

# The Additional Value of Cystoscopy with Urodynamic Study in the Assessment of Patients with Urinary Incontinence

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## Abstract

**Background:** Urinary incontinence (UI) is generally defined as the involuntary loss of urine from the bladder through the urethral meatus. Filling cystometry is the method by which the pressure/volume relationship of the bladder is measured during bladder filling. **Purpose:** To determine the value of diagnostic cystoscopy in addition to Urodynamic study (UDS) in patients with primary urinary incontinence. **Material and Methods:** 200 patients with primary incontinence studied prospectively from January 2013 to June 2014. Their age ranges from (14 - 93 years), 86.5% were female, and 13.5% of them were male. In addition to physical, neurological examination and biochemical investigations, urine analysis and urine culture with Ultra-sound and Post void residual volume (PVRV), all patients underwent diagnostic flexible cystoscopy under local anesthesia, and urodynamic study. **Result:** 43.5% of patients age were between (34 - 53 years), (39%) between (54 - 73 years), (9%) between (14 - 33 years) and (8.5%) were between (74 - 93 years). Atonic bladder on UDS were (40.5%), Detrusor over activity (29%), patients with normal UDS were (22%) and patients that had DSD (Detrusor Sphincter Dyssynergia) were (8.5%). Eighty-four cases (42%) were found to have normal cystoscopy, those with grade-I-II bladder wall trabeculations were (49%) and patients with grade-III were (8.5%). Sixty-one patients (30.5%) with normal diagnostic cystoscopy have abnormal UDS (Atonic bladder, over-active bladder and DSD) while twenty-one (10.5%) patients with normal UDS had bladder wall trabeculations (grade-I-III) on diagnostic cystoscopy. **Conclusion:** Diagnostic cystoscopy in addition to urodynamic study will put in further knowledge in the assessment of patients with urinary incontinence. To some extent, it can predict the diagnosis.

## Keywords

Urodynamic Study, Diagnostic Cystoscopy, Incontinence

## 1. Introduction

The basic factors of normal bladder function are bladder capacity, accommodation, sensation, contractility, voluntary control, and response to drugs. All these can be evaluated by cystometry [1]. Bladder filling and urine storage require: accommodation of increasing volumes of urine at a low intravesical pressure (normal compliance) and with appropriate sensation, a bladder outlet that is closed at rest and remains so during increased intra-abdominal pressure and absence of involuntary bladder contractions [2]. The distended bladder is normally quite smooth, with hypertrophy; individual muscle bundles become taut and give a coarsely interwoven appearance to the mucosal surface known as (Trabeculation) of bladder wall [3]. When bladder passes through the stages of irritability, compensation, and decompensation outlet obstruction may occur in response to outlet resistance, hypertrophy of detrusor muscles begins and trabeculations may develop [4].

Normal intravesical pressure is about 30 cm of water at the beginning of micturition. The Trabeculated (hypertrophied) bladder may reach pressures 2 - 4 times as great in its attempt to force urine past the obstruction [3]. The bladder wall trabeculations is classified into four grades according to maximum depth of bladder surface: Grade 0 (none), Grade 1 (mild, depth < 5 mm), Grade 2 (moderate, depth 5 - 10 mm), and Grade 3 (severe, depth > 10 mm) [5].

Urinary incontinence (UI) is generally defined as the involuntary loss of urine from the bladder through the urethral meatus [6]. The condition of (UI) is far more prevalent in women than men with a significant progress in incidence with the increase of age [7].

Urodynamic study (UDS) is the term used to describe testing and measurements of the function of the lower urinary tract. It is clear that a number of conditions and diseases affect the lower urinary tract and disrupt the storage and/or evacuation of urine. Functional abnormalities of the lower urinary tract can be divided into the following: Storage dysfunction, Emptying dysfunction and combined dysfunction [8]. The aim of UDS is to reproduce the troublesome symptoms, answer specific clinical questions, establish a precise diagnosis, determine the severity of the condition and plan further investigations or therapies [9]. The pre-urodynamic assessment comprises: A focused history and physical examination, urinalysis with or without culture, a 24-hour pad test (for patients with incontinence), Uroflow and estimation of PVR urine [4].

The aim is to determine the additional value of diagnostic cystoscopy to UDS in the assessment of incontinence.

## 2. Patients and Methods

Two hundred patients presented with urinary incontinence studied prospectively between January 2013 and June 2014. Full history, physical (digital rectal examination; in male patients and abdominal examination), neurological examination (perineal sensations and cavernoso-anal reflex examination) were done. Full blood count and biochemistry, urinalysis with urine culture were done. Also all patients underwent ultrasonography of urinary tract and post void residual urine volume. In addition, all underwent flexible cystoscopy under local anesthesia. Urodynamic study done by (ANDROMEDA medizinische System GmbH 2002; device made in Germany) including Flowmetry, Cystometry, Pressure flow-study and UPP were performed. They were prepared by bowel and by prophylactic antibiotics. Patients with diabetes mellitus, neurological diseases, secondary incontinence were excluded.

## 3. Results

Two hundred patients with primary mixed urinary incontinence were analyzed, 173 cases (86.5%) of them were female and 27 (13.5%) were male (**Table 1**). Eighteen patients (9%) ages were (14 - 33 years), 87 cases (43.5%) were between (34 - 53 years), 78 cases (39%) were between (54 - 73 years) and 17 cases (8.5%) were between (74 - 93 years) as in (**Table 2**).

Eighty four patients (42%) have normal diagnostic cystoscopy, 99 cases (49.5%) had grade one (mild) to grade two (moderate) trabeculations of bladder wall and 17 cases (8.5%) had grade three (severe) bladder wall trabeculation (**Table 3**).

