosin use for 9 days, her BP suddenly dropped to 70/40 mmHg. Before the event, she had difficulties defecating and experienced dizziness. Her heart rate was 50 beats/min (bpm), and body temperature (BT) was 36.3℃, although there was no alteration in consciousness. Despite treatment with normal saline hydration, supplemental O2, and norepinephrine, her BP decreased to 50/40 mmHg. We did not suspect hypovolemia as the underlying cause and administered atropine for possible cardiogenic shock. However, her electrocardiogram (EKG) showed sinus bradycardia and vasovagal syncope as potential causes of her symptoms. After several minutes, her BP increased to 120/80 mmHg, and all other vital signs returned to within normal range, including BT. No abnormal result was found in her laboratory tests, including urinalysis. We stopped tamsulosin immediately because of its possible hypotensive effect.

On the next day, her BP dropped to 60/40 mmHg after defecation. Once again, she remained conscious and alert. Atropine was administered but had no effect. Norepinephrine was administered, her BP increased to 100/60 mmHg, and heart rate ranged from 90 to 110 bpm.

After the second event, there was no additional event of hypotension or difficulty in defecation after stopping tamsulosin.

History of past illness

The patient had a medical history of diabetes and hypertension and use of associated medications for the previous 20 years. Her BP and blood glucose level had been well-controlled. She had not experienced previous orthostatic hypotension or hypoglycemia.

Personal and family history

She had no family history of cervical cord disorder and other diseases.

Physical examination

Her motor strength was 3/5 grade in the upper extremities and 4/5 grade in the lower extremities. She suffered hypoesthesia below the C4 dermatome. Deep anal pressure and voluntary anal contraction were intact. According to physical examination, she was classified as C3 AIS D.

Laboratory examinations

Her blood glucose level was 74, 84, 94, 74, and 75 mg/dL pre-meal and 122, 133, 102, 106, and 140 mg/dL on 2 h after a meal. We did not examine hemoglobin A1c because we thought that her blood glucose level was well-controlled.

At the first hypotensive event, the laboratory test results showed WBC of 8,500/mm^3, CRP of 0.77 mg/dL, and procalcitonin of 0.04 ng/mL; troponin-I, lactate dehydrogenase, and creatinine levels were normal.

Imaging examinations

Cervical spine MRI revealed cord signal change at the C4-C6 Levels in the emergency room (Figure 1). Chest and abdomen x-ray revealed no specific finding at the first hypotensive event (Figure 2).

FINAL DIAGNOSIS

As all symptoms resolved after stopping tamsulosin, we posited tamsulosin as the possible cause of her symptoms.

TREATMENT

We stopped tamsulosin immediately after her severe event. To treat possible sepsis, we administered piperacillin-tazobactam after laboratory tests including blood, urine, and stool cultures including that for *Clostridium difficile*. After 2 days, no bacterial

growth was observed, and piperacillin-tazobactam was stopped. Norepinephrine was administered and tapered for 2 days.

OUTCOME AND FOLLOW-UP

At 4 days from the event, laboratory test results showed WBC of 5,600/mm^3, CRP of 5.0 mg/dL, and procalcitonin of 1.80 ng/mL. Her kidney function was normal, with a creatinine level of 0.60 mg/dL. There was no persistent difficulty in defecation.

We prescribed bethanechol chloride for voiding difficulty, and the patient was discharged 10 days after the first event[10,11].

DISCUSSION

At present, tamsulosin is widely used for voiding difficulty in patients with SCI. Although tamsulosin can affect BP, associated life-threatening hypotensive events are not common. One case report discusses tamsulosin-induced severe hypotension during general anesthesia [7]. Another documented increased risk of severe hypotension when administering tamsulosin to people with BPH [6]. However, there are no reported cases of tamsulosin-induced severe side effects in people with SCI.

