Psychiatric Symptoms in Children with Neurogenic Bladder

Nörojen Mesane Tanılı Çocuklarda Psikiyatrik Belirtiler

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ABSTRACT

Objective: This study aimed to evaluate children with ''neurogenic bladder" diagnosis in terms of anxiety and depression.

Material and Methods: Thirty-three pediatric patients with neurogenic bladder followed in Adana City Training and Research Hospital Pediatric Urology and Nephrology outpatient clinics from May 2023 to July 2023 and 20 healthy controls who were age and sex-matched, from public schools located in the same geographic area were included in the study. All participants were requested to complete the Hospital Anxiety and Depression Scale, Conners' Parent Rating Scale and Turgay DSM-IV Disruptive Behavior Disorders Rating Scale.

Results: Global score of the CPRS reported by parents, was higher in patients than controls (p=0.012). CPRS Hyperactivity/Impulsivity and Anxiety subscale scores of the patients were significantly higher than controls. Global score of the CPRS reported by parents, was higher in patients with CKD than without (p=0.033). CPRS- Learning problems subscale of the patients with CKD was also higher than the patients without (p=0.023). DSM-IV Total score and the DSM-IV inattention score was higher in patients with CKD than without. Hospital Anxiety and Depression Scale-anxiety subscale reported by children was higher in patients without wheelchair dependence than the patients with (p=0.002). CPRS-conduct disorder and CPRS-Hyperactivity/ Impulsivity subscale scores of the patients without wheelchair dependence was higher than the patient with (p=0.016, p=0.009). DSM-IV hyperactive/impulsive subscale score of the patients without wheelchair dependence was higher than the patients with (p=0.043).

Conclusion: Children with NB are at risk for physical, neurocognitive, psychosocial, and family challenges. Anxiety and depression symptoms should not be underestimated. For long-term appropriate management of such vulnerable patients psychological support is required.

Key Words: Anxiety, Depression, Neurogenic bladder, Pediatrics, Psychiatry

ÖZ

Amaç: Bu çalışmada "nörojenik mesane" tanılı çocukların anksiyete ve depresyon açısından değerlendirilmesi amaçlanmıştır.

Gereç ve Yöntemler: Adana Şehir Eğitim ve Araştırma Hastanesi Çocuk Ürolojisi ve Nefroloji polikliniklerinde Mayıs 2023-Temmuz 2023 tarihleri arasında takip edilen 33 nörojen mesaneli çocuk hasta ve aynı coğrafi bölgede bulunan devlet okullarından yaş/cinsiyet olarak eşleştirilmiş 20 sağlıklı kontrol çalışmaya dahil edilmiştir. Tüm katılımcılardan Hastane Anksiyete ve Depresyon Ölçeği, Conners Ebeveyn Derecelendirme Ölçeği ve Turgay DSM-IV Yıkıcı Davranış Bozuklukları Derecelendirme Ölçeği'ni doldurmaları istendi.

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Ethics Committee Approval / *Etik Kurul Onayı*: This study was conducted in accordance with the Helsinki Declaration Principles. Ethics committee approval was obtained from the Local Ethics Committee of Adana City Training and Research Hospital for the study (Approval Date:06.04.2023; Approval Number:2431).

Contribution of the Authors / Yazarların katkısı: EKBERLİ G: Taking responsibility in logical interpretation and conclusion of the results, Taking responsibility in necessary literature review for the study, Reviewing the article before submission scientifically besides spelling and grammar. ***TANER S:*** Constructing the hypothesis or idea of research and/or article, Organizing, supervising the course of progress and taking the responsibility of the research/study, Taking responsibility in logical interpretation and conclusion of the results, Reviewing the article before submission scientifically besides spelling and grammar. ***GÜNEŞ S:*** Planning methodology to reach the conclusions.