Forty four patients (22%) have normal urodynamic study, 81 cases (40.5%) had hypotonic bladder, 58 cases (29%) had detrusor over activity and 17 cases (8.5%) had DSD as shown in (**Table 4**).

*Twenty three patients* (11.5%) had normal both diagnostic cystoscopy with UDS and 21 cases (10.5%) had normal UDS with grade (I to II) trabeculations on diagnostic cystoscopy. P-value is (0.00) statistically significant.

**Table 1.** Shows frequency of gender in all patients.

	Frequency	%
Male	27	13.5
Female	173	86.5
Total	200	100

**Table 2.** Shows frequency of age in all patients.

Age	Frequency	%
14 - 33 years	18	9
34 - 53 years	87	43.5
54 - 73 years	78	39
74 - 93 years	17	8.5
Total	200	100

**Table 3.** Shows frequency of Diagnostic cystoscopy results in all patients.

Class	Frequency	%
Normal	84	42
Grade I-Grade II trabeculation	99	49.5
Grade III trabeculation	17	8.5
Total	200	100

**Table 4.** Shows frequency of Urodynamic study results in all patients.

Class	Frequency	%
Normal	44	22
Atonic bladder	81	40.5
Detrusor over activity	58	29
DSD	17	8.5
Total	200	100

*Atonic bladder* on UDS were 81 cases in which 39 cases (19.5%) of them had normal diagnostic cystoscopy, 38 cases (19%) had grade (I to II) bladder wall trabeculation and 4 cases (2%) had grade III bladder wall trabeculation on diagnostic cystoscopy. P-value is (0.00) statistically significant.

*Those with detrusor over activity* on UDS were 58 cases; 17 cases (8.5%) of them had normal diagnostic cystoscopy, 31 cases (15.5%) had grade (I to II) trabeculation and 10 cases (5%) had grade III bladder wall trabeculation on diagnostic cystoscopy. P-value is (0.00) statistically significant.

*Those with DSD* on UDS were 17 patients in which 5 cases (2.5%) show normal diagnostic cystoscopy, 9 cases (4.5%) had grade (I to II) trabeculation and 3 cases (1.5%) had grade III bladder wall trabeculation by diagnostic cystoscopy. P-value is (0.00) statistically significant (**Table 5**).

*Those with normal diagnostic cystoscopy* were 84 cases (42%) in which 23 (11.5%) of them had normal UDS while 51 cases (25.5%) had abnormal UDS.

*Those with grade (I to II) bladder wall trabeculations* on cystoscopy were 99 cases (49.5%) in which 21 of them had normal UDS and the other 78 cases (39%) had abnormal UDS.

*Those with grade III bladder wall trabeculation* on cystoscopy were 17 cases (8.5%); all of them had abnormal UDS.

Results were calculated by using Stat graphic Info program which is a public domain statistical software for

**Table 5.** Shows cross relation between cystoscopy & urodynamic study in all patients.

		Cystoscopy			Total	P-value
		Normal	Mild-Moderate trabeculation	Severe trabeculation		
Urodynamic	Normal	23	21	0	44	0.00
	Atonic bladder	39	38	4	81	0.00
	Detrusor over activity	17	31	10	58	0.00
	DSD	5	9	3	17	0.00
	Total	84	99	17	200	

epidemiology and statistical package for social science {version 5:1} and a P-value of equal and less than 0.01 was considered as significant.

#### 4. Discussion

Cystourethroscopy facilitates anatomical assessment of the bladder and the urethra. On the other hand, cystoscopy helps detect bladder lesions and identify other pathologies. These may include foreign bodies (eg, suture and mesh material from prior surgery for prolapse or incontinence), bladder cancer, and bladder stones conditions that would otherwise remain undiagnosed if only urodynamic studies are performed [10].

Majority of our patients were female (86.5%), 43.5% of patients age were between (34 - 53) years. (40.5%) presented with Atonic bladder as a UDS finding, so most have hypotonic or atonic bladders.

Eighty four cases (42%) had normal Cystoscopic finding, 44 cases (22%) had normal UDS finding, those with normal cystoscopy and abnormal UDS were 61 cases (30.5%) so about one third of the patients had no Cystoscopic features which suggest or predict the UDS diagnosis, and among cases with normal UDS associated with bladder wall trabeculations were 21 cases (10.5%).

Majority of our patients age were between (34 - 53 years), this is different from a study done by Reynard *et al.* which reported that incontinence more in elderly [11]. This difference might be due to sample collection or earlier presentations of our patients. Zimmern *et al.* reported that incontinent patients were mostly in elderly, suggested that detrusor contractility and efficiency decrease with age while our study showed that elderly patients present to a lesser extent to the urologist [12].

Shuang Wei-bing *et al.* have shown that bladder trabeculations as a kind of morphology change has matched well with the detrusor function change and Urethroscopy provides good information on the site, patency of bladder neck and severity of bladder obstruction [13].

In our study there were statistically significant correlation between incontinence and bladder wall trabeculations; this is compatible with a study done by Yoo Jin Lee *et al.* [14], Shuang Wei-bing *et al.* [13] K. Ezzeldin *et al.* [15]. That had shown a significant correlation between bladder trabeculations and urinary incontinence Also Liang CC *et al.* which reported that patients with bladder trabeculations had higher incidence of incontinence [16].

#### 5. Conclusion

In patients presented with urinary incontinence who are scheduled to have urodynamic study, diagnostic cystoscopy is recommended. Performing it together with urodynamic study, further information will add to the final study results of UDS. Additionally it can, to some extent predict the diagnosis.

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