

# Micturition Syncope: Report of Two Cases

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## ABSTRACT

Micturition syncope: report of two cases

Syncope is a symptom which is a transient loss of consciousness and very common in society and is one of the most important referral causes to emergency services. Micturition syncope (MS) appears as a rare cause of neurally-mediated syncope. MS is caused by reflex which results with vasodilatation and bradycardia, like defecation syncope. In the clinical setting, the MS is presented with transient loss of consciousness during supine position or micturition following after a sleep period mostly in otherwise healthy men. It is a reflex state in which standing triggers vasodilatation and bradycardia. MS covers 2-8% of all syncopes. There is still no consensus about treatment and outcome of MS. In this article two male patients with MS are presented. With these two cases, we aimed to give detailed information about micturition syncope which is a rare type of syncope.

**Key words:** Syncope, micturition syncope, vasovagal reflex

## ÖZET

Miksiyon senkobu: İki olgu sunumu

Toplumda sık görülen ve acil servise başvurunun önemli nedenlerinden olan senkop, kısa süreli geçici bilinç kaybı ile karakterizedir. Miksiyon senkobu (MS), nöral kökenli refleks sendromlarından birisidir. MS ve defekasyon senkobu, vazodilatasyon ve bradikardi ile sonuçlanan refleks nedeniyle ortaya çıkmaktadır. Klasik olarak MS sağlıklı insanlarda, uykudan uyanıp idrar yapma sonrası gelişen senkop şeklinde tarif edilmektedir. Halen MS hakkındaki bilgiler çok sınırlıdır. MS tüm senkopların %2-8'ini oluşturmaktadır. MS'nin tedavi ve sonuçları konusunda halen görüş birliği yoktur. Sunacağımız iki olgu ile nadir görülen bir senkop çeşidi olan miksiyon senkobuna ait ayrıntılı bir değerlendirme yapılması amaçlanmıştır.

**Anahtar kelimeler:** Senkop, miksiyon senkobu, vazovagal refleks

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## INTRODUCTION

The micturition syncope was first reported by Rugg-Gunn (1) in 1946 as a syncope occurring immediately after urination. However no study had been conducted on this syndrome during the following ten years. A study of 40 cases including 3 women reported by Gestaut is the most comprehensive study on this syndrome (2). The number of the studies gradually increased during the ensuing period, even familial forms were reported.

As with all types of syncope, differential diagnosis of MS from epilepsy and the other causes of syncope should also be considered. This is an important clinical situation that may guide the treatment. According to the hypothesis of Chakravarty (3), the main reason of this syndrome is the vasodilation and decreased vascular resistance due to vasovagal reflex related to urination after getting up from a warm a bed. MS is a rare type of

syncope and due to the little knowledge of the physicians about the disease, its diagnosis may be missed. Furthermore, unlike other syncopes, MS responds the behavioral treatment modalities. We present two cases diagnosed with MS along with the studies on this subject in literature.

## CASE 1

M.K. was a 62 year old male farmer. He was admitted to our department with the complaint of a syncope lasting 2-3 minutes, that occurred one week ago immediately after getting up and urination in the morning. About one year ago, he had the same complaint however he had not applied to any medical center. The patient was hospitalized to our department for the differential diagnosis of syncope and seizure.

He had a history of essential hypertension (HT) for 5 years and type II Diabetes Mellitus in his medical history.

He was on the treatment of 2000 mg/day metformin, 10 mg/day amlodipine and 100 mg/day acetylsalicylic acid. There was no remarkable clinical features in his family history and smoking-drinking habits.

The patient did not define any sensation of fainting, cold sweat, grayout or nausea and he was first assessed for orthostatic hypotension. His blood pressure was measured as 130/80 mmHg while he was in a lying position; 125/80 mmHg when he stood up; and 125/70 mmHg on the third minute in standing position. These results were not considered as significant in terms of orthostatic hypotension. In addition the patient was seen by a cardiologist and the patient underwent a 24 hour heart rhythm and blood pressure monitoring. Electrocardiogram (ECG) was clinically normal however a left ventricular diastolic dysfunction and left ventricular concentric hypertrophy was detected in his echocardiogram. These results eliminated pathological conditions leading to cardiogenic syncope. The neurological examination of the patient was normal.

