



Clinical Characteristics of Defecation Syncope Compared With Micturition Syncope

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Background: Defecation syncope (DS) and micturition syncope (MS) are daily excretion-related syndromes that are both classified as situational. However, their clinical features seem to be very different, so the present comparative study aimed to clarify those of DS.

Methods and Results: The study population consisted of 20 consecutive patients with DS and 37 consecutive patients with MS. The DS patients were significantly older than the MS patients (63 ± 15 vs 52 ± 17 years, $P=0.026$). Gender was significantly different ($P=0.026$): women predominated in the DS group (60%) whereas men more commonly had MS (70%). The diurnal distribution of syncope differed ($P=0.0054$): 88% of MS episodes occurred between 6 PM and 6 AM, whereas DS occurred almost equally throughout the 24 h. Syncope after drinking alcohol was less common with DS (10%) than with MS (60%) ($P=0.0003$), whereas gastrointestinal tract (GIT) symptoms as a premonitory sign were more common with DS (55%) than with MS (3%) ($P<0.0001$). Positive responses to head-up tilt testing did not differ between the DS and MS groups.

Conclusions: DS tends to occur in elderly women and without any significant daily distribution. Alcohol-related syncope was uncommon in patients with DS, and preceding GIT symptoms may be important as predictors or triggering factors. (*Circ J* 2010; **74**: 307–311)

Key Words: Defecation syncope; Micturition syncope; Situational syncope

Defecation syncope (DS) and micturition syncope (MS) are both daily excretion-related transient circulatory disorders classified as situational syncope.¹ However, their respective clinical features seem to be different, but there have been only a few clinical descriptions of DS.^{2–4} The aim of this study was to clarify the clinical characteristics of DS as compared with those of MS.

Methods

The study population consisted of 20 consecutive patients who had experienced DS and 37 consecutive patients with MS, referred to 3 institutions (Juntendo University Hospital, Juntendo University Shizuoka Hospital, and University Hospital of Occupational and Environmental Health) between August 1995 and December 2006. Two female patients (54 years and 71 years, respectively) had experienced both DS and MS so they were included in both groups.

Clinical characteristics including age, gender, number of syncopal episodes, association with vasovagal syncope and cardiovascular diseases, time of occurrence of syncope, predisposing factors, association with premonitory symptoms (prodromes), and response to head-up tilt testing (HUT) were compared between the DS and MS groups. All patients were interviewed for their complete medical history, and they underwent physical and neurological examinations, routine laboratory testing, a 12-lead ECG, ambulatory ECG monitoring for ≥ 24 h, and echocardiography. Other cardiac or neurologic investigations, such as exercise stress test, electrophysiologic study, cardiac catheterization, coronary angiography, computed tomographic brain scans, and electroencephalograms, were performed only when clinically indicated. In all patients other causes of syncope or presyncope were excluded before performing a tilt test. A gastrointestinal tract (GIT) examination was performed only if specific gastrointestinal problems were being evaluated.

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Table 1. Comparison of Clinical Characteristics of Defecation Syncope and Micturition Syncope

	Defecation syncope	Micturition syncope	P value
No. of patients	20	37	
Age (mean \pm SD)	62.5 \pm 15.0	52.2 \pm 16.8	0.026
Range	32–86	19–76	
Sex (M/F)	8/12	26/11	0.026
Male %	40%	70%	
No. of syncopal episodes			
1	7 (35%)	23 (62%)	0.05
>1	13 (65%)	14 (38%)	
Concomitant with vasovagal syncope	5 (25%)	14 (38%)	NS
Time of occurrence of syncopal episodes			
Day (6 AM–6 PM)	10/22 (45%)	4/33 (12%)	0.0054
Night (6 PM–6 AM)	12/22 (55%)	29/33 (88%)	
Predisposing factors			
Alcohol intake	2 (10%)	22 (60%)	0.0003
Vasodilators or diuretics	5 (25%)	7 (19%)	NS
Premonitory signs			
Gastrointestinal tract symptoms	11 (55%)	1 (3%)	<0.0001
Abdominal cramps	9	1	
Strong urge to defecate with diarrhea	4		
Vomiting	2		
Nausea	2		
Head-up tilt test results			
Passive tilt positive	3/17 (18%)	3/35 (8.6%)	NS
ISP/NTG tilt positive	1	9	
Overall positive	4/17 (24%)	12/35 (34%)	NS

ISP, isoproterenol; NTG, nitroglycerin.

