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A Precision Urodynamic Diagnosis is Essential for Successful Treatment of Lower Urinary Tract Dysfunction

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The meta-analysis by Bodmer et al. [1] in a recent issue of *European Urology Open Science* analyzes several randomized controlled trials of clinical value on urodynamic studies (UDS) in the diagnosis of lower urinary tract symptoms (LUTS). The authors retrieved eight articles including six focused on female stress urinary incontinence (SUI) and two on treatment outcomes for transurethral resection of benign prostatic hyperplasia (BPH) to assess the need for surgical intervention in men with LUTS with and without UDS diagnosis of bladder outlet obstruction (BOO). Using results from the clinical studies retrieved, the meta-analysis indicates that UDS does not add value in the diagnosis of and decision-making for female uncomplicated SUI or male LUTS. However, the authors comment that UDS is not replaceable in the diagnosis of specific bladder or bladder outlet dysfunction, so the clinical value of UDS cannot be overlooked on the basis of these clinical trials.

LUTS are complicated and an accurate diagnosis of lower urinary tract dysfunction (LUTD) and guidance for precision treatment from LUTS alone are usually difficult [2]. Male or female patients with BOO, detrusor underactivity (DU), or bladder hypersensitivity may have voiding predominant LUTS, whereas patients with detrusor overactivity (DO), dysfunctional voiding (DV), or BOO may have storage-predominant LUTS [3]. In order to identify specific LUTD, especially in patients with mixed storage and voiding LUTS, a comprehensive UDS including pressure flow study, or concomitant video image study if possible, during the storage and emptying phases is necessary. The randomized clinical trials retrieved for this meta-analysis enrolled patients with uncomplicated SUI to assess outcomes after incontinence treatment. Patients with complicated SUI were already excluded, so the surgical treatment

outcome would be similar with or without preoperative UDS assessment.

The critical point is how accurate a diagnosis of uncomplicated SUI can be made without UDS? Women with SUI may have intrinsic sphincter deficiency (ISD) while coughing, and DO may be provoked in women without ISD, mimicking SUI [4]. Without a preoperative UDS or video UDS to identify DO, anti-incontinence treatment might fail to completely eradicate incontinence [5]. In addition, BOO and DU can also coexist in women with ISD and women might urinate efficiently because of low urethral resistance [4,6]. These LUTDs might become prominent after anti-incontinence surgery, and patients might need revision after surgery.

The necessity for UDS in female SUI before surgical intervention and the value of UDS in predicting treatment success have been debated for a long time. In a multicenter randomized trial, Nager et al. [7] concluded that preoperative UDS would not influence the decision on treatment strategy in female SUI cases that are clinically uncomplicated. The results from this clinical trial have become a gold standard for clinical practice whereby preoperative UDS is not performed before anti-incontinence surgery. However, an accurate diagnosis of uncomplicated SUI is not easy to make on the basis of symptoms and history alone. Female SUI patients usually have coexisting overactive bladder symptoms. These can usually not separate DO-induced urgency incontinence from pure SUI during stress or coughing [8]. Women with so-called “uncomplicated SUI” might also have urodynamic DU, DV, or DO that is hidden behind the SUI. In identifying complicated SUI, a history, physical examination, voiding diary, and postvoid residual volume are essential. For cases with a suspicion of complicated SUI, a detailed UDS involving a pressure flow study or a

