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Importance of neuropsychiatric evaluation in children with primary monosymptomatic enuresis

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Summary

Background

Nocturnal enuresis (NE) is an involuntary voiding during sleep. It is a very common disorder in school-age children. Comorbid psychopathologies are common in patients affected by enuresis. According to the ICCS, the rate of behavioral and emotional disorders in children with enuresis is doubled compared with healthy control (HC) children.

Objective

The aim of the present study was to investigate the prevalence of neuropsychiatric comorbidities in children affected by NE.

Study design

Two hundred children with a diagnosis of enuresis were recruited from the Neuropsychiatric Unit of Catania University and 200 age-matched neurologically intact HC children were recruited from local schools. The inclusion criteria were a normal IQ and the absence of other pathological clinical conditions such as diabetes or kidney malformation. The exclusion criteria were failure to complete the initial evaluation or clinical/diagnostic procedures, inability (because of young age) to complete study questionnaires, and severe neurological or physical impairment.

Results

Age and gender proportions were not significantly different between the groups. In the NE group, 138

subjects (69%) had a familial history of NE, compared with 24 subjects (12%) in the HC group ($p < 0.01$). The NE group demonstrated significantly higher scores in the Child Behavior Check List, Conners' Multidimensional Anxiety Scale for Children, and the Child Depression Inventory compared than the HC group as well as the Yale Global Tic Severity Score and Child-Yale–Brown Obsessive Compulsive Scale scores ($p < 0.01$). Quality of life scores were significantly lower in the NE group than in the HCs group; specifically, between-group differences were significant in the relationship and self domains ($p > 0.01$ for both comparisons) (Figure).

Discussion

The present case-control study evaluates the prevalence of different neuropsychiatric comorbidities in children with NE as diagnosed according to the new ICCS criteria. An important finding was that neuropsychiatric conditions were more prevalent in NE patients than in age-matched HC subjects. To the best of our knowledge, this is the first study to report associations between enuresis and obsessive compulsive disorder as well as tic disorder, and is the first to describe the comparative psychopathological profiles of 200 children with enuresis and 200 matched HC children.

Conclusion

The results suggest that clinicians should not underestimate the effects of enuresis on psychosocial development. Childhood NE should be managed carefully and comprehensively in order to prevent the development of more serious behavioral problems in the future.

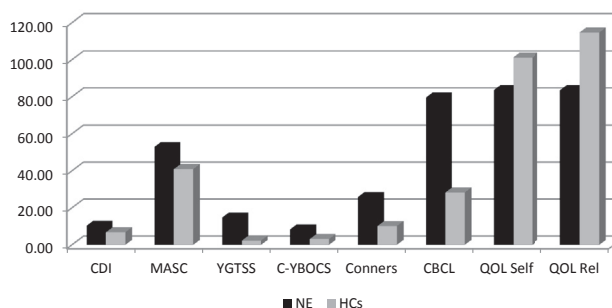


Figure Comparison between nocturnal enuresis patients and healthy control children ($p \leq 0.000$). CDI = Child Depression Inventory; MASC = Multidimensional Anxiety Scale for Children; YGTSS = Yale Global Tic Severity Score; C-YBOCS = Children-Yale–Brown Obsessive Compulsive Scale; CBCL = Child Behavior Check-List; QoL = Quality of life; Rel = relationship.

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Introduction

Nocturnal enuresis (NE) is an involuntary voiding that occurs in subjects who have not yet achieved bladder control. NE is a very common disorder in school-age children, occurring in 10% of 6-year-olds and in 5% of 10-year-olds [1]. Recently the Children's Continence Society (ICCS) [2] defined enuresis as intermittent (i.e., not continuous) wetting during sleep in children 5 years and older, where the term nocturnal can be added for clarity (i.e., enuresis and NE are synonyms).

