



Can Frequency of Nocturnal Enuresis in Bladder Diary Predict the Efficacy of Urotherapy?

İşeme Günlüğünde Tespit Edilen Noktürnal Enürez Sıklığı, Üroterapi Başarısını Öngörebilir Mi?

İşeme Günlüğü ve Üroterapi Başarısı / Bladder Diary and Efficacy of Urotherapy

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Özet

Amaç: Noktürnal enürez, çocukluk döneminde en sık görülen üriner sistem hastalıklarından biridir. Üroterapi(davranış tedavisi), noktürnal enürez tedavisinde ilk uygulanan yöntemdir. Bu çalışmada, 3 günlük işeme günlüğündeki noktürnal enürez sıklığının, üroterapi başarısını öngörmeye ki yerini araştırmayı amaçladık. **Gereç ve Yöntem:** Monosemptomatik noktürnal enürez olan, 5-18 yaş arası hastalar prospektif olarak çalışmaya dahil edildi. Her hastaya 3 günlük işeme çizelgesi verilerek 1 hafta sonra değerlendirmeye çağrıldı. Bir hafta sonraki kontrolde, üroterapi stratejileri hem aileye hem de çocuklara anlatıldı. Üç aylık takip sonrası hastalar tekrar değerlendirilerek, üroterapi başarı oranı 3 günlük işeme çizelgesindeki noktürnal enürez sıklığı ile karşılaştırıldı. **Bulgular:** Toplam 66 hasta değerlendirmeye alındı. Çalışma grubunda, haftada 3 gecedan fazla noktürnal enürez olan 26(%39.4) hasta varken, 40(%60.6) hasta her gece idrar kaçırmaktaydı. Üç aylık üroterapi sonrası 50(%75.7) hastada klinik noktürnal enürez sıklığında % 50'den fazla azalma tespit edilirken, 16(%24.3) hastada klinik iyileşme gözlenmedi. İşeme günlüğü sırasında noktürnal enürez gözlenmeyen hastaların 21'i(%91.3) üroterapiden fayda gördü. İşeme günlüğünde 1 gün enürez olan hastaların hepsi üroterapiden fayda görürken, 2 gün enürez olan hastaların %53.3'ü, 3 gün enürez olan hastaların ise %22.2'si üroterapiden fayda görebildi. **Tartışma:** İşeme günlüğündeki noktürnal enürez sıklığı ile üroterapi başarısı arasında direkt ilişki olduğu tespit edildi. Klinisyenler, dikkatli ve özenle yapılmış işeme günlüğü yardımıyla, üroterapi başarısını öngörebilirler.

Anahtar Kelimeler

Gece İdrar Kaçırma; İşeme; Davranış Tedavisi

Abstract

Aim: Nocturnal enuresis is one of the most common urinary system disorders of childhood. Urotherapy(behavioral therapy) is the primary method for treatment of nocturnal enuresis. In this study, we aimed to evaluate the efficacy of nocturnal enuresis frequency during 3 days bladder diary for estimating the success of urotherapy. **Material and Method:** Patients with monosymptomatic nocturnal enuresis in an age group of 5 to 18 years were prospectively included to study. They were given a 3 days bladder diary and re-evaluated 1 week later and urotherapy strategies were told to both patients and parents. They were evaluated after 3 months later and success rate of urotherapy was compared with the nocturnal enuresis frequency in 3 days bladder diary. **Results:** A total of 66 patients were evaluated. There were 26(39.4%) patients with nocturnal enuresis in >3 nights/week and 40(60.6%) patients with nocturnal enuresis in every night. At the end of the third month of urotherapy, 50(75.7%) patients had >%50 decrease in clinical nocturnal enuresis frequency, whereas 16(24.3%) had no clinical improvement. Among the patients who did not have enuresis during bladder diary, 21(91.3%) had improvement with urotherapy. All of the patients with 1 day nocturnal enuresis in bladder diary had improved by conservative strategies, whereas 53.3% with 2 days enuresis and 22.2% with 3 days enuresis was able to improve by urotherapy. **Discussions:** We observed a direct relation between nocturnal enuresis frequency in bladder diary and urotherapy success. Clinician may predict urotherapy success by an attentive bladder diary evaluation.

