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Original Research Article

Urodynamic findings in patient above 15 years old with primary refractory nocturnal enuresis

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Abstract

Enuresis is normal but involuntary voiding that occurs at an inappropriate time or social setting, during the day, night, or both. Nocturnal enuresis describes any involuntary loss of urine during sleep. It is classified into:- 1) Primary: never been dry for more than 6-month period. 2) Secondary: re-emergence of bed wetting after a period of being dry for at least 6 months. This study included 35 patients older than 15 years with primary refractory enuresis; 24 males and 11 females. All had tried multiple courses of medical treatment for enuresis without response for at least six months. All patients underwent full urodynamic investigation by cystometry, profilometry, uroflowmetry and electromyogram. After failure of medical and behavioral therapy in enuresis, the usual next step is to investigate using urodynamics. The aim of this study was to find the urodynamic finding in enuretic patients above 15 years of age so that we can determine the actual benefit of urodynamics in the treatment of refractory enuresis. All 35 patients have one or more urodynamic abnormality; 11 patient have Detrusor–sphincterdyssynergia (DSD) (31.43%),15 Patient have bladder overactivity (42.86(%,16 patient has high postvoid (45.71%), 20 patient have high urethral pressure profile (57.10%), 4 patient have low urethral pressure profile 11 (40%), 29 patient have small capacity bladder (82.86%), 6 patient have large bladder capacity (17.14%), 28 patient have low average flow rate (80%), 21 patient have hypocomplinet bladder (60%). Urodynamics is very helpful in cases of refractory enuresis by detecting voiding dysfunction which is present in all of these patients.

Keywords: Bladder capacity, Detrusor–sphincterdyssynergia, Flow rate, Refractory enuresis, Urodynamics

INTRODUCTION

Nocturnal is defined as repeated, spontaneous voiding of urine during sleep in a child five years or older (Nevéus et al., 2006). Enuresis may be classified as primary (never been dry for more than a 6-month period) or secondary (re-emergence of bed wetting after a period of being dry for at least 6 months), and monosymptomatic (uncomplicated) or nonmonosymptomatic (i.e., concomitant lower urinary tract symptoms are present) (Nevéus et al., 2006; Fritz et al., 2004).

Nocturnal enuresis is uncommon among older patients; but it associates with poorer therapeutic outcomes compared with the more common forms of daytime incontinence (Burgio et al., 1996). In contrast to the large volumes of research on treatment of daytime incontinence, there is little investigation on the nighttime incontinence in older patients.

A proportion of children in the first grade occasionnally wet the bed and 4% wet two or more times a week

(Robson, 2009). The prevalence estimates of enuresis are highly variable.

According to a study of 10960 children, the respective prevalence of enuresis in early school ages (7 and 10 years) were 9% and 7% in boys and 6% and 3% in girls, respectively (Byrd et al., 1996).

More girls than boys are dry both day and night by the age of 2 years, and NE is 50% more common in boys than in girls. NE has a spontaneous resolution rate of 15% per year, so that by age of 15 years it persists in only 1% of the population (Brian et al., 2010).

Enuresis is a phenomenon with a number of possible causes, including detrusor overactivity, low bladder capacity, reduced bladder sensations, failure of arousal from sleep, sleep disordered breathing and overproduction of urine at night (Abrams, 2006; Bascom et al., 2011). The urodynamic findings in patients with primary enuresis are usually storage abnormalities in the form of small bladder capacity, bladder hypocompliance or detrusor overactivity (Haddad et al., 1993; Sehgal et al., 2007). The incidence of low cystometric capacity ranges from 15% to 73% (Haddad et al., 1993; Yeung et al., 2004; Scholtmeijer and Nijman, 1993; Sehgal et al., 2007). The occurrence of detrusor overactivity ranges from 10% to 79% (Haddad et al., 1993; Sehgal et al., 2007). Low bladder compliance has been found in 2.5%e 40% (Sehgal et al., 2007; Yucel et al., 2004). Patients with primary enuresis that is refractory to treatment are usually referred for urodynamic assessment. The referring physician is looking for an urodynamic explanation for the failure of treatment, which has usually been given with the aim of improving the storage function of the bladder.

MATERIALS AND METHOD

This study was done in the period from June 2013 till September 2015 in surgical subspecialty hospital, medical city complex included 35 patients, 24 males and 11 females.

Inclusion criteria:-

1) Patient of 15 year of age or older than that.
2) Patient who has Primary enuresis (never been dry for more than a 6-month period).
3) Patient who has refractory enuresis according to the ICCS guidelines, meaning failure of medical treatment after at least 6 months of continuous treatment.

Exclusion criteria:-

1) Patients with urinary tract infection.
2) Patients with nocturnal polyuria.
2) Patients with urologic or neurogenic lesions.

For all 35 patients fully detailed history, including bladder diary and thorough physical examination, lumbosacral spine x-ray and even MRI was done. The treatment modalities included imipramine, anticholinergic drugs, desmopressin, enuretic alarm and bladder training.

