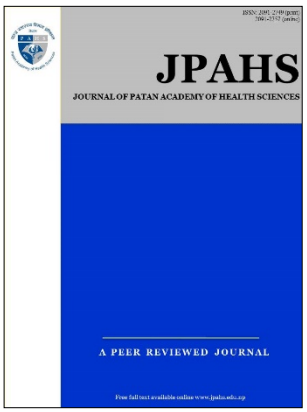

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Associated risk factors for acute urinary retention among patients presenting with benign prostatic hyperplasia at a tertiary care hospital in Nepal

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Abstract

Introduction: Acute urinary retention (AUR) is an important public health issue in older male population with benign prostatic hyperplasia (BPH). Various risk factors are associated with increased incidence of AUR among patients with BPH being managed conservatively.

Method: A retrospective analysis was performed AUR with BPH among patients in Shree Birendra Hospital (SBH), Chhauni, Kathmandu, Nepal for a period of one year. Study variables included patient age, serum prostate specific antigen (PSA), prostate volume, history of AUR, smoking, diabetes mellitus, hypertension, cardiovascular disease, and other comorbid diseases. The SPSS was used for data analysis, X^2 test to find out the association and a $p<0.05$ considered statistically significant. The study was approved from the ethical committee.

Result: Total 110 patients (out of 182 BPH) had AUR, an incidence of 60.9% (110 out of 182), with a mean (SD) age of 67.41±7.1 ($p<0.05$). Patients with AUR had larger mean prostate volume. There were 38(34.54 %) patients with AUR having PSA >4.5 ng/mL ($p<0.001$). More number of patients with AUR had diabetes mellitus and smoker ($p<0.001$). Consumption of alcohol, hypertension and cardiac disease were not significantly associated with AUR ($p>0.05$).

Conclusion: Our study showed that increasing age, high prostate volume, high serum PSA, diabetes and smoking had increased incidence of AUR among patients with BPH.

Keywords: Acute urinary retention (AUR), benign prostatic hyperplasia (BPH), PSA (prostate specific antigen)

Introduction

Acute urinary retention (AUR) is an emergency characterized by a sudden and/or painful inability to pass urine. It is estimated that 10% of men in their seventies and a third in their eighties experience AUR. It is an important public health issue in the older male population with a substantial economic burden.[1-3] The incidence of AUR is estimated at 2.2 to 6.8 cases/1000 patients.[4,5] Benign prostatic hyperplasia (BPH) is a common problem in aging men. If BPH is left untreated, it interferes with daily activities through bothersome lower urinary tract symptoms (LUTS).[6,7]

The BPH may lead to AUR which results in painful distension of the bladder requiring decompression. The AUR may occur spontaneously in men with BPH or be precipitated by surgery, anesthesia, or ingestion of medications such as alpha-sympathomimetic and anticholinergics.[8-10] AUR can be classified as related to BPH or not related to BPH. One of the prophylactic measures attempted to prevent AUR in men with moderate to severe LUTS and large-sized prostate, is the use of 5-alpha-reductase inhibitors. Alpha-blockers have also been used in symptomatic BPH patients to prevent AUR.[9] In the vast majority of cases, AUR appears simply related to the natural history of BPH also called spontaneous AUR.[11-14.]

This research aimed to identify the risk factors for AUR among patients with BPH presenting in a tertiary care hospital, Kathmandu, Nepal.

Method

A retrospective review of data from Mar 2019 and Feb 2020 was performed at Shree Birendra Hospital (SBH), Chhauni, Kathmandu, Nepal. The SBH is a 750 bedded tertiary care hospital. The case sheets of all the patients who were managed during the study period were collected for analysis. Those patients having stricture urethra proved cases of carcinoma of the prostate confirmed by prostatic biopsy among patients presenting with PSA >4.5ng/ml, history of pelvic irradiation, neurogenic bladder (confirmed by urodynamic studies), and surgery for bladder neck were excluded from the study. The initial evaluation of patients included demographic profile, lower urinary tract symptoms (LUTS), international prostate symptom score (IPSS), and other relevant medical (hypertension and diabetes mellitus- DM) and surgical history. Also, other predisposing factors such as smoking and alcohol consumption among the patients were analyzed from the demographic profile of the case sheet of the patients. Hospital routine clinical practice for BPH includes digital rectal examination to assess anal tone and approximate prostate size, urine routine, microscopy and culture, blood urea, serum creatinine, electrolytes and serum prostate specific antigen measurement (PSA), transabdominal ultrasound to measure prostate volume, and evidence of bladder outlet obstruction (BOO). The grade of enlargement of the prostate was correlated with the severity of symptoms.

