

Pre- and Postadenotonsillectomy Nocturnal Enuresis in Children with Adenotonsillar Hypertrophy

Dear Editor,

Enuresis is a common health problem worldwide. It is estimated that there are over 50 million children with enuresis throughout the world. According to the International Children's Continence Society (ICCS), enuresis is intermittent incontinence while sleeping and it is a term applicable to children who are at least 5 years old.^[1]

Enuresis may be classified as primary enuresis (80% of cases) – enuresis in a child who has never established urinary continence for more than 6 months – and secondary enuresis (20% of cases) – resumption of enuresis after at least 6 months of urinary continence.

Nocturnal enuresis (NE) means enuresis that occurs during sleep, daytime wetting means urinary incontinence that occurs while the child is awake, while monosymptomatic enuresis (uncomplicated) is enuresis without lower urinary tract symptoms other than nocturia and no history of bladder dysfunction.

Nonmonosymptomatic enuresis is the enuresis with lower urinary tract symptoms (e.g., increase or decrease in voiding frequency, daytime wetting, urgency, hesitancy, straining, weak or intermittent stream, posturination dribbling, holding maneuvers, sensation of incomplete emptying, and lower abdominal or genital discomfort).^[1,2]

NE is caused by a disparity between bladder capacity and nocturnal urine production and the child's failure to awaken in response to a full bladder. Factors associated with enuresis include nocturnal polyuria, detrusor instability, and an abnormally deep sleep pattern.^[2]

There is no definite etiology for NE among children, and the disorder is probably multifactorial. Many potential causes have been suggested and investigated, such as dysfunction of sleep arousal, altered diurnal antidiuretic hormone secretion, genetic factors, nocturnal polyuria, psychological factors, delayed maturation, and parental age and education level.^[3]

Sleep-disordered breathing (SDB) refers to a pathophysiologic continuum that includes snoring, upper airway resistance syndrome, obstructive hypopnea syndrome, and obstructive sleep apnea (OSA). Adenotonsillar hypertrophy (ATH) is the most common cause of SDB among children. Several retrospective studies have addressed the beneficial effects of AT in improving NE in children with simultaneous ATH.^[4]

Although enuresis tends to disappear spontaneously as the child grows, a significant proportion of patients continue to wet the beds into adolescence or adulthood. The impact of enuresis on

affected children and their families is mainly psychological and may be severe.^[5] This makes treatment of prime importance.

This study was performed to screen the prevalence of NE among children who were already candidated for AT because of ATH and clinical features of SDB and compare it with a control group and also to investigate prospectively the beneficial effect of AT on NE in such children.

This is a descriptive study carried out in the ENT Department of Almahawil Hospital, Babylon Province, Iraq, from January 2014 to July 2017. In this study, we included 232 patients who were already decided to have AT operation because of ATH with upper airway obstruction (UAO). All these children had moderate-severe tonsillar enlargement (clinical Grades 3 and 4), adenoid hypertrophy confirmed by radiology, and clinical features of SDB such as mouth breathing, snoring, abnormal sleep position, and witnessed sleep apnea, and all had normal urine analysis.

For the purposes of this study, enuresis was defined as nighttime bedwetting to any degree in children aged 5 years and older and toilet trained. NE was defined in accordance with the ICCS standardized terminology.^[1] Children with urinary incontinence associated with a well-known urological or neuro-urological dysfunction were excluded from the study. Hence, the type of all NE in our patients was primary and monosymptomatic.

The standardized tonsillar hypertrophy grading scale used was as follows:

- Grade 0 – Tonsils are entirely within the tonsillar fossa
- Grade 1 – Tonsils occupy <25% of the lateral dimension of the oropharynx, as measured between the anterior tonsillar pillars
- Grade 2 – Tonsils occupy <50% of the lateral dimension of the oropharynx
- Grade 3 – Tonsils occupy <75% of the lateral dimension of the oropharynx
- Grade 4 – Tonsils occupy 75% or more of the lateral dimension of the oropharynx.

Soft-tissue lateral neck radiography was done to confirm the adenoid hypertrophy, and urine analysis was made to detect any abnormalities. The age ranges between 5 and 16 years; 180 (78%) were 5–9 years and 52 (22%) from 10 to 16 years; and 128 were boys (55%) and 104 girls (45%). NE severity before operation was classified (mild – 1–2 nights/week, moderate – 3–4 nights/week, and severe – 5–7 nights/week). Patients were divided into two categories based on their enuresis response after AT operation: responders had a complete resolution or decreased enuresis episodes to < 2 nights (mild) a week and

nonresponders had no change or 3 or more (moderate-severe) wet nights a week. We made a comparative study by comparing the association of (NE) in this group with a control group of the same number of patients (232) and the same age range (5–16 years) of both genders who visited our department for another complaint (other than ATH). We also follow the operated patients prospectively by recording the impact of AT operation on NE for 3–6 months postoperatively and compare the results with those who did not do the operation (for different reasons) for 3–6 months.

From a total of 232 patients with ATH, results found: 102 (44%) patients with NE, all were primary monosymptomatic type; 78 (63%) of them were 5–9 years of age, 24 (37%) in 10–16 years of age. Results also found that 130 (56%) of patients without NE. 102 (81%), of them were 5–9 years of age, and 28 (19%) 10–16 years of age. Regarding control group, from the total of 232, 21 (9%) of patients with NE: 16 (7%) of them were 5–9 years, and 5 (2%) 10–16 years [Figure 1].

