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Original Research Article

A Prospective Study of Factors Predicting Outcome of Trial of Void without Catheter in Patients with Acute Urinary Retention Secondary to Benign Prostatic Hyperplasia

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Abstract

Aim: This study was conducted with the objective to evaluate the parameters that can predict the success or failure of trial of voiding without catheter (TWOC) for acute urinary retention (AUR) due to benign prostatic hyperplasia (BPH).

Methods: A prospective study including 100 patients who were hospitalized for BPH-associated AUR was conducted at the Department of Genito-Urinary Surgery, Sri Venkateswara Institute of Medical Sciences, for 1 year to include male patients who were hospitalized for BPH-associated AUR. Out of total 100 patients enrolled in our study, 65 (65%) belonged to successful group while remaining 35 (35%) to failed group.

Results: Majority of the patients belonged to the age group 61-80 years in the study. Majority of the patients belonged to the age group 61-80 years in the study. Total of 78% of patients in our study accepted having prior LUTS. Duration of symptoms was shorter in successful group and ranged from no prior LUTS to 18 months when compared to no prior LUTS to 20 months in failed group. Majority of the patients belonged to the age group 61-80 years in the study. Total of 78% of patients in our study accepted having prior LUTS. Duration of symptoms was shorter in successful group and ranged from no prior LUTS to 18 months when compared to no prior LUTS to 20 months in failed group. 45% had IPSS <15 and 53% had IPSS 15-30. PV was lesser in the successful group, it was not found to be statistically significant. We had 18 patients (18%) with grade I, 54 (54%) with grade II and 28 (28%) with grade III IPP.

Conclusion: Severe lower urinary tract symptoms, prostatic pain during DRE, large urine volume after catheterization, and high blood urea are the predictive factors for TWOC failure in AUR due to BPH.

Keywords: Acute urinary retention, benign prostatic hyperplasia, predictors, trial without catheter

Introduction

Acute urinary retention (AUR) is uncomfortable, stressful, and even painful (palpable or percussible bladder). Consequently, the patient is unable to pass any urine.1 AUR is classified as spontaneous or precipitated. Spontaneous AUR is considered when no evidence of stimulating factors exists except benign prostatic hyperplasia (BPH). Conversely, precipitated AUR is considered when stimulating factors including BPH and others (e.g., preceding surgery, stroke, urinary tract infection, and some anticholinergic medicaments are present.[2] Primary AUR increases with age, and it usually occurs in men >60 years old with incidence rates of 3.06 and 5.23 per 1000 men annually and in 2010, respectively. [3] Acute urinary retention (AUR) is one of the most serious complications of benign prostatic hyperplasia (BPH). BPH can lead to bladder outlet obstruction, and it is the most common cause of AUR in men (at least 65% of men with AUR).[4] Well-controlled studies have estimated the frequency of this complication to be about 5–25 per 1000 person-years or 0.5% to 2.5% per year. However, the risk is cumulative and increases with age.[5]

Therefore, according to the recommendation of the American Urology Association (AUA), treatment of AUR due to BPH includes the emergency release of urine in the bladder, and BPH is treated using α-1 blockers (alfuzosin and tamsulosin, among others) at the same time.[6] The immediate management of this complication is urethral catheterization. In the past, most of these patients would then undergo transurethral prostate resection (TURP) as the gold standard of definitive treatment. However, studies have shown that the success of trial of voiding without catheter (TWOC), which is defined as the point at which the patient can regain self-voiding and be free of AUR for at least a year, [7,8] ranges from 23% to 58%. [9,10] Various factors have been known to affect the likelihood of a successful TWOC, knowledge of which may help us to predict the outcome an according counsel the patient about the possible outcome.

This study was conducted with the objective to evaluate the parameters that can predict the success or failure of trial of voiding without catheter (TWOC) for acute urinary retention (AUR) due to benign prostatic hyperplasia (BPH).

Material & Methods

A prospective study including 100 patients who were hospitalized for BPH-associated AUR was conducted at the Department of Genito-Urinary Surgery, Sri Venkateswara Institute of Medical Sciences, for 1 year to include male patients who were hospitalized for BPH-associated AUR. This study was accepted by the ethical approval committee and Institutional Review Board Informed consent was obtained from the patients. Out of total 100 patients enrolled in our study, 65 (65%) belonged to successful group while remaining 35 (35%) to failed group.

Exclusion Criteria

Patients with prostate cancer, prostatitis, urethral injury, pelvic fracture, urethral gravel, urethral stricture, bladder neck sclerosis, tabes dorsalis, spinal cord injury, spinal cord inflammation, or drug‐induced AUR (pseudoephedrine and antihistamine, among others).