Full urodynamic study using WIEST JUPITER 8000 II, 6-Fr double-lumen urodynamic catheter was used for saline infusion at room temperature with infusion rate from 30 to 50 ml/min. Peri-anal surface electrodes were used to perform the EMG. The cystometric capacity was divided into low, high and normal. Normal bladder capacity is about 450 ml. Cystometric capacity is considered; capacity <65% of the normal value was defined as small and large if it is >150% of normal capacity (Haddad et al., 1993; Yeung et al., 2004; Koff, 1983; Mattsson, 1994). The normal flow rate from a full bladder is about 20–25 mL/s in men and 25–30 mL/s in women. A rate of less than 15 mL/s was considered low. Voiding pressure > 30 mmH2O was considered high, indicating an element of bladder outlet obstruction (Coombs et al., 2005). Residual urine was measured in all patients and was considered high if it was >10% of bladder capacity (Jansson et al., 2000).

Values were considered abnormal as compared to the normal range. Uroflowmetry, cystometrography, profile-metry and electromyography were performed. Intra-vesical and abdominal pressures were recorded and detrusor pressure was derived. Electromyography was done using skin electrodes. Increase in detrusor pressure ≥15 cm water as bladder was filled to a normal functional capacity was defined as low compliance bladder (Haddad et al., 1993; Koff, 1983). Detrusor over activity was defined as involuntary detrusor contractions during the filling phase, involving a detrusor pressure increase of >15 cm water above baseline (Haddad et al., 1993). Detrusor under-activity was defined as a contraction of decreased strength resulting in prolonged bladder emptying and/or failure to achieve complete bladder emptying (Haddad et al., 1993). Overactive bladder was defined as involuntary detrusor contractions, small bladder capacity and urethral instability (Haddad et al., 1993; Mattsson, 1994).

RESULTS

There were 35 children who met the inclusion criteria and enrolled in the study. Patients included 24 boys (68.5%) and 11 girls (31.4%) (Figure 1), patients' ages ranged from 15 – 51 years. All of them full urodynamic study done, which revealed that (Diagram 1).

11 patients have DSD 31.43% (figure 2), 15 patients have bladder overactivity 42.86% (figure 3), 16 patients has high postvoiding residual 45.71% (figure 4), 20 patients have high urethral pressure profile 57.10%, 4 patients have low urethral pressure profile 11.40% (figure 5), 29 patients have small capacity bladder 82.86%, 6 patients have large bladder capacity 17.14 (figure 6), 28 patients have low average flow rate 80% (figure 7), 21 patients have hypocomplinet bladder 60% (figure 8).

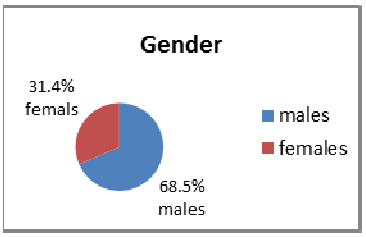


Figure 1. Gender

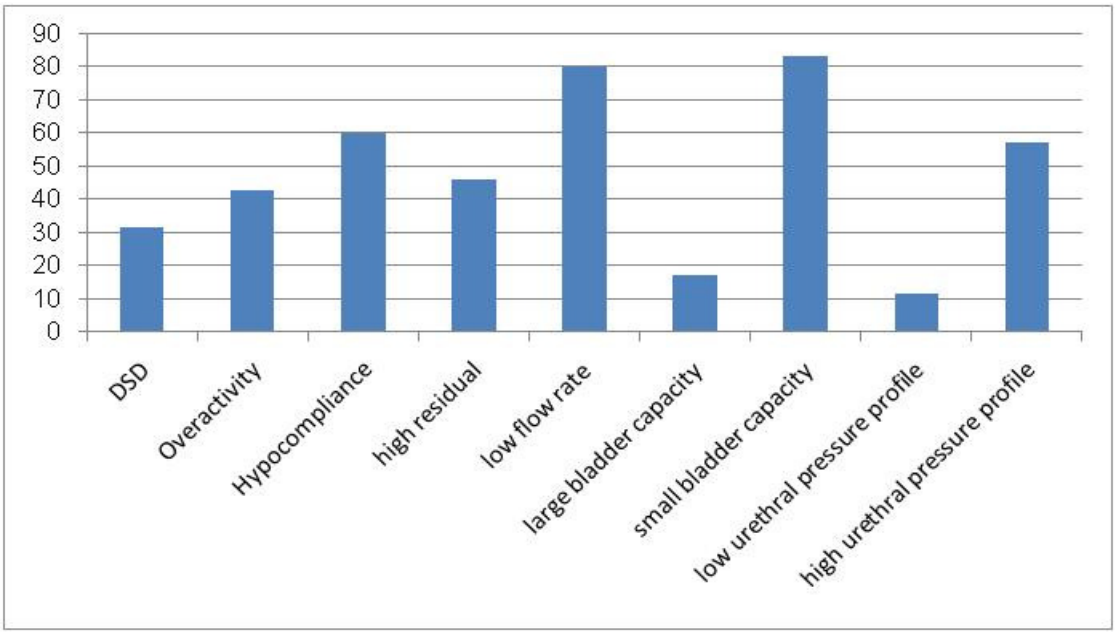
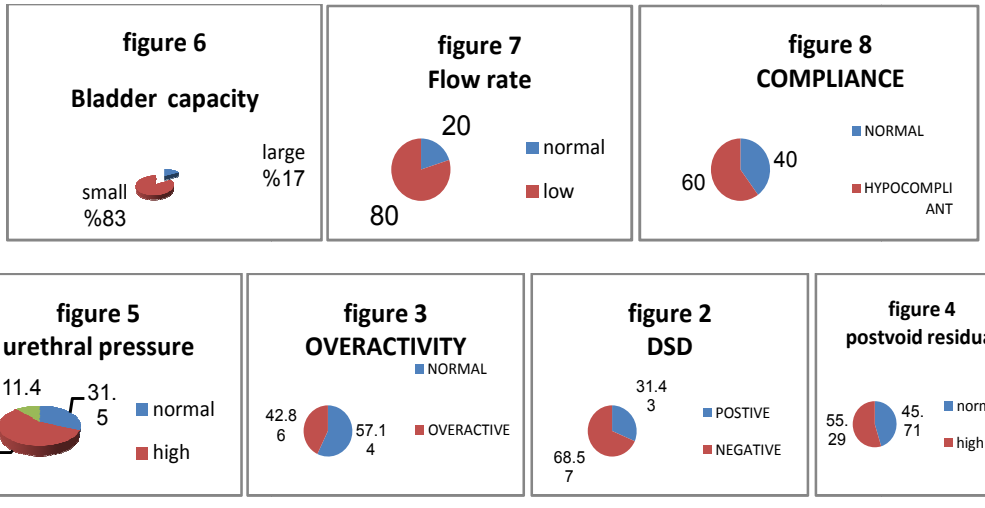


