Role of videourodynamics in the identification of causes of lower urinary tract symptoms and low uroflow in young men

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Abstract

Introduction: The etiology of lower urinary tract symptoms (LUTS) is multifactorial with causes attributed either to the dysfunction of the bladder or its outlet. Although the etiologies are well studied in aged men, very limited research trials are available in young men with LUTS. Most of the time young men presenting with chronic irritative or obstructive symptoms are labeled with chronic prostatitis or prostatodynia and are treated empirically. In this study using videourodynamics, we prospectively investigated the etiologies of LUTS and low uroflow in young men.

Materials and Methods: Fifty male patients, 18–50 years of age attending the urology outpatient department at a tertiary care center from January 2021 to December 2021 with symptoms suggestive of chronic LUTS and low uroflow (maximum urinary flow rate [Qmax] < 15 ml/s at a voided volume > 150 ml) were included in the study and underwent multichannel videourodynamic study (VUDS). Clinical characteristics and urodynamic results in different diagnostic groups were tabulated and analyzed. The P ≤ 0.05 was considered statistically significant.

Results: Out of 50 enrolled patients, primary bladder neck obstruction was seen in 21 patients (42%), dysfunctional voiding in 14 (28%), impaired detrusor contractility (IDC) in 9 (18%), and benign prostatic obstruction (BPO) was noted in 6 patients (12%). The mean age and size of the prostate of patients with BPO were greater than those in the remaining groups and patients with IDC had lower Qmax and Pdet at Qmax than those in the remaining patients.

Conclusion: Chronic LUTS in young men has a variety of underlying etiologies and VUDS in this population is helpful in attaining an accurate diagnosis and thus may guide toward efficient management.

Keywords: Low uroflow, lower urinary tract symptoms, videourodynamics

INTRODUCTION

Although the prevalence of lower urinary tract symptoms (LUTS) is known to increase with age, the presence of LUTS in young men is not rare. A population-based cross-sectional survey conducted in five countries found the prevalence of LUTS to be 80.7% in men aged 60 years or older, 62% in those aged 40–59 years, and 51.3% in men aged 18–39 years. Abundant clinical trials have been done on LUTS in males focusing on older patients with only a few studies available in younger men.
The etiology of LUTS is multifactorial with causes attributed either to the dysfunction of the bladder or its outlet. In elderly male patients, the underlying pathology is most likely benign prostatic hyperplasia. However, in young men, most studies have demonstrated primary bladder neck obstruction (PBNO) and dysfunctional voiding (DV) to be the most common etiologies associated with LUTS and low uroflow. Detrusor underactivity and benign prostatic hyperplasia are some other specific urodynamic etiologies that have been described to be associated with chronic LUTS and low uroflow in young men.

In young men with chronic LUTS obtaining a specific clinical diagnosis based on the history and physical examination alone is often not possible and detailed investigations are mostly not performed. Mainly a provisional diagnosis of nonbacterial prostatitis, simple overactive bladder syndrome, or psychogenic voiding dysfunction is made and the empirical treatment is started with antibiotics, anti-inflammatory agents, and alpha-blockers. The results of such treatment are often discouraging with patients presenting repeatedly with recurrent symptoms. Since the management strategy differs for each urodynamic diagnosis, accurate diagnosis with sophisticated urodynamic evaluation, videourodynamic study (VUDS) in such patients has helped in more focused and thus efficient treatment. In this study, we have evaluated the role of videourodynamics in the identification of causes of young men with chronic LUTS and low uroflow, and to the best of our knowledge, this is the first study from the Indian subcontinent evaluating the role of VUDS in young men with chronic LUTS and low uroflow.