Study procedure and data collection

All patients with AUR due to BPH were initially managed with emergency urinary catheter combined with α-1 blockers and antibiotics. Consequently, the urinary catheter was removed, and the patients' results were evaluated after 3 days. All study parameters used for developing the RF model in this study were collected from the initial evaluation data during the

period. Clinical factors, including age, classification of urinary retention, progression time of lower urinary tract symptoms, urinary signs, prostate clinical examination, comorbidities, and total urinary volume after catheterization, were recorded in addition to laboratory and imaging parameters (parameters of urine sample test, bladder–prostate ultrasound, and blood count test). Moreover, the international prostate symptom score (IPSS) and quality of life (QoL) were also recorded for assessment.[11] After removing the catheter (TWOC), the results were evaluated in the next 24 h. According to Guang-Jun et al., "α1 -blockers provide substantial benefit in increasing a satisfactory micturition within 24 h after TWOC for men with AUR due to BPH, even though the long-term effectiveness remains uncertain."[12] Thus, the 24-h mark after TWOC was chosen.

A successful TWOC was considered a postvoid residual volume of <100 mL and the patient not needing re-catheterization within 24 h after removing the catheter. Subsequently, the patients were categorized into two groups: the first successful group and the first failed group, based on the success of the initially applied TWOC. Consequently, the aforementioned predictive factors were statistically investigated. Furthermore, precipitated AUR refers to the inability to urinate following a triggering event (e.g., nonprostate-related surgery, catheterization, anesthesia, or ingestion of medications with sympathomimetic or anticholinergic effects, antihistamines, or others). All other AUR episodes are classified as spontaneous.[5]

Statistical analysis

The Statistical Package for the Social Sciences, Version 23, and R software produced by SPSS Inc., IBM, Chicago, IL. were used to analyze the data. Moreover, descriptive analysis was used to describe the study characteristics between the two groups. The characteristics of the patients in the two groups were compared using either Fisher's exact test (for categorical variables) or Mann–Whitney U test (for continuous variables). Subsequent multivariable analysis was used to analyze the association between the predictive factors and the TWOC outcomes. Consequently, the RF was used to select variables for multivariable analysis for detecting the interaction and nonlinearity without pre specification.

Based on the results of the model selection stage, the selected variables were included in the logistic regression model to conduct multivariable analysis to evaluate the independent predictability of each factor. Furthermore, the receiver operating characteristic (ROC) analysis was used to select the appropriate cutoff values for continuous prognostic parameters.

Results

Table 1: Patient details

Age inyears	Successfulgroup (%)	Failed group (%)	Total (%)
50-60	20 (30.76)	5 (14.28)	25 (25)
61-70	30 (46.15)	11 (31.42)	41 (41)
71-80	15 (23.09)	19 (54.29)	34 (34)
Total	65 (100.0)	35 (100.0)	100 (100.0)
Mean ±SD	64.36±6.24	68.02±6.74	67.23±7.33
Duration of LUTS (months)			
0	15 (23.09)	7 (20)	22 (22)
1-5	12 (18.46)	4 (11.42)	16 (16)
6-10	26 (40)	14 (40)	40 (40)
11-20	12 (18.46)	10 (28.58)	22 (22)

Total	65 (100)	35 (100)	100 (100)
IPSS			
<15	32 (49.23)	13 (37.15)	45 (45)
15-30	33 (50.76)	20 (57.15)	53 (53)
>30	0 (0)	2 (5.71)	2 (2)
Total	65 (100)	35 (100)	100 (100)

Majority of the patients belonged to the age group 61-80 years in the study. Total of 78% of patients in our study accepted having prior LUTS. Duration of symptoms was shorter in successful group and ranged from no prior LUTS to 18 months when compared to no prior LUTS to 20 months in failed group. 45% had IPSS <15 and 53% had IPSS 15-30.

Table 2: PV on USG (grams) and Intra-vesical prostate protrusion-distribution of patients in two groups studied

PV on USG (gm)	Successfulgroup (%)	Failed group (%)	Total
<50	48 (73.85)	25 (71.42)	73 (73)
50-60	12 (18.45)	5 (14.29)	17 (17)
>60	5 (7.70)	5 (14.29)	10 (10)
Total	65 (100)	35 (100)	100 (100)
IPP grade			
1	15 (23.07)	3 (8.57)	18 (18)
2	40 (61.54)	14 (40)	54 (54)
3	10 (15.39)	18 (51.43)	28 (28)
Total	65 (100)	35 (100)	100 (100)

PV was lesser in the successful group, it was not found to be statistically significant. We had 18 patients (18%) with grade I, 54 (54%) with grade II and 28 (28%) with grade III IPP.

