

OBJECTIVES

Nocturia results from a mismatch between bladder capacity and urine production, which is determined with a frequency volume chart (FVC). The aim of this study was to describe variations in nocturia severity and its associated factors.

METHODS

This was a post-hoc analysis of patients who all completed a 72h-FVC in previous prospective, observational studies. The nocturnal polyuria index (NPI) was defined as the ratio of nocturnal on 24h urine output. Subgroups were defined according to the variation in nocturia frequency during the three 24h-periods of the FVC (fluctuating/ continuous) and to the number of nocturia episodes during a single night (0/1/≥2).

RESULTS

We analyzed 504 24h-FVC, collected by 168 subjects (58% female) with a median age of 60 (50-68) years. All significant parameters on univariate analysis were included in a multivariate logistic regression model to predict for the occurrence of nocturia ≥2 during during a given night. Body mass index (OR 1.076; p=0.020), daytime fluid intake (OR 1.002; p<0.001), maximum voided volume (OR 0.992; p<0.001) and NPI (OR 1.119; p<0.001) remained significant predictors for the presence of at least two nocturnal voids during a given night.

Nocturia frequency fluctuated in 69 (41%) subjects. Table 1 shows that for the same number of nocturnal voids, we found no differences in NPI and maximum voided volume (MVV) between continuous and fluctuating nocturia frequency. Increasing numbers of nocturnal voids were associated with an increasing NPI in subjects with fluctuating nocturia, while for continuous nocturia, it was linked to an increase in NPI and a decrease in MVV. For both subjects with fluctuating and continuous nocturia, increasing nocturia severity was associated with increasing daytime fluid intake.

Table 1: General characteristics, underlying causes of nocturia and fluid intake according to the number of nocturia episodes during a single night in subjects with continuous or fluctuating nocturia frequency

	Nocturia = 0 (n = 80)			Nocturia = 1 (n = 133)			Nocturia ≥2 (n = 191)			p-value° between continuous n = 99	p-value° between fluctuating n = 69
	continuous	fluctuating	p-value*	continuous	fluctuating	p-value*	continuous	fluctuating	p-value*		
Number of 24h registrations	123	57		45	88		129	62		297	207
Age (years)	49 (31-61)	63 (53-69)	<0.001	61 (48-68)	60 (53-69)	0.515	67 (55-69)	52 (52-69)	0.129	<0.001	0.942
Gender, M/F (% F)	57/66 (54)	14/43 (75)	0.006	12/34 (74)	37/50 (58)	0.088	66/63 (49)	27/35 (57)	0.356	0.012	0.049
BMI (kg/m ²)	24 (22-25)	24 (22-26)	0.838	25 (23-27)	24 (22-26)	0.092	25 (23-27)	25 (22-27)	0.519	0.011	0.304
Mean voided volume (ml)	286 (198-400)	225 (169-301)	0.006	260 (218-311)	209 (159-280)	0.037	178 (146-225)	179 (140-271)	0.288	<0.001	0.152
Maximum voided volume (ml)	450 (320-640)	400 (300-575)	0.195	428 (340-505)	400 (300-520)	0.604	350 (280-410)	320 (348-500)	0.939	<0.001	0.067
NPI (%)	25 (18-33)	26 (18-32)	0.857	28 (21-40)	31 (25-38)	0.304	41 (33-50)	38 (28-46)	0.099	<0.001	<0.001
Nocturnal urine output (ml/h)	46 (33-67)	36 (27-62)	0.035	76 (49-98)	65 (44-102)	0.555	103 (72-135)	82 (50-113)	0.008	<0.001	<0.001
Nocturnal polyuria**, n (%)	22 (18)	10 (18)	1.000	15 (33)	36 (41)	0.354	94 (73)	37 (60)	0.070	<0.001	<0.001
Reduced FBC ⁺ , n (%)	15 (12)	11 (19)	0.255	6 (13)	19 (22)	0.251	26 (20)	20 (32)	0.073	0.209	0.220
Global polyuria, n (%)	20 (16)	6 (11)	0.368	13 (28)	13 (15)	0.106	30 (23)	12 (19)	0.581	0.171	0.422
Daytime fluid intake (ml)	1150 (915-1403)	1200 (760-1465)	0.674	1363 (1063-1713)	1325 (1075-1670)	0.816	1500 (1075-1800)	1300 (950-1650)	0.052	<0.001	0.049
Evening fluid intake (ml)	500 (350-785)	450 (300-675)	0.292	525 (328-800)	450 (300-640)	0.177	500 (300-760)	400 (250-580)	0.064	0.953	0.553

Data are presented as median (interquartile range) unless indicated otherwise; * maximum voided volume <250ml; ** nocturnal polyuria index >33%, exclusion of global polyuria
* Fisher's exact-test (categorical variables) or Mann-Whitney U (continuous variables); ° Kruskal-Wallis test

CONCLUSION

For the same number of nocturnal voids, bladder capacity and nocturnal urine production were similar between patients with continuous and fluctuating nocturia. An increasing number of nocturnal voids in subjects with fluctuating nocturia was linked to more nocturnal urine production and more daytime fluid intake.