

# Patterns of Benign Prostatic Hyperplasia Associated Urinary Retention: Indwelling Urinary Catheter Use and Clinical Sequelae

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## Abstract

**Introduction:** Current clinical practice guidelines aim to decrease the use of unnecessary indwelling urinary catheters to prevent catheter associated urinary tract infections. Patients with benign prostatic hyperplasia often experience increased post-void residual urine volume and subsequent bladder catheterization to prevent complications such as urinary tract infections or hydronephrosis. However, the management of urinary retention in patients with benign prostatic hyperplasia varies and clinical guidelines are lacking. In this study we gather information on post-void residual urine volume, the use of catheters and associated complications in a sample of older veterans with benign prostatic hyperplasia.

**Methods:** A retrospective chart review was performed using 660 patients screened for documented post-void residual urine volume greater than 100 cc, age greater than 65 years and the absence of cancer. A final chart review of 136 male veterans was performed for this analysis.

**Results:** A total of 59 (43.4%) indwelling urinary catheters were placed. Catheters were placed in subjects with modest post-void residual urine volumes in the 100 to 150 cc range and in those with a post-void residual urine volume greater than 500 cc. Overall complication rates were low. Among those patients who had a catheter placed 51% reported hematuria, 36% reported pain and only 1 had documented urosepsis. Hydronephrosis occurred in 4 cases, each with a post-void residual urine volume of 301 to 400 cc, and 3 of these individuals had an indwelling urinary catheter placed. In those patients emergency room visits and hospitalizations were more frequently associated with placement of an indwelling urinary catheter.

**Conclusions:** Larger studies are needed for the development of clinical guidelines on the treatment of patients with benign prostatic hyperplasia and urinary retention.

**Key Words:** prostatic hyperplasia, catheter-related infections, urinary tract infections, urinary retention, urinary catheters

## Abbreviations and Acronyms

AUR = acute urinary retention

BPH = benign prostatic hyperplasia

CAUTI = catheter associated urinary tract infection

IUC = indwelling urinary catheter

PVR = post-void residual urine volume

UTI = urinary tract infection

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all human subjects provided written informed consent with guarantees of confidentiality; IRB approved protocol number; animal approved project number.

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Efforts are ongoing worldwide to decrease the unnecessary use of indwelling urinary catheters in all care settings and populations to prevent the development of CAUTIs.<sup>1,2</sup> These infections are the most common hospital acquired infection, and can result in prolonged hospital stays, increased cost of care and increased mortality, especially in patients who are older with severe illnesses.<sup>2,3</sup> In addition, other catheter associated complications include pain and hematuria.<sup>4</sup>

Patients with BPH and increased PVR are a significant population who may be catheterized for an extended duration, thereby increasing the chance of complications and increased health care use.<sup>4</sup> BPH is a normal aging change that often begins at age 40 to 50 years, is common in older men and may result in significantly increased prostate volume with advanced age. As prostate size increases, adequate bladder emptying is reduced, and urgency, frequency, urinary retention and increased PVR are common symptoms.<sup>4</sup> Increased PVR is an indication of voiding dysfunction and is often associated with BPH. It is generally assumed that an increased PVR predisposes individuals to a urinary tract infection, creates an environment for bacterial growth and may subsequently lead to hydronephrosis.<sup>4</sup>

The treatment of BPH ranges from the use of medications that reduce prostate size or relax smooth muscle, to surgical interventions to remove the prostate. During the last decade medical therapies for BPH have improved dramatically, including alpha-adrenergic antagonists and 5-alpha reductase inhibitors, which have largely replaced surgical therapy.<sup>5</sup>

However, these medications do not lead to immediate relief and in the short term an indwelling urinary catheter is often placed for bladder decompression in patients with BPH induced urinary retention.<sup>2,3,5</sup> Although the urological literature generally states that a PVR greater than 150 cc is abnormal, there is no clear PVR cutoff to direct catheter insertion for decompression in patients with BPH to prevent complications. It is clinically accepted that a catheter should be placed in patients with AUR and PVRs greater than 500 cc, volumes which will generally lead to significant symptoms. However, catheters are often placed in patients with more modest PVRs (250 to 500 cc) due to concern for the risk of UTI, renal insufficiency, hydronephrosis or overflow incontinence.<sup>4</sup>

While it has been assumed that an increased PVR results in infections and hydronephrosis, some studies have failed to support this assumption.<sup>6-9</sup> Of 3,047 men in the Medical Therapy of Prostatic Symptoms trial there were only 5 with recurrent UTIs and none with renal insufficiency.<sup>6</sup> A worldwide study of 6,074 men on the conservative management of BPH and PVR greater than 250 cc showed that

complications of renal failure, AUR (inability to void) and UTIs were uncommon.<sup>7</sup> Although there have been numerous studies aimed at the prevention of infections directly associated with urinary catheter use, none has focused on specific recommendations for patients with BPH complicated by urinary retention.<sup>4</sup>

The CDC (Centers for Disease Control and Prevention) guidelines list urinary retention as an accepted indication for indwelling catheter placement. However, there are no standardized guidelines for catheter placement for BPH induced urinary retention or for catheter removal from patients with BPH receiving medication.<sup>2</sup> Recently a multidisciplinary panel of physicians, nurses and specialists conducted a systematic review of the literature on appropriate urinary catheter indications.<sup>10</sup> After this review some areas of uncertainty remain regarding the treatment of urinary retention due to bladder outlet obstruction. The panelists noted that for AUR with outlet obstruction, indwelling catheters or intermittent catheterization may be indicated. Bladder scanners should be used to avoid placement of catheters for little urine in the bladder. In addition, the use of catheters for chronic retention and obstruction was uncertain.

As increased PVR and prolonged catheter use are common in patients with BPH and are associated with a higher risk of UTIs and other complications, it is imperative to determine at which PVR value catheter placement is efficacious. The purpose of this study was to gain a better understanding of current clinical practice for IUC placement in older veterans with BPH and increased PVR. We explored differences among patients treated with an IUC and those who did not have an IUC placed. Specifically we examined differences in demographics, medical diagnoses, medications, PVR and complications such as hydronephrosis.

## Methods

After receiving institutional review board approval the investigators conducted a retrospective chart review of veterans with BPH who had a documented PVR. Information gathered included demographics (age, race), medications for common conditions such as cardiovascular disease, diabetes and BPH, urgent care visits, hospital admissions/readmissions, inpatient days, discharge disposition and other medical complications. Insertion of an indwelling urinary catheter, PVR values documented as justification for placement, the presence of urinary symptoms before placement, and complications due to catheter placement such as bleeding, pain or infection were noted. Also noted were the duration of urinary catheter placement and the time frame for removal, as well as the occurrence of hydronephrosis,

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