Research Article

POP-Q point C may not be equal to point D after hysterectomy

Abstract

Objectives: The Pelvic Organ Prolapse Quantification (POPQ) staging system assumes point C equates to point D after hysterectomy and we tested this hypothesis.

Methods: A retrospective chart review was performed on 98 new patients with a previous hysterectomy for prolapse surgery. Prolapse determined by the POPQ staging system except Point D (Cul-de-sac) and point C (hysterectomy scar) were measured. There were 3 groups based on prolapse: (I: primarily anterior compartment, II: primarily posterior compartment and III: complete(Anterior/posterior compartment).

Results: Mean point C and D varied significantly among different groups; The mean difference between point C and D also varied significantly among the groups with point C being significantly different from point D for groups I and III;C-D: (I)=4.82+2.8 (P<0.001), (II)=0.50+1.41 (P=0.35), (III)=5.3+3.3(P<0.001).

Conclusion: Point C does not equate to point D after hysterectomy in anterior vault prolapse.

Keywords: pelvic organ prolapse, POPQ, prolapse stagin

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Abbreviations: POPQ, the pelvic organ prolapse quantification; POP, pelvic organ prolapse; ICS, the International continence society; AUGS, the American urogynecology society; SGS, the society of gynecologic surgeons; ANOVA, analysis of variance

Introduction

Vaginal vault prolapse is a common complication in patients undergoing hysterectomy, affecting approximately 0.2%-43%.[1,2] General risk factors for the development of Pelvic Organ Prolapse (POP) include genetic factors, surgery, parity, age, and obesity.[3] Detachment of the uterosacral and cardinal ligament (Level I support) or detachment of pubocervical and rectovaginal fascia (Level II support) has been proposed as the leading cause of pelvic organ prolapsed (POP).[4,5]

The standardization of terminology for female pelvic organ prolapse and pelvic floor dysfunction (POPQ system) was developed in 1996 to enhance both clinical and academic communication regarding POP patients.[6] That article presented a standard system of terminology for the description of female pelvic organ prolapse. The system was endorsed by the International Continence Society (ICS) the Society of Gynecologic Surgeons (SGS) and the American Urogynecology Society (AUGS). The classification system underwent extensive testing for reproducibility and was shown to have excellent inter-observer reliability.[7]

The committee defined point C as a point that represents the most distal (most dependent) edge of the cervix or the leading edge of vaginal cuff (hysterectomy scar) post hysterectomy. Point D is a point that represents the posterior fornix (pouch of Douglas) in women who still have a cervix. The committee also recommended that Point D should be omitted in the absence of the cervix with the assumption that point C will be equal to point D after hysterectomy.

In patients with hypertrophic cervical elongation Point D is the posterior fornix and the uterosacral ligaments attachment to the posterior cervix at the level of the uterine artery. In the absence of a culdoplasty at the time of hysterectomy, the scar from removal of the cervix and uterus may be different from the level of persistent support of the cul-de-sac. In the presence of a uterus much of anterior prolapse is associated with elongation of the cervix.[8] The senior author (RRC) recognized that point C (hysterectomy scar) and Point D (cul-de-sac support) are not always the same at the time of post-hysterectomy evaluation. His observation led to the hypothesis of this study that Point C does not always equal D after hysterectomy.

Material and methods

A retrospective office chart review was performed for 98 patients having undergone surgery for vaginal vault prolapse post hysterectomy, from January 2008 until June 2011. Approval of the Institutional Review Board of the Louisiana State University Health Sciences Center was obtained prior to initiating the study. Patients were included if they were diagnosed with vaginal vault prolapse post hysterectomy. Data collected included demographic characteristics, initial visit assessment, operative report, medical and surgical history, urinary symptoms, and patient status at all postoperative visits. Patients were examined by the attending physician and/or Urogynecology fellow. Vaginal vault prolapse was staged using the POPQ staging system. Patients with no measurements on any of C and D were selectively removed from specific analyses and effective sample sizes are reported. A total of 92 patients were included in the analysis. Patients were divided into 3 groups according to the type of prolapse (group I: anterior compartment, group II: posterior compartment and group III: complete vault prolapse).