The IPSS score was calculated. This score was correlated with the grade of BPH. Statistical analysis was performed by using the IBM SPSS 20. Univariate analysis was conducted to determine potential risk factors for AUR. The p-value <0.05 was considered significant. The study was approved by the ethics committee of NAIHS (Nepal Army Institute of Health Sciences) Reference no. 245.

Result

Total 110 patients out of 182 BPH presented with AUR, an incidence of 60.9% (110 out of 182) and 44(40.0%) AUR were in the 56-75 y age group, Table 1.

The mean IPSS score of patients presenting with AUR was 23.4±3.4 (range19-30), 109(94.5%) were on medical treatment (alpha1-blocker: terazosin, prazosin, or tamsulosin). Among the total patients with BPH with AUR, 101(91.8%) presented to the emergency while 09(8.1%) presented to the

surgical outpatient department (SOPD) for AUR. Also, 50(69.4%) patients with BPH without AUR presented to the emergency department.

Among BPH patients, prostate Grade III were 54(49.09%) with AUR, and 12 (16.6%) without AUR, p-value <0.05, Table 2.

The PSA level among patients with AUR in BPH showed a significant difference with the grade of prostate enlargement (p<0.05). Among patients with AUR 38(34.54%) had PSA >4.5 ng/mL and those without AUR 34(47.2%) had PSA level <1.5ng/ml, Table 3. None of the patients without AUR had a PSA level above 3.6ng/ml.

There was a significant group difference in the number of patients with AUR who also had DM, p<0.001. More patients with AUR were smokers, Table 4. Hypertension, cardiac disease, and alcohol consumption were not found significant risk factors, p-value >0.05.

Table 1. Demographic profile of benign prostatic hypertrophy (BPH, N=182) patients presenting with acute urinary retention (AUR=110)

Demographic Characteristics		Patients with BPH 182		p-value
		AUR, Yes 110 (60.9%)	AUR, No 72 (39.1%)	
Age in years	45-55	13(11.8%)	23(32.4%)	<0.05
	56-75	44(40.0%)	34(47.2%)	
	76-85	36(32.7%)	11(15.2%)	
	≥86	17(15.4%)	4(5.5%)	
Medication for BPH	Yes	104(94.5 %)	69(95.83%)	NS
	No	06(5.5%)	03(4.1%)	
Place of presentation	Emergency Dept.	101(91.8%)	50(69.4%)	NS
	Outpatient Dept.	09(8.1%)	22(30.5%)	

*p-value <0.05 considered significant, NS: Not significant

Table 2. Grading of BPH (N=182) on abdomen ultrasonography (USG) presenting with AUR (N=110)

Grade of BPH	USG prostate size, g	Patients with BPH 182		p-value
		AUR, Yes 110(60.9%)	AUR, No 72(39.1%)	
Grade I	20-40	03(2.7%)	21(29.1%)	<0.05
Grade II	40-60	23(20.9%)	32(44.44%)	
Grade III	60-80	54(49.09%)	12(16.6%)	
Grade IV	>80	30(27.2%)	7(9.7%)	

Table 3. Serum prostate specific antigen (PSA) among BPH (N=182) patients presenting with AUR (N=110)

Serum PSA ng/ml	Patients with BPH 182	Patients with BPH 182	p-value
	AUR, Yes 110(60.9%)	AUR, Yes 110(60.9%)	
0-1.5	03(2.7%)	34(47.2%)	<0.05
1.6-2.5	12(10.9%)	32(44.44%)	
2.6-3.5	25(22.7%)	06(8.3%)	
3.6-4.5	32(29.09%)		
> 4.5	38(34.54%)		

Table 4. Association of comorbidities and Risk factors in BPH (N=182) presenting with AUR (N=110)

