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Research Article

Predictors of urinary retention in benign prostate hyperplasia

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ABSTRACT

Background: Acute urinary retention (AUR) is one of the most significant complications or long-term outcomes of benign prostatic hyperplasia (BPH). Because of the high prevalence of BPH and its effect on the patient's quality of life, additional research is needed to better predict the risk factors of AUR. The study was aimed to find out the incidence and factors responsible for retention of urine in BPH.
Methods: It was a prospective study, conducted at a medical college after the approval from IEC. The study included the patients admitted to the surgical wards admitted with the symptoms of lower urinary tract symptom and presented with acute urinary retention. Duration of the study was 2 months. A total 40 patients were studied over this duration. The outcome of the study was analyzed by these factors: Age in years, Symptom severity, Prostate Volume on DRE and USG Grade.
Results: The mean age of presentation was 64.87±7.85 with median age of 65 years (range 45-82 years) with mean IPSS score of 17.45and the mean PVR was 110.80 ± 85.52 with median 110 (range 0-500). Maximum number of patients having Grade 3 and 4 enlargements had PSA level 9-12 ng/ml. The PSA levels and the grade of enlargement on USG were statistically significant (p-0.004).
Conclusions: Out of the four factors considered to be the independent risk factors, all of them have positive correlation with the symptom of acute urinary retention. None of these four factors i.e. age in years, symptom severity, prostate Volume on DRE and USG grade could establish significant correlation.

Keywords: BPH, Predictors, PVR, PSA, Acute urinary retention

INTRODUCTION

Acute urinary retention (AUR) is one of the most significant complications or long-term outcomes of benign prostatic hyperplasia (BPH). Between 25% and 30% of men who underwent transurethral resection of the prostate (TURP) had AUR as their main indication[1] and today most patients failing to void after an attempt at catheter removal still undergo surgery. From an economical viewpoint, AUR is a significant event, and from the viewpoint of the patient, often a feared one. For the patient it presents as the inability to urinate, with increasing pain, a visit to the emergency room, catheterization, follow-up visits to the physician, an attempt at catheter removal, and eventually recovery or surgery.

The risk of recurrent AUR was cited as being 56%–64% within 1 week of the first episode and 76%–83% in men with diagnosed BPH.[2] BPH involves hyperplasia of prostatic stromal at epithelial cells, resulting in formation of large fairly discrete nodules in the per-urethral region of the prostate. When sufficiently large, the nodule compress the urethral canal to cause partial or sometimes virtually complete obstruction of urethra which interfere with normal flow of urine it leads to symptoms of urinary

hesitancy, frequent urination, dysuria , increased risk of UTI and urinary retention.

With an increased risk of AUR in men with BPH include a reduction in the force Benign prostatic hyperplasia (BPH) is a common problem in aging men. If BPH is left untreated, it has a negative impact on health-related quality of life and interferes with daily activities through bothersome lower urinary tract symptoms (LUTS).AUR is a serious complication in patients with BPH and a significant public health problem. It may occur spontaneously in men with BPH or be precipitated by surgery, anesthesia, or ingestion of medications such as alpha-sympathomimetic and anticholinergic.[3-5] Thus, use of anticholinergic agents is contraindicated in men with BPH and positive post voiding residual volume. Symptoms associated of the urinary stream, a sensation of incomplete bladder emptying, having to void again after less than 2 hours, and an enlarged prostate gland on digital rectal examination.[6, 7]

Management of AUR involves immediate bladder decompression by catheterization and, in most cases, prostatic surgery. The primary goal of therapy for BPH to improve the patient's quality of life by reducing symptoms and the risk of AUR and by providing BPH-related surgery, when needed.[8-10]

Multiple controlled studies have been done to evaluate the risk factors of AUR. Age is a strong independent risk factor.[11,12] BPH disease is mostly associated with prostate enlargement (volume > 30 mL).[13] Other major risk factors for AUR include a history of prior AUR, high symptom scores, high prostate-specific antigen (PSA), large prostate size, intra vesical prostatic protrusion, and high residual urine and low peak urine flow rate following a TWOC; such risk factors may require non conservative treatment.[14-18] Other factors such as smoking habits, hypertension, preexisting atherosclerotic coronary vascular disease, and a previous history of general anesthesia may lead to AUR via probable prostatic infarction.[3]

Because of the high prevalence of BPH and its effect on the patient's quality of life, additional research is needed to better predict the risk factors of AUR. Cultural, dietary, medical, and lifestyle differences make it important to study patients in different geographic locations. With this background the present study was conducted to find out the incidence and factors responsible for retention of urine in BPH.