Statistical analysis

The distribution of categorical demographic data among groups

was compared via the Exact Chi-Square test. Differences in Aa, Ba, C, Ap, Bp, or D measurements between diagnosis groups were assessed by the Kruskal-Wallis test. A paired t-test was used to determine if there was a significant difference in the point C and point D measurements separately for each of the three groups. Analysis of variance (ANOVA) was used to compare the mean differences between point C and point D measurements among the three groups with Tukey's Honestly Significant Differences Test used for post-hoc analysis. ANOVA was also used to compare the three groups' mean age. SAS version 9.2 (SAS Institute, Inc., Cary NC) was used for all data analysis.

Results

A total of 92 patients were included in the study, 47 in group I the anterior compartment prolapse group, 8 in group II the posterior compartment prolapse group, and 37 in group III the complete vaginal vault prolapse group. The mean±SD age of subjects in group III was 73.4±9.5 years which was significantly higher (p=0.002) than group I (65.7±10.3 years) and marginally higher (p=0.063) than group II (64.6±7.9 years). Table 1 shows the distribution of demographic data for the entire cohort and the three subgroups. There were no significant differences between the three groups except for history of prior prolapse repair. Table 2 shows the differences between the three groups with respect to POPQ measurements; the median values of Aa, C, Ap, D were significantly different among the groups.

There was a significant difference between point C and point D for groups I (anterior) and III (complete) but not for group II (posterior) (Table 3). Group II and had a significantly smaller mean difference between point C and point D compared to group I (p=0.004) and group III (p=0.001).

Table 1 Descriptive statistics on subject demographic characteristics by diagnosis group

Characteristic	N (% of total)	N (% of group)			p-value
	ALL	Anterio	Posterior	Complete	
Parity					
1	15 (18%)	10 (23.8%	1 (12.5%)	4 (12.5%)	
2	26 (31.7%)	12 (28.6%)	4 (50.0%)	10 (31.3%)	
3	28 (34.1%)	12 (28.6%)	2 (25.0%)	14 (43.8%)	0.839
4+	13 (15.8%)	8 (19.0%)	1 (12.5%)	4 (12.5%)	
Race					
Caucasian	70 (75.3%)	40 (83.3%)	6 (75.0%)	24 (64.9%)	0.15
Other	23 (24.7%)	8 (16.7%)	2 (25.0%)	13 (35.1%)	
Smoking					
No	84 (91.3%)	44 (93.6%)	6 (75.0%)	34 (91.9%)	0.219
Yes	8 (8.7%)	3 (6.4%)	2 (25.0%)	3 (8.1%)	
Prior prolapse surgery					
No	67	39 (58%)	2 (3%)	26 (40%)	0.004*
Yes	25	9 (36%)	6 (24%)	10 (40%)	
Diabetes					
No	81	43 (53%)	6 (7%)	32 (40%)	0.673
Yes	12	5 (42%)	2 (16%)	5 (42%)	

Table 2 Descriptive of POPQ measurements by diagnosis group. *Indicates a significant difference between groups

		ALL	**Diagnosis**			
			Anterior	**Posterior**	**Complete**	
		Mean (SD)	**Mean (SD)**	**Mean (SD)**	**Mean (SD)**	**p-value**
Aa		1.4	1.6	-0.4	1.5	0.010*
		-1.5	-1	-2.5	-1.5	
Ba		3	3.2	-0.3	3.5	0.002*
		-2.3	-1.8	-2.6	-2.2	
C		1.4	-0.4	-1.9	4.3	<0.001*
		-4.1	-3.1	-4.4	-3.3	
Ap		-0.3	-1.7	1.2	1.4	<0.001*
		-1.8	-0.7	-1.3	-1.4	
Bp		0.5	-1.5	3.6	2.7	<0.001*
		-2.9	-1.2	-1.5	-2.7	
D		-3.3	-5.2	-2.4	-1	<0.001*
		-2.7	-1.1	-3.9	-2.6	