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Bulgular: Ebeveynlerin bildirdiği CPRS global skoru, hastalarda kontrollere göre daha yüksek olarak tespit edildi (p=0.012). Hastaların CPRS Hiperaktivite/Dürtüsellik ve Anksiyete alt ölçek puanları kontrollerden anlamlı olarak yüksekti. Ebeveynler tarafından bildirilen CPRS global puanı, KBH olan hastalarda olmayanlara göre daha yüksekti (p=0.033). KBH olan hastaların CPRS- Öğrenme sorunları alt ölçek puanı da olmayanlara göre daha yüksekti (p=0.023). DSM-IV Toplam puanı ve DSM-IV dikkatsizlik puanı KBH olan hastalarda olmayanlara göre daha yüksekti. Hastane Anksiyete ve Depresyon Ölçeği-çocukların bildirdiği anksiyete alt ölçeği, tekerlekli sandalye bağımlılığı olmayan hastalarda, olanlara göre daha yüksekti (p=0.002). Tekerlekli sandalye bağımlılığı olmayan hastaların CPRS-davranım bozukluğu, CPRS-Hiperaktivite/Dürtüsellik alt ölçek puanları, DSM-IV hiperaktif/dürtüsel alt ölçek puanı tekerlekli sandalye bağımlılığı olan hastalara göre daha yüksekti (p=0.016, p=0.009, p=0.043).

Sonuç: Nörojen mesaneli çocuklar fiziksel, nörobilişsel, psikososyal ve ailevi zorluklar açısından risk altındadır. Anksiyete ve depresyon belirtileri hafife alınmamalıdır. Bu tür savunmasız hastaların uzun vadeli uygun yönetimi için psikolojik destek gereklidir.

Anahtar Sözcükler: Anksiyete, Depresyon, Nörojen mesane, Pediatri, Psikiyatri

INTRODUCTION

Neurogenic bladder (NB) may develop as a result of a lesion at any level in the nervous system. Main consequences of this condition are urinary incontinence, stool incontinence recurrent urinary tract infection (UTI), vesicoureteral reflux (VUR) and renal failure requiring dialysis and/or transplantation (1). The main goals of treatment regarding urinary tract are prevention of UTI, prevention of upper urinary tract deterioration and achievement of continence (2). An ongoing multidisciplinary approach, close follow-up and cooperation of both caregiver and patient are paramount for proper management and achievement of the best-possible quality of life (QoL) in this patient population (3). Early administration of antibiotic prophylaxis, anticholinergics and clean intermittent catheterization (CIC) after closure is main part of treatment and has shown to decrease renal complications (4). Like patients with other chronic diseases, anxiety and depression (A/D) among children with NB could contribute to non-adherence in treatment regimens which may result with severe consequences (5). Lower urinary tract storage and emptying problems is reported to be associated with behavioral and emotional symptoms such as anxiety and depression (6). Depressed patients reported to be noncompliant to treatment recommendations compared with nondepressed patients (7).

Considering the importance of treatment compliance and the early exposure children with NB to multiple clinical procedures lead us to conduct this study. Presence of A/D in NB population and comparison with healthy controls aimed to be evaluated in this study.

MATERIALS and METHODS

Study Design

This cross-sectional study was conducted to evaluate the presence of attention deficit and hyperactivity disorder (ADHD), A/D in patients with a diagnosis of NB and to compare it with healthy control group. Thirty-three pediatric patients with NB followed in Adana City Training and Research Hospital Pediatric Urology and Nephrology outpatient clinics from May 2023 to July 2023 and 20 healthy controls who were age and sex-matched, from public schools located in the same geographic area were included in the study. Diagnostic criteria for NB was defined as presence of emptying or storage defect of urine and stool secondary to neural tube defects or other congenital malformations (1). Clinical and laboratory data were already available as a part of the routine protocol for managing. The patients' differentiated kidney functions and scarring were evaluated with Tc 99m dimercaptosuccinic acid (DMSA) scan. Presence of more than 10% decrease in differentiated kidney functions in scintigraphic evaluation was considered as loss of function. The definition and classification of chronic kidney disease (CKD) was evaluated according to Kidney Disease: Improving Global Outcomes guidelines (8). Glomerular filtration rate (GFR) was estimated (eGFR) adopting the original Schwartz formula (9).

After informed consent had been provided all participants were requested to complete the Hospital Anxiety and Depression Scale (HADS). Parents of all participants were requested to fill in Conners' Parent Rating Scale (CPRS) and Turgay DSM-IV Disruptive Behavior Disorders Rating Scale (T-DSM-IV-S).

