



## Association of Nocturnal Enuresis With Vesicoureteral Reflux and Renal Cortical Damage

Mitra Naseri<sup>1\*</sup>

<sup>1</sup> Pediatric Nephrology Department, Dr Sheikh Children Hospital, Mashhad University of Medical Sciences, Mashhad, IR Iran

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### ABSTRACT

*Background:* The prevalence of vesicoureteral reflux (VUR) is higher in enuretic children than in non-enuretic children. Recent studies have reported VUR in 6–23% of children with enuresis.

*Objectives:* To clarify the association of nocturnal enuresis with vesicoureteral reflux (VUR) and to identify children who are at risk for VUR.

*Patients and Methods:* During 2007–2009, neurologically normal children who were referred with a chief complaint of nocturnal enuresis and had abnormal renal ultrasonography (US) results, daytime incontinence, abnormal results in urodynamic studies, urinary tract infection, or a history of VUR in their siblings were prospectively evaluated for VUR by voiding cystourethrography (VCUG).

*Results:* A total of 60 children (26 boys and 34 girls) aged 5–17 (mean  $\pm$  SD: 8.46  $\pm$  2.45) years met the inclusion criteria and were enrolled in the study. Twenty-eight (46.7%) patients had mono-symptomatic nocturnal enuresis (MNE), and 32 (53.3%) had non-mono symptomatic nocturnal enuresis (NMNE). VUR was reported in 10 (16.7%) patients and posterior urethral valve (PUV) was found in 1 (1.7%) patient. The prevalence of VUR was significantly higher in patients with daytime incontinence and in girls ( $P = 0.016$  and  $0.003$  respectively). We did not find any significant correlations between VUR and the form of enuresis (primary versus secondary), urinary tract infection, or any diurnal urinary symptoms other than daytime incontinence ( $P > 0.05$  for all). Of 10 renal scintigrams, 5 (50%) showed renal cortical defects. *Conclusions:* VUR is uncommon in children with MNE and in those with NMNE who do not wet themselves during the day; however, it is a relatively common finding in enuretic children who have daytime incontinence. We recommend VCUG in all enuretic children who have daytime incontinence.

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### ► Implication for health policy/practice/research/medical education:

The groups that can use the paper are general practitioner, pediatricists and researchers.

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## 1. Background

Nocturnal enuresis often accompanies urological abnormalities (1), and urinary incontinence can be caused by anatomic or neurologic abnormalities, including vesicoureteral reflux (VUR), ectopic ureter, bladder exstrophy, myelomeningocele (2), congenital urethral stricture (3), anterior urethral valve (4), and PUV (5). The prevalence of VUR is higher in enuretic children (6–8) than in other children (9, 10). New studies have noted VUR in 6–23% of children with enuresis (1, 11, 12), while other urological abnormalities have been reported in a few cases (1, 11, 12).

The American Academy of Pediatrics recommends urological evaluation of enuretic children only in cases with a history of urinary tract infection (UTI) (13), while other

\* Corresponding author: Mitra Naseri, Pediatric Nephrology Department, Dr Sheikh Children Hospital, Mashhad University of Medical Sciences, Mashhad, IR Iran. Tel: +98-5117269021; Ext: 5, Fax: +98-5117277470, E-mail: naserim@mums.ac.ir, mtr\_naseri2006@yahoo.com