The patient's blood biochemistry test results, vitamin B12, folic acid, ferritin, HbA1c were found within the normal limits. No abnormality was detected in the values of complete blood count and thyroid function test results.

Tilt table test is essentially a drug free test but it may be produced by a drug (isoprotenerol) if needed. The patient underwent a drug free tilt testing since he did not accept drug provocation testing. After making the patient lie flat for 15 minutes, heart rhythm and blood pressure were monitored during the next 45 minutes at a 80 degrees upright position. Neither bradycardia nor orthostatic hypotension was observed and the tilt table testing of the patient was considered as negative. A 30 minute-routine electroencephalogram (EEG) of the patient was performed for the diagnosis of seizure and was considered as normal. A 24 hour-sleep deprived and 40 minutes-awake EEG was planned and the results were within the normal limits.

Diffuse chronic gliotic foci irrelevant to syncope were observed on 1.5 Tesla cranial magnetic resonance imaging (MRI) and diffusion MRI of the patient. Furthermore carotid and vertebral Doppler examinations were normal and an acute diffusion limitation was not observed.

## CASE 2

I.S. was a 75 year old male farmer. He presented with the complaint of grayout and fainting sensation for one minute without losing consciousness after he woke up at 4 am and urinated in a sitting position, for two times (15 days and 3 days ago). The cough was not associated with fainting.

His medical history revealed a history of chronic pulmonary disease for 55 years and he was on formoterol and budesonide inhaler, in addition to hydrochlorothiazide due to essential hypertension lasting for 10 years.

His family history was unremarkable and neurological exam was normal. In the evaluation of the patient in terms of orthostatic hypotension; his blood pressure was measured as 130/75 mmHg while he was in a lying position; 120/70 mmHg when he stood up; and 125/65 mmHg on the third minute in standing position. This finding was not considered as significant for orthostatic hypotension. ECG was normal and complete blood count results were within the normal limits. However, blood biochemistry testing revealed a ferritin level of 13.7 ng/ml (reference range: 23.9-336.2 ng/ml) and a homocysteine level of 22.3  $\mu$ mol/L (reference range: 5-15  $\mu$ mol/L). An appropriate treatment was prescribed according to these values. Other biochemical results and blood gas analysis were found within the normal limits.

The patient was seen by a pulmonologist for chronic bronchitis and was diagnosed with emphysema and a moderate chronic obstructive pulmonary disease and a new treatment was prescribed to the patient. The patient was also seen by a cardiologist for the assessment of syncope and a 24 hour Holter monitoring of rhythm and blood pressure and echocardiographic examination were recommended. The blood pressure monitoring results were in the range of 120/70 to 130/85 mmHg. Rhythm Holter examination revealed a basal sinus rhythm, a sinus tachycardia with a maximum heartbeat rate of 125 beats/minute, the minimum heart rate was 75 beats/minute and the average heart rate was 92 beats/minute and no conduction block was detected. The 24-hour blood pressure Holter revealed an average blood pressure

of 115/74 mmHg, while the day average was found as 115/74 mmHg, the nightly average was measured as 117/72 mmHg. No abnormal finding was determined in echocardiographic examination. No significant cardiopulmonary pathology that might lead to syncope was determined. Cranial MRI and Vertebral and carotid Doppler US examination results were within the normal limits. The patient refused to undergo a tilt table test and for this reason, this test could not be performed.

## DISCUSSION

Syncope is a common symptom for emergency admission and common in the society and is defined as a transient loss of consciousness for a short period of time.

In a recent study, syncope was ranked as the sixth leading cause of emergency and hospital admission among the patients over 65 years old. In patients diagnosed with syncope, the average length of hospital stay varies from 5 to 17 days (4).

MS is a situational type of neurally mediated syncope syndrome (5). Transient loss of consciousness was divided in two as syncopes and non syncopal conditions according to the European Society of Cardiology Guidelines of 2004 and micturation syncope was classified under the subunit of situational syncope among the neurally mediated (reflex) syncopes (6). Defecation syncope and gelastic syncope which is a very rare type of syncope were also included in this group. Situational syncopes are defined as neurally mediated syncope forms related to certain activities (micturation/defecation/cough) (6).

