

# ACTAS UROLÓGICAS ESPAÑOLAS

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## Short original – Voiding dysfunction

## Does cystocele have a role in bladder outlet obstruction?

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### ARTICLE INFORMATION

#### Article history:

Received on 24 April, 2009

Accepted on 7 December, 2009

#### Keywords:

Pelvic organ prolapse

Cystocele

Bladder outlet obstruction

Urodynamics

### ABSTRACT

**Introduction:** Controversy exists as to whether cystocele has a causative role in bladder outlet obstruction (BOO).

**Objective:** To assess the relationship between cystocele and bladder outlet obstruction.

**Materials and methods:** Two hundred women undergoing a urodynamic study from December 2007 to December 2008 were retrospectively assessed.

Patients were divided into two groups:

Group A: Patients with no cystocele (Grade 0) and Grade I cystocele

Group B: Patients with Grade II-IV cystocele.

**Exclusion criteria:**

1. Absence of flowmetry or voided volume < 150 ml.
2. Neurological disorders.
3. History of urogenital surgery.

Bladder outlet obstruction was defined as follows: Postvoid residue (PVR) > 20%; peak flow (Qmax) < 15 ml/sec; detrusor pressure at maximum flow (PdetQmax) > 25 cm H<sub>2</sub>O.

**Results:** Group A included 64% of patients, and Group B the remaining 36%. A pathological PVR > 20% was found in 26.6% and 40.3% of patients in Group A and Group B respectively (p=0.04). A Qmax < 15 mL/sec was seen in 15.6% and 27.8% of Group A and Group B patients respectively (p=0.03). A PdetQmax > 25 cm H<sub>2</sub>O was found in 26.3% and 47.8% of Group A and Group B patients respectively (p=0.01).

**Conclusions:** A statistically significant association exists between cystocele and bladder outlet obstruction.

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## ¿Es realmente el cistocele un factor de obstrucción infravesical?

### R E S U M E N

#### Palabras clave:

Prolapso órganos pélvicos

Cistocele

Obstrucción infravesical

Urodinámica

**Introducción:** existen controversias con respecto a si la presencia de cistocele, y el grado de este, es un factor de obstrucción del tracto urinario inferior (TUI).

**Objetivos:** valorar la relación entre el cistocele y la obstrucción infravesical.

**Material y métodos:** evaluamos retrospectivamente a 200 mujeres sometidas a estudio urodinámico, entre diciembre de 2007 y diciembre de 2008.

Se clasificó a las pacientes en 2 grupos:

Grupo A: ausencia de cistocele (grado 0) y grado I.

Grupo B: cistocele grado II-IV.

**Criterios de exclusión:**

1. Ausencia de flujometría libre o volumen vaciado < 150 ml.

2. Existencia de patología neurológica.

3. Antecedentes de cirugía urogenital.

Definimos obstrucción del TUI según los siguientes parámetros: volumen residual postmiccional (VRP) > 20%; flujo máximo (Q<sub>máx</sub>) < 15 ml/s; y presión del detrusor en el flujo máximo (PD<sub>et</sub>Q<sub>máx</sub>) > 25 cmH<sub>2</sub>O.

**Resultados:** el grupo A incluyó al 64,0% de las pacientes y el grupo B al 36% restante. Se apreció volumen residual postmiccional (VRP) patológico en el 26,6% en el grupo A y en el 40,3% en el grupo B (p = 0,04); Q<sub>máx</sub> < 15 ml/s en 15,6% en el grupo A y en el 27,8% en el grupo B (p = 0,03); PD<sub>et</sub>Q<sub>máx</sub> > 25 cmH<sub>2</sub>O en el 26,3% en el grupo A y en el 47,8% en el grupo B (p = 0,01).

**Conclusiones:** existe una asociación estadísticamente significativa entre el cistocele y parámetros de obstrucción infravesical.

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## Introduction

Controversy exists as to whether cystocele has a causative role in bladder outlet obstruction (BOO).

Lower urinary tract (LUT) symptoms are common and up to 8% of cases are due to bladder outlet obstruction. Their diagnosis is important to prevent inadequate treatment based only on symptoms<sup>1,2</sup>.

Although bladder outlet obstruction is clearly defined in men, this is not so in women and children<sup>3-5</sup>. The difficulty for diagnosing bladder outlet obstruction in women lies in the variety of their physiological pattern of urination, usually by low pressure detrusor contraction and perineal relaxation or even with the aid of abdominal straining<sup>6</sup>. As a result, Abrams-Griffiths nomograms<sup>7</sup> or the Schäfer linearized passive resistance urethral relation<sup>8</sup> cannot be applied in women. One of the key signs of obstruction is a high postvoid residual volume (PVR)<sup>4</sup>. Its presence may be due to both bladder outlet obstruction and impaired detrusor contractility. Thus, flowmetry alone cannot distinguish between these two conditions, requiring the performance of a pressure-flow urodynamic study.

