

The Relations between Enuresis in Childhood and Nocturnal Polyuria Syndrome in Adult Life

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Purpose: The aim of this study, to investigate whether there is any association between enuresis in childhood and nocturnal polyuria syndrome (NPS) in adult life.

Methods: The study consisted of thirty five patients with nocturnal polyuria, and thirty five healthy people without nocturnal polyuria in adult life, were asked to assess their enuresis in childhood.

Results: There was a history of enuresis in childhood in 18 (51.42%) of 35 of men with nocturnal polyuria and in 4 (11.42%) of 35 without nocturnal polyuria. Enuresis in childhood was significantly more common in men with nocturnal polyuria than without nocturnal polyuria. The difference was significant ($P < 0.0001$). The prevalence of enuresis in the nocturnal polyuria (51.42%) was more than two-fold higher than reported prevalence in general populations.

Conclusions: The results of this study suggest that the history of enuresis in childhood seems to increase the risk of having NPS in adult life. This relationship should be taken into account in the evaluation of men with complaints from NPS in adult life and the possible common pathophysiology should be considered in the treatment planning.

Keywords: Nocturnal enuresis; Child; Polyuria; Adult

INTRODUCTION

Monosymptomatic nocturnal enuresis (MNE) according to new terminology of the International Children's Continence Society is intermittent incontinence while sleeping, and it is applicable to children who are at least 5-years-old [1]. It is a most common childhood problem and represents an important chapter because of its pathophysiological implications in adulthood and its social impact. This disorder can affect 5 to 18 % of children in different age groups [2,3]. Boys are more commonly afflicted than girls [4] and a small percentage of children, it persists into adolescence [5,6]. The impact of this condition upon the patients is significant and includes low self-esteem, family conflicts, embarrassment and reduced performance at school. Heterogeneous conditions of various causative factors have been hypothesized for MNE, because the nature of MNE has not been clarified yet. However there are three pathogenetic mech-

anisms to be regarded as important, namely nocturnal polyuria, nocturnal detrusor overactivity and high arousal threshold. These may all, in turn, be explained by a common underlying disturbance at the brainstem level [5]. Current treatment options for MNE include desmopressin and enuresis alarm (EA), and their efficacy depends on the relationship between nocturnal bladder capacity and nocturnal urine output [7].

Nocturia is caused by nocturnal polyuria, a reduced bladder capacity, bladder outlet obstruction or a combination of their. Global polyuria can be caused by numerous diseases, such as diabetes insipidus, diabetes mellitus, congestive heart failure, and sleep apnea [8]. The nocturnal polyuria syndrome (NPS) is an overproduction of urine at night without increasing the normal 24-hour urination, defined as a urinary output greater than 20% of the daily total in young individuals and greater than 33% in older individuals [9]. NPS is caused by a disturbance of the vasopressin system, with a lack of nocturnal increase in plasma

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vasopressin or, in some cases, no detectable levels of the hormone at any time of the 24-hour period. The calculated prevalence of NPS is about 3% in an elderly population, with no gender difference [10,11]. In NPS, there are serious sleep disturbances, partly due to the need to get up for micturition, but there is also increased difficulty in falling asleep after nocturnal awakenings and increased sleepiness in the morning. The treatment of NPS may include avoidance of excessive fluid intake, use of diuretics medication in the afternoon rather than the morning, and desmopressin orally at bedtime [10,12].

Although both biological and psychological factors are important in the etiologies, the underlying physiopathologies of NPS and MNE are not completely understood. The aim of this study, to investigate the prevalence of MNE in patient diagnosed with NPS and relationships of these two conditions.

MATERIALS AND METHODS

The study was designed to a retrospective randomized study in 35 patients who had presented with NPS and in age-matched healthy control cases without NPS in adult life, were asked to assess their enuresis in childhood. Patients who did not have clear memories of their childhood and other diseases such as diabetes mellitus, diabetes insipidus, renal insufficiency, congestive heart failure, edema in the lower extremities, sleep apnea were excluded from the study. All patients provided written informed consent with declaration of Helsinki. NPS is defined (with the voiding bladder diary) as a nocturnal fraction exceeding 20 to 33 % of the 24-hour urine output in patients [13].

Enuresis in children without any other lower urinary tract symptoms and without a history of bladder disfunction is defined as MNE [1].

Statistical Analysis

Student's t-test, chi-square test were performed using SPSS ver. 11.5 (SPSS Inc., Chicago, IL, USA) and $P < 0.05$ were considered statistically significant. The results are given as mean \pm standard deviation of mean (Student's t-test, was used to assess differences between means, chi-square test, to evaluate the difference in prevalence).