Patient clinical information was collected retrospectively from their medical records. After written informed consent was obtained, the HUT was performed in a quiet room after at least a 5-h fast. A peripheral intravenous catheter was inserted 30 min before the test, and a saline solution of 4.3% glucose was started at a rate of 60 ml/h. The ECG was monitored continuously during the test, and arterial blood pressure was monitored noninvasively by a tonometry system (BP-508, Colin Electronics, Komaki, Japan). After at least 15 min resting supine, each patient was positioned upright at 80 degrees for a maximum of 30 min on the tilt table equipped with a footboard for bearing weight (passive tilt). If the passive tilt ended as a negative, the patient was returned to the supine position and the HUT with either isoproterenol (ISP) or nitroglycerin (NTG) provocation was performed. For ISP provocation, ISP was infused at 0.01 μ g/kg body weight per minute IV for 10 min. The tilt test was then repeated for a maximum of 10 min. If the initial ISP tilt ended as a negative and the maximum heart rate did not exceed 120 beats/min, the patient was returned to the supine position and the ISP dose was increased to 0.02 μ g \cdot kg⁻¹ \cdot min⁻¹ for 10 min and the tilt test was repeated again for a maximum of 10 min. For NTG provocation, a 0.3 mg tablet was administered sublingually if the passive tilt ended as a negative. The tilt test was then repeated for a maximum of 15 min. If syncope or presyncope developed during the test, the tilt table was rapidly lowered to the supine position and the study ended. We preferred to perform NTG provocation if the patient fulfilled the following criteria: elderly (≥ 65 years) with (1) hypertension, (2) coronary artery disease or (3) arrhythmia such as sinus tachycardia, frequent premature ventricular

contractions, or Wolff-Parkinson-White syndrome.

Syncope is defined as a sudden transient loss of consciousness, associated with an inability to maintain postural tone. Presyncope is defined as experiencing premonitory signs (eg, severe weakness or lightheadedness). The criterion of DS is syncope occurring during or immediately after defecation. Patients who experienced syncope during rectal examination, an enema, sigmoidoscopy or colonoscopy were excluded from this category. MS was defined as an episode of syncope occurring at any time from the onset to cessation of urination. A positive response was defined as the development of syncope or presyncope associated with hypotension (systolic blood pressure <90 mmHg), bradycardia (heart rate <50 beats/min) or asystole >3 s. Three types of responses were noted during tilt testing: vasodepressor, mixed or cardioinhibitory response.⁵