MS has been defined as a transient loss of consciousness occurring mostly in healthy men after lying down in a supine position or after sleep (7,8). Sudden emptying of a full bladder stimulates the mechanoreceptors in the bladder wall. The afferent stimulus passes to brainstem through the vagus nerve, parasympathetic activity is triggered and bradycardia develops. The inhibition of sympathetic activity results in arterial dilation and hypotension (7,8). In our cases, the development of MS after getting up from a warm bed was consistent with the classical definition of MS.

Kapoor and colleagues stated that the clinical features

of MS might vary according to age and the knowledge about MS was very limited up to that date (9).

MS tends to develop in the evening or before the midnight in younger persons (under the age of 55) and at midnight or early in the morning in elderly. Alcohol is known as an important trigger factor in MS among young population (9,10). Although the hypothesis of Chakravarty (3) defined that MS can be seen only in males, the presence of a female patient diagnosed with MS in the same study, result in doubt about supposing MS as a problem of male gender alone.

A variety of mechanisms are effective in the development of MS. "Neuronally mediated syncope" is a reflex reaction triggered by vasodilatation and bradycardia. However systemic hypotension and cerebral hypoperfusion are two factors significantly contributing to the development of syncope (6).

In standing position, the muscle pump mechanisms in the legs do not function in males and sudden decrease in venous return results in stretching in the resistance-sensitive vessels. In men with prostatic hypertrophy, intrathoracic pressure increase due to forced vasalva maneuver and venous return to heart suddenly decrease. The relaxation of the distended bladder results in reflex vasodilation related to the decreased stimulation of bladder stretch receptors. The essential physiological mechanism, has been interpreted as over-functioning of parasympathetic nerves (3). In our cases, we believe that leaving the warm bed and the reflex vasodilation following sudden urinary voiding were effective in the pathophysiology of the development of MS.

The difference between males and females is related to the posture during urination. Men diagnosed with MS, are recommended to urinate while sitting on the closet or in squatting position. This may also decrease the risk of major trauma (3).

Since most cases are associated with orthostatic hypotension, the cases of micturation syncope are approached with suspicion. In our cases the absence of orthostatic hypotension in the bedside measurements and 24 hour tension Holter of the patients was considered as significant for the micturation syncope.

Mostly, the evaluation and treatment of syncope are performed negligently and lack a known algorithm. The

diagnosis is essentially made by the medical history of the patient. Although there are a variety of diagnostic tests, the rate of definitive diagnosis varies from 10% to 70% (6). The diagnosis of MS is mainly based on the medical history and clinical findings. The diagnosis of syncope and treatment modalities were defined in the Guidelines of 2004 of the European Society of Cardiology. Tests required for the diagnosis of MS include; ECG, blood pressure monitoring, 24 hour-Holter blood pressure monitoring, 24 hour Holter ECG and autonomic function tests (sympathetic skin responses, tilt table test, valsalva maneuver etc.), computed tomography, magnetic resonance imaging and EEG (6).

After the exclusion of cardiac reasons, the tilt table test may be used for differentiating the orthostatic hypotension related to autonomic dysfunction from reflex syncope in cases of unexplained syncopes lacking typical diagnostic clues. The sensitivity of the test varies from 20% to 74% at 600 and 900 in a period of time of 20 to 60 minutes. In a study conducted by Komatsu and colleagues (11), the positivity of the tilt table test was found as 37%.

A single attack of syncope does not require treatment. However the increased frequency of syncope, decrease in quality of life, high risk of trauma (even minor head traumas in elderly may cause intracranial pathologies)

or in case of occupational high risks (driver, machine operators, athleticism), the condition should be treated. For the treatment of situational syncope, addition of salt in the diet for the expansion of volume, bladder gymnastic as intermittent voiding during urination, avoiding sudden emptying of bladder and raising the inclination of the bed of the head more than 10 degrees are recommended (6). In our cases pharmacological treatment was not started because the attacks were infrequent and the life quality of the patients were not affected. Behavioral treatment modalities such as avoiding sudden getting up off the bed, sitting in bed for a while, and intermittent urination and follow up were recommended to the patients.

In conclusion, MS is a symptom that can be easily missed out due to insufficient medical history and rarely considered in the differential diagnosis of syncope. In the literature review, we observed that studies conducted by neurologists were particularly insufficient. The advanced age, male sex, syncope attacks occurring in late night while urinating in sitting or standing positions pointed out MS as a diagnosis in our cases in consistent with the limited number of publications in the literature. In this study, we aimed to attract clinicians' attention to MS and share the studies on this subject in the literature.

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