Inclusion and exclusion criteria

The study included pediatric patients 6-18 years of age who are being treated with diagnosis of NB. In selection of patients diagnosed with NB, the inclusion criteria were absence of any mental disabilities or mobilization problems. All children were mobile either with a wheelchair or spontaneously. Patients with acute illness (e. g. infections, clinical instabilities) were not scheduled for interviews.

Exclusion criteria were; patients <6 years old, patients who do not want to fill in the scales, illiterate patients, and patients with mental retardation.

Controls

The control group consisted of healthy sex and age-matched children from public schools who gave informed consent to take part in the study. All controls were healthy and had no medical or family history of renal diseases. Healthy status was determined through a review of the medical history and either a parental report or self-report to rule out the presence of chronic or acute diseases.

Clinical and laboratory measurements

Clinical characteristics, anthropometric measurements, laboratory test, radiological test results were evaluated during the clinic visit and by reviewing medical records at the time of interview. Clinical data included gender, age, height, weight, primary etiology of NB, stage of CKD, wheelchair status, treatment compliance, CIC compliance, experienced surgical procedures were recorded. Laboratory tests included serum levels of BUN, creatinine, hemoglobin were recorded.

Sociodemographic Characteristics Data Form

The authors created a questionnaire including information on sociodemographic features of children and caregivers. The form applied to all caregivers and children.

Hospital Anxiety and Depression Scale (HADS)

The Hospital Anxiety and Depression Scale is a reliable and valid questionnaire for hospitalized populations, consisting of seven questions (rated 0, 1, 2 and 3) related to anxiety (subscale A) and seven others to depression (subscale D), thus providing two scores (10). The HADS has been adapted and used in various studies to assess anxiety and depression symptoms in children and adolescents (11). Turkish validity and reliability study was carried out by Aydemir et al. (12).

Conner's Parent Rating Scale (CPRS)

Conners' Rating Scales 2 (CRS), which were developed primarily for use in drug studies of children with hyperkinesias (13). The items in the Conners scales are rated on a Likert-type scale, typically ranging from "not at all" to "very much." The Conners scale includes different versions, such as the Conners' Rating Scales-Revised (CRS-R) and the Conners 3rd Edition (Conners 3). These scales are typically completed by parents, teachers, and sometimes the child or adolescent themselves. They consist of a series of items that assess various domains, including inattention, hyperactivity/impulsivity, aggression, oppositional behavior, and other behavioral and emotional problems (14). The scores obtained from the scales help in quantifying the severity of symptoms and identifying areas of concern. The scales provide standardized scores that allow for comparisons to be made with normative data from the general population. Turkish validity and realiability study eas conducted by Dereboy et al (15).

Turgay DSM-IV Disruptive Behavior Disorders Rating Scale parent form (T-DSM-IV-S)

The Turgay DSM-IV Disruptive Behavior Disorders Rating Scale parent form was developed by Turgay (16) and translated into Turkish by Ercan et al (17). The T-DSM-IV-S is based on DSM-IV diagnostic criteria and evaluates hyperactivity–impulsivity, inattention, opposition-defiance, and conduct disorder. Symptoms are scored on a 4-point Likert scale (0 = not at all; 1 = just a little; 2 = quite a bit; and 3 = very much). The T-DSM-IV-S was shown reliable and valid for Turkish children (17). All psychometric instruments used for psychological assessment were read to the participants to reduce differences due to educational levels and performance.

Ethical Considerations

Ethics committee approval was obtained from the Local Ethics Committee of Adana City Training and Research Hospital for the study (Approval Date:06.04.2023; Approval Number:2431). Verbal and written consent was received from caregivers who agreed to participate in the study.

Statistical Analysis

All statistical analyses were analyzed by SPSS version 25 software package. Normal distribution of numeric variables was tested with Kolmogorov–Smirnov test. Continuous data were defined by means of mean±SD under the parametric conditions and median (minimum-maximum) under the nonparametric conditions. Independent sample t test was used for the comparison of normally distributed numeric variables; the Mann-Whitney U test for non-normal distributions. P values less than 0.050 were considered to be statistically significant.

