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ESTABLISHING A MEAN POST-VOID RESIDUAL VOLUME IN ASYMPTOMATIC PERI- AND POST MENOPAUSAL WOMEN

Hypothesis / aims of study:
The purpose of this study is to determine the average post void residual (PVR) volume among asymptomatic perimenopausal and postmenopausal women.

Study design, materials and methods:
Approval from the Investigational Review Board was obtained prior to the initiation of the study. All patients 45 years or older presenting to a tertiary care gynecology clinic for routine annual examination were offered study participation from February 10th, 2005 to March 15th, 2006. Demographic data, past medical, surgical, gynecologic, and obstetrical histories, as well as medications, and menopausal status were obtained from each patient via questionnaire. A targeted history of voiding habits and incontinence was used to screen subjects for inclusion. Patients with a history of urinary incontinence greater than 2x per week; voiding dysfunction or urinary retention; urinary frequency (greater than 10 daytime voids); urinary urgency; nocturia (greater than 2 nighttime voids); or a history of neurological disorders affecting bladder function were excluded. A detailed pelvic exam was performed to assess the degree of pelvic relaxation according to the Pelvic Organ Prolapse Quantification (POPQ) system. In addition, qualitative assessment of vulvovaginal atrophy was made. Within 10 minutes of a spontaneous void, we performed a bladder scan utilizing the Diagnostic Ultrasound Bladder Scanner BVI 6100 (Bothell, Washington) to determine the patient's PVR volume. Standard descriptive and Mann-Whitney U analyses were performed.

Results:
One hundred and three asymptomatic patients were enrolled in our protocol. The mean age (±SD) was 60 ± 11 years. Eighty-two percent of patients were post-menopausal and 31 % had undergone hysterectomy. Eighty-five percent of patients were parous. The median stage of prolapse was stage I with the anterior compartment representing the leading edge of prolapse in 65% of subjects. The median PVR volume was 19 ml, and ranged from 0 to 145 ml. Nearly 83% (95% CI: 74% to 89%) of subjects had <50ml PVR. Ninety five percent of patients had less than 100ml residual.

TABLE 1.

Variable	Number	Median (Range) Post Void Residual volume (ml)	P value
All patients	103		-
Age < 65	73	16 (0-145)	0.029*
Age ≥65	30	30 (0-115)	
BMI< 30	29	14 (0-100)	0.56
BMI≥30	64	19 (0-115)	
Hysterectomy	32	21 (0-65)	0.028*
No hysterectomy	71	11 (0-145)	
Anti-incontinence procedures	9	19 (0-115)	0.33
No prior anti-incontinence procedures	94	18 (0-145)	

Menopausal for ≤ 5 years	40	12 (0-100)	0.053
Menopausal for > 5 years	63	20 (0-145)	
Currently taking HRT	13	15 (0-65)	0.42
Not taking HRT	90	20 (0-145)	
Vaginal Atrophy	57	20 (0-145)	0.30
No vaginal atrophy	46	17 (0-100)	
POPQ ≤ Stage 1	66	20(0-145)	0.69
POPQ > Stage 1	37	16(0-100)	

Comparison of median post-void residual volumes among patients based on age, Body Mass Index (BMI), surgical history, menopausal history, vaginal atrophy and prolapse. Analysis was performed using the Mann- Whitney U test for non-parametric variables. A P value of <0.05 was recorded as statistically significant
*- statistically significant

Interpretation of results:
In asymptomatic peri- and postmenopausal patients 4 of 5 patients had less than 50cc of PVR and 95 of 100 had less than 100cc. None of the patients had a PVR greater than 200cc which is generally considered pathological. Age ≥ 65 and a history of hysterectomy correlated with statistically increased, albeit normal, median PVR volume. Greater than 5 years menopausal trended toward significance. Hormone replacement therapy, presence of vaginal atrophy and asymptomatic prolapse did not appear to affect the PVR.

Concluding message:
Bladder emptying appears adequately maintained in asymptomatic peri- and post- menopausal women.

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HUMAN SUBJECTS: **This study was approved by the Walter Reed Army Medical Center Investigational Review Board and followed the Declaration of Helsinki Informed consent was obtained from the patients.**