148

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THE EPIDEMIOLOGY OF NOCTURNAL POLYURIA (INCIDENCE AND PREVALENCE): A LONGITUDINAL COMMUNITY BASED STUDY IN MEN BETWEEN 50 AND 78 YEARS OF AGE

Hypothesis / aims of study

Nocturnal polyuria (NoPo) is a common problem in older men, leading to bothersome lower urinary tract symptoms (LUTS). A limited amount of data about its prevalence is available. However, the incidence in the community is unknown. Community-based data derived from frequency-volume (FV) charts are needed to determine the incidence. We determined age specific (prevalence and) incidence rates of NoPo in community-based older men.

Study design, materials and methods

The data were obtained as part of a community-based cohort study, as previously described [1]. Men aged 50-78 yrs, residing in a commuter town were invited to participate. At baseline, data on 1688 participants (50% response) were collected via a questionnaire, during a visit to a health center and a urology outpatient clinic. All men provided written informed consent. If no exclusion criteria were met, men were found eligible for re-invitation for 3 follow-up rounds; these took place after 2.1, 4.2, and 6.5 years (mean). In each round, the participants completed a 3-day FV-chart. Urine production (UP) for each hour of the day was determined according to a previously described method [2]. Nocturnal UP (NUP) per hour was estimated as the mean between 1 a.m. and 6 a.m. because 90% of the men were asleep in this period. Three different definitions of NoPo were used: nocturnal urine volume > 33% of 24-hr total urine volume (NUP33%/24h); NUP > 54 ml/hr (NUP54; defined as “normal” for a younger population [3]); NUP > 90 ml/hr (NUP90; suggested as a reasonable discriminator for nocturia more than 3 times (N≥3) [3]). For each round the prevalence of NoPo was determined for the different age strata using the 3 definitions. Next, the crude cumulative incidence (CCI) was estimated for the follow-up rounds. For this, all men without NoPo at baseline were selected and the incidence was estimated as a cumulative incidence. Patients not participating in the subsequent rounds were censored.

Results

At baseline, 1597 men (95% of the responders) completed the FV-chart. Due to some inadequately completed charts, NoPo prevalence could be estimated in 1532 men. The prevalences for the 5-year age strata, according to the 3 definitions are shown in Table1 (NUP54 not shown). The lowest prevalence was shown for the definition NUP90. The longitudinal evolution of the prevalence in the subsequent rounds showed slight variations over time for all definitions. The greatest increase over time was shown for men aged 60-65 years according to the NUP33%/24h-definition. At baseline, 454 of 1532 men had no NoPo according to the NUP33%/24h-definition; 784 men had no NUP54; 1288 men had no NUP90. For these men, incidences were estimated (Table 2; NUP54 not shown).

Interpretation of results

The prevalence of NUP33%/24h, NUP54 and NUP90, clearly increases with age. The prevalence rate of men with NUP33%/24hr and NUP54 is high (>40%) for all age strata; this indicates that these cut-offs / definitions can probably not be used as the only factor in a clinical setting. The cross-sectional prevalence rate of NUP90 increases from 12.1% between 50-54 to 23.6% between 70-78 yrs, also showing a clear age related trend. Analysis of the longitudinal data also shows that the prevalence per baseline age category increases somewhat. This is mainly due to increasing age of the baseline age strata (on average 6.5 yrs). The CCI rate of NoPo increases with age in a cross-sectional view at all follow-up points. The CCI also clearly increases with increasing follow-up time. However, the way the CCI-rate was calculated (i.e. as a cumulative rate) ignores the possibility of (spontaneous or therapeutic) normalisation of nocturnal urine production over time. Therefore, the crude incidence rates probably are an overestimation of the true incidence.

Concluding message

The 6.5-yr CCI of NoPo using the NUP33%/24hr-definition in men 50-54 yrs is 78.6%. Since this is very high its clinical significance has to be weighed against the incidence of nocturia. Furthermore, its discriminative value for N≥2 and N≥3 has to be studied. The 6.5-yr incidence of NUP90 is 36% for the baseline age stratum of 50-54 yrs. The CCI for this age stratum increases from 10.3%, via 26%, to 36% after 2.1, 4.2 and 6.5 yrs, respectively. The NUP90-definition has been shown to be a reasonable discriminator for N≥3 and is therefore relevant for the characterisation of the clinical condition nocturia in older men [3]. Knowledge of the relative contributions of NUP and functional bladder capacity will help to make better treatment choices for patients with bothersome nocturia.