Table 3 Descriptive statistics on the difference between point C and point D for the three groups

Group†	**n**	**Mean (SD)**			**p-value**
		Point C	**Point D**	**Difference (Point C - D)**	
IA	47	-0.4 (3.1)	-5.2 (1.1)	4.8 (2.8)	<0.001*
IIB	8	-1.9 (4.4)	-2.4 (3.9)	0.5 (1.4)	0.351
IIIA	37	4.3 (3.3)	-1.0 (2.6)	5.3 (3.3)	<0.001*

*Indicates a significant difference between point C and point D †Groups with different letters have a significantly different mean point C minus point D difference.

Discussion

The description of pelvic prolapse is determined during clinical vaginal exams. The standardization of terminology for female pelvic organ prolapse (POPQ system) has allowed evaluation of uterovaginal prolapse by a standard system relative to clearly defined points.[6] However, it does not identify the specific defects in the lateral vaginal walls and nor does it determine parameters for successful repair.[9,10] An ICS and AUGS survey showed that the acceptance rate for POPQ was low with 40 % of practitioners routinely using the system and 33.5% of the members never using it.[11] The POPQ system was adapted from previous classifications systems including the system described by Baden and Walker.[12,13] The hymen is a fixed point that was defined as zero, and six other points were defined in relation to the hymen. Point C represents the leading edge of the cervix or the vaginal cuff post hysterectomy, and point D represents the posterior cul-de-sac (posterior fornix) in a patient without a hysterectomy. Prolapse of the cul-de-sac represents loss of uterosacral support of the cul-de-sac, but persistent support of the cul-de-sac with anterior vault prolapse along with the prolapse of the hysterectomy scar represents apical prolapse. A paravaginal defect will also lead to some apical prolapse, adding to the anterior defect. We feel that the observation that persistent support of the cul-de-sac (D) in relation to a prolapsing hysterectomy scar (C) has significance as seen in the POPQ graph (Figure 1) based on the average values in the anterior prolapse group, as suggested by Bernard Schussler.[14] This might also have implications regarding surgical repair and is very similar to hypertrophic cervical elongation (Figure 2). Hypertrophic cervical elongation is a poorly defined process that we have previously described that represents anterior prolapse associated with cervical prolapse with the persistence of support of the cul-de-sac.[8] This prolapse of the scar after hysterectomy is due to a lack of culdoplasty at the time of hysterectomy or a failure of the culdoplasty to maintain support of the scar from the hysterectomy.

In this study the mean difference between point C and point D was significantly different between different vaginal vault prolapse groups. For patients with posterior vaginal vault prolapse point C and D measurement was quite similar, but there were a small number of patients in this group.

Having a picture of the prolapse helps not only the surgeon in understanding the prolapse (a picture is worth a thousand words) but it is also a good tool to explain to the patient the proposed surgical repair. Repeat POPQ graphs in cases of failure of repair are also helpful for the surgeon's understanding of the cause of failure. We believe that Figure 1 shows the result of no culdoplasty at the time of hysterectomy for cervical elongation as you compare Figure 1 to Figure 2. The results of this study confirmed our hypothesis that patients without prior prolapse surgery have a significant difference