**MATERIALS AND METHODS**

Fifty male patients, 18–50 years of age attending the urology outpatient department at a tertiary care center from January 2021 to December 2021 with symptoms suggestive of chronic LUTS and low uroflow (maximum urinary flow rate (Qmax) <15 ml/s at a voided volume >150 ml) were included in the study. Patients presenting with symptoms suggestive of chronic LUTS such as frequency, urgency, nocturia (storage symptoms); slow stream, straining, hesitancy (voiding symptoms); feeling of incomplete emptying, and postmicturition dribble (postmicturition symptoms) were included. Patients not willing to be part of the study and those with active urinary tract infection, neurological diseases, diabetes mellitus, congenital urogenital diseases, or urinary tract malignancy were excluded. After the institutional ethical committee clearance and informed consent, patients were evaluated by the International Prostate Symptom Score (I-PSS), ultrasonography of kidney, bladder and prostate, and all the patients underwent multichannel videourodynamic study that was conducted according to standards recommended by the International Continence Society. Two 6 Fr catheters were used, one for bladder filling and one for determining intravesical pressure. A single-lumen rectal catheter was inserted to estimate abdominal pressure and the detrusor pressure was calculated by the difference between these two pressures. Electromyography electrodes adhered to the region around the anal sphincter were indicated. Patients were asked to sit in a natural seated position using a specialized fluoroscopy table and sequential fluoroscopic images were taken. The results of urodynamic findings were categorized into storage and voiding disorders. Storage phase disorders include idiopathic detrusor overactivity and low bladder compliance and voiding phase disorders include PBNO, DV, impaired detrusor contractility (IDC), and benign prostatic obstruction (BPO).

In VUDS, PBNO is defined as a narrowing only at the vesical neck on fluoroscopic voiding cystourethrogram with sustained high detrusor pressure during voiding, low Qmax, obstructive flow pattern, and relaxed external sphincter electromyography. DV is defined as an obstruction at the external sphincter which can be seen as intermittent narrowing of the membranous urethra on fluoroscopy. IDC is defined by bladder contractibility index <100 and no obstruction identified radiologically. In VUDS, BPO is seen as high detrusor pressure with low Qmax, obstructive flow pattern with narrowing at the prostatic urethra. Low bladder compliance was defined as <12.5 ml/cmH2O. Clinical characteristics and urodynamic results data were tabulated and analyzed with SPSS version 24 software (IBM SPSS Statistics for Windows, IBM Corp., Armonk, NY, USA). One-way analysis of variance was used for the comparison of the quantitative variables and Chi-square test was used for the comparison of the qualitative variables among the groups. The P ≤ 0.05 was considered statistically significant.

**RESULTS**

Demographic data and the urodynamic diagnosis of enrolled patients are listed in Table 1. Out of 50 patients, PBNO was seen in 21 patients (42%), DV in 14 (28%), IDC in 9 (18%), and BPO was noted in 6 patients (12%). The age of the patients ranged between 18 and 49 years with a mean age of 34.36 ± 8.10 years. The mean age of the patients with PNBO was 38.285 ± years, 31.5 ± 8.20 years in patients with DV, 35.88 ± 7.72 years in patients with IDC, and 46 ± 2.36 years in BPO patients. The mean age was higher in patients with BPO and the difference was statistically significant (P < 0.001). The mean I-PSS score ranged from 13 to 24 with a mean score of 19.95 ± 2.88. The mean voiding score was 12 ± 1.89 (range: 8–15) and the mean storage score was 7.9 ± 1.93 (range: 5–13). There was no significant difference in the mean I-PSS scores (voiding and
storage) in different diagnostic groups ($P > 0.05$). The mean prostate size of enrolled patients was $22.90 \pm 6.89 \text{ ml}$ (range: 14–35). Mean prostate size in patients with BPO was higher, $25.54 \pm 7.86 \text{ ml}$ as compared to $22.90 \pm \text{ ml}$ in PBNO patients, $24.71 \pm 7.47 \text{ ml}$ in DV patients, $25.66 \pm 6.67 \text{ ml}$ in IDC, and the difference was statistically significant. The results of the videourodynamic study in different diagnostic groups are listed in Table 2. The mean bladder capacity of the patients was $382.86 \pm 104.78 \text{ ml}$ and the mean residual urine was $82.02 \pm 66.20 \text{ ml}$ with no significant difference in different diagnostic groups. The average Qmax and Pdet at Qmax of the patients were $10.01 \pm 2.65 \text{ ml}$ (range: 2.5–13.8) and $73.46 \pm 29.29 \text{ cmH}20$ (range: 19–162), respectively. The average Qmax and Pdet at Qmax in the patients with IDC were significantly lower as compared to different diagnostic groups. Out of 50 patients, idiopathic detrusor overactivity was seen in 12 (24%) patients and low bladder compliance was seen in 3 (6%) patients.