METHODS

It was a prospective study, conducted at Acharya Vinoba Bhave Rural Hospital, Sawangi (Meghe), Wardha DMIMS (DU). The study was conducted on patients admitted to the surgical wards. Duration of the study was 2 months. A total 40 patients were studied over this duration after the approval from Institutional Ethics Committee. Patients presenting with acute urinary retention was included and Patients having stricture urethra, Carcinoma prostate, Cancer cachexia, Patients of traumatic spinal cord injury excluded.

Patients who were willing to participate and sign the informed consent were enrolled in the study. The demographics as well as other data like patient's medical history, surgical and other significant history was captured on case record form. The history of acute urinary retention was noted and thereafter the causes for retention were evaluated on history. For recurrent episodes of acute urinary retention, the precipitating cause for this episode was found out. The grade of enlargement of prostate was correlated with severity of symptoms. The previous symptoms were recorded on proforma of The International Prostate Symptom Score (I-PSS) and score was calculated. This score was also be correlated with the grade of enlargement of prostate.

The blood and urine investigations were done for the evaluation of general condition of the patient and to rule out other disorders. Serum Prostate specific antigen (PSA) was done and will be correlated with the symptoms and precipitating factors. Ultrasonography of abdomen including urinary system was done specifically to know the size of prostate and Post void residual urine volume. Depending on the factors involved, the further management was decided and its outcome was evaluated in terms of resolution of symptoms.

RESULTS

Most of the patients belonged to the age group of 61-70 yrs., accounting for 52%(21) of all patients,17.5 %(7) patients in the 71-75 yrs. group , and 27.5% (11) patient belong to below 60yrs. group. Least patients belong to above 76yrs. age group. The Mean age was 64.87, SD – 7.85, Median -65 years, with age range- 45-82 yrs.

Maximum 42.5 % (17) patient had residual urine less than 40 ml. A range of 81-120 ml residual urine was present in 35% (14) patient. A range of 41-80ml residual urine was present in 5 %(2) patient. Above 160 ml PVR urine was found in about 17.5% (10). The Mean PVR was 110.80, SD – 85.52, Median – 110 with a Range of 0-500 ml (Table 1).

The grads of prostate enlargement on USG were correlated with PSA level. At PSA level 0-3, maximum patients had grade 1BPH. BPH grade 2 was seen in 8 patient had PSA level 4-6. At PSA level 7-9, grade 1,2and 3 seen in patients4, 3and 2 respectively. Grade 3 and 4 seen in patient having PSA level 9-12 mg/ml (Table 2).

Grade 1 BPH on digital rectal examination (DRE) was true positive on USG as Grade 1 whereas Grade 2 BPH on DRE, out of 13 patients only 5 was correlated with USG findings. Grade 3 BPH on DRE, out of 13 patients

only 3 was correlated positively with USG findings (Table 3).

Table 1: Age and Post void residual urine volume (PVR).

	Frequency	Percent
Age Groups		
Total	40	100
Below 60	11	27.5
61-65	10	25.0
66-70	11	27.5
71-75	7	17.5
76-80	0	0.00
>80	1	2.5
Mean	64.87	
SD	7.85	
Median	65 years	
Range	45-82 years	
PVR		
0-40	17	42.5
41-80	2	5
81-120	14	35
121-160	1	2.5
161-200	3	7.5
201-240	3	7.5
Mean	110.80	
SD	85.52	
Median	110	
Range	0-500	

Table 2: USG grading and PSA score.

		USG				
		Grade 1	Grade 2	Grade 3	Grade 4	Total
PSA	0-3	8	1	3	0	12
	4-6	3	8	2	1	14
	7-9	4	3	2	0	9
	10-12	0	0	3	2	5
Total		15	12	10	3	40
X2-value		24.26				
p-value		0.004,S,p<0.05				

To assess the outcome of the study four factors were analyzed, these were, Age in years, Symptom/severity, Prostate Volume on DRE and USG Grade. All of them have positive correlation with the symptom of acute urinary retention. For Age in years t –value 0.112, with odds ratio 0.019, p-value 0.912 and it was not significant, p >0.005. Symptom severity t value 1.2560, odds ratio 0.388, p value, 0.218, Not significant, p>0.05. Prostate Volume on DRE t- value 1.186, with odds ratio 0.241, p value, 0.244, Not significant, p>0.05 and USG Grade t-value 0.798, with odds ratio 0.266 and p value, 0.430, it was not significant, p>0.05 (Table 4).