Table 3: Urine volume (ml) and Bladder wall thickness (mm) distribution of patients in two groups studied

RUV (ml)	Successfulgroup (%)	Failed group (%)	Total
<700	50 (76.92)	5 (14.28)	55 (55)
700-800	15 (23.08)	20 (57.14)	35 (35)
>800	0 (0)	10 (28.58)	10 (10)
Total	65 (100)	35 (100)	100 (100)
BWT (mm)			
<6	40 (61.53)	6 (17.15)	42 (46.7)
6-7	25 (30.07)	24 (68.57)	44 (48.9)
>7	0 (0)	5 (14.28)	4 (4.4)
Total	65 (100)	35 (100)	100 (100)

RUV drained post catheterisation ranged from 510 to 730 ml with mean of 649 ml and 670 to 880 ml with mean of 758 ml in successful and failed group respectively. BWT in failed group ranged from 5 to 7.2 mm with mean of 6.4 mm while in successful group it ranged from 4.5 to 6.2 mm with mean of 5.48 mm.

Discussion

Benign prostatic hypertrophy (BPH) even though being a benign condition can still have serious complication like haematuria, recurrent urinary tract infection (UTI), obstructive nephropathy and acute urinary retention (AUR) which can adversely

affect health and quality of life (QOL). [13] AUR represents one of the most distressing complications of BPH. For those with mild score (IPSS <8), the documented incidence increases from 0.4/1000 for patients 45 to 49 years of age to 7.9/1000 person-years for those between 79 to 83 years, for those with moderate to severe scores (IPSS 8-35), rates increased from 3.3/1000 to 11.3/1000 for the respective age groups. [14] Attempt of trial without urinary catheter (TWOC) is given to all these patients, failing which they are subjected to surgical management. Various factors have been known to affect the likelihood of a successful TWOC, knowledge of which may help us to predict the outcome an according counsel the patient about the possible outcome.

Majority of the patients belonged to the age group 61-80 years in the study. Total of 78% of patients in our study accepted having prior LUTS. Duration of symptoms was shorter in successful group and ranged from no prior LUTS to 18 months when compared to no prior LUTS to 20 months in failed group. 45% had IPSS <15 and 53% had IPSS 15-30. We had a success rate of 65% which was comparable to other studies in literature. Tiong, Sharis and Bansal et al in their respective studies demonstrated a success rate of 60%, 50% and 66.3%. [15-17] Average age was noted to be lesser by 3 years and 6 months in successful group in our study and was found to be a statistically significant parameter for determining success. PV was lesser in the successful group, it was not found to be statistically significant. We had 18 patients (18%) with grade I, 54 (54%) with grade II and 28 (28%) with grade III IPP. Duration of LUTS before the onset of AUR was not found to be a significant parameter in predicting success in our study. Contrary to our finding Das et al, in their study not only demonstrated an association between the two but also showed that by using cut-off of two and half months failure rate could be predicted with sensitivity of 82.1% (area under the receiver operating characteristics. [18] Mahadik et al similarly showed success rate to be more in patients who had less than three months of prior LUTS. [19] We found IPSS to be significant parameter in predicting success. This finding was in accordance with a worldwide survey by Fitzpatrick et al which not only showed that among patients presenting with AUR, 52% to 75% had moderate score while 21.9% to 40.6% had severe score but also statistically significant association between higher IPSS and failure rate ($p<0.001$). [20]

RUV drained post catheterisation ranged from 510 to 730 ml with mean of 649 ml and 670 to 880 ml with mean of 758 ml in successful and failed group respectively. BWT in failed group ranged from 5 to 7.2 mm with mean of 6.4 mm while in successful group it ranged from 4.5 to 6.2 mm with mean of 5.48 mm. Similarly Bhomi and Li et al, in their respective studies not only showed statistical significance of RUV but also demonstrated a critical volume of 800 ml and 700 ml respectively in determining the chances of success. [21,22] Tenke et al [23] reported that the incidence of urinary tract infections increases daily by 3%–7% with the presence of urethral catheterization. Moreover, the multivariate analysis performed by Fitzpatrick et al [20] and Saint et al [24] revealed that catheterization for 3 days did not affect successful TWOC rate but was related to urinary tract infection, urinary leakage, catheter obstruction, and prolonged hospitalization due to side effects. Manjunath and Hofer [25] suggested that the predictors of TWOC failure were age (>69 years) and urine volume after catheterization (>654 mL). Furthermore, Bhomi and Bhattachan [21] suggested that prostate size (>40 g), IPSS (>16), urine volume after catheterization (>800 mL), and intravesical prostatic protrusion (>8 mm) were the predictors of TWOC failure.

Conclusion

Age of patient, IPSS, RUV drained, IPP and BWT can be used as parameters in predicting successful catheter free trial following AUR secondary to BPH.

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