in the relation of point C to point D Measurement of C and D seems to add little complexity yet offers benefits for the care of patients with POP. It involves little if any additional time and provides a better definition of POP. But this necessitates doing away with the assumption that point C always equates to point D after hysterectomy.
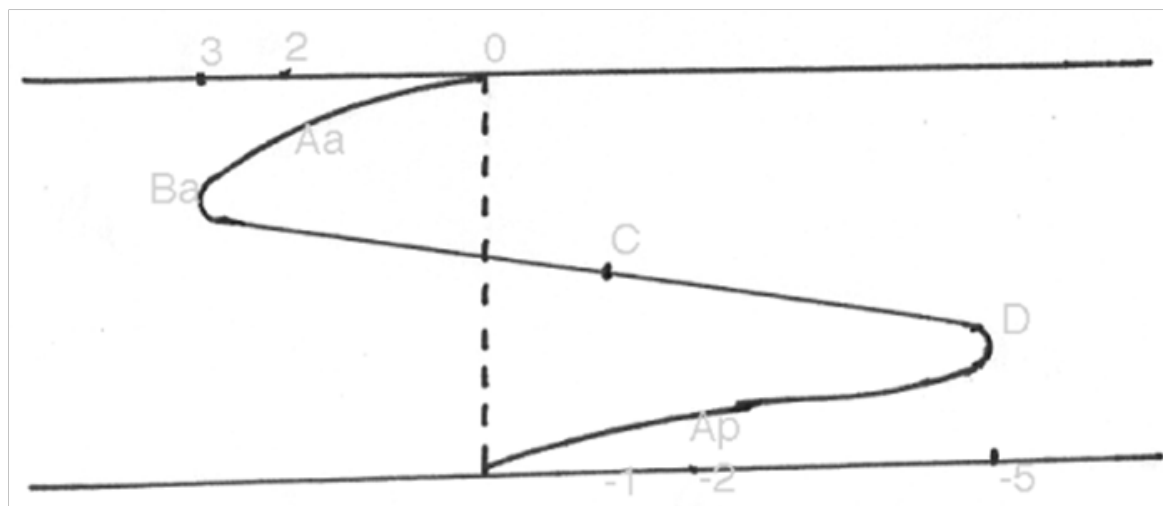

Figure 1 POPQ graph utilizing mean values of point C and D.
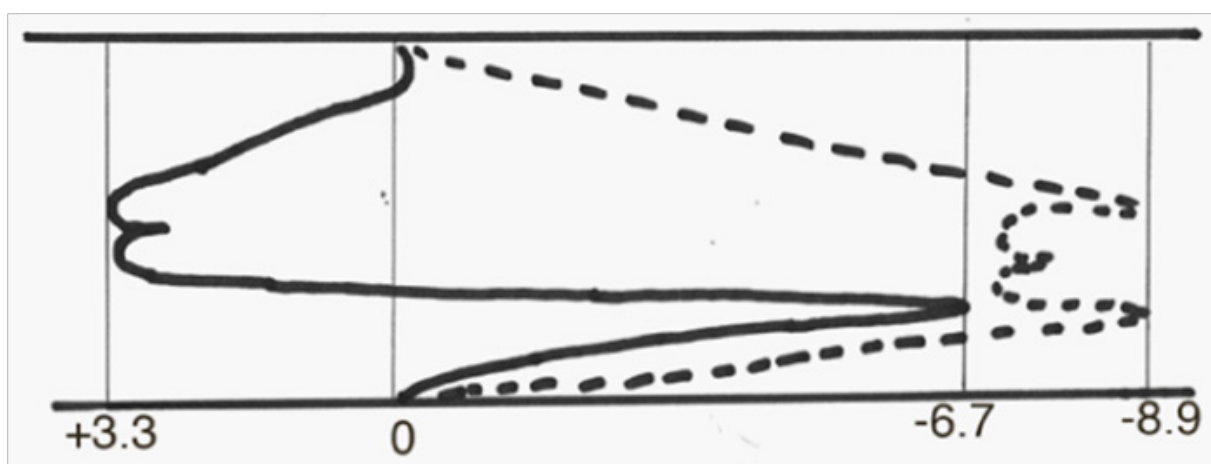

Figure 2 POPQ graph from reference # 8 showing hypertrophic cervical elongation.

Limitations of the study

Our study is limited primarily by its retrospective nature. Data were missing for six cases. We did not have records on the type of prior prolapse surgery.

Conclusion

We have shown that with anterior vault prolapse point C does not always equal D. Although it is sometimes difficult to determine the location of the scar, it is usually obvious and this measurement may have clinical significance.

Acknowledgments

None.

Conflicts of interest

Dr. Ralph Chesson has mentored for Gynecare and Boston Scientific; both companies have contributed supplies for his mission trips to Niger, Rwanda and Nicaragua. All other authors have no relationships/conditions/circumstances that present potential conflict of interest.

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