Growing interest in the pathophysiology and etiology of enuresis has spurred the publication of more than 570 studies since 2009. This body of work uncovered subclinical behavioral symptoms such as sadness, embarrassment, and humiliation in children with enuresis that could not be technically classified as a disorder [3]. However, some studies suggest that comorbid psychopathologies are common in enuresis patients. In the general population, 10–15% of children have a behavioral disorder. According to the ICCS, the rate of behavioral disorders in children with enuresis is doubled [4]. Enuresis has been previously associated with attention deficit hyperactivity disorder (ADHD) [5,6], oppositional defiant disorder [7], and conduct disorders [8]. Moreover, patients and family members of patients with enuresis demonstrated lower quality of life global ratings in comparison with healthy control (HC) children [9,10], similar to observations in patients with chronic diseases such as epilepsy or asthma [11].

Therefore, we conducted the present exploratory case-control study to investigate the prevalence of neuropsychiatric comorbidities in children affected by NE.

Materials and methods

Study population

Subjects (patients and controls) were prospectively enrolled between October 2013 and September 2015. In total, 200 children with a diagnosis of primary monosymptomatic enuresis were recruited from the Neuropsychiatric Unit of Catania University and 200 age-matched neurologically intact HC children were recruited from local schools. Diagnoses of enuresis and other clinical conditions were made in accordance with the ICCS criteria by an experienced child neurologist. The inclusion criteria were a normal IQ and the absence of other pathological clinical conditions such as diabetes or kidney malformation. The exclusion criteria were failure to complete the initial evaluation or clinical/diagnostic procedures, inability (because of young age) to complete study questionnaires, and severe neurological or physical impairment. The study protocol was approved by the local ethics committee, and all participants provided written informed consent prior to participation.

Procedures

An outpatient medical history was obtained from child participants and their parents with a focus on

neuropsychiatric disorders, psychomotor development, toilet training, urinary habits/enuresis, and sleep habits. Moreover, all participants underwent a basic physical examination as well as a kidney and bladder ultrasound examination. Venous blood and urine samples were gathered in order to exclude the possibility of organic disorders such as diabetes, antidiuretic hormone deficiency, or urinary tract infection. A fasting blood test was also performed and included a full blood count and analyses of glucose, glycated hemoglobin, azotemia, creatinine, urea, electrolytes, C-reactive protein, and the erythrocyte sedimentation rate.

During the study, child participants and their parents were asked to keep a diary (3 days per month) of nocturia, urinary incontinence, urinary frequency and volumes, and daily fluid intake. Participants (with parental assistance if needed) also completed two diaries according to the practical consensus guidelines for the management of enuresis: a daytime diary and a diary of NE and nocturnal polyuria for 14 consecutive nights [12].

Assessments

All patients and control subjects were assessed using the following instruments: the *Wechsler Intelligence Scale for Children*, 3rd edition (WISC-III) [13], Youth Quality of Life Instrument-Research Version (YQOL-R) [14], Multidimensional Anxiety Scale for Children (MASC) [15], Child Depression Inventory (CDI) [16], Conners' ADHD/DSM-IV Scale (CADS) [17], Child Behavior Checklist (CBCL) [18], Yale Global Tic Severity Rating Scale (YGTSS) [19], and Children's Yale-Brown Obsessive Compulsive Scale (CY-BOCS) [20]. All subjects (patients and controls) underwent the complete evaluation.

The WISC III is a validated and widely used tool for IQ assessment. The MASC and CDI were used to assess anxiety and depression, the CADS provided an indication of symptoms related to ADHD, and the CBCL was used to assess a range of emotional and behavioral difficulties. Finally, the YGTSS was used to measure the presence and severity of tics and the CY-BOCS was used to assess symptoms related to obsessive-compulsive disorder (OCD). Of note, HC children were defined as individuals with no chronic or psychiatric disease that had scores <10 on the CADS and normal results on the CBCL.

Statistical analysis

The Student *t* test was used to compare behavioral and cognitive characteristics between groups. A *p* value ≤ 0.01 was considered to indicate statistical significance.

Results

Participant demographics

Demographic information is summarized in Table 1. A total of 200 NE patients (122 males and 78 females; mean age, 11.5 ± 3.9 years; age range, 8–15 years) and 200 HC subjects (131 males and 69 females; mean age, 11.9 ± 2.5

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