RESULTS

Mean ages of the study group and control group were 43.11 ± 9 years (range, 22 to 59 years) and 38.45 ± 7 years (range, 26 to 61

Table 1. Properties of patients and the control group

Variables	Patients with NP (n = 35)	Controls without NP (n = 35)	P-value
Age (yr), mean \pm SD	43.11 ± 9	38.45 ± 7	> 0.05
No. of MNE (%)	18 (51.42)	4 (11.42)	< 0.0001

NP, nocturnal polyuria; MNE, monosymptomatic nocturnal enuresis.

years), respectively. There were history of enuresis in childhood in 18 (51.42%) of 35 of patients with NPS and in 4 (11.42%) of 35 without NPS. Enuresis in childhood was significantly more common in patient with NPS than without NPS. The difference was significant ($P < 0.0001$). The prevalence of enuresis in the NPS men (51.42%) was more higher than general populations. The properties of the study participants are summarized in Table 1.

DISCUSSION

Main purpose of this study is to investigate the prevalence of MNE in patients diagnosed with NPS and the relationship between these two conditions. In the present study our findings indicated that the prevalence of enuresis in the NPS was more than two-fold higher. Studies on the relationship between these two conditions is on the increase and in this context a lot of studies were done. There are three known pathogenic mechanisms such as nocturnal polyuria, nocturnal detrusor overactivity and high arousal thresholds. These may all, in turn, be explained by a common underlying disturbance at the brainstem level. It is quite evident that there are bedwetting children who produce disproportionately large amounts of urine at night; this polyuria is often explained by a nocturnal lack of the antidiuretic pituitary hormone vasopressin [14]. Similar to pathophysiology of enuresis, NPS may result from a disorder in the diurnal secretion patterns of arginine vasopressin (AVP), a naturally occurring antidiuretic hormone, which is secreted by the posterior pituitary. The release of AVP is controlled by plasma osmolality. AVP increases the resorption of water from the renal tubule, higher concentrations of AVP as seen with orthostasis and vasodilatation in the evening result in the production of a lower volumes of concentrated urine. The diurnal variation in AVP release is absent in many older patients, and disruption of nighttime secretion of AVP results in increased quantities of dilute urine [9]. These studies indicated common pathophysiology of nocturnal enuresis and nocturnal polyuria, a disruption in the

diurnal secretion pattern of AVP [11]. There are some therapeutic options effective in NPS patients. Excessive fluid intake in the evening should be eliminated, without reducing the normal 24-hour intake with regard to reduce the risk for dehydration, behavioral therapy, including pelvic floor muscle exercise and urge suppression strategies have proven to be useful, bladder relaxant therapies with anticholinergics are frequently used to treat nocturia and desmopressin, a synthetic analogue of AVP is used [15-17]. Current treatment options for enuresis include therapy of non-urolological causes, lifestyle advice and pharmacologic support [14]. Therefore, due to similar treatment options, several clinical trials investigated the benefits of desmopressin therapy for patients with nocturnal polyuria and nocturnal enuresis [7,8]. Treatments of NPS and enuresis have similar features that suggesting the common pathophysiological characteristics of these disorders. These findings allow for a close relationship between enuresis in childhood and NPS in adult life to be hypothesized. Another study on this subject from Bengtsson [18] they reported nocturia is increased in children who have been suffering from nocturnal enuresis, even after the enuresis has stopped. In a group of 61 men and 27 women of ages over 20 years who had severe enuresis during their childhood, one third of the men and two thirds of the women had nocturia. This frequency is far higher than expected in young adults. In our study, MNE was documented 18 (51.42%) of 35 of patients with NPS. This prevalence of enuresis is more higher than general populations. Another significant study from Fitzgerald et al. [19] showed that frequent nocturia in childhood was strongly associated with adult nocturia. Childhood daytime incontinence was associated with adult urge incontinence, as was childhood nocturnal enuresis [19]. Similar studies by Kuh et al. [20] and Coyne et al. [21] reported the consequences of enuresis in children. For example, the enuretic child is at risk of developing other bladder problems, such as urge incontinence, in adulthood. In fact, it stresses how in adult life with severe incontinence and urgency are likely to have suffered from childhood enuresis. Montaldo et al. [22] also reported a strong correlation between a nocturic mother with previous enuresis and children affected by enuresis. Further experimental studies are needed to clarify this issue; because the limitation of this study was that results depended just on the memory of the participants and the sample size in this study is small. Studies on larger numbers of participants might evaluate the relation between the NPS and MNE exactly.

In conclusion, the results of this study suggest that the histo-

ry of enuresis in childhood seems to be increase the risk of having NPS in adulthood and therefore it must be identified and treated in a timely and precocious manner.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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