Comorbidities		Patients with BPH 182		p-value
		AUR, Yes 110(60.9%)	AUR, No 110(60.9%)	
Hypertension	Yes	81 (73.6%)	48(66.66%)	>0.05
	No	29 (26.3%)	24(33.33%)	
Cardiac disease	Yes	37 (33.6%)	24(33.33%)	>0.05
	No	73 (66.3%)	48(66.66%)	
Alcohol consumption	Yes	47 (42.7%)	43(59.72%)	>0.05
	No	63 (57.3%)	29(40.2%)	
Diabetes mellitus	Yes	97(88.18%)	15(20.8%)	<0.05
	No	13 (11.8%)	57(79.16%)	
Smoking	Yes	87(79.1%)	21(29.16%)	<0.05
	No	23 (20.9%)	51(70.83%)	

Discussion

The mean age of patients presenting with AUR in the present study was 67.41±7.1 y (range 61-86) with a history of BPH. Our study showed that among the total of 182 patients admitted with BPH 110 (60.9%) patients had an episode of AUR. The risk for men in their 80s is nearly 1 in 3.[1] The BPH is characterized by the obstruction of urine outflow from the bladder caused by an enlarged prostate.[13-15] Other studies have shown similar results of increased risk for AUR with increasing age.[10,16] The risk of AUR is 8-times greater for men in the 7th decade (70-79 y) than for men in their fourth decade of age.[16] Men in their 50's are 4-time less likely to have AUR than men in their 70's.[5] Our study however showed that acute urinary retention was more common in the age group between 56-75 y. According to the results of the medical therapy of prostatic symptoms (MTOPS) study, age is only a minor risk factor for disease progression and other variables are important contributors.[17]

The PSA produced exclusively in the prostate gland is the most useful clinical marker for the detection of prostate cancer. In a study conducted among 3040 men with BPH, the receiver operating characteristic (ROC) curve analyses showed that in comparison with symptom scores, flow rates, and residual urine volume; the serum PSA and prostate volume were the most powerful predictors of spontaneous AUR in placebo-treated patients (area under the curve 0.70 and 0.81, respectively).[18] The 2-year incidence of spontaneous AUR was higher in placebo patients with enlarged prostates (4.2% in men with prostate volume ≥40 ml vs. 1.6% in the <40 ml group) and higher PSA levels (3.9% in men with PSA ≥1.4 ng/ml vs. 0.5% in the <1.4 ng/ml group) at baseline.[18] Serum PSA was found to be an important risk factor for the development of AUR in our patients. The majority of cases 38(34.54%) in our study had a PSA level greater than 4.5. Our study showed the increased incidence of AUR with an increased level of PSA among patients with BPH which was statistically significant, similar to other studies.[1-3] Median serum PSA level was significantly higher in a group of patients with AUR when compared with a group of patients with LUTS and raised PSA was an important risk factor for the development of AUR.[19]

In aging men, AUR most often results from BPH. It is accepted that the pathophysiology of BPH includes increases in the size of transitional zone prostate stroma and an increase in alpha-1 receptors.[16] In our study, the size of the prostate was found to be an important predictor among patients developing AUR, but there a fewer number of patients with retention in prostate size of grade IV than grade III possibly because of less number of samples and more importantly the median-lobe enlargement and intravesical prostatic protrusion (IPP) is another important factor than simply the total volume of the prostate. Due to inconsistency in reported data, we could not analyze IPP. The majority of patients 54(49.09%) with AUR in our study was

found to have a prostate of Grade III approximately 60-80 g, similar to other studies.[16-19] The risk of AUR was 3 times greater for men with a prostate volume >30 mL when compared with a prostate volume of <30 mL. Similar results were reported in studies with an incidence rate of AUR significantly higher in patients with prostate volume ≥40 mL (4.2%) than patients with prostate volume <40 mL (1.6%).[18] There were few cases of prostate weighing more than 80 grams in our study as most of the patients in this category were managed with a catheter in situ and suprapubic catheter (SPC). Unlike other studies, our study showed a higher incidence of AUR among patients with BPH with grade III prostatomegaly which was statistically significant ($p<0.01$).