Regarding the impact of AT on the 102 patients with NE [Figure 2], we could follow only 86 patients for 3–6 months postoperatively; The results were as follows: the responders: 32 (37%) of them showed complete resolution and 25 (29%) of them showed partial improvement, while the nonresponders: 29 (34%) of them showed no improvement. We could follow 36 (26%) of the 102 patients preoperatively for 3–6 months, and there was no change of their status of NE.

Enuresis is a frequent chronic illness in the pediatric population. Previous studies reported its frequency between 5% and 15%.^[6]

Etiology of EN is still controversial. Delay of nervous system maturation, low bladder capacity, abnormalities of the urinary tract, inadequate secretion of antidiuretic hormone, genetic factors, immature waking mechanisms, deep sleep, neurologic bladder problems, bacteriuria, diet, socioeconomic status, and psychogenic factors were suggested as etiologic factors.^[1]

The rate of EN in children with ATH and SDB has been reported to be between 20% and 34.5% in previous studies.^[1]

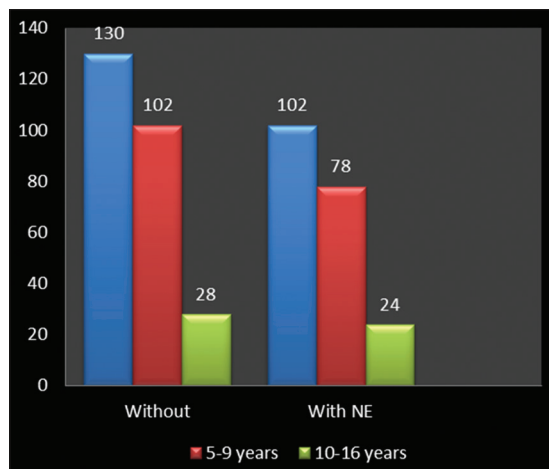


Figure 1: Distribution of the patients according to the age

In our study, the rate of NE in children with ATH and SDB was 44%, whereas it was 9% in the control group.

There are several hypotheses to explain the relationship between the ATH and the NE. Brooks and Topol believe that UAO has negative effects on arousal response.^[6] Yeung *et al.* suggested that temporary fall in oxygen saturation in UAO patients leads to loss of bladder control. They indicated that a number of patients who could not be aroused before surgery were able to wake up and go to the bathroom after surgery.^[7]

Besides this, upper airway resistance causes high inspiratory effort, and this effort results in high intrathoracic negative pressure that leads to cardiac distention, natriuretic response, and atrial natriuretic peptide secretion. As a result, atrial natriuretic peptide enhances sodium/water excretion and inhibits other hormones, which regulates fluid balance and the renin-angiotensin system.

Based on the results of our study, the post-AT cure rate and improvement rate of enuresis symptoms were 37% and 66%, respectively. Basha *et al.* investigated the effect of AT on NE and found an 84.2% improvement in enuresis symptoms after surgery.^[8] Another study conducted by Weider *et al.* in 115 children with NE and OSA reported that enuresis symptoms were improved in 76% of patients after surgery.^[4]

Limitations of this study are that we used subjective questions about symptoms such as NE which might not be accurate enough. We could not perform polysomnography for our patients, as it is the gold standard tool to assess the SDB, because of unavailability in our country. However, it is an expensive test and it is still controversial whether it is necessary to perform polysomnography as a routine preoperative test to document the presence of SDB in children with an obvious clinical situation.^[9] Difficulty in the following of our patients and poor cooperation of some families is another limitation.

From this study, it can be concluded that children with ATH have a high rate of (NE). Adenotonsillectomy resulted in the complete resolution or partial improvement of NE in about two-thirds of patients.

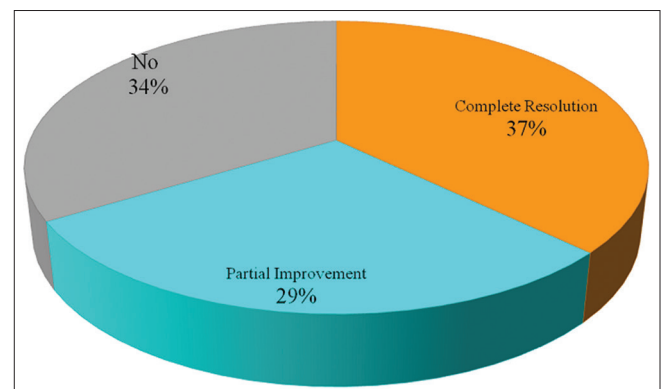


Figure 2: Impact of adenotonsillar hypertrophy on the patients with nocturnal enuresis

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Conflicts of interest

There are no conflicts of interest.

Abdulhusein Mizhir Al-Maamuri

Department of ENT, Almahawil Hospital, Babil Health Directorate,
Babylon Province, Iraq

Address for correspondence: Dr. Abdulhusein Mizhir Al-Maamuri,
Department of ENT, Almahawil Hospital, Babylon Health Directorate,
Babylon Province, Iraq.
E-mail: drahment@yahoo.com

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