RESULTS

The patient group consisted of 20 girls and 13 boys, and the control group consisted of 11 girls and 10 boys. The mean age of the patients was 10.8±3.7 years, and the mean age of the control group was 12.0±3.3 years. The patient and control groups were similar in terms of age and gender (p=0.201, p=0.551). Demographical and clinical characteristics of the patients were shown in Table I.

Patients and the Controls

Hospital Anxiety and Depression Scale reported by children and adolescents were similar in patient and control group in terms of HADS-depression and HADS-anxiety scores. Global

Table I: Demographical and clinical characteristics of the patients with neurogenic bladder

Patients Characteristics	n=33 (%)
Gender (male/female)	13/20
Mean age (years)	10.8±3.7
Neurogenic bladder etiology	
Meningomyelocele	23 (69.7)
Spina bifida	5 (15.2)
Cerebral palsy	2 (6.1)
Non-neurogenic neurogenic bladder	1 (3.0)
Posterior urethral valve	1 (3.0)
Postoperative	1 (3.0)
Wheelchair dependence	24 (72.7)
Presence of kidney function loss	9 (24.3)
Presence of CKD	12 (36.4)
Need for urological surgery	3 (9.1)
CIC therapy	24 (72.7)

Table II: Comparison of the Hospital Anxiety and Depression Scale, Conners' Parent Rating Scale and T-DSM-IV-S scale scores of the patient and control groups

	Patients (n=33)	Controls (n=23)	p
Hospital Anxiety and Depression Scale*			
HADS-depression	4.7± 3.2	4.5± 4.4	0.899‡
HADS-anxiety	5.3± 3.9	5.0±3.5	0.847‡
Conners' Parent Rating Scale †			
CPRS- Conduct disorder	1 (0-13)	1 (0-5)	0.272‖
CPRS- Hyperactivity/ Impulsivity	2 (0-10)	1 (0-4)	0.006‖
CPRS- Learning problems	3 (0-9)	1 (0-7)	0.542‖
CPRS- Anxiety	4 (0-16)	2 (0-15)	0.033‖
CPRS- Psychosomatic subscale	2 (0-12)	0 (0-4)	0.057‖
CPRS- Global score	19 (4-45)	8 (0-30)	0.012‖
T-DSM-IV-S Scale †			
DSM-IV inattention	3 (0-24)	4 (0-17)	0.653‖
DSM-IV hyperactive/impulsive	2 (0-12)	3 (0-17)	0.416‖
DSM- IV Total	6 (0-28)	7 (0-34)	0.640‖

*****Mean± SD, †Median (Min-Max), ‡Independent t-test, ‖Mann-Whitney U test, **HADS:** Hospital Anxiety and Depression Scale, **CPRS:** Conners' Parent Rating Scale, **T-DSM-IV-S Scale:** Turgay DSM-IV Disruptive Behavior Disorders Rating Scale*

Table III: Comparison of the Hospital Anxiety and Depression Scale, Conners' Parent Rating Scale and DSM-IV AD/ADHD scale scores of the patients with and without CKD.

	Patients with CKD (n=12) Median (Min-Max)	Patients without CKD (n=21) Median (Min-Max)	p
Hospital Anxiety and Depression Scale			
HADS-depression	5 (1-12)	5 (1-15)	0.890
HADS-anxiety	5 (3-17)	3 (0-13)	0.095
Conners' Parent Rating Scale			
CPRS- conduct disorder	2 (0-3)	1 (0-13)	0.332
CPRS- Hyperactivity/ Impulsivity	2 (1-4)	3 (0-10)	0.830
CPRS- Learning problems	4 (1-9)	2 (0-5)	0.023
CPRS- Anxiety	4 (2-16)	4 (1-11)	0.395
CPRS- Psychosomatic subscale	2 (0-5)	1 (0-8)	0.294
CPRS- Global score	23 (11-44)	13 (4-45)	0.033
T-DSM-IV-S Scale			
DSM-IV inattention	9 (0-24)	3 (0-13)	0.003
DSM-IV hyperactive/impulsive	4 (1-9)	2 (0-12)	0.186
DSM- IV Total	15 (1-28)	4 (0-19)	0.013

*****Mann-Whitney U test, **HADS:** Hospital Anxiety and Depression Scale, **CPRS:** Conners' Parent Rating Scale, **T-DSM-IV-S Scale:** Turgay DSM-IV Disruptive Behavior Disorders Rating Scale*

