

WHY ARE THERE DIFFERENT TYPES OF CYSTOCELES?

Hypothesis / aims of study

Cystoceles with a similar degree of anterior vaginal wall descent may in one patient be associated with stress incontinence (SI) and with voiding dysfunction (VD) in another. In the 70's, this observation led to a radiological classification of cystocele based on bladder neck position, retrovesical angle measurement, and urethral rotation on Valsalva by Green (1). Various authors have speculated that the main two types of cystocele; cystourethrocele or Green II and cystocele with intact retrovesical angle or Green III; may be due to different anatomical situations, i.e., lateral versus central fascial defects. The anatomical distinction between the two types of cystocele is valid and worth further investigation even though the Green classification has fallen into disuse. While we are currently unable to reliably detect anterior vaginal wall fascial defects, it is possible to detect avulsion of the puborectalis muscle by ultrasound or palpation, representing birth trauma that should be strongly associated with lateral fascial trauma. We undertook a retrospective observational study to determine the prevalence of levator trauma in patients with cystocele as defined by translabial ultrasound, in an attempt to shed light on potential pathophysiological mechanisms.

Study design, materials and methods

We reviewed the datasets of 222 women who had undergone a physical examination, urodynamic testing and 4D pelvic floor ultrasound between January 2007 and May 2008 in a tertiary referral centre. Ultrasound volume datasets obtained with a GE Kretz Voluson 730 expert system were reviewed for prolapse, hiatal dimensions and levator trauma using tomographic ultrasound imaging (TUI) (2). Cystoceles reaching below the symphysis pubis were classified as Green type II (retrovesical angle of 140° or more) or Green type III (retrovesical angle of less than 140°), see Figure 1. Cystoceles that showed rotation of below 45° (Green type I) were excluded from the analysis due to their comparative rarity.

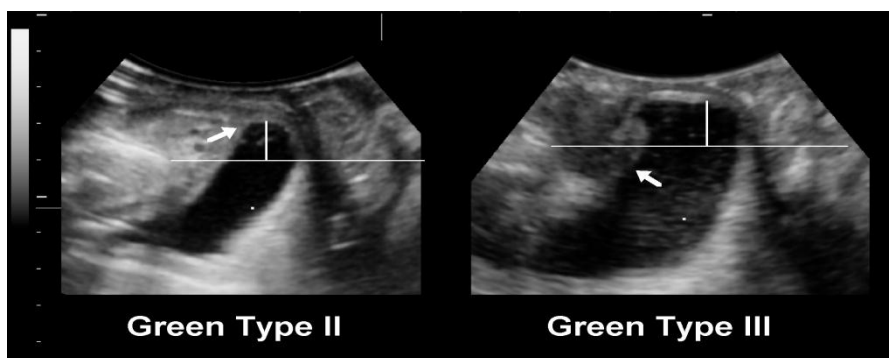


Figure 1: Cystourethrocele (left) and cystocele with intact retrovesical angle (right) on Valsalva. Arrows represent the bladder neck.

The ultrasound analysis was performed offline (GE Kretz 4DView 5.0), blinded against all clinical and urodynamic data. Statistical analysis was performed with Minitab and SPSS. A p-value < 0.05 was considered statistically significant.

Results

The mean age was 55 years (range 19-87), median parity 3 (0-10). Patients presented with stress incontinence (SI, 78%), urge incontinence (UI, 72%), frequency (31%), nocturia (48%), voiding dysfunction (VD, 24%), and symptoms of prolapse (70%). Multichannel urodynamic testing showed: USI (67%), DO (25%), VD (30%), and sensory urgency (16%). Thirty nine datasets were excluded from further analysis due to previous surgery affecting bladder neck anatomy, such as anterior wall repair, colposuspension, slings of any kind, or transobturator mesh. 103 women had a cystocele below the symphysis pubis and were classified as Green type II (62) or Green type III (41). Women with a Green type III cystocele had more severe prolapse, but were less likely to report stress incontinence. They were nonsignificantly less likely to be diagnosed with USI, but were more likely to have objective voiding dysfunction. A comparison of demographic, clinical and urodynamic data is given in Table 1.

Category	Measure	Green type 2 (n=62)	Green type 3 (n=41)	P value
Demographics	Age	48.3±13.1	59.9±10.6	<0.001
	Instrumental delivery	19%	44%	0.007
Symptoms	Stress incontinence	92%	66%	0.003
	Prolapse symptoms	43%	71%	0.006
Clinical exam	Cystocele	13.9±9.1mm	24±14.7mm	<0.001
Urodynamic data	USI	77%	65%	0.19
	Voiding dysfunction	16%	40%	0.011
	Strong desire to void	307±102ml	382±95ml	0.002
	Bladder capacity	443±94ml	480±69ml	0.025
	Residual volume	29±44.5	68±99	0.026

Table 1: Demographic, clinical and urodynamic data of patients presenting with Green type II and III cystoceles (described as means and standard deviations).

Women with Green III cystoceles were more likely to suffer from levator avulsion and showed a higher number of abnormal slices on TUI. The association between levator trauma and Green III cystocele was present in all eight levels assessed by TUI. Hiatal dimensions were generally higher in Green III, especially on pelvic floor muscle contraction. Ultrasound data is given in Table 2.

Measure	Green type 2 (n=62)	Green type 3 (n=41)	P value
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Midsagittal hiatal diameter (rest)	5.41±0.86	5.85±0.77	0.008
Coronal hiatal diameter (rest)	4.57±0.69	4.93±0.75	0.018
Hiatal area (rest)	17.71±4.28	20.24±5.42	0.014
Midsagittal hiatal diameter (Valsalva)	6.86±1.00	7.16±0.93	0.118
Coronal hiatal diameter (Valsalva)	5.77±0.91	6.11±0.94	0.078
Hiatal area (Valsalva)	30.69±7.73	33.73±8.93	0.079
Midsagittal hiatal diameter (PFMC)	4.61±0.73	5.145±0.81	0.095
Coronal hiatal diameter (PFMC)	4.36±0.74	4.73±0.97	0.049
Hiatal area (PFMC)	14.26±3.32	17.15±5.21	0.004
Levator avulsion defect	36%	66%	0.002
Abnormal slices on TUI	3.5±5.7	7.6±6.8	0.003

Table 2: Ultrasound findings in patients with Green type 2 and 3 cystoceles. Figures signify means and standard deviations. PFMC= pelvic floor muscle contraction.

Interpretation of results

This study sheds light on mechanisms which may underlie the pathogenesis of cystocele. It has been claimed that cystourethrocele is more often related to paravaginal defects (3). Our study shows contrary evidence in that a cystocele with an intact retrovesical angle is more likely to be associated with avulsion defects of the levator ani, the possible surrogate mechanism for a paravaginal defect, rather than a cystourethrocele. The two types of cystocele are associated with different symptoms, urodynamic findings, and levator biometry and morphology.

Concluding message

Cystourethrocele (Green II) is not associated with levator trauma and less likely to be associated with lateral fascial defects, as opposed to a cystocele with intact retrovesical angle (Green III).

References

1. AJOG 1975;122:368-400
2. Ultrasound Obstet Gynecol 2007;29:329-334
3. Obstet Gynecol 1981;57:357-62

Specify source of funding or grant	None
Is this a clinical trial?	No
What were the subjects in the study?	HUMAN
Was this study approved by an ethics committee?	Yes
Specify Name of Ethics Committee	SWAHS HREC
Was the Declaration of Helsinki followed?	Yes
Was informed consent obtained from the patients?	No