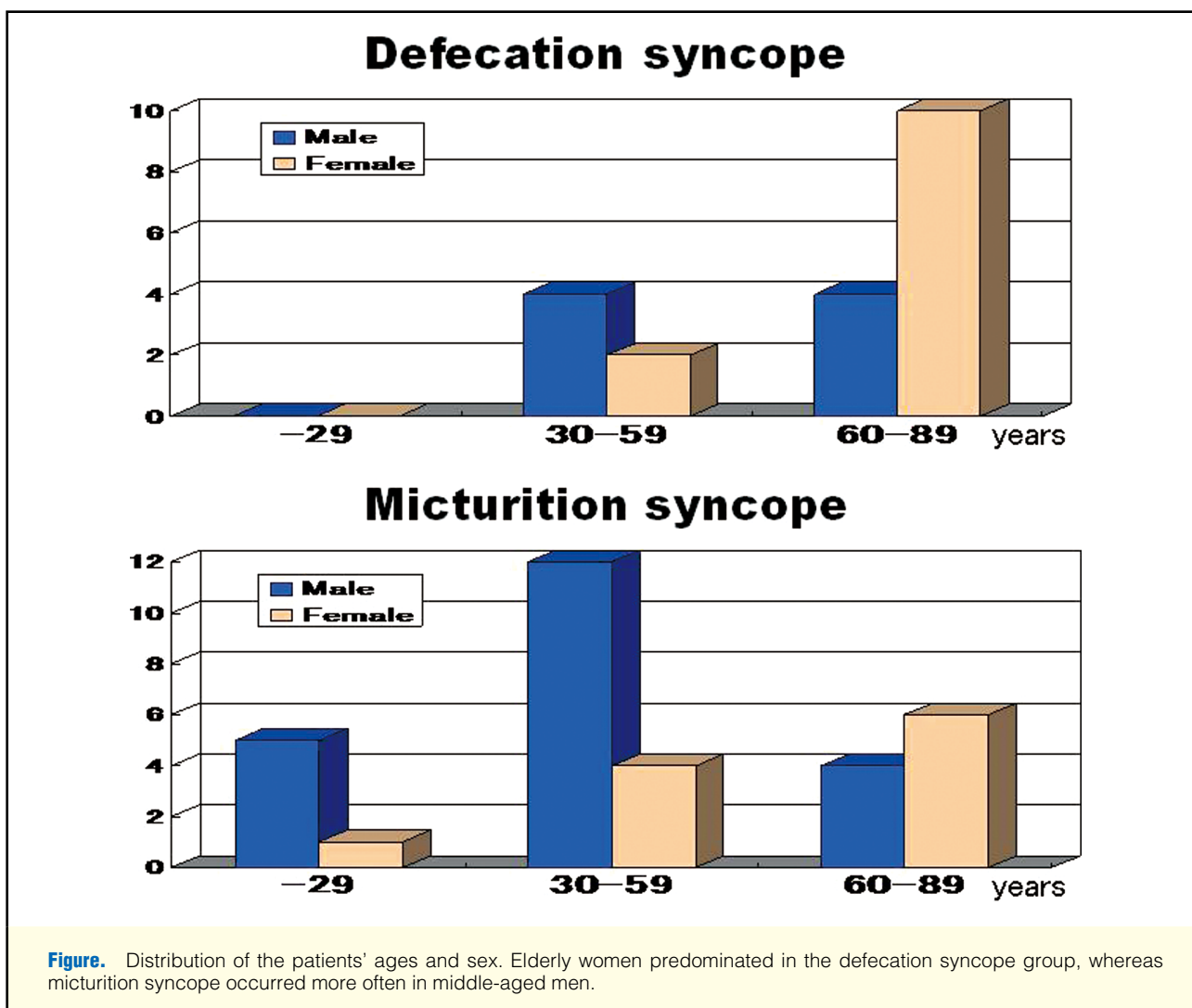
Statistical Analysis

Continuous variables are presented as the mean \pm SD and were compared by paired t test. Categorical variables were compared by Fisher's exact test. A P value <0.05 was considered statistically significant.

Results

Age and Sex

The DS patients were significantly older than the MS patients (63 \pm 15 vs 52 \pm 17 years, P=0.026) and more likely to be women (60%, P=0.026), whereas men more commonly had MS (70%) (Table 1, Figure).



Number of Syncopal Episodes and Association With Vasovagal Syncope

Patients with a single episode of syncope were less common in the DS group (35%) than in the MS group (62%) ($P=0.05$) (Table 1). An association with typical vasovagal syncope did not differ between the DS (25%) and MS (38%) groups, including 1 patient in the DS group who had pain at the time of colonoscopy.

Association With Underlying Cardiovascular Disease

As shown in Table 2, an association with cardiovascular diseases was common with DS (65%) compared with MS (41%), but was not significant ($P=0.078$). Hypertension was the most common disease in both groups.