Chancellors et al define bladder outlet obstruction as a detrusor contraction of adequate magnitude, duration and speed, and a low urine flow<sup>9</sup>.

Many women who have had children show some type of genital prolapse, but only 5% have symptoms enough to warrant treatment. There are no accurate data on the prevalence of this condition, despite the fact that it is the most common cause of gynecological surgery in women over 50 years of age. Pelvic organ prolapse (POP) is the reason for 13% of all hysterectomies in all age groups<sup>10</sup>.

POP may take a plethora of LUS symptoms, such as urinary frequency, urgency, incontinence, and voiding dysfunction. It is known that problems in relaxation of the pelvic floor lead to bladder outlet obstruction, but the mechanism of cystocele obstruction is not clear. Many authors agree in pointing to a urethral distortion, associated with a marked bladder descent during voiding, but it is not always possible to document this event<sup>4</sup>. For Romanzi, obstruction by the cystocele is a mechanical mechanism, so that reduction of prolapse leads to an increase in urinary flow. Bladder outlet obstruction may cause secondary detrusor overactivity that is reversible when prolapse is reduced<sup>11</sup>.

Occult stress incontinence is common (reported in up to 80% of cases) in patients with severe grades of cystocele<sup>11</sup>.

## Objective

To assess the relationship between cystocele and parameters associated with bladder outlet obstruction.

## Materials and methods

Two hundred consecutive women undergoing a urodynamic study in our Unit from December 2007 to December 2008 were retrospectively assessed.

All patients underwent a urogynecological physical examination in the lithotomy position at rest and during the Valsalva maneuver to assess the presence of urogenital prolapse. A physiological flowmetry and a urodynamic pressure-flow study were also performed, with no reduction of prolapse in order to assess the effect of this on the voiding phase.

The following exclusion criteria were defined: a) absence of free flowmetry or flowmetry with a voided volume less than 150 mL; b) presence of neurological disease; c) history of urogenital surgery.

Cystocele was assessed according to the Baden-Walker scale (1972)<sup>12</sup>.

1. Grade 0: no bladder prolapse (descent to anterior vaginal wall) on effort.
2. Grade 1: descent to less than midvaginal plane on effort.
3. Grade 2: descent below midvaginal plane, but not beyond hymenal ring plane on effort.
4. Grade 3: bladder prolapse beyond hymenal ring on effort.
5. Grade 4: bladder prolapse beyond hymenal ring at rest.

Patients were divided into two groups; Group A: patients with no cystocele (grade 0) and grade I cystocele and Group B: patients with grade II-IV cystocele.

Bladder outlet obstruction was diagnosed based on the following urodynamic criteria:

1. PVR > 20% of voided volume.
2. Peak flow (Q<sub>max</sub>) < 15 mL/s.
3. Detrusor pressure at peak flow (P<sub>det</sub>Q<sub>max</sub>) > 25 cm H<sub>2</sub>O.

Urodynamic terminology and measurements complied with International Continence Society (ICS) standards.

Statistical analysis was performed using SPSS 13.0, software. Student's t-test was used for quantitative variables and Pearson's chi-square test for nonparametric variables.

The statistical study was completed by a linear regression analysis using the forward stepwise method, taking cystocele grade as the independent variable and postvoid residue, Q<sub>max</sub> and P<sub>det</sub>Q<sub>max</sub> as the dependent variables.

A p-value less than 0.05 was considered statistically significant.

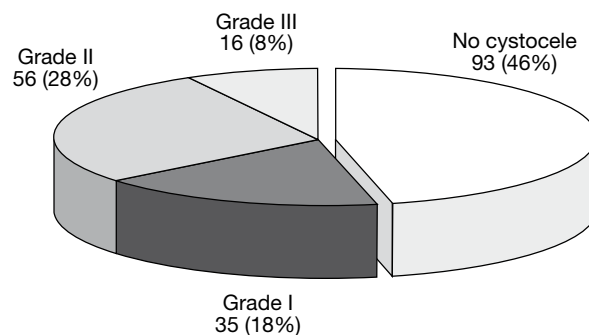


Figure 1 – Frequency of cystocele.

## Results

The mean patient age was 56 years (range: 12-83 years), with no significant differences between the groups (Group A: 55.3; Group B: 57.3;  $p = 0.3$ ).

Of the women evaluated, 93 (46.5%) had no cystocele, 35 (17.5%) had grade I cystocele, 56 (28%) grade II and 16 (8%) grade III cystocele. There were no case of grade IV cystocele (Fig. 1).

