OLGU SUNUMU CASE REPORT

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Midodrine Treatment in a Patient with Orthostatic Hypotension Associated with Spinal Cord Injury

Omurilik Yaralanmasına Bağlı Ortostatik Hipotansiyonlu Bir Hastada Midodrin Tedavisi

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ABSTRACT Orthostatic hypotension (OH) is an important clinical issue that may adversely affect the rehabilitation process in patients with spinal cord injury (SCI). In some clinical situations where OH is nonresponsive to non-pharmacological approaches, it may be beneficial to use midodrine for the treatment of OH, which is a potent vasoconstrictive agent. A 62-year-old male patients with C4 AIS C chronic spinal cord injury, he have OH associated with spinal cord injury admitted to hospital for the long term rehabilitative care. Rehabilitation program couldn't be maintained as a result of OH. Midodrine therapy was started to remove the OH. OH was completely improved with midodrine therapy and the patient was finally able to sit. During the treatment, rate of Autonomic Dysreflexia (AD) was increased, hence, the midodrin dosage was lowered to the level at which the AD was at least seen, and the treatment continued. The patient then was discharged from the hospital at a wheelchair-dependent level. The midodrine was observed to be effective for the treatment of OH in patients with SCI. AD, however, should be kept in mind that its frequency may increases as a side effect of midodrine therapy.

Keywords: Orthostatic hypotension; spinal cord injury; midodrine; autonomic dysreflexia

ÖZET Ortostatik hipotansiyon (OH), omurilik yaralanmalı (OY) hastalarda, rehabilitasyon sürecini olumsuz yönde etkileyebilecek önemli bir sorundur. OH'nun non-farmakolojik yaklaşımlara yanıtsız olduğu bazı klinik durumlarda, tedaviye güçlü bir vazokonstrüktif ajan olan Midodrinin eklenmesi OH tedavisinde faydalı olabilmektedir. Altmışiki yaşında C4 AIS C kronik spinal kord yaralanması olan erkek hastanın, OY'na bağlı gelişmiş olan OH'unun rehabilitasyonu olumsuz yönde etkilediği ve rehabilitasyon programında ilerleme kaydedilemediği görüldü. OH'nu ortadan kaldırmak amacıyla hastaya Midodrin tedavisi başlandı. Midodrin tedavisiyle OH tamamen kayboldu ve hasta oturabilir pozisyonu sağlayabildi. Midodrine bağlı otonomik disrefleksi (OD) sıklığı arttığından dolayı, midodrinin dozu, OD'nin en az görüldüğü seviyeye düşürülerek tedaviye devam edildi. Hasta tekerlekli sandalye seviyesine getirildi ve taburcu edildi. Omurilik yaralanmasına bağlı gelişen OH'nun tedavisinde midodrinin etkili olduğu gözlenmiştir. Bunun yanında, midodrin tedavisinin, OD'nin gelişmesi ya da sıklığının artmasına neden olabileceği akılda tutulmalıdır.

Anahtar Kelimeler: Ortostatik hipotansiyon; omurilik yaralanması; midodrin; otonomik disrefleksi

Orthostatic hypotension (OH) is a distressing clinical disorder, which is frequently related to Spinal Cord Injury (SCI). It is defined by The Consensus Committee of the American Autonomic Society and the American Academy of Neurology (1996) as a fall in systolic blood pres-

sure ≥20 mmHg, or in diastolic blood pressure ≥10 mmHg, upon the assumption of an upright posture from a supine position, independent of whether symptoms develop.[1] The exact mechanisms responsible for OH in patients with SCI are still unclear, and more likely to have multifactorial etiology. Some of the possible factors contributing to OH associated with SCI are as follows; lack of tonic sympathetic control (particularly at high level lesions), impaired baroreceptor regulation, lack of skeletal muscle pumping activity in the dependent limbs of paralyzed individuals, cardiovascular deconditioning after prolonged periods of bed rest, and hyponatremia leading to hypovolemia. This clinical condition severely affects the quality of life and has a marked impact upon activities of daily living, particularly participating in rehabilitation programs.[2] One study has found the rate of OH and its associated symptoms during tilting as 57% and 25% in patients with SCI, respectively.[3] The risk of OH is higher in individuals who sustain a traumatic SCI rather than non-traumatic injury and OH is more common in patients with tetraplegia than in those with paraplegia (prevalence rates 82% and 50%, respectively).[3,4] It is important to note that there are few reported incidents of OH related to SCI in the long-term, with the most associated symptoms being as lightheadedness, dizziness, blurred vision, weakness, or even syncope.[2,3,5] Non-pharmacologic methods including compression stockings, abdominal binders, applying functional electrical stimulation to lower extremities, adequate hydration, increased salt intake, and gradual changes in position should be the first choice of treatment in patients with OH. If the symptoms are non-responsive to conventional non-pharmacological strategies, many drugs are currently available to treat OH, such as fludrocortisone, sympathomimetic amines (ephedrine), somatostatin, caffeine, vasopressin agonists, dopamine antagonists, and ergot alkaloids.[2,6] Herein we would like to share an experience of midodrine therapy in a tetraplegic patient over two years of period after SCI in whom the rehabilitation program was adversely affected by OH but improved completely with midodrine therapy.