Keywords

Nocturnal Enuresis; Urination; Behavioral Therapy

DOI: 10.4328/JCAM.1843

Received: 24.04.2013 Accepted: 14.05.2013 Printed: 01.03.2015

J Clin Anal Med 2015;6(2): 139-43

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Introduction

Nocturnal enuresis (NE) is one of the most common urinary system disorders of childhood which is defined as “any bed-wetting in children over 5 years old that occurs in discrete amounts during sleep” [1]. The prevalence rates are as high as 15-20% by the age of 5, decreasing to 1% by the age of 15 years [2-9]. It is a self-limiting disease with a spontaneous remission rate of 15% per year [3]. Nocturnal enuresis is classified as monosymptomatic (simple) or non-monosymptomatic (complex) according to presence of day-time lower urinary tract symptoms like; pollakiuria, incontinence, urgency etc. Meticulous clinical evaluation is a rule to establish the best treatment opportunity and appropriate follow-up is necessary for treatment success.

It is not possible to find an organic pathology in 97-98% of enuretic patients. The remaining may have local or systemic diseases like; voiding dysfunction, urinary tract infection, ectopic ureter, diabetes mellitus or diabetes insipidus. Nocturnal polyuria, nocturnal bladder overactivity or reduced nocturnal bladder capacity plays a major role in pathogenesis of nocturnal enuresis [1]. A well-taken medical history, careful physical examination and baseline laboratory evaluation are recommended to distinguish the pathogenesis. Bladder diary is one of the most important diagnostic tools of NE evaluation. A precise bladder diary for a minimum 3-4 days may be very useful to determine the possible etiopathogenic factor like; nocturnal polyuria and decreased nocturnal bladder capacity. It is also very important to understand the voiding and hydration habits of patients. By the help of this cheap and feasible diagnostic tool, specialists can determine the wrong habitual behavior of patients and fix them with simple manipulations without using unnecessary medications.

Conservative treatment strategies (regular voiding, fluid restriction before sleeping, waking the child to void and prevention of constipation) are the primary treatment opportunities for monosymptomatic nocturnal enuresis. For the patients who are refractory to conservative treatment (urotherapy), other treatment modalities like; enuresis alarm or medical treatment may be warrant. Nocturnal enuresis is somewhat a “secret disease” that 50-80% of parents do not seek medical help and families may be impatient for treatment [2,4-6]. For an impatient family, unsatisfactory treatment may cause decompensation and may be a reason to abandon the treatment. Any prescient finding that may estimate the treatment efficiency can increase the treatment persistency. Bladder diary, which is very important for patient evaluation, may also be a guide for assessment of conservative treatment success. In this prospective study, we aimed to evaluate the value of bladder diary in estimating the success rate of conservative treatment in monosymptomatic enuresis nocturna.

Material and Method

Along with the permission of local ethic committee, patients with monosymptomatic nocturnal enuresis in an age group of 5 to 18 years were prospectively included to survey. A detailed medical history with urological physical examination (including neurological examination) was performed. Patient with a history of day-time lower urinary tract symptoms like; pollakiuria, urgency and urge incontinence and patients who had NE treatment before the admission to our outpatient clinic were excluded from survey. All patients in study group had undergone biochemical analysis (fasting glucose, serum creatinine, urinalysis and urine culture) and radiological evaluation (direct urinary system graphy and urinary system ultrasonography). Patients who had diabetes mellitus, urinary tract infection, spinal dysraphism, neurogenic bladder and upper urinary tract deterioration were also excluded from the study.