**DISCUSSION**

Chronic LUTS is not an uncommon condition in young men and can present either with the storage or the voiding symptoms. The storage or irritative symptoms include frequency, urgency, urgency incontinence, and nocturia and they happen to be more common than the voiding or obstructive symptoms which include hesitancy, straining, poor stream, intermittency, and feeling of incomplete emptying. Although a proper history of the exact nature of the symptoms (storage or voiding) could point toward the underlying pathology, it is very difficult and often not possible to attain a specific diagnosis just based on symptoms and physical examination. Young men with chronic LUTS and low uroflow are often found to be on empirical treatments with long-term antimicrobials with results frustrating for both the patient and the doctor.

The etiology of LUTS is multifactorial with various urological or neurological causes associated with it. The major etiologies behind LUTS vary as we move in the age spectrum. On the one end where benign prostatic hyperplasia is the most common cause of LUTS in old men, it is less common to be found in young men. PBNO and DV are known to be the most common etiologies behind LUTS with low uroflow in young men.

In 1994, a retrospective analysis of 34 consecutive men who were referred with the diagnosis of chronic prostatitis showed bladder outlet obstruction at the level of vesical neck on video pressure-flow urodynamic evaluation.[3] Kaplan et al. emphasized that urodynamic evaluation should be an integral part of the diagnostic study in men misdiagnosed with chronic nonbacterial prostatitis.[4] Another study in 1996 retrospectively analyzed the videourodynamic studies of 137 men, <50 years of age with chronic voiding dysfunction and found the main etiologies to be primary vesical neck obstruction (54%), pseudodysynergia (24%), impaired bladder contractility (17%), and an acontractile bladder (5%).[3]

In 2002, Nitti et al. prospectively evaluated 85 young men, 18–45 years of age with LUTS with videourodynamic

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**Table 1: Demographic data in different diagnostic groups**

| Number of patients | PBNO | DV | IDC | BPO | All |
|--------------------|------|----|-----|-----|-----|
| Age (years)        | 21   | 14 | 9   | 6   | 50  |
| I-PSS total        | 38.28±6.30 (23–45) | 31.5±8.20 (19–43) | 35.88±7.72 (18–44) | 46±2.36 (43–49) | 34.3±8.10 (18–49) | <0.001* |
| Voiding score      | 12±1.89 (8–15) | 13±3.01 (8–18) | 13.77±1.56 (11–16) | 12.5±1.51 (10–14) | 12.66±2.22 (8–18) | 0.217 |
| Storage score      | 7.9±1.93 (5–13) | 7.78±2.60 (4–13) | 9.33±1.73 (7–12) | 7.5±1.04 (6–9) | 8.1±2.07 (4–13) | 0.253 |
| Prostate size (ml) | 22.90±6.89 (14–35) | 24.71±7.47 (14–38) | 25.66±6.67 (16–35) | 36.5±4.88 (29–43) | 25.5±7.86 (14–43) | 0.001* |

*Statistically significant. PBNO: Primary bladder neck obstruction, DV: Dysfunctional voiding, IDC: Inadequate detrusor contraction, BPO: Benign prostatic obstruction, I-PSS: International Prostate Symptom Score