Table 3: Correlation of digital examination and USG.

		USG				
		Grade 1	Grade 2	Grade 3	Grade 4	Total
Digi-tal exam	Grade 1	10	3	1	0	14
	Grade 2	4	5	4	0	13
	Grade 3	1	4	5	3	13
Total		15	12	10	3	40
X2-value		17.32				
p-value		0.008,S,p<0.05				

Table 4: Predictors of AUR.

Model		OR	t	p-value
1	Retention of urine		-	-
	Age (yrs)	0.019	0.112	0.912,NS, p>0.05
	Symptom/severity	0.388	1.256	0.218,NS, p>0.05
	Prostate Volume	0.241	1.186	0.244,NS, p>0.05
	USG Grade	0.266	0.798	0.430,NS, p>0.05

DISCUSSION

BPH is characterized by the obstruction of urine outflow from the bladder caused by an enlarged prostate. This then leads to clinical manifestations of irritative and obstructive lower urinary tract symptoms, reduction in urinary flow rates. Data from clinical trials shown that BPH is a progressive disease associated with an increase in prostate volume and risk of serious complications such as AUR.[19] BPH progression is different between individuals.[20] Although the etiology of AUR is not fully understood,[21] it is conceivable that bladder outlet obstruction plays a key role in its occurrence. Recent advances in ultrasonic evaluation of the zonal anatomy of the prostate developing BPH have promoted the understanding.

Clinical BPH is a highly prevalent disease. By the age of 60 years, nearly 60% of the cohort of the Baltimore Longitudinal Study of Aging had some degree of clinical BPH.[22] In the USA, results of the Olmstead County survey, in a sample of unselected Caucasian men aged 40-79 years, showed that moderate-to-severe symptoms can occur among 13% of men aged 40-49 years and among 28% of those older than 70 years.[23]

In Canada, 23% of the cohort studied presented with moderate-to-severe symptoms.[20] The findings for prevalence of LUTS in Europe are similar to those in the USA. In Scotland and in the area of Maastricht, the Netherlands, the prevalence of symptoms increased from

14% of men in their 40s to 43% in their 60s.[24,25] Depending on the sample, the prevalence of moderate-to-severe symptoms varies from 14% in France to 30% in the Netherlands.[26,27] The proportion of men with moderate-to-severe symptoms doubles with each decade of life.[28]

Preliminary results of one of the most recent European epidemiological studies on the prevalence of LUTS show that approximately 30% of German males aged 50-80 years present with moderate to severe symptoms according to the International Prostate Symptom Score (i.e. I-PSS >7).[29] In our study the mean age of presentation was 64.87±7.85 with median age of 65 years (range 45-82 years) with mean IPSS score of 17.45.

In recent years PSA become a powerful predictors of the risk of AUR. Sometimes there is a difficulty to separate the causes of the PSA increasing between BPH and prostate cancer, but authors showed a strong PSA correlation with prostate growth related AUR.[30] Than patient has PSA level from 1.4 to 3.2 ng/ml, prostate growth during 4 years was 16%, but if the PSA was between 3.3 and 12 ng/ml, prostate volume changed 22%. In Olmsted county study subjects with PSA levels greater than 1.4 ng/ml were three times as likely to experience AUR compared with subjects having PSA levels of 1.4 ng/ml or less.[31] Another study reported a 4-fold AUR risk in men with PSA level more than 1.4 [32] Results of our study showed a significant PSA correlation with total prostate volume and especially TZ volume (r=0.607), also we detected that PSA is a strong predictor of AUR. If cutoff value of PSA was 3 ng/ml the positive predictive value to detect AUR is 39%, with sensitivity 76% and specificity 60%.

In our study, PSA levels were well correlated with the grades of prostate enlargement. With PSA 0-3, nine patients having grade 1 or 2.Prostate grade 2 is seen in 8 patient having PSA level 3-6. Patient having PSA level 9-12 mg/ml, all were having grade 3 and 4 enlargements.

The risk factors for AUR, we tried to find out age, symptom severity, grade of enlargement, PSA levels and Prostate Volume, but no significant correlation could be found. They all showed positive correlation but it was no significant.

This may be because of the small sample size. The cut off values to detect the risk of AUR should be evaluated in a larger sample size. Surprisingly in this sample size none patient could give the drug history as a risk for AUR.

CONCLUSIONS

Out of the four factors considered to be the independent risk factors, all of them have positive correlation with the symptom of acute urinary retention. None of these four factors i.e. age in years, symptom severity, prostate Volume on DRE and USG grade could establish significant correlation.

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