A mini briefing about bladder diary was given to parents by the same specialist (C.Y.). A urine container with a standard scale and a bladder diary form were given to families (App. 1). In order to eliminate possible bias, none of the families had been instructed about conservative treatment strategies in the first visit. They were asked to document timely fluid intake and voiding volumes of the child. They were also requested to note any type of day-time incontinence and nocturnal enuresis during 3 days bladder diary. One week later, all patients were recalled for second visit with the documents of bladder diary. Minimum and maximum voided volume, voiding frequency, nocturnal bladder capacities, nocturnal urinary output, timely hydration habits and number of enuretic nights during the bladder diary were evaluated. In this visit, the strategies of conservative treatment (regular voiding, fluid restriction before sleeping, waking the child to void and prevention of constipation) were described to families by the same specialist (C.Y.). Nocturnal enuresis follow-up forms indicating sunshine for dry and cloudy for enuretic nights were given to document the child's enuresis frequency for 3 months during conservative treatment. Patients were recalled at the third month of follow-up to evaluate the efficacy of conservative treatment. Families who were not consistent with the strategies of conservative treatment were excluded from study. More than 50% decrease in nocturnal enuresis frequency was considered to be success for conservative treatment. Success rate of conservative treatment was compared with the nocturnal enuresis frequency in 3 days bladder diary. SPSS version 16.0 software was used for statistical analysis. Differences in frequencies were tested using the chi-square test. P values of less than 0.05 were considered statistically significant.

Results

A total of 73 patients with monosymptomatic nocturnal enuresis were included to the survey. At the end of the 3 months, 4 patients were lost to follow-up and 3 families were inconsistent with the strategies of conservative treatment. As a result 66 (90.4%) patients (42 boys (63.6%) and 24 girls (36.4%)) were analyzed. The mean age of the study population was 9.5±2.3 years. There were 26 (39.4%) patients with nocturnal enuresis in >3 nights/week and 40 (60.6%) patients with nocturnal enuresis in every night. Among the patients who were wetting their beds everynight, 30 (45.4%) patients had once a night, 4 (6.1%) patients had 2 times a night and 6 (9.1%) patients had >2 times nocturnal enuresis a night (figure 1). There were 23 (34.9%) patients who did not have any nocturnal enuresis during the 3 days bladder diary period. On the other hand, 19 (28.8%) patients had 1 night, 15 (22.7%) patients had 2 nights and 9 (13.6%) patients had 3 nights nocturnal enu-

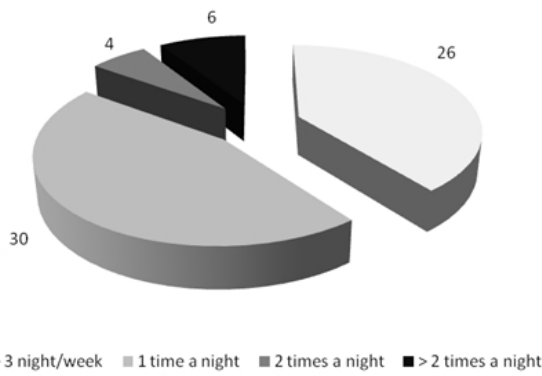


Figure 1. The number and percentages of study population according to frequency of nocturnal enuresis.

resis during bladder diary. The relation between nocturnal enuresis frequency in bladder diary and frequency of clinical nocturnal enuresis is illustrated in table 1.

Table 1. The distribution of study population according to clinical nocturnal enuresis frequency and frequency of nocturnal enuresis in 3 days bladder diary

Frequency of clinical nocturnal enuresis	Frequency of nocturnal enuresis in 3 days bladder diary				Total n(%)
	No nocturnal enuresis n(%)	1 night nocturnal enuresis n(%)	2 nights nocturnal enuresis n(%)	3 nights nocturnal enuresis n(%)	
>3 nights/week	13(50%)	8(30.8%)	5(19.2%)	0(0.0%)	26(100%)
1 time in every night	8(26.7%)	10(33.3%)	9(30%)	3(10%)	30(100%)
2 times in every night	2(50%)	0(0.0%)	0(0.0%)	2(50%)	4(100%)
>2 times every night	0(0.0%)	1(16.7%)	1(16.7%)	4(66.6%)	6(100%)
Total	23(34.9%)	19(28.8%)	15(22.7%)	9(13.6%)	66(100%)