Daily Distribution of Syncopal Episodes

The time of occurrence of syncope was identified in 22 episodes in 16 patients with DS and in 33 episodes in 24 patients with MS. The diurnal distribution of syncope was significantly different ($P=0.0054$): 88% of MS episodes occurred at night between 6 PM and 6 AM, whereas DS occurred almost equally throughout the 24 h (45% during the daytime and 55% at night) (Table 1).

Precipitating Factors

DS occurred after alcohol intake in only 2 patients (10%) whereas alcohol-related episodes of syncope were common in MS patients (22 patients (60%), $P=0.0003$) (Table 1). In the DS group, 5 patients were taking vasodilators, including calcium-channel blockers ($n=2$), angiotensin-converting enzyme inhibitors ($n=2$), and angiotensin II blockers ($n=2$), and 3 patients were taking diuretics. Beta-blockers were prescribed in 2 patients. In the MS group, 7 patients were taking vasodilators, including calcium-channel blockers ($n=6$, 1 patient also taking an angiotensin-converting enzyme inhibitor) and 1 patient was taking α -blocker plus an angiotensin II blocker. None of the patients was taking diuretics at the time of MS. Vasodilator and diuretic administration did not differ between the DS (25%) and MS group (19%).

Premonitory Symptoms

In the DS group, an association with GIT symptoms immediately before syncope was identified in 11 patients: abdominal cramps in 9, strong urge to defecate with diarrhea in 4, vomiting in 2, and nausea in 2 (Table 1). However, only 1 patient had abdominal pain before MS. GIT symptoms as a premonitory sign were more common with DS (55%) than with MS (3%) ($P<0.0001$).

Table 2. Association With Cardiovascular Disorders in Patients With Defecation Syncope or Micturition Syncope

	Defecation syncope	Micturition syncope	P value
Underlying cardiovascular disease			
Yes	13 (65%)	15 (41%)	0.078
Hypertension	6 (30%)	12 (32%)	NS
Coronary artery disease	4	2	
Diabetes mellitus	2	2	
Sick sinus syndrome	1*	1	
Atrioventricular block	1	2*	
Left bundle branch block	1	0	
Hypothyroidism	1	0	
Myasthenia gravis	1	0	
Paroxysmal atrial fibrillation	0	1	
Wolff-Parkinson-White syndrome	0	1	

*Pacemaker implantation.

Results of HUT

Of the 20 patients with DS 17 underwent the HUT was performed and 35 of the 37 patients with MS also underwent the test. The remaining patients in each group did not give informed consent for the HUT. During the passive HUT, 1 patient with DS had to discontinue because of hyperventilation and 2 patients with MS discontinued because of orthostatic hypotension (n=1) or hyperventilation (n=1). During the passive HUT, 3 patients with DS and 3 with MS had a positive response. In the DS group, ISP or NTG provocation was performed in 13 patients (9 with ISP, 2 with NTG), but only 1 patient was positive during ISP tilt testing. In the MS group, drug provocation was performed in 26 patients (22 with ISP, 4 with NTG) and 9 were positive (7 with ISP, 2 with NTG). In the DS group, all 4 positive responses were the mixed type, whereas in the MS group, positive responses were vasodepressor (n=5) or mixed type (n=7). A cardioinhibitory response was not observed in either group. The rate of a positive response did not differ between the DS and MS groups during the passive HUT (18% vs 8.6%) or in the overall result (24% vs 37%).

Discussion

Our study demonstrated that DS tends to occur in elderly women, does not have a significant daily distribution and there are less alcohol-related episodes compared with MS. Preceding GIT symptoms, such as abdominal cramps or a strong urge to defecate with diarrhea, may be important as predictors or triggering factors.