CASE REPORT

A 62-year-old male patient presented with C4 incomplete tetraplegia (C4-AIS C) over a two years of period after SCI following a high fall. In medical past history, patient had no comorbid conditions. It was notable that the patient had not been taken to any rehabilitation program within the period after the occurrence of complete tetraplegia. On admission, patients‘ mobilization level was at bed mobility and he was dependent on a caregiver to maintain his personal self-care. There were no urodynamic examinations performed after the SCI and he had a permanent urinary catheter. No available information regarding the AIS evaluation within the first 72 hours after the injury was available. Patient's AIS motor score was 16, and intra-anal contraction was present. He was sad and a little bit depressed for being unable to move and walk, however, he was hopeful enough to wish being able to have a sitting position from bed mobility. At the beginning of the upright activities, patient's complaints had been identified as dizziness, blurred vision, tachycardia, and sweating. During the first two weeks of rehabilitation, all the non-pharmacological therapeutics strategies including tilt training program, salt and fluid regulation, press to abdominal region, upper body exercises, compression bandages, and pressure stocking were applied. Despite all of these therapies, he couldn't tolerate more than 50 degrees of tilt angle and continued to have severe hypotension in upright position (70/40 mmHg) during transferring from bed to wheelchair. While the arterial blood pressure was 90/60 mmHg at supine position, it decreased to 70/40 mmHg at 50 degrees of tilt angle, with the accompanying symptoms of dizziness, and blurred vision. Before initiating midodrine therapy, kidney function tests and cardiovascular system were evaluated with biochemical blood tests, echocardiography, and electrocardiography in terms of inadequate renal functions, heart failure, and rhythm disorder as to whether there was any contraindication for midodrine therapy. Midodrine was orally administered 2,5 mg twice daily, at breakfast and lunch. Blood pressure, heart rate, and symptoms were

monitored frequently before and after administering midodrine. Two weeks after the midodrine initiation, the patient still continued to have the symptoms of OH at the dose of 2,5 mg twice daily. However, after increasing the dose of midodrine up to 7,5 mg twice a day, symptoms and OH were observed to improve. When increasing the dose up to 12,5 mg twice daily, hypertension attacks, facial sweating, anxiety, and bradycardia developed, which were more likely considered to be associated with Autonomic Dysreflexia (AD). The frequency of AD was seemed to increase at the dose of 12.5 mg twice daily. The dose, therefore, was decreased to dose of 10 mg per day at which AD did not repeat. The patient completed the tilt program within six weeks. At the end of the program, the patient was able to sit on a wheelchair for 3 to 4 hours, which led to a significant increase in the level of social interaction of the patient, such as making long conversations with other patients around a table. The patient, however, encountered some scars on tuberositas ischii and sacrum due to the sitting for prolonged periods on the wheelchair. His wounds were treated applying dressings to the scars. The rehabilitation care was eventually reached to its primary aim and the patient was discharged from the hospital at a wheelchair-dependent level.

DISCUSSION

OH may occur in either acute or chronic phase of SCI and has a negative impact upon the ability of affected individuals to participate in rehabilitation. Midodrine, an alpha-1 agonist, exerts the effects through activation of the alpha-adrenergic receptors on the vascular walls, thereby adjusting the vascular tone and increasing the blood pressure.[7,8] Case series have been reported regarding the effects of midodrine on increasing orthostatic blood pressure and reducing the symptoms of OH in individuals with SCI, suggesting that midodrine is a well-tolerable and effective agent to treat OH associated with SCI, with the aim of improving the OH to facilitate and optimize the rehabilitation activities.[9] When adjusting the dose of midodrine, physicians should be aware of the hypersensitivity of alpha-1 adrenoreceptors. The starting dose needs to be increased gradually within 1 to 3 days, in order to maintain the same effect; however, this desensitization does not continue after the first week of therapy. The initial dose is 2.5mg twice a day (at breakfast and lunch) and it is increased daily by 2,5 mg until reaching a convincing response, or a maximum daily dose of 30 mg.[7,10]

As in our case, AD was reported in several cases with tetraplegia following midodrine administration given for the treatment of OH in SCI.[11,12] It is important to differentiate the adverse effects of midodrine from the AD. A careful attention should be paid on both clinical conditions, as it is known that AD might be life-threatening, hence needs a greater attention when prescribing midodrine for the treatment of OH in individuals with SCI. Patients and their relatives who will experience the use of midodrine for OH should be carefully informed regarding the side effects of midodrine and AD, in order to avoid further complications of the treatment. In conclusion, midodrine is an effective agent for treatment of SCI-induced OH; however, AD should be kept in mind as a serious adverse event during midodrine therapy.

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