In this case, the patient had two specific issues that commonly accompany cervical cord myelopathy: orthostatic hypotension and difficulty in defecation. Her other medications included antidiabetics and an angiotensin receptor blocker for underlying hypertension. These medications have no reported significant effect when co-administered with tamsulosin [2]. As mentioned earlier, she had no evidence of hypovolemic, neurogenic, cardiogenic, or septic shock. Treatment with only normal saline hydration showed no benefit to her symptoms, and no evidence of dehydration was found. Cardiogenic shock was a possible cause since her BP increased after administering atropine at the first event. However, her EKG showed sinus bradycardia and no evidence of cardiogenic shock. Her response to atropine might have been due to vasovagal syncope. No microorganisms were found in culture before administration of antibiotics, and no evidence of infection was found. Although elevated CRP and PCT

levels are common in septic conditions, those circumstances can be seen in other conditions, such as in anaphylactic shock [12]. Also, CRP and PCT levels can be increased by various etiologies other than infection [13]. Although autonomic dysreflexia is seen in SCI patients, she had experienced no prior acute hypertensive emergency and reported no noxious stimulus. Rather than autonomic dysreflexia, loss of sympathetic tone might have contributed to bradycardia or hypothermia. Therefore, a non-infectious and normal pathologic response was the suspected reason for her shock [14, 15].

Tamsulosin and malignant vasovagal syncope remained possible causes of her life-threatening hypotension. However, vasovagal syncope is a common disorder and does not usually cause life-threatening situations. The term "malignant vasovagal syncope" is used to explain a rare unexplained syncope that is recurrent and can cause serious disability [16, 17]. Because the patient recovered soon after stopping tamsulosin and had no further severe events, malignant vasovagal syncope was excluded as the cause of her severe hypotension. Excluding all other possible causes and combined with the absence of an additional severe event, we concluded that tamsulosin was the reason for her symptoms.

Furthermore, considering her history of DM, her shock might have been due to autonomic neuropathy. Diabetes-associated cardiovascular autonomic neuropathy (CAN) affects the autonomic nerve that innervates the heart and blood vessels and can cause multi-organ failure[18]. However, autonomic neuropathy due to DM was less likely because her blood glucose level had been well-controlled.

Though no other such cases have been reported, use of tamsulosin could cause severe side effects in people with SCI. We focused on orthostatic hypotension and vasovagal symptoms as risk factors of severe adverse effects of tamsulosin in people with SCI. Cardiovascular complications, including orthostatic hypotension, are frequently seen in people with SCI and are often attributed to sympathetic nervous system disturbances, loss of supraspinal control, and peripheral α-adrenoreceptor hyperresponsiveness [19, 20]. With disturbances in cardiovascular systems in people with SCI, adverse effects of tamsulosin are possible. In people with SCI suffering orthostatic hypotension and

vasovagal symptoms, tamsulosin could affect BP based on an underlying pathophysiology of orthostatic hypotension seen in SCI. Additionally, the duration of use of tamsulosin should be analyzed. Bird *et al* showed that the incidence of severe hypotension increased during the first 8 wk after administering tamsulosin to people with BPH [6]. The patient in the presented case suffered severe hypotension after 9 days of treatment with tamsulosin. The phrase "first-dose phenomenon" could be applied with use of tamsulosin in patients with SCI as well as in patients with BPH [6].

There were some limitations in this case report. First, we tended to manage urinary retention too strictly when using tamsulosin. The patient was able to self-void, and residual urine was in the range of 160-200 mL. Though we could have managed her with self-voiding and timed CIC, considering her cervical myelopathy, we thought that strict management of urinary retention with tamsulosin was needed to prevent urinary tract infection and autonomic dysreflexia. Second, we could not perform urodynamic study because the patient refused. In general, urodynamic study should be performed and used as the basis for appropriate treatments to manage voiding difficulty of SCI patients. We should have persuaded the patient to proceed with the urodynamic study. Third, we did not examine hemoglobin A1c level of the patient. However, in DM patients, hemoglobin A1c level should be measured because it reflects the mean blood sugar over the previous weeks to months[21].

CONCLUSION

This is the first reported case of severe life-threatening hypotension induced by tamsulosin in an SCI patient. Hence, we report this case to increase awareness when administering tamsulosin for neurogenic bladder to patients with SCI. Additional studies should be performed in patients with SCI treated with tamsulosin to reveal possible severe side effects.

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