Table IV: Comparison of the Hospital Anxiety and Depression Scale, Conners' Parent Rating Scale and DSM-IV AD/ADHD scale scores of the patients with and without wheelchair dependence

	Patients with wheelchair dependence (n=24)	Patients without wheelchair dependence (n=9)	p
Hospital Anxiety and Depression Scale*			
HADS-depression	4.6±3.2	5±3.3	0.463‡
HADS-anxiety	3.8±2.8	8.4±4.7	0.002‡
Conners' Parent Rating Scale†			
CPRS- conduct disorder	1 (0-8)	3 (1-13)	0.016§
CPRS- Hyperactivity/ Impulsivity	2 (0-7)	4 (1-10)	0.009§
CPRS- Learning problems	3 (0-9)	1 (0-5)	0.965§
CPRS- Anxiety	4 (1-16)	6 (2-11)	0.069§
CPRS- Psychosomatic subscale	1 (0-8)	3 (0-5)	0.392§
CPRS- Global score	16 (4-44)	24 (10-50)	0.058§
T-DSM-IV-S Scale†			
DSM-IV inattention	3 (0-13)	5 (0-24)	0.275§
DSM-IV hyperactive/impulsive	2 (0-12)	5 (1-9)	0.043§
DSM- IV Total	5 (0-22)	12 (1-28)	0.094§

*****Mean± SD, †Median (Min-Max) ‡Independent t-test, §Mann-Whitney U test, **HADS:** Hospital Anxiety and Depression Scale, **CPRS:** Conners' Parent Rating Scale, **T-DSM-IV-S Scale:** Turgay DSM-IV Disruptive Behavior Disorders Rating Scale*

score of the CPRS reported by parents, was higher in patients than controls (p=0.012). CPRS Hyperactivity/Impulsivity and Anxiety subscale scores of the patients were significantly higher than controls, respectively (p=0.006, p=0.033). The T-DSM-IV-S was reported by parents. T-DSM-IV-S inattention, T-DSM-IV-S hyperactive/impulsive and T-DSM-IV-S total scores were similar in patient and control groups. Comparison of the scores between patient and control group were shown in Table II.

Patients with CKD

Hospital Anxiety and Depression Scale scores were similar in patients with and without CKD. Global score of the CPRS reported by parents, was higher in patients with CKD than without (p=0.033). CPRS- Learning problems subscale of the patients with CKD was also higher than the patients without (p=0.023). T-DSM-IV-S total score and the T-DSM-IV-S inattention score was higher in patients with CKD than without, respectively (p=0.013, p=0.003). Comparison of the scales of the patients with and without CKD was shown in Table III.

Patients with/without Wheelchair Dependence

Hospital Anxiety and Depression Scale-anxiety subscale reported by children was higher in patients without wheelchair dependence than the patients with (p=0.002). CPRS-conduct disorder and CPRS-Hyperactivity/ Impulsivity subscale scores of the patients without wheelchair dependence was higher than the patient with (p=0.016, p=0.009). T-DSM-IV-S hyperactive/impulsive subscale score of the patients without wheelchair dependence was higher than the patients with (p=0.043). Comparison of the scales of the patients according to their wheelchair dependence was shown in Table III.

DISCUSSION

Presented study detected CPRS Hyperactivity/ Impulsivity and Anxiety subscale scores of the patients to be significantly higher than controls. World Health Organization reported around 10% of children and adolescents suffer from mental disorders, and of those 3% develop a depressive disorder (18). Depression is often comorbid with anxiety (up to 30%) (19). Comorbidity is important because both of the conditions contribute to significant impairment in the daily functioning of the child (20). Depression is reported to be more common among those with chronic somatic health problems. Concomitance of depression with chronic condition influences adherence of patient to medical recommendations, pharmacotherapy and control visits beside emotional and cognitive functioning (21). Kabra et al. (22) screened A/D among pediatric patients of NB and their caregivers. They found considerable anxiety in adolescents with NB and both A/D in caregivers. Lopes et al. (23) in their cross-sectional study evaluated QoL of pediatric patients with lower urinary tract malformations managed with incontinent or continent urinary stomas or by urethral CIC and compared them with heathy controls. The patients reported to have negative perceptions regarding necessity of undergoing CIC and to the occurrence of daytime urinary losses, however, the feeling associated to the CIC procedure itself resulted in a positive perception which is explained by the possibility to be diaper-free. In our study contrary to the literature HADS, CPRS and T-DSM-IV-S scores were similar in patients with and without CIC. These not expected results can be explained by the fact that the patients and caregivers are incompatible with CIC treatment due to the socio-cultural structure and belief structure of the population. Small number of study group or discordance between in numbers of compared groups may be another reason.