We also analyzed other risk factors among patients with AUR such as hypertension, cardiovascular disease, alcohol consumption, diabetes, and smoking. Among these comorbidities, patients with diabetes and smoking had presented with increased incidence of AUR which was comparable with few other studies.[1-3] In the present study diabetes was present in 97(88.18%) of patients with AUR and was found to be statistically significant. A similar result was found in a study conducted in Iran among 430 adult patients with BPH who were admitted for surgery from 2003 through 2008 showed that diabetes was significantly associated with AUR among the patient with BPH ($X^2_1=10.73$, $p<0.001$) compared to a patient with BPH without DM. Duration of diabetes was <5 y among all the patients with AUR.[20] Similar result was seen among patient who was smokers, $p<0.01$. Our study showed a higher incidence of AUR among patients who were smokers as compared to patients with BPH who were non-smokers. However, a study conducted in Iran[20] showed that smoking habit ratios were the same in both groups with and without AUR. The study showed that the group with AUR had a significantly larger number of smokers ($p< 0.0001$), and the risk of AUR for smokers was 3.341 times more than for nonsmokers.[20] Smoking accelerates atherosclerosis in pelvic vessels and results in hypoxia in pelvic organs. Reduction in bladder perfusion may lead to detrusor muscle dysfunction and increased risk of urinary retention among patients with BPH. Few other studies showed that there was no significant association between smoking and increased incidence of AUR.[17,19]

Other risk factors such as coronary vascular disease, hypertension, and alcohol consumption were not associated with increased incidence of AUR in our study, similar to results from other studies.[21,22] Smoking habit ratios were the same in both groups, but preexisting cardiovascular disease anesthesia ratios were significantly higher in patients with AUR.[18] Multivariate logistic regression analysis did not show a significant association between AUR and smoking, preexisting cardiovascular disease. The progression of BPH also differs between individuals. Although the etiology of AUR is not fully understood it is conceivable that bladder outlet obstruction plays a key role in its occurrence.

In the past, an episode of AUR was an indication for surgery. A 25% to 30% of men who underwent transurethral resection of the prostate (TURP) had AUR as their main indication for surgery, but in recent years only those patients who fail trial without catheter undergo surgery.[12]

The risk factors for AUR for patients in the present study were consistent with those presented in previous research with patients from other geographic locations.[17-22] Patient increasing age, high prostate volume and high serum PSA seem to be major risk factors. One of the limitations of this study includes we could not analyze the intravesical prostatic protrusion together with the total volume of the prostate size due to inconsistency in retrospective data. The results of the present study also indicate that smoking and uncontrolled DM puts the patient at increased risk. Due to the retrospective nature of data, we could not analyze in detail the DM and smoking habits.

Conclusion

Acute urinary retention (AUR) is one of the significant complications of benign prostatic hyperplasia (BPH). Advanced age, high prostate volume, and high serum PSA were identified as major risk factors for AUR among patients with BPH in the current study.

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Conflict of Interest

None

Funding

None

Author Contribution

Concept, design, planning: ALL; Literature review: SB; Data collection/analysis: SB; Draft manuscript: SB, SBB; Revision of draft: BB, SK; Final manuscript: ALL; Accountability of the work: ALL.