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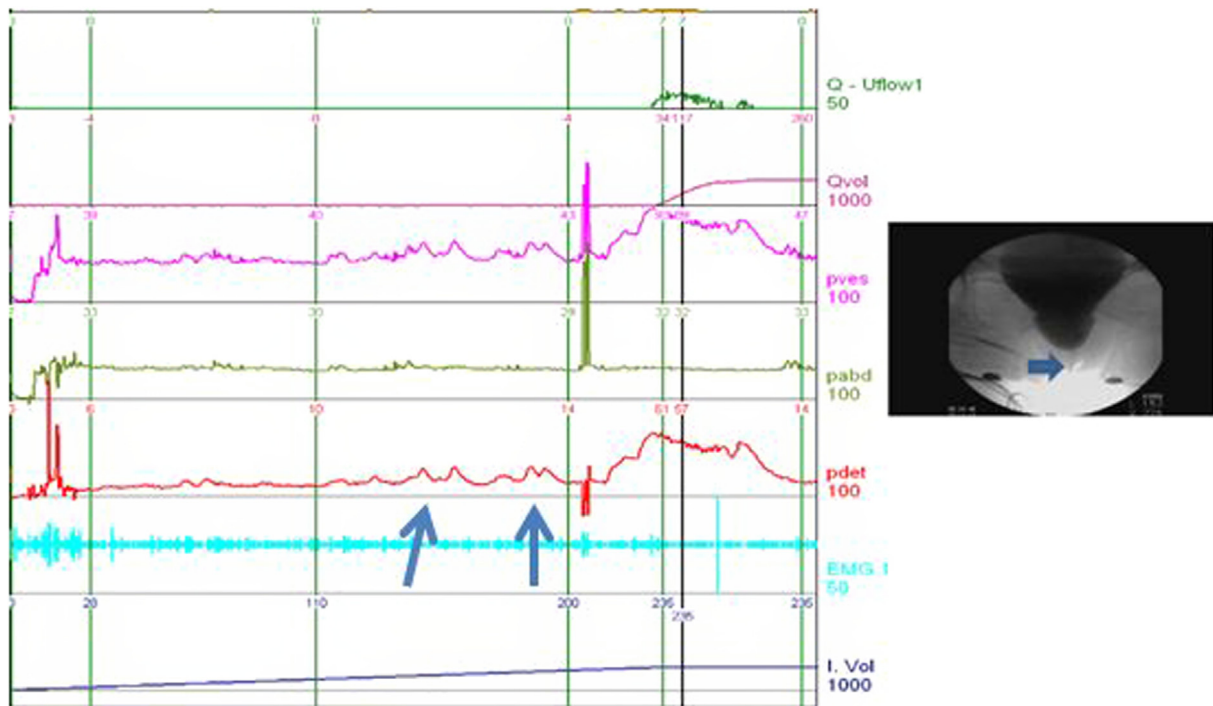


Fig. 1 – Video urodynamic study in a woman with stress urinary incontinence. The result shows phasic detrusor overactivity during the storage phase (large arrows) and a tight urethral sphincter (small arrow) and dilated proximal urethra during voiding.

video UDS study can help in identifying SUI combined with abnormal bladder or bladder outlet dysfunctions [4] (Fig. 1). A previous review indicated that preoperative UDS can provide additional information on LUTD that can guide physi-

cians to choose the correct and effective therapeutic treatment [9].

LUTS is highly prevalent among elderly men, who may develop overactive bladder or underactive bladder in addi-

