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DESMOPRESSIN TREATMENT AND ENURESIS ALARM FOR NIGHTTIME BEDWETTING IN CHILDREN ACCOMPANIED BY OVERACTIVE BLADDER

Aim of study
Overactive bladder (OAB) symptoms such as increased daytime frequency, urge urinary incontinence and urgency are common in childhood. Children with OAB often suffer from nighttime bedwetting or nocturia during sleep. Desmopressin (DDAVP) and enuresis alarm have been regarded as effective treatments for monosymptomatic nocturnal enuresis in childhood. However, therapeutic strategies for nighttime bedwetting in children with OAB have not been well studied. This prospective study was therefore carried out to investigate whether DDAVP or enuresis alarm could be an effective treatment for nighttime bedwetting in children accompanied by OAB.

Materials and methods
A total of 41 children who underwent DDAVP or enuresis alarm for nighttime bedwetting accompanied by OAB were enrolled in the study. Before this study, all the children had undergone standard urotherapy of OAB for at least 12 weeks. Standard urotherapy included information of normal micturition mechanism, prohibition of holding posture, timed voiding and management of bowel movement. Anticholinergic drugs were added, if necessary. In patients who responded to the treatment for OAB, those who were highly motivated to undergo additional treatment for nighttime bedwetting were informed about two options; DDAVP (10-30 μg intranasal) and enuresis alarm. We asked them to decide which treatment they would like to receive. Twenty-five children underwent DDAVP treatment (the DDAVP group) and 16 did enuresis alarm (the alarm group). Children who did not respond to the treatment for OAB, those under the age of seven, with bedwetting < 4/week, neurogenic abnormalities or nocturnal polyuria were excluded. Parameters were the number of nighttime bedwetting and urinary output during sleep. Urinary output during sleep was calculated by diaper weight plus the first morning micturition volume. The efficacy of treatment was assessed within 8 to 12 weeks by frequency/volume charts, according to the definition of clinical outcome conformed to the International Children's Continence Society [2]. Children with complete cure or improvement are defined as responders. The data were analysed statistically using the non-parametric Mann-Whitney U test.

Results
One boy in the DDAVP and two girls in the alarm group were excluded due to their poor compliance with the treatment. A total of 38 children (25 boys and 13 girls) between 7 and 13 years (mean age 9.8 year) were evaluated. The two groups were matched for age, pre-treatment number of bedwetting and urinary output during sleep **(Table 1)**. Treatment period was significantly longer in the alarm group than in the DDAVP group (11.7 v.s. 8.2 weeks, $p<0.001$). Complete cure and improvement were found in 25% and 16.7% of the DDAVP group, and 7.1% and 14.3% of the alarm group, respectively. DDAVP offered statistically more preferable relief of bedwetting than enuresis alarm. Comparing the responders and non-responders in the DDAVP group, urinary output during sleep decreased significantly in responders, however, it did not change in non-responders **(Table 2)**. Among all the responders in the DDAVP group, bedwetting immediately relapsed on cessation of DDAVP. In the alarm group, nocturia replaced the nighttime bedwetting in two of the three responders and they woke to void during sleep after the treatment.

Interpretation of results
Children with OAB can usually prevent urgency and urge incontinence unless the bladder is adequately filled. In the responders to the DDAVP, reduced urinary output and the lower bladder filling rate caused by DDAVP would reduce the onset of idiopathic bladder overactivity during sleep, resulting in relief of bedwetting.

Concluding message

The results suggest that DDAVP could be a more effective treatment for nighttime bedwetting in children accompanied by OAB than the enuresis alarm.

	DDAVP n=24	Alarm n=14	Total n=38
Age (years)	9.4±1.6 7-12	10.4±1.8 8-13	9.8±1.7 7-13
Treatment period (weeks)	8.2±0.8 8-12	11.7±1.0 9-12	9.1±1.8 7-12
Urinary output during sleep Pre-treatment (ml)	208.7±80 130-380	196.4±67.2 110-320	203.5±74.0 110-380
Outcome Responders n (%)	10 (41.7%)	3 (21.4%)	13 (34.2%)

Table 1: Age, treatment period, pre-treatment urinary output during sleep and outcome in two groups

	Responders n=10	Non-responders n=14
Pre-treatment (ml)	237.0±98.2 130-380	177.2±37.7 140-240
Post-treatment (ml)	173.0±58.8 100-260	168.1±29.3 132-210
p value	0.0014	0.275

Table 2: Comparison of urinary output during sleep in the DDAVP group

1. Incontinence 2nd Edition. Health Publication Ltd Plymouth. 2002:1086-1089.
2. Standardization and definitions in lower urinary tract dysfunction in children. International Children's Continence Society. BJU. 1998;**81**:1-16.