The Predictive Value of a Cystocele for Concomitant Vaginal Apical Prolapse

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Abbreviations and Acronyms

BMI = body mass index

POP = pelvic organ prolapse

POP-Q = POP quantification

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Purpose: Recent studies showing a correlation between descent of the anterior and apical vaginal compartments suggest that cystoceles may recur if associated apical prolapse is not corrected. However, to date the anatomical relationship of apical prolapse with respect to cystocele has been incompletely reported. We present the predictive value of a cystocele for clinically significant vaginal apical prolapse.

Materials and Methods: We retrospectively reviewed the records of all new patient visits to a urogynecology clinic in a 30-month period. Women with a point Ba value of −1 or greater (stage 2 cystocele and above) were included in analysis. Predictive values of clinically significant apical prolapse, defined as point C −3 or greater, were calculated and stratified by cystocele stage.

Results: A total of 385 women were included in study. Point Ba was the leading edge of prolapse in 83.9% of cases. The position of Ba strongly correlated with that of the vaginal apex (Spearman $\rho = 0.769$, $p < 0.001$). Overall 59.7% of patients had a point C of −3 or greater. The finding of clinically significant apical prolapse increased significantly with increasing Ba values. Of patients with stage 2, 3 and 4 cystocele point C was −3 or greater in 42%, 85% and 100%, respectively.

Conclusions: The finding of stage 2 or greater cystocele is highly suggestive of clinically significant apical vaginal descent to −3 or greater. Furthermore, as cystocele stage increases, the predictive value of apical prolapse also increases. Surgeons contemplating cystocele repair should have high suspicion for vaginal apical prolapse and consider concomitant repair.

Key Words: urinary bladder, prolapse, cystocele, vagina, reoperation

Each year approximately 170,000 women undergo surgery for POP in the United States.[1] The most common POP surgery performed is repair of anterior vaginal wall prolapse (cystocele).[2] The anatomical failure rate of cystocele repair is 40% to 70%.[3–5] Of patients treated with POP repair approximately 17% undergo reoperation within 10 years with the majority of these procedures directed at the same site as the previous repair.[6]

The cause of failed POP surgery is thought to be due to one or a combination of 1) poor patient tissue quality that causes repair to fail, 2) inadequate repair and/or 3) unrecognized vaginal compartment defects that are not addressed at original repair.[7] Recently, pelvic surgeons have been giving increased attention to multiple vaginal compartment defects, specifically that of the vaginal apex, combined with anterior vaginal wall prolapse. It

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was suggested that apical prolapse highly correlates with cystocele and correcting apical prolapse alone can rectify 55% of cystoceles without further repair.[7–9] It was also postulated that the high rate of cystocele recurrence may in part result from unrecognized and unrepaired apical defects that ultimately cause the cystocele to recur. Clinical trials of POP repair recently began to require apical defect repair in patients with point C measurements −3 or greater.[10]

Despite previous studies showing that 50% to 75% of cystoceles are associated with apical prolapse to some degree[7–9] it is unclear how often cystocele defects predict clinically significant apical prolapse, defined as POP-Q point C −3 or greater, and how this changes with increasing cystocele stage. We present the predictive value of cystoceles for clinically significant vaginal apical prolapse in a cohort of women with stage 2 or greater cystocele.

METHODS

After obtaining institutional board review approval we retrospectively reviewed the records of all new patient visits to a urogynecology clinic during 30 months. At these visits POP-Q was performed by 1 examiner (ERS) with the patient in the lithotomy position during maximal Valsalva strain.[11] POP-Q measurements, medical history, symptomatic complaints and patient demographics were collected on all patients with point Ba values −1 or greater (stage 2 cystocele and above). Point Ba was correlated with point C by scatterplots and linear regression. Positive predictive values of clinically significant apical prolapse, defined as point C −3 or greater, were calculated using the formula, number of patients with point Ba −1 or greater and point C −3 or greater divided by the total number of patients with point Ba −1 or greater, stratified by the degree of anterior prolapse. We also investigated predictive values based on common anatomical landmarks, including 0 to 1 cm—at or beyond the hymenal ring and greater than 1 cm—stage 3 cystocele or greater.

The chi-square test was used to compare proportions among groups, as appropriate. Multivariate linear regression was performed using forced selection to assess the degree of impact of patient characteristics on clinically significant apical prolapse. In the multivariate model patient age and BMI were tested as continuous and as categorical variables. All statistical analysis was performed using SAS®, version 9.

RESULTS

We identified 385 women with a Ba value of −1 or greater (stage 2 cystocele or above) during the study period. Table 1 shows patient demographics. The most common primary reasons for referral were prolapse (61% of cases), urinary incontinence (31.2%) and constipation (5.2%), in addition to fecal incontinence, urinary urgency, dyspareunia, pelvic pain, frequent urinary tract infection and urinary retention (each less than 5%). On further questioning stress incontinence and urinary urgency were endorsed by 56% and 32.5% of the cohort, respectively. Post-void residual urine was greater than 100 ml in 24.3% of patients. Of the study cohort 152 women (39.5%) had undergone prior hysterectomy, while 45 (11.7%), 13 (3.4%) and 14 (3.6%) had undergone prior anterior, apical, and combined anterior and apical repair, respectively.

Table 1. *Characteristics of 385 women with stage 2 or greater cystocele*

Mean ± SD age	60.4 ± 14.3
Mean ± SD BMI (kg/m^2)	26.3 ± 4.9
Mean ± SD gravidity	3.3 ± 2.0
Mean ± SD parity	2.6 ± 1.5
No. race/ethnicity (%):	
White	220 (57.1)
Hispanic	33 (8.6)
Asian/Pacific Islander	32 (8.3)
Black	5 (1.3)
Other/unknown	95 (24.7)

On examination the cystocele contained the leading edge of prolapse in 323 women (83.9%). The overall prolapse distribution was stage 2 in 58% of patients, stage 3 in 31% and stage 4 in 11%. In women with a stage 2 or greater cystocele the position of the anterior vaginal wall (Ba) strongly correlated with that of the vaginal apex (R^2 = 0.594, Spearman ρ = 0.769, p <0.001). On linear regression this relationship was modeled by the equation, C = 1.4(Ba) – 3.04 (see figure). Of all POP-Q measurements point Ba was most correlated with point C. Only points Aa and Bp had a significant correlation, although it was less (data not shown).

Overall 59.7% of the study cohort had a point C measurement of −3 or greater. Table 2 shows the predictive value of Ba for clinically significant apical prolapse. As the Ba measurement increased from −1 to 2.5 or greater, the positive predictive value of point C −3 or greater increased from 29% to 98%. Of patients with stage 2, 3 and 4 cystocele point C was −3 or greater in 42%, 85% and 100%, respectively.

On categorical univariate analysis age 65 years or greater positively predicted clinically significant apical prolapse, while obesity (BMI 30 kg/m^2 or greater) and prior hysterectomy were associated with a decreased chance of point C −3 or greater (table 3). However, when a multivariate linear regression model was fit with age, BMI, hysterectomy status, prior anterior or apical prolapse surgery and point Ba, the adjusted R^2 decreased compared to the univariate model with point Ba only. This suggests that these other clinical variables did not help predict point C (adjusted r^2 = 0.588 vs 0.591).