Postvoid residual volume

Postvoid residual volume (PVR) is a medical term used to describe the amount of urine that remains in the bladder after a person has finished urinating. It is typically measured in milliliters (ml) or cubic centimeters (cc). PVR is an important clinical parameter and is often assessed to evaluate bladder function and urinary retention.

Key points

Measurement: PVR is usually measured using an ultrasound or catheterization technique. Ultrasound is non-invasive and involves using a device to scan the lower abdomen to estimate the volume of urine left in the bladder. Catheterization is invasive and involves inserting a thin tube (catheter) into the urethra and into the bladder to directly measure the remaining urine.

Normal Values: A normal PVR is typically considered to be 50-100 ml or less. If the PVR is significantly higher than this range, it may suggest incomplete emptying of the bladder, which can be due to various underlying medical conditions.

Clinical Significance: Elevated Postvoid residual volume can be indicative of several conditions, including urinary retention, neurogenic bladder dysfunction, bladder outlet obstruction (such as in benign prostatic hyperplasia in men), urinary tract infections, and other urinary tract issues.

Symptoms: Some individuals with elevated PVR may not experience noticeable symptoms, while others may have symptoms such as a weak urine stream, frequent urination, urgency, or a feeling of incomplete emptying.

Clinical Assessment: Physicians may assess PVR to help diagnose and manage conditions related to bladder function. High PVR may lead to further evaluation, which can include imaging studies and urodynamic testing to determine the underlying cause.

Treatment: Treatment for elevated PVR depends on the underlying cause. It may involve lifestyle changes, medication, physical therapy, or, in some cases, surgical procedures to address bladder dysfunction or obstruction.

PVR assessment is an important part of the evaluation of urinary tract function and can be valuable in diagnosing and managing various urological conditions.

The postvoid residual (PVR) volume of urine in the bladder is widely used in clinical practice as a guide to initiate treatment, including clean-intermittent self-catheterization (CISC). It is often believed that an elevated PVR causes complications such as recurrenturinary tract infections (UTI) and renal failure. However, evidence for this is limited, and identifying alternative measures to guide treatment decisions may optimize patient care. At the International Consultation on Incontinence Research Society (ICI-RS) meeting in 2023 a Think Tank addressed the question of whether we can define the optimal PVR at which CISC should be recommended, and whether there are other measures that could guide a CISC protocol.

The Think Tank conducted a literature review and expert consensus meeting focusing on current limitations in defining and measuring PVR, and highlighting other measures that may optimize selection for, and persistence with, CISC.

There is no consensus on the threshold value of PVR that is considered “elevated” or “significant.” There is a lack of standardization in terminology, and the normal range of PVR in different populations of different ages remains to be well-studied. The measurement of PVR is influenced by several factors, including intraindividual variation, timing, and method of measurement. Furthermore, the evidence linking an elevated PVR with complications such as UTI and renal failure is mixed. Other measures, such as bladder voiding efficiency or urodynamic parameters, may be better at predicting such complications and therefore may be more relevant in guiding a CISC protocol.

There is a lack of high-quality evidence to support PVR as a predictor for complications of UTI or renal failure. Threshold values for normal PVR in different populations are unknown, and so threshold values for “elevated” or “significant” PVR cannot be determined. Other factors, such as urodynamic findings, may be better at predicting complications and therefore guiding management decisions, and this remains to be studied. Areas for further research are proposed [1)].

---

1)
Malde S, Belal M, Mohamed-Ahmed R, Gibson W, Padilla-Fernandez B, Rantell A, Selai C, Solomon E, Abrams P. Can we define the optimal postvoid residual volume at which intermittent catheterization should be recommended, and are there other measures that could guide an intermittent catheterization protocol: ICI-RS 2023. Neurourol Urodyn. 2023 Oct 31. doi: 10.1002/nau.25324. Epub ahead of print. PMID: 37905437.