At the end of the third month, 50 (75.7%) patients had >50% decrease in clinical nocturnal enuresis frequency, whereas 16 (24.3%) had no clinical improvement. The efficacy of conservative treatment according to frequency of clinical nocturnal enuresis was evaluated. Twenty-five of 26 (96.2%) patients with nocturnal enuresis >3 days/week had clinical improvement with conservative treatment. Among the 30 patients with 1 time nocturnal enuresis in a night, 23 (76.7%) had clinical benefit from conservative strategies. As the frequency of clinical nocturnal enuresis increased, the rate of clinical improvement with conservative treatment decreased, that 1 of 4 (25%) patients with 2 times and 1 of 6 (16.6%) patients with >2 times nocturnal enuresis a night had clinical improvement with conservative treatment. Patients who had nocturnal enuresis frequency >3 days a week had significantly higher improvement rates with conservative management than the patients who had nocturnal enuresis everynight (p=0.001). Among the patients with daily enuresis, patients who had 1 time a night had also significantly higher rates of improvement with conservative treatment, than the patients who had ≥2 times nocturnal enuresis a night(p=0.002) (table 2).

The probable efficacy of conservative treatment according to

Table 2. The success of urotherapy according to clinical frequency of nocturnal enuresis

	>50 decrease in nocturnal enuresis frequency n(%)	<50 decrease in nocturnal enuresis frequency n(%)	Total n(%)	p value
>3 nights/week	25(96.2%)	1(3.8%)	26(100%)	p=0.001
Every night	25(62.5%)	15(37.5%)	40(100%)	
NE=1 time in everyday	23(76.7%)	7(23.3%)	30(100%)	p=0.002
NE=2 times in everyday	1(25%)	3(75%)	4(100%)	
NE >2 times everyday	1(16.7%)	5(83.3%)	6(100%)	

the nocturnal enuresis frequency during bladder diary was also evaluated. There were 23 patients who did not have enuresis during bladder diary and 21 (91.3%) of them had improvement with conservative treatment. All of the patients with 1 day nocturnal enuresis in bladder diary had improved by conservative strategies, whereas 8 of 15 (53.3%) patients with 2 days enuresis and 2 of 9 (22.2%) patients with 3 days enuresis was able to improve by conservative manner (table 2). Patients who had no or 1 night nocturnal enuresis during 3 days bladder diary had significant higher rates of improvement by conservative treatment than the patients who had nocturnal enuresis in 2 or more nights (p<0.001).

Table 3. The success of urotherapy according to frequency of nocturnal enuresis in 3 days bladder diary

	>50 decrease in nocturnal enuresis frequency n(%)	<50 decrease in nocturnal enuresis frequency n(%)	Total n(%)	p value
No nocturnal enuresis in bladder diary	21(91.3%)	2(8.7%)	23(100%)	P<0.001
1 day nocturnal enuresis in bladder diary	19(100%)	0(0.0%)	19(100%)	
2 days nocturnal enuresis in bladder diary	8(53.3%)	7(46.7%)	15(100%)	
3 days nocturnal enuresis in bladder diary	2(22.2%)	7(87.2%)	9(100%)	

Discussion

Nocturnal enuresis is one of the most common urinary system diseases of children. The prevalence rates from different countries ranges 1-20% [2,4-9]. Although nocturnal enuresis is a self limiting disease with a spontaneous remission rate of 15% per year, it may cause psychosocial problems in both children and families [3]. Nocturnal enuresis may causes distress to both child and family. It may give rise to social phobia and withdrawal while reducing the self-esteem of the child. It may also cause disturbances of child's and families' sleep architecture that may have an impact on daytime functioning and health [10-15]. Beside these, nocturnal enuresis may be a reason for familial problems related to personal intolerance and may cause economical costs related with frequent laundering of bed sheets and clothing [16-18]. These data indicates that, NE is an important social disease which may have hazardous effects on pati-

ents and family.