Age and Sex

The distributions of age and sex differed between patients with DS and MS. DS is reported to occur more in elderly patients than in adolescent or middle-aged populations,²⁻⁴ whereas MS often occurs in young patients.⁶⁻⁹ Our results showed that women predominated (60%) in the DS group whereas MS was more common in men (70%). Female predominance has been reported as 65–78%,²⁻⁴ which concurs with our result, but a precise explanation has not been ascertained. Male dominance in MS has been identified previously,⁷⁻⁹ probably related to greater alcohol intake and voiding in the standing position.⁶⁻⁹ In addition, a single episode of syncope was more common with MS than with DS, probably because of more younger patients being included in the MS group.

Association With Cardiovascular Diseases

Although the difference was not statistically significant (P=0.078), there was a slightly higher prevalence of an association with cardiovascular disorders with DS (65%) than with MS (41%). Kapoor et al reported that an association with cardiovascular disorder was common in patients with DS.³ Advanced age may have a greater effect on the prevalence of cardiovascular disease in the DS group.

Alcohol Intake and Daily Distribution of Syncopal Episodes

Syncopal episodes after drinking alcohol were significantly more prominent with MS (60%) than with DS (10%) (P=0.0003). Alcohol dilates the arterial and venous vessels, which leads to diminished venous return and activates the sympathetic nerve system,¹⁰⁻¹² as with ISP or NTG, which are used as the provocative agents in the HUT. Alcohol is a notorious precipitating factor in cases of MS.^{6,9} We have reported that MS occurs more often as an alcohol-related episode in a young population,⁹ but previous studies of DS do not mention alcohol intake. In the present study, we demonstrated that alcohol intake is not a major precipitating factor for DS and similar to a previous report,¹³ the greater number of alcohol-related episodes in MS may affect the difference in daily distribution.

Association With Prodromal GIT Symptoms

In the present study, GIT symptoms preceded syncopal episodes in more than half of the patients with DS (55%), whereas only 1 patient (3%) with MS exhibited an association with this symptom. Kapoor et al³ reported that GIT symptoms occurred immediately before syncope in 12 (60%) of 20 patients with DS. In their study population, although they excluded DS associated with diarrhea, a strong urge to defecate (8 patients), abdominal cramps and bloating (5), nausea and vomiting (2), and constipation (2) preceded DS. The precise mechanism of DS is not fully understood. Diminishing venous return to the heart by the Valsalva maneuver and a neurally mediated reflex during defecation could trigger a fall in arterial pressure and associated decrease in heart rate.³ Sympathetic and parasympathetic autonomic nerve dysfunction have been reported in patients with DS.⁴ An irritable GIT could influence the autonomic nervous system and contribute to the occurrence of DS. GIT symptoms, specifically abdominal cramps and a strong urge to defecate with or without diarrhea, may be important predictors or triggers for DS.

Results of the HUT

In this study, the rates of positive passive and overall HUT testing did not differ between the DS and MS groups. Poor positive responses to HUT, specifically passive HUT, have been identified in patients with situational syncope^{14,15} and may be explained by the fact that the afferent pathways of the neurally mediated reflex differ from those in tilt-induced vasovagal syncope.^{1,14} In addition, genetic factors might influence the HUT results.¹⁶

Study Limitations

First, we examined only 20 consecutive patients with DS, which is a relatively rare type of neurally mediated reflex syncope. There have been only 3 previous studies, which included 7–20 patients,^{2–4} so in that regard, our study population is not small. Second, we investigated the clinical data retrospectively from medical records, so we could not obtain all the clinical information from all the study patients: the time of day at which the syncope occurred was obtained from 16 patients (80%) with DS and from 24 patients (65%) with MS. This is a major limitation to our study. Third, we could not evaluate the recurrence of syncope because it was difficult to obtain follow-up information from most of the study patients. A large multicenter study is needed to confirm our results and identify the prognosis of DS.

Conclusions

DS tends to occur in elderly women and does not have a significant daily distribution. In DS, alcohol-related syncope is uncommon and preceding GIT symptoms may be important as predictors or triggering factors.

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