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Original Research Article

Effectiveness of adenotonsillectomy in resolution of enuresis in children with sleep-disordered breathing: a hospital based prospective cohort study in Dar es Salaam, Tanzania

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ABSTRACT

Background: Adenotonsillar hypertrophy remains to be the commonest causes of sleep disordered breathing in paediatric patients and has been implicated as a cause of primary and secondary enuresis. The aim of this study was to determine the effectiveness of adenotonsillectomy in resolution of enuresis in children with sleep-disordered breathing.
Methods: A hospital based prospective cohort study was conducted at Ekenywa Specialised Hospital in Dar es Salaam, from May 2018 to February 2019. Two hundred children aged 3 to 15 years with obstructive adenotonsillar hypertrophy who were admitted ready to undergo adenotonsillectomy were evaluated. Upon such evaluation, the primary outcome was the number of bedwetting incidents (nocturnal enuresis) post-operatively compared with pre-operative incidents. Patients were kept under follow-up for 3 months. Data were collected using structured questionnaires regarding number of bedwetting incidents, type of enuresis (primary or secondary) and family history of enuresis. Data was analyzed using SPSS version 21 and p-values <0.05 were considered to be statistically significant.
Results: Of 200 children admitted for adenotonsillectomy, 80 (40%) had a positive history of preoperative enuresis, including 35 (43.8%) girls and 45 (56.2%) boys. All parents for the children consented to participate in the study. Three months after adenotonsillectomy, enuresis had resolved completely in 50 (62.5%) children and had shown relative improvement in 25 (31.3%) children. Enuresis had not improved in the remaining 5 (6.3%) children (p<0.05).
Conclusions: Findings from this study indicates that adenotonsillectomy can improve nocturnal enuresis and day-time incontinence in the majority of children with adenotonsillar hypertrophy.

Keywords: Adenotonsillectomy, Enuresis, Nocturnal, Sleep-disordered breathing, Tanzania

INTRODUCTION

Enuresis is one of the commonest peadiatric urological problems with psychosocial consequences to primary caretakers of such children.[1,2] Though the true incidence of enuresis in children is not known, the estimated incidence rate of enuresis in 5-year old children is 15.1%.[3] Amongst children with enuresis, 15% will usually experience annual spontaneous resolution while 5% continue to experience enuresis by the age of 10 years and 1% remain unimproved into adulthood.[1,3]

The exact etiology for enuresis among children has not been elucidated but probably multifactorial in origin with many causes having been suggested such as dysfunction of sleep arousal, altered diurnal antidiuretic hormone secretion, genetic factors, nocturnal polyuria, psychological factors, delayed maturation, parental age and level of education.[4,5]

Available studies have elucidated the relationship between peadiatric enuresis and sleep disorder.[1,3,6-12] Obstructive sleep apnea among children is commonly caused by obstructive adenotonsillar hypertrophy and thus studies have reported significant benefits of adenotonsillectomy towards improving enuresis in children with concomitant enuresis and obstructive adenotonsillar hypertrophy.[1,8,12-14] The aim of this study was thus to determine the role of adenotonsillectomy towards improvement of symptoms linked to enuresis and to the best of our knowledge, this is the first study in Tanzania to unveil such information.

METHODS

The hospital based prospective cohort study was conducted from May 2018 to February 2019 at Ekenywa Specialised Hospital in Dar es Salaam Region. Children, who were aged from 3 to 15 years with nocturnal enuresis as well as obstructive adenotonsillar hypertrophy were admitted at ESH for adenotonsillectomy. For convenience, enuresis has been defined in this study as nighttime bedwetting or daytime incontinence to any degree in children aged 3 years and/or older and toilet trained. Children with urinary incontinence associated with a well-known urological or neurological dysfunction and with primary enuresis were excluded from the study. Of 200 children admitted for adenotonsillectomy, eighty met the eligibility criteria of having nocturnal enuresis. All parents for the children who were recruited in this study consented to participate. Data collection tool was basically a questionnaire pertaining the number of nighttime bedwetting and daytime incontinence episodes per week. Recruited study participants were followed-up and the same questionnaire used preoperatively was completed three months postoperatively. Data was analyzed using SPSS version 21 and $p<0.05$ were considered to be statistically significant. Chi-square test was performed for data analysis.

RESULTS

A total of 200 children aged 3 to 15 years were recruited in this study where majority were males, 152 (76%). The prevalence of nocturnal enuresis among children with obstructive adenotonsillar hypertrophy was 40% (80/200), with a prevalence of 43.8% (35/80) in females and 56.2% in males (45/80) (p=0.001) (Table 1).