**Table 2: The results of videourodynamic study in different diagnostic groups**

| Capacity (ml)      | 381.76±108.51 (278–697) | 375.64±129.77 (236–701) | 395.33±86.55 (257–484) | 384.83±65.45 (297–465) | 382.86±104.78 (236–701) | 0.979 |
| Qmax (ml/s)        | 10.62±2.32 (7.8–13.8) | 10.05±1.95 (6.6–13.8) | 7.26±3.21 (2.5–11.4) | 11.86±1.29 (10.2–13.8) | 10.01±2.65 (2.5–13.8) | 0.002* |
| Pdet at Qmax (cmH20) | 79±15.43 (55–122) | 97.92±23.20 (78–162) | 25.77±5.01 (19–33) | 68.5±9.52 (15–77) | 73.46±29.29 (19–162) | <0.001* |
| Residual urine (ml) | 78.19±69.35 (22–320) | 96.5±62.38 (10–215) | 99.22±87.94 (15–55) | 35.83±15.32 (10–320) | 82.02±66.20 (9–38) | 0.608 |
| Idiopathic detrusor overactivity (%) | 5 (23.8) | 6 (42.8) | 1 (11.1) | 0 | 12 (24) | 0.142 |
| Low bladder compliance (%) | 0 | 2 (14.3) | 1 (11.1) | 0 | 3 (6) | 0.279 |

*Statistically significant. PBNO: Primary bladder neck obstruction, DV: Dysfunctional voiding, IDC: Inadequate detrusor contraction, BPO: Benign prostatic obstruction
testing to determine the cause of LUTS in young men. The most common etiology was found to be PBNO which was seen in 40 (47%) cases, followed by DV which was seen in 12 (14%) cases. Other causes were impaired contractility seen in eight cases (9%), sensory urgency in 7 (8%), detrusor instability in 5 (6%), detrusor instability and impaired contractility in 1 (1%), and external detrusor sphincter dyssynergia in 1 (1%).

Another study by Wang et al. prospectively investigated the etiologies of LUTS and low uroflow in 90 young men, 18–50 years of age using VUDS and found DV in 39 patients (43%), PBNO in 37 patients (41%), IDC in 9 (10%), and BPO was seen in 5 (6%) patients. This study also recommended VUDS to reach an accurate diagnosis in young men with LUTS and low uroflow.[7]

In our study, we found PBNO to be the most common urodynamic diagnosis which was seen in 42% of the patients. The results are similar to the previous studies by Kaplan et al., Nitti et al., and Wang et al. who have reported PBNO to be in 54%, 47%, and 41% of the patients, respectively.[5,7]

In the present study, DV was seen in 28% of the patients and the finding is consistent with the findings of Kaplan et al.[6] who described pseudodyssynergia in 24% of the cases. Both in this study and the study of Nitti et al., DV was the second most common diagnosis in the included patients.[6]

In the present study, IDC was found in 18% of young men with chronic LUTS. IDC has been reported in 10% of the patients by Wang et al., and these patients had significantly higher symptom scores as compared to other diagnostic groups.[7] In our study, there was no significant difference in the I-PSS score, however, the average maximum flow rate was significantly lower in this group as compared to other groups. Altered detrusor contractility explains low Qmax in such patients.

Twelve percent of the patients in our study had BPO (12%) and the mean age and prostate size in this subset were higher as compared to other groups; these findings are similar to the previously published literature. Wang et al. also reported BPO in 6% of cases who had significantly higher average age and prostate size as compared to other groups.[7]

In our study, idiopathic detrusor overactivity was seen in 12 (24%) of the patients and low bladder compliance was seen in 3 (6%) of the patients. The findings are similar to those reported by Wang et al. where 33 patients (37%) had idiopathic detrusor overactivity and 3 (3%) patients had low compliance.[7]

Without urodynamic evaluation, management of chronic LUTS in young men poses a therapeutic challenge. VUDS further has an advantage over conventional urodynamics in identifying the exact anatomical location involved. Based on VUDS, we were able to attain a specific urodynamic diagnosis in all 50 patients and thus these patients of chronic LUTS who were having recurrent symptoms were directed toward proper management with the help of VUDS. To the best of our knowledge, this is the first study in the Indian subcontinent evaluating the role of VUDS in identifying the etiologies of chronic LUTS and low uroflow in young men. Furthermore, since only a few such studies are available in the published literature, this study adds up to the available evidence of the role of VUDS in chronic LUTS in young men.

CONCLUSION

VUDS plays an essential role in pinpointing the specific etiology behind chronic LUTS and low uroflow in young men and the enhanced use of VUDS in these young men would enable better-directed treatment instead of empirical treatment.

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Conflicts of interest
There are no conflicts of interest.

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