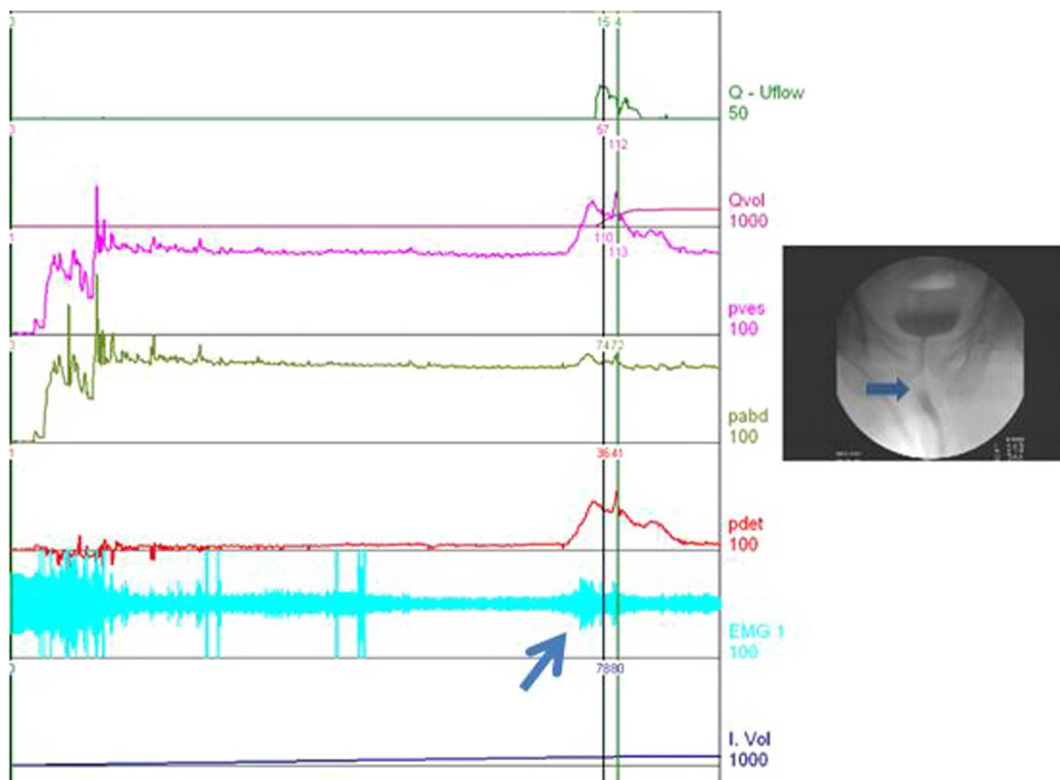


Fig. 2 – Video urodynamic study in a man with lower urinary tract symptoms, revealing a hypersensitive bladder and increased external sphincter electromyographic activity (large arrow) and a poorly relaxed urethral sphincter during voiding (small arrow). No bladder neck or prostatic urethral obstruction is evident.

tion to BPH. Many clinical studies had revealed that the diagnostic specificity of male LUTS is low for BOO [10]. Our previous study using video UDS in the diagnosis of LUTD revealed that patients with LUTS after medical treatment might have different bladder dysfunctions (such as DO, DO and inadequate contractility, DU, and hypersensitive bladder LUTS), and bladder outlet dysfunctions (primary bladder neck obstruction, poor relaxation of the external sphincter, and BPH) [11] (Fig. 2). Although transurethral prostatic surgeries are less invasive and usually successful in relieving BOO and LUTS, surgical complications are not uncommon [12]. In men with LUTS not caused by BOO, transurethral surgery for BPH might not adequately alleviate the LUTS and patients might have persistent voiding LUTS or exacerbated storage LUTS after surgery. A baseline UDS or video UDS can provide a clear diagnosis to differentiate the etiology of male LUTS, and may avoid unnecessary surgery or overtreatment [9]. A randomized trial of the diagnostic and prognostic value of UDS in male LUTS would be of academic interest, but in real-life practice, men with LUTS still need a precise diagnosis of a specific LUTD before invasive surgery to obtain a best treatment option for their LUTS.

In addition to female SUI and male LUTS, there are several aspects of functional urology in which plays an important role for precise diagnosis and treatment [4]. Without UDS or video UDS, a diagnosis of DV cannot be made in female voiding dysfunction. Pediatric incontinence and urinary retention need UDS to explore the underlying DO and external sphincter dysfunction. Urinary retention and overflow incontinence in frail elderly patients need UDS to differentiate BOO and DU. Even in women with recurrent urinary tract infection, UDS or video UDS could uncover a high incidence of LUTD.

Although the authors conclude from their meta-analysis that UDS usually does not change treatment strategy in uncomplicated SUI and male LUTS, they also point out that UDS is important in the diagnosis of LUTD and that further well-designed trials are needed. In addressing many voiding dysfunction and bladder storage LUTS, we need more precise diagnoses to avoid going down the wrong route and performing incorrect and harmful procedures. A conven-

tional UDS such as a pressure flow study might not enough to make a difference in the management of male LUTS or female SUI, but a video UDS might change the conclusion in these randomized controlled clinical trials.

Conflicts of interest: The author has nothing to disclose.

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