Another interesting result of this sturdy difference regarding HADS-anxiety scores, CPRS-conduct disorder and CPRS-Hyperactivity/ Impulsivity subscale scores, T-DSM-IV-S hyperactive/impulsive subscale score between those with and without wheelchair dependence. Those without wheelchair dependence detected to have higher scores compared with wheelchair dependent patients. Although we have no data on the cause of this finding in this preliminary study with small sample size the explanations can be as follows; the fact that the small number of patients who have the same pathology and are not wheelchair dependent in their surroundings may be a source of concern for the future. The patient's unwillingness to adapt to the requirements of the condition or, perhaps high expectations may be the reason also.

NB patients with CKD or ESRD can experience multiple hospital visits, examinations, wide ranged treatment modalities like medications, CIC, surgical procedures or renal replacement therapies. The exact prevalence of psychiatric disorder in pediatric CKD patients varies (10–35%) depending on the progression of CKD and the age of the child (young children or adolescents). In the study conducted by Kogon et al. (24) 7% of children and adolescents with CKD met the study criteria for depression and 5% reported elevated depressive symptoms. Moreira et al.(25) in their study conducted of 28 children and adolescents with pre-dialysis CKD and 28 healthy sex/age-matched controls concluded that CKD negatively impact the QoL of pediatric patients, contributing to a higher frequency of depression and separation anxiety. Multicenter study enrolled with CKD patients on hemodialysis, peritoneal dialysis and on conservative treatment concluded that the level of anxiety among the researched group, with the exception of hemodialysis patients, was not significantly different than the level of anxiety among healthy subjects (26). Demir et al.(27) reported presence of psychiatric disease to be most important factor affecting Qol in transplanted children. Consistent with the literature, global score of the CPRS, DSM-IV total score and the DSM-IV inattention score was higher in patients with CKD than without. Limited mobilization capacity with wheelchair, multiple hospital visits, long hospitalizations due to acute illness, complicated management therapies are obliges patients to live in isolation from their school and social environment. Family and

close relatives are only social network of these patients. This isolation may be source of A/D in these patients group.

Impairments in cognitive abilities including impaired intellectual abilities and difficulties in executive functioning, such as attention, memory in CKD patients have been frequently reported in the literature (28-30).

Moreira et al. (25) found a significant difference in the frequency of grade retention, delayed educational attainment and interruption of studies between CKD patients and matched controls. Elorza et al. (31) explained worse scores for psychosocial health and school dimensions in CKD patients compared to healthy controls and claimed this condition to be secondary to medical interventions inherent to the treatment and due to disease development. Educational status of mother is reported to be highly related with cognitive status of patient possibility due to the mother's undeniable role in the treatment and follow-up (32). However, studies have shown that despite these challenges, improvements in cognitive functioning are probable with improvements in renal function (33).

Remarkable and consistent with the literature finding of our study is statistically significant difference between CKD and non-CKD patients regarding CPRS- Learning problems subscale. In addition to the fact that the known effect of the disease and treatment process on learning difficulties manifests itself severely in our society, the education and awareness level of the caregivers is an ongoing challenge for clinicians. Beside proper management and follow-up awareness should be created among family members, caregivers and schools regarding these children.

CONCLUSION

In accordance with the protocol we applied in NB patient group, we prefer to begin CIC and medical treatment at an early age. We think that subjecting patients in the adolescent age group to NB examinations and treatments is a source of anxiety for the patient and caregiver. As a result of improvement in medical care opportunities long life expectation is grooving in NB patient population. We think that, beside management and follow-up of primary disease, monitoring and referring of patients regarding A/D symptoms may develop QoL.

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