

IPP AS PREDICTIVE FACTOR FOR ACUTE URINARY RETENTION IN BPH PATIENTS

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ABSTRACT

Objective: To demonstrate usefulness of Intra Prostatic Protrusion (IPP) as Predictive Factor for Acute Urinary Retention (AUR) in Benign Prostate Hyperplasia (BPH) Patients. **Material & methods:** Cross sectional retrospective study of case records from January to July 2012 of BPH patients at Saiful Anwar General Hospital (SAGH) Malang was carried out. The data were collected from the Medical Record Division in SAGH Malang. We noted age, prostate volume, IPP, IPSS and urinary retention status. The patients were classified by IPP degree < 5 mm (group A), 5-10 mm (group B), 10-15 mm (group C), > 15 mm (group D) and we compared all parameters that we noticed. **Results:** Eighty patients, mean age was 66.32 years were enrolled. Transabdominal ultrasound determined the mean IPP was 13.5 mm, and prostatic volume 95 cc. IPP values were distributed as follows: group A 10 (12.5%), group B 25 (31.25%), group C 24 (30%), group D 21 (26.25%), with AUR incidence in group A 20%, group B 36%, group C 79%, and group D 81%. The IPP showed a significant correlation with urinary retention ($r = 0.8$, $p < 0.05$, $OR = 15$) and IPSS ($r = 0.6$, $p < 0.05$). **Conclusion:** IPP can be used as predictive factor for the incidence of acute urinary retention in BPH Patients.

Keywords: Intra Prostatic Protrusion, Acute Urinary Retention, Benign Prostate Hyperplasia.

ABSTRAK

Tujuan: Untuk menganalisa kegunaan Intra Prostatic Protrusion (IPP) sebagai faktor prediksi untuk Acute Urinary Retention (AUR) pada pasien Benign Prostate Hyperplasia (BPH). **Bahan & cara:** Penelitian retrospektif cross sectional rekam medis dari bulan Januari sampai Juli 2012 pada pasien BPH di RS Saiful Anwar Malang. Data dikumpulkan dari Divisi rekam medis RS Saiful Anwar Malang. Kami mencatat umur, volume prostat, IPP, IPSS dan pasien dengan retensi urine atau tidak. Pasien dikelompokkan dengan derajat IPP: < 5 mm (kelompok A), 5-10 mm (kelompok B), 10-15 mm (kelompok C), > 15 mm (kelompok D), dan membandingkan semua parameter tercatat. **Hasil:** Delapan puluh pasien, dengan rerata umur 66.32 tahun, ultrasonografi transabdominal mengukur rerata IPP 13.5 mm, volume prostat 95 cc. Nilai IPP pada masing-masing kelompok adalah kelompok A 10 (12.5%), kelompok B 25 (31.25%), kelompok C 24 (30%), kelompok D 21 (26.25%), dengan kejadian AUR pada kelompok A 20%, kelompok B 36%, kelompok C 79%, dan kelompok D 81%. IPP menunjukkan korelasi yang signifikan dengan retensio urine ($r = 0.8$, $p < 0.05$, $OR = 15$) dan IPSS ($r = 0.6$, $p < 0.05$). **Simpulan:** IPP bisa digunakan sebagai faktor prediksi untuk acute urinary retention pada pasien BPH.

Kata kunci: Intra Prostatic Protrusion, Acute Urinary Retention, Benign Prostate Hyperplasia.

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INTRODUCTION

Acute urinary retention (AUR) is a painful urologic condition requiring rapid bladder decompression. It is characterized by suprapubic pain and an inability to urinate.¹ AUR may develop into

urinary infection, permanent bladder dysfunction and even renal insufficiency.²⁻⁴ Benign prostatic enlargement is a common cause of AUR in men older than 50 years. There is a significant positive correlation between lower urinary tract symptoms (LUTS) and the presence of urinary retention.⁵

Because of the age-dependent nature of BPH, the risk of AUR increases with age (10-30% with every 5-year age increase).^{3,6,7} There are three main pathophysiologic mechanisms of AUR: bladder outlet obstruction, detrusor underactivity and neurogenic bladder. The first two of these three mechanisms are responsible for the AUR observed in BPH patients.⁸

IPP is a morphological change due to excessive growth of the median and lateral lobe of the prostate into the bladder. The strongest correlation was observed between the IPP measured by transabdominal ultrasonography (TAUS) and the International Prostate Symptom Score (IPSS) score and AUR incident.⁹ The IPP may be a useful, noninvasive predictor of AUR. The objective of this study was to demonstrate the usefulness of Intra Prostatic Protrusion (IPP) as Predictive Factor for Acute Urinary Retention in Benign Prostate Hyperplasia (BPH) Patients at Saiful Anwar General Hospital Malang.

OBJECTIVE

To demonstrate the usefulness Intra Prostatic Protrusion (IPP) as Predictive Factor for Acute Urinary Retention (AUR) in Benign Prostate Hyperplasia (BPH) Patients.

MATERIAL & METHOD

Cross sectional retrospective study of case records from January to July 2012 of BPH patients at Saiful Anwar General Hospital (SAGH) Malang was carried out. The data were collected from the Medical Record Division in SAGH Malang. Routine initial evaluation for male with BPH in our department included age, past history, digital rectal examination with neurological examination, IPSS and quality of life (BPH with LUTS), and TAUS. Patients with bladder stone, upper tract complications, malignancy including prostate cancer, and

neurological conditions such as cerebrovascular dysfunction and Parkinson's disease were excluded from this study.

Abdominal ultrasound (TAUS) was performed in sagittal plane, and IPP along with prostate volume were measured. According to Yuen, et al, the bladder was filled with at least 100 ml of urine to examine IPP.⁶ IPP was defined as distance from the tip of prostatic protrusion to the vesical lumen at bladder neck measured in millimeters.

We noted age, prostate volume, IPP, IPSS and patient in urinary retention or not. The patients were classified by the IPP degree: less than 5 mm (group A), 5-10 mm (group B), 10-15 mm (group C), more than 15 mm (group D) and we compared all parameters noted. All statistical analyses were performed using the SPSS version 16.0 for Windows (SPSS Inc., Chicago, USA). Differences in clinical characteristics among groups were evaluated by unpaired t-test, relative risk calculated with odds ratio and the correlations were quantified by Spearman rank correlation coefficient. A 5% level of significance was used for all statistical testing.

RESULTS

In all, 80 patients with BPH were assessed and entered into the study. Mean age was 66.32 years, mean prostate volume was 95 cc and the mean IPP was 13.5 mm. The distribution of the various clinical parameters according to retention and no retention patients is shown in Table 1. Forty eight patients (57.5%) had urinary retention. The mean age in AUR patient is 68.25 and mean age for non urine retention is 63.44 (p 0.869). The mean prostate volume in AUR patients is 100 cc and mean prostate volume for non urine retention is 73.2 cc (p 0.02). The mean IPP in AUR patients is 15mm and mean IPP for non urinary retention is 9.9 mm (p 0.03).