Of the eighty children who had enuresis, and upon follow up three months after adenotonsillectomy, enuresis had resolved completely in 50 (62.5%) children and had shown relative improvement in 25 (31.3%) children. Enuresis had not improved in the remaining 5 (6.3%) children (p value <0.05) (Table 2).

Table 1: Clinical characteristics of children with obstructive adenotonsillar hypertrophy scheduled for adenotonsillectomy.

Gender	With enuresis (%)	Without enuresis (%)	Total (%)	P value
Male	45 (29.6)	107 (70.4)	152 (76)	0.0001
Female	35 (72.9)	13 (27.1)	48 (24)	
Total	80 (40)	120 (60)	200 (100)	

Table 2: Status of paediatric enuresis three months' post adenotonsillectomy due to obstructive adenotonsillar hypertrophy.

Status of paediatric enuresis three months post adenotonsillectomy	Frequency (%)
Complete resolution	50 (62.5)
Relative improvement	25 (31.3)
No improvement	5 (6.3)
Total	80 (100)

DISCUSSION

Enuresis is the commonest encounter in peadiatric patients with obstructive adenotonsillar hypertrophy. The aim of this study was thus to determine the effectiveness of adenotonsillectomy in resolution of enuresis in peadiatric patients with obstructive adenotonsillar hypertrophy at a private hospital located in Tanzanias' largest city and such hospital serves the largest number of patients with otorhinolaryngological complaints as per private practice in Dar es Salaam. The results of this study indicate that adenotonsillectomy can improve enuresis in the majority of children with obstructive adenotonsillar hypertrophy. Obstructive adenotonsillar hypertrophy is one the most common leading causes of upper airway obstruction which may result in nocturnal enuresis and day time incontinence in children.[15,16] The reported pathophysiology through which obstructive adeno-tonsillar hypertrophy may cause enuresis is related to the increased work of breathing that can lead to higher negative intrathoracic pressure during inspiration and hence increased cardiac load. This effect may increase circulating serum levels of atrial and brain natriuretic peptides, which are produced and released by cardiac myocytes in response to stretch or strain, and result in diuresis.[7,17] It has psychosocial impact to children with such status of enuresis.

This study which was conducted in Tanzania revealed the prevalence of enuresis in children with obstructive adenotonsillar hypertrophy to be 40% with male preponderance (56.2%). Such finding appears to have resemblance with other studies done elsewhere. Ahmadi

et al, from Iran found the prevalence of nocturnal enuresis among children with adenotonsillar hypertrophy to be 23.1% (25.2% in boys and 20.8% in girls) 1 and similarly Topol et al found the prevalence of nocturnal enuresis to be 41% (49% in boys and 31% in girls).[5] However, several anatomical, psychological, and hormonal factors as well as parental characteristics may play a role in the etiology of nocturnal enuresis.[1,3,13,14,16]

Moreover, this study has also found adenotonsillectomy to have brought a cure rate of enuresis in about 62.5% of cases and relative improvement in 31.3% of cases. Such improvement has also been established in other studies done elsewhere where Ahmadi et al, found complete resolution of enuresis in 60.7% of cases and relative improvement in 26.2% of children and 13.1% showed no improvement after adenotonsillectomy.[1] Thus, adeno-tonsillectomy should be resorted in children with enuresis and underlying obstructive adenotonsillar hypertrophy.

This study has found postoperative improvement and cure rate of enuresis to be 31.3% and 62.5% respectively. Several other studies done in other parts of the world has elucidated almost similar findings where Weider et al, found improvement of enuresis to occur in 76% of children after adenotonsillectomy.[16] Similarly, Basha et al, investigated the effect of adenotonsillectomy on nocturnal enuresis and found an improvement of 84.2%.[12] Firoozi et al, found complete resolution of enuresis in 33% of patients and significant improvement in 31% whilst 36% had no changes in enuresis pattern after adenotonsillectomy.[14]

The limitation of the study is the number of recruited participants and thus large multi-centered hospital based studies should be designed to give more validation of the role of adenotonsillectomy in resolution of peadiatric enuresis.

CONCLUSION

The results of this study indicate that adenotonsillectomy can improve enuresis in the majority of children with obstructive adenotonsillar hypertrophy. However, further larger hospital-based studies are necessary to validate these findings.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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