Diagram 1. Urodynamic findings



DISCUSSION

Patients with enuresis that is refractory to treatment who are referred for urodynamic study usually have tried several kinds of medical and behavioral therapy without any response. The referring physicians are hoping to find a urodynamic explanation for this treatment failure that will affect management.

Nocturnal enuresis is uncommon among older patients; but it associates with poorer therapeutic outcomes compared with the more common forms of daytime incontinence (Burgio et al., 1996). In contrast to the large volumes of research on treatment of daytime incontinence, there is little investigation on the nighttime incontinence in older patients.

Nocturnal enuresis has a spontaneous resolution rate of 15% per year, so that by age of 15 years it persists in only 1% of the population (Brian et al., 2010). So that is why we choose patients above 15 years in our research to investigate them urodynamically to know what type of voiding dysfunction that cause nocturnal enuresis to persist and so that treat successfully.

Acquisition of urinary control is complex and has not been completely understood. This process consists of different stages are usually achieved at the age of 3 to 4 years when the majority of children develop an adult pattern of urinary control (Mueller, 1960). Nocturnal enuresis affects 5% – 10% of younger school-age children (Norgaard et al., 1985). Daytime urinary incontinence of varying severity occurs in 2% – 20% of school-age children and 0.7% wet daily (Sureshkumar et al., 2000). Bedwetting is more common in boys whereas daytime incontinence is more common in girls (Abrams et al., 2002).

Burgio *et al.* have reported that the prevalence of nocturnal enuresis in community-dwelling older adults is 2.1% (Burgio et al., 1996). By reviewing urodynamic record, Sakamoto *et al.* found the prevalence rate of 0.02% for adult onset nocturnal enuresis, but without daytime incontinence (Sakamoto and Blaivas, 2001). McGrother *et al.* reported that 2.4% of older people (75 years of age or older) living at home had nocturnal enuresis (McGrother et al., 1987). Elmissiry *et al.* found that the urodynamic finding inrefractory enuresis in children and adolescents showed low bladder capacity in 39%, hypocompliance in 32%, and detrusor overactivity in 45%. Detrusor–sphincterdyssynergia and 67% (Mostafa et al., 2013).

In the present study, 11 patient have DSD (31.43%), 15 Patient have bladder overactivity (42.86%), 16patient has high postvoid (45.71 %), 20 patient have high urethral pressure profile (57.10%), 4patient have low urethral pressure profile 11 (40%), 29 patient have small capacity bladder (82.86%), 6 patient have large bladder capacity (17.14%), 28 patient have low average flow rate (80%), 21 patient have hypocomplinet bladder (60%) which was nearly similar to that in other studies.

CONCLUSIONS

Refractory enuresis persisting above 15 years mostly associated with abnormal urodynamic findings. Patients may benefit from urodynamic studies, because if the the findings are abnormal, they might have the best chance of successful treatment.

Urodynamics can help in cases of refractory enuresis by detecting dysfunctional voiding, which is present in all of these patients.

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