This disease is mostly a “secret disease”. Instead of seeking medical help, most families prefer to wait for resolution [2]. Even if the parents seek medical help, they may be so impatient. A delay in the success of treatment can decrease the compliance of parents which is the most important issue for the successful treatment of nocturnal enuresis. “Trial and error” treatments for enuresis may be a waste of time and money and it may increase frustration among families and doctors and may also have negative psychological effect on the child [15,19]. For this reason, it is important to decide the exact treatment modality for nocturnal enuresis for both patient’s and parent’s compliance to treatment.

Conservative treatment may be the first line treatment opportunity for monosymptomatic nocturnal enuresis. A successful urotherapy may eliminate the need for alternative treatment modalities and may salvage the patient from unnecessary medical treatments. Modification of hydration and eating, waking the child to void, avoiding caffeine, salty and acidic consumption, avoiding the constipation, increasing the physical activity and fluid restriction 2 hours before sleep are the main principles of urotherapy. Although it has been demonstrated that, urotherapy might not be enough and must be used in conjunction with other modalities, it can have good results if we able to choose suitable patients for this treatment. In order not to waste time and discourage the patients, it is important to guess which patients will benefit from the conservative treatment strategies. A precise forecasting may also eliminate the overtreatment of monosymptomatic nocturnal enuresis patients.

Bladder diary has a considerable importance to decide the exact treatment modality for patients with nocturnal enuresis. The data in bladder diary like; daily fluid intake, voiding frequency, voiding volume, maximum bladder capacity, hydration habits, nocturnal voiding volume and nocturnal bladder capacity can guide the physician to distinguish the main etiopathogenic factor for individual patient. Nocturnal enuresis frequency during bladder diary, which is an unusual variable for physicians, can also be a guide for estimating the success of conservative treatment. We observed that the frequency of nocturnal enuresis in bladder diary was inversely related with the success of conservative treatment. Nearly 91% of patients who did not wet their beds during bladder diary had clinical improvement with conservative treatment whereas it was only 33% for patients who had nocturnal enuresis in every night during bladder diary. This may have 2 explanations. Urotherapy is such a treatment modality that the compliance of the child and the parents is the most important issue for success. It needs a good relation between children and parents and parents must be supportive for their children. Bladder diary may externalize this relation between children and parents and be a guide for the physician to understand how supportive can the parents be during conservative treatment. Another explanation for this can be related with the severity of disease and underlying etiology. In our study, it is also documented that severe forms of nocturnal enuresis was not able to be under control with conservative strategies. Nearly 96% of patients with nocturnal enuresis with a frequency of >3 nights/week had improved with conservative treatment while it was only 16% in patients with a frequency of

minimum 2 times a night. This was also reflected during bladder diary that nearly 80 % of patients with nocturnal enuresis frequency of >3 nights/week had no or 1 day enuresis during bladder diary. On the other hand, %83 of patients who had >2 times nocturnal enuresis a night was documented to have 2 or 3 days nocturnal enuresis during bladder diary. The high frequency of nocturnal enuresis during bladder diary may be related with the severity of disease so they can not be manageable by only conservative strategies. Whether it is related with the compliance of children and parents or it is related with the severity of disease, bladder diary was able to predict the success of conservative treatment in monosymptomatic nocturnal enuresis patients. The guidelines about nocturnal enuresis recommend that urotherapy is not enough in most cases for the treatment of nocturnal enuresis and it must be supported by alarm or medical treatment [15]. But this approach may cause overtreatment for some patients. For this reason, any diagnostic tool which may help physicians to foresee the possible results of conservative treatment may be valuable to expurgate the patients who may or may not have improvement by conservative strategies. According to our study both the severity of nocturnal enuresis and the frequency of nocturnal enuresis in bladder diary may be used as a guide. Conservative treatment may be the principle treatment for patients who has low (no nocturnal enuresis or 1 night in 3 day bladder diary) frequency of nocturnal enuresis in bladder diary, whereas it may be only a supportive therapy to alarm and medical treatment in patients with higher nocturnal enuresis frequency (2 or 3 nights in 3 day bladder diary) during bladder diary. This may help the physicians to eliminate possible time waste for treatment and increase the compliance of patients and parents.

Competing interests

The authors declare that they have no competing interests.

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