Reference

1. Emberton M, Anson K. Acute urinary retention in men: an age-old problem. BMJ. 1999;318:921-5. | DOI | PubMed | Google Scholar | Full Text | Weblink |
2. Thomas K, Oades G, Taylor-Hay C, Kirby RS. Acute urinary retention: what is the impact on patients' quality of life? BJU Int. 2005;95:72-6. | DOI | PubMed | Google Scholar | Full Text | Weblink |
3. Oelke M, Speakman MJ, Desgrandchamps F, Mamoulakis C. Acute urinary retention rates in the general male population and adult men with lower urinary tract symptoms participating in pharmacotherapy trials: a literature review. Urology. 2015;86:654-65. | DOI | PubMed | Google Scholar | Full Text | Weblink |
4. Verhamme KM, Dieleman JP, van Wijk MA, Bosch JL, Stricker BH, Sturkenboom MC. Low incidence of acute urinary retention in the general male population: the triumph project. Eur Urol. 2005;47:494-8. | DOI | PubMed | Google Scholar | Full Text | Weblink |
5. Breum L, Klarskov P, Munck LK, Nielsen TH, Nordestgaard AG. Significance of acute urinary retention due to intravesical obstruction. Scand J Urol Nephrol. 1982;16:21-4. | DOI | PubMed | Google Scholar | Full Text | Weblink |
6. Roehrborn CG. Acute urinary retention: Risks and management. Rev Urol. 2005;7(4):S31-41. | PubMed | Google Scholar | Full Text | Weblink |
7. McConnell JD, Bruskewitz R, Walsh P. The effect of finasteride on the risk of acute urinary retention and the need for surgical treatment among men with benign prostatic hyperplasia. N Engl J Med. 1998;338:557-63. | DOI | PubMed | Google Scholar | Full Text | Weblink |
8. Gratzke C, Reich O, Staehler M, Seitz M, Schlenker B, Stief CG. Risk assessment and medical management of acute urinary retention in patients with benign prostatic hyperplasia. EAU-EBU Update Series. 2006;4(3):109-16. | DOI | Google Scholar | Full Text | Weblink |
9. Kaplan SA, Wein AJ, Staskin DR, Roehrborn CG, Steers WD. Urinary retention and post-void residual urine in men: separating truth from tradition. J Urol. 2008;180(1):47-54. | DOI | PubMed | Google Scholar | Full Text | Weblink |
10. Meigs JB, Barry MJ, Giovannucci E, Rimm EB, Stampfer MJ, Kawachi I. Incidence rates and risk factors for acute urinary retention: the health professionals follow-up study. J Urol. 1999;162(2):376-82. | DOI | PubMed | Google Scholar | Full Text | Weblink |
11. Pickard R, Emberton M, Neal DE, on behalf of the National Prostatectomy Audit Steering Group. The management of men with acute urinary retention. Br J Urol. 1998;81:712-20. | DOI | PubMed | Google Scholar | Full Text | Weblink |
12. Murray K, Massey A, Feneley RC. Acute urinary retention-a urodynamic assessment. Br J Urol. 1984;56:468-73. | DOI | PubMed | Google Scholar | Full Text | Weblink |
13. Manikandnan R, Srirangam SJ, O'Reily PH, Collins GN. Management of cute urinary retention secondary to benign prostatic hyperplasia in the UK: national survey. BJU Int. 2004;93:84-8. | DOI | PubMed | Google Scholar | Full Text | Weblink |
14. Desgrandchamps F, De la Taille A, Doublet J. Management of acute urinary retention in France: a cross-sectional survey in 2618 men with benign prostatic hyperplasia. BJU Int.

2006;97:727-33. | DOI | PubMed | Google Scholar | Full Text | Weblink |
15. Cathcart P, van der Meulen J, Armitage J, Emberton M. Incidence of primary and recurrent acute urinary retention between 1998 and 2003 in England. J Urol. 2006;176:200-4. | DOI | PubMed | Google Scholar | Full Text | Weblink |
16. Strachan JR, Corbishley CM, Shearer RJ. Post-operative retention associated with acute prostatic infarction. Br J Urol. 1993;72(3):311-3. | DOI | PubMed | Google Scholar | Full Text | Weblink |
17. Crawford ED, Wilson SS, McConnell JD, Slawin KM, Lieber MC, Smith JA, et al. Baseline factors as predictors of clinical progression of benign prostatic hyperplasia in men treated with placebo. J Urol. 2006;175(4):1422-6. | DOI | PubMed | Google Scholar | Full Text | Weblink |
18. Roehrborn CG, McConnell JD, Lieber M, Kaplan S, Geller J, Malek GH, et al. Serum prostate-specific antigen concentration is a powerful predictor of acute urinary retention and need for surgery in men with clinical benign prostatic hyperplasia. Urology. 1999;53(3):473-80. | DOI | PubMed | Google Scholar | Full Text | Weblink |
19. Tuncel A, Uzun B, Eruyar T, Karabulut E, Seckin S, Atan A. Do prostatic infarction, prostatic inflammation and prostate morphology play a role in acute urinary retention? Eur Urol. 2005;48(2):277-84. | DOI | PubMed | Google Scholar | Full Text | Weblink |
20. Uro Today, UTI CA. Risk factors for acute urinary retention in patients with benign prostatic hyperplasia from the Islamic Republic of Iran. | DOI | Google Scholar | Full Text | Weblink |
21. Hargreave TB, McNeill AS. Acute urinary retention in men: the risks and outcomes with medical therapy. Curr Urol Rep. 2005;6(4):263-70. | DOI | PubMed | Google Scholar | Full Text | Weblink |
22. Milord R, Kahane H, Epstein JI. Infarct of the prostate gland. Am J Surg Pathol. 2000;24(10):1378-84. | DOI | PubMed | Google Scholar | Full Text | Weblink |