

IS AN ELEVATED POST-VOID RESIDUAL A RISK FACTOR FOR BACTERIURIA?

Hypothesis / aims of study

It is a common assumption that an elevated post-void residual (PVR), like a stagnate pool, allows for bacterial growth and predisposes a patient to urinary tract infections. Previous studies have produced varied results in attempting to clarify this relationship. We sought to determine if elevated PVR is associated with bacteriuria.

Study design, materials and methods

We reviewed a clinical database of women seeking care for pelvic floor disorders. Inclusion criteria were a catheterized PVR recorded from the initial visit and urine culture results from within 30 days of the initial visit. Patients on antibiotics were excluded. Elevated PVR was defined as ≥ 100 mL. Bacteriuria was defined as greater than 10^5 colonies per mL. Additional data obtained included age, parity, vaginal parity, menopausal status, diabetes history, prior anterior vaginal wall surgery, vaginal estrogen, sexual activity, body mass index (BMI) and pelvic organ prolapse quantification (POPQ) measurements. Anterior vaginal wall prolapse was defined as Ba ≥ 0 . Anterior vaginal wall surgery was defined as any history of anti-incontinence surgery, anterior colporrhaphy, "bladder lift" or "bladder suspension" abstracted from the surgical history in the database. Vaginal estrogen described post-menopausal women using vaginal estrogen. Analysis of this variable included only post-menopausal women. Prior to conducting the study, a power analysis was performed assuming that 10% of patients would have an elevated PVR and the baseline bacteriuria rate would be 10%. A clinically significant finding in patients with an elevated PVR would be a 25% bacteriuria rate. Based on these values a total of 507 women would be needed to achieve a power of 80% with a significance of 0.05. Urine culture results, PVR measurements, and demographic data were analyzed using T-tests, Mann-Whitney tests and chi-squared tests. Logistic regression was used to calculate odds ratios (OR) with 95% confidence intervals (CI). Sub-analyses of the PVR cut offs 30 mL, 50 mL, and 150 mL were also performed using separate models to determine if a difference in the definition of elevated PVR would change the results.

Results

There were 1799 patients entered into the database. Of these entries, 604 (34%) patients had incomplete medical history, physical examination or no documented urine cultures available for review. An additional 373 subjects (21%) were excluded due to a lack of catheterized PVR measurement (i.e. had ultrasound PVR measurement) and 92 (5%) did not have a urine culture from within 30 days of the intake examination or were taking antibiotics at the time of initial evaluation. Of the 731 (41%) women who met inclusion criteria, bacteriuria was more prevalent in women with elevated PVR vs. normal (17% vs. 9%, $p=0.019$). Univariate analyses demonstrated that in addition to elevated PVR, age, anterior vaginal wall surgery, and not being sexually active were significantly positively associated with bacteriuria. After multivariate analysis though, elevated residual was no longer significantly associated with bacteriuria (OR=1.414, CI 0.723 – 2.764). Increasing age was the only variable significantly associated with bacteriuria (OR = 1.021 (per year), CI = 1.002 – 1.040, $p<0.05$). Sub-analyses of the alternate PVR cut offs similarly found that age was the only predictor of bacteriuria and not PVR.

Interpretation of results

In this population of women seeking care for pelvic floor disorders, elevated PVR was not significantly associated with increased rates of bacteriuria when controlled for age and other confounding variables.

Concluding message

The presence of an elevated PVR alone may not be as important a risk factor for bacteriuria as previously believed.

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HUMAN SUBJECTS: This study was approved by the University of California, San Diego Human Research Protections Program and Institutional Review Board at Naval Medical Center San Diego and followed the Declaration of Helsinki Informed consent was obtained from the patients.