Table 1. Prevalence of nocturnal polyuria

a. Prevalence of nocturnal polyuria defined as NUP33%/24h

	Baseline		**2.1 year-follow up**		**4.2-year follow up**		**6.5-year follow up**	
baseline age strata	Prevalence (n=1532)	(95% C.I.)	Prevalence (n = 1080)	(95% C.I.)	Prevalence (n = 803)	(95% C.I.)	Prevalence (n = 739)	(95% C.I.)
50-54 yrs	41,8%	(36,2-47,4)	44,3%	(37,4-51,2)	52,2%	(44,4-59,9)	51,4%	(44,0-58,9)
55-59 yrs	44,3%	(39,3-49,3)	44,2%	(38,4-50,1)	48,9%	(42,3-55,5)	48,8%	(42,1-55,6)
60-64 yrs	47,5%	(42,4-52,5)	48,8%	(42,9-54,6)	50,0%	(43,2-56,9)	62,5%	(55,4-69,6)
65-69 yrs	56,7%	(51,0-62,3)	54,2%	(47,3-61,0)	66,2%	(58,4-74,0)	65,3%	(56,7-73,9)
70-78 yrs	56,9%	(49,5-64,3)	66,4%	(57,5-75,2)	64,1%	(52,0-76,1)	59,1%	(44,0-74,2)

b. Prevalence of nocturnal polyuria defined as NUP of > 90 mL/h

Baseline	**2.1-year follow up**	**4.2-year follow up**	**6.5-year follow up**

baseline age strata	Prevalence (n= 1521)	(95% C.I.)	Prevalence (n = 1,075)	(95% C.I.)	Prevalence (n = 798)	(95% C.I.)	Prevalence (n = 735)	(95% C.I.)
50-54 yrs	12,1%	(8,4-15,9)	14,3%	(9,4-19,1)	19,0%	(12,9-25,1)	19,0%	(13,1-24,9)
55-59 yrs	12,0%	(8,7-15,3)	11,6%	(7,8-15,3)	16,1%	(11,3-21,0)	17,2%	(12,1-22,3)
60-64 yrs	13,2%	(9,8-16,7)	20,1%	(15,3-24,8)	15,4%	(10,4-20,3)	25,7%	(19,3-32,1)
65-69 yrs	20,5%	(15,9-25,2)	19,7%	(14,2-25,2)	19,7%	(13,1-26,3)	20,8%	(13,5-28,2)
70-78 yrs	23,6%	(17,2-29,9)	23,0%	(15,1-30,9)	21,0%	(10,6-31,4)	25,6%	(12,0-39,2)

Table 2. Incidence of nocturnal polyuria

a. Incidence of nocturnal polyuria [NUP33%/24h].

baseline age strata	2.1-year crude cumulative incidence (n = 310)	(95% C.I.)	4.2-year crude cumulative incidence (n= 221)	(95% C.I.)	6.5-year crude cumulative incidence (n= 213)	(95% C.I.)
50-54 yrs	35,9%	(23,9-48,0)	59,6%	(45,0-74,1)	78,6%	(67,5-87,0)
55-59 yrs	40,6%	(30,9-50,3)	52,0%	(40,4-63,6)	69,9%	(59,1-80,1)
60-64 yrs	35,1%	(24,0-46,3)	56,1%	(42,9-69,4)	64,6%	(50,6-78,6)
65-69 yrs	42,2%	(27,2-57,2)	75,9%	(59,3-92,4)	87,5%	73,2-100)
70-78 yrs	42,3%	(22,0-62,7)	69,2%	(40,2-98,3)	75,0%	(46,3-100)

b. Incidence of nocturnal polyuria [NUP90]

baseline age strata	2.1-year crude cumulative incidence (n = 855)	(95% C.I.)	4.2-year crude cumulative incidence (n = 607)	(95% C.I.)	6.5-year crude cumulative incidence (n = 523)	(95% C.I.)
50-54 yrs	10,3%	(5,6-15,0)	26,0%	(18,5-33,7)	36,0%	(27,5-44,5)
55-59 yrs	10,4%	(6,5-14,4)	22,4%	(16,2-28,7)	28,1%	(21,1-35,2)
60-64 yrs	17,0%	(12,0-21,9)	24,1%	(17,4-30,7)	37,3%	(28,7-45,9)
65-69 yrs	13,1%	(7,7-18,5)	24,8%	(16,2-33,3)	36,9%	(26,4-47,4)
70-78 yrs	15,7%	(7,8-23,7)	27,9%	(13,9-41,9)	35,7%	(16,8-54,6)

References

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Is this a clinical trial?	**No**
What were the subjects in the study?	**HUMAN**
Was this study approved by an ethics committee?	**Yes**
Specify Name of Ethics Committee	**The study was approved by the Ethical Committee of the Erasmus University, Rotterdam.**
Was the Declaration of Helsinki followed?	**Yes**
Was informed consent obtained from the patients?	**Yes**