Analysis of the proportions using the chi-square test for the presence of parameters indicative of BOO was as follows:

1. A PVR > 20% was found in 26.6% of Group A patients versus 40.3% of Group B patients ( $p = 0.04$ ).
2. A Q<sub>max</sub> < 15 mL/s was seen in 15.6% of Group A and 27.8% of Group B patients ( $p = 0.03$ ).
3. A P<sub>det</sub>Q<sub>max</sub> > 25 cm H<sub>2</sub>O was found in 26.3% of Group A patients as compared to 47.8% of Group B patients ( $p = 0.01$ ) (Table 1).

Using the Chi-square test, cystocele was significantly associated with the presence of other urogenital prolapses (Table 1).

In the linear regression analysis, cystocele grade (independent variable) showed a statistically significant association with both postvoid residue (coefficient B: 6.47;  $p = 0.007$ ) and peak flow (coefficient B: -2.12;  $p = 0.038$ ), but not with P<sub>det</sub>Q<sub>max</sub> ( $p = 0.72$ ) (Table 2).

Of the total women evaluated, 79% had urinary incontinence (stress incontinence: 40%; emergency incontinence: 15%, mixed urinary incontinence: 24%). There were no significant differences between Group A or Group B for the presence of incontinence or detrusor overactivity (Table 1).

## Discussion

Diagnosing bladder outlet obstruction (BOO) in women is not easy, and it is often overlooked in women with symptoms of BOO. However, there is no consensus on the urodynamic parameters to be used for its diagnosis, and even less so regarding their normal values.

**Table 1 – Analysis of parameters associated with bladder outlet obstruction**

	Group A	Group B	p
	Cystocele grade 0-I (observed frequencies)	Cystocele grade II-IV (observed frequencies)	
N	128 (64%)	72 (36%)	
Mean age	55.3	57.3	0.307
PVR > 20%	26.6%	40.3%	0.045
Qmax < 15 mL/s	15.6%	27.8%	0.039
PdetQmax > 25 cm H <sub>2</sub> O	26.3%	47.8%	0.015
Uterine prolapse	3.1%	13.9%	0.004
Rectocele	28.1%	41.7%	0.049
Urinary incontinence	81.1%	75%	0.311
Detrusor overactivity	40.6%	45.8%	0.474

Student's t test was used for parametric variables and Pearson-s chi-square test for nonparametric variables. PdetQmax: detrusor pressure at peak flow; Qmax: peak flow; PVR: postvoid residual urine volume.

**Table 2 – Linear regression analysis**

Dependent variables	Cystocele grade (independent variable)		
	Coefficient B	95% CI for coefficient B	p
PVR	6.47	1.75 - 11.2	0.007
Qmax	-2.12	-4.13 - -0.12	0.038
PdetQmax	0.45	-2.13 - 3.05	0.726

CI: confidence interval; PdetQmax: detrusor pressure at peak flow; Qmax: peak flow; PVR: postvoid residual urine volume.

Thus, Blaivas presented a bladder outlet obstruction nomogram for women with lower urinary tract symptoms using as urodynamic criteria a PdetQmax > 20 cm H<sub>2</sub>O and a Qmax < 12 mL/s<sup>13</sup>. Romanzi defined bladder outlet obstruction as a PdetQmax > 25 cm H<sub>2</sub>O with a Qmax < 15 mL/s<sup>11</sup>, while Chassagne used a PdetQmax > 20 cm H<sub>2</sub>O and a Qmax < 15 mL/s<sup>14</sup>.

Kuo et al, confirming obstruction by videourodynamics, reported a sensitivity of 81% and a specificity of 93% for this diagnosis, with a PdetQmax > 35 cm H<sub>2</sub>O and a Qmax < 15 mL/s. They also noted that the use of stricter parameters, such as a higher PdetQmax, leads to an increase in specificity, but a reduction in sensitivity<sup>2</sup>.

Finally, Nitti et al presented as urodynamic parameters indicative of obstruction a high postvoid residue, a peak flow of <15 mL/s and a high PdetQmax<sup>6</sup>. These authors also confirmed their urodynamic results with videourodynamic findings.

We, in line with these authors, have taken the following parameters as indicative of BOO: PVR > 20%, Qmax < 15 mL/s and PdetQmax > 25 cm H<sub>2</sub>O.

Although there are some authors who reported no association between cystocele and bladder outlet obstruction<sup>4</sup>, in our study the presence and grade of cystocele showed a

significant relationship with the diagnosis of BOO, which is consistent with that reported by other authors<sup>11</sup>.

In our series, the presence of bladder overactivity was not correlated to the grade of cystocele, possibly because of the bias caused by the fact that the study population was women undergoing a urodynamic study, and not the general population.

As expected, cystocele was significantly associated with the presence of other urogenital prolapses.

## Conclusions

Analysis of the differences between variables associated with BOO showed a statistically significant association between grade II-IV cystocele and bladder outlet obstruction.

Given the results obtained, we regard the presence of cystocele as a factor associated to bladder outlet obstruction.

## Conflicts of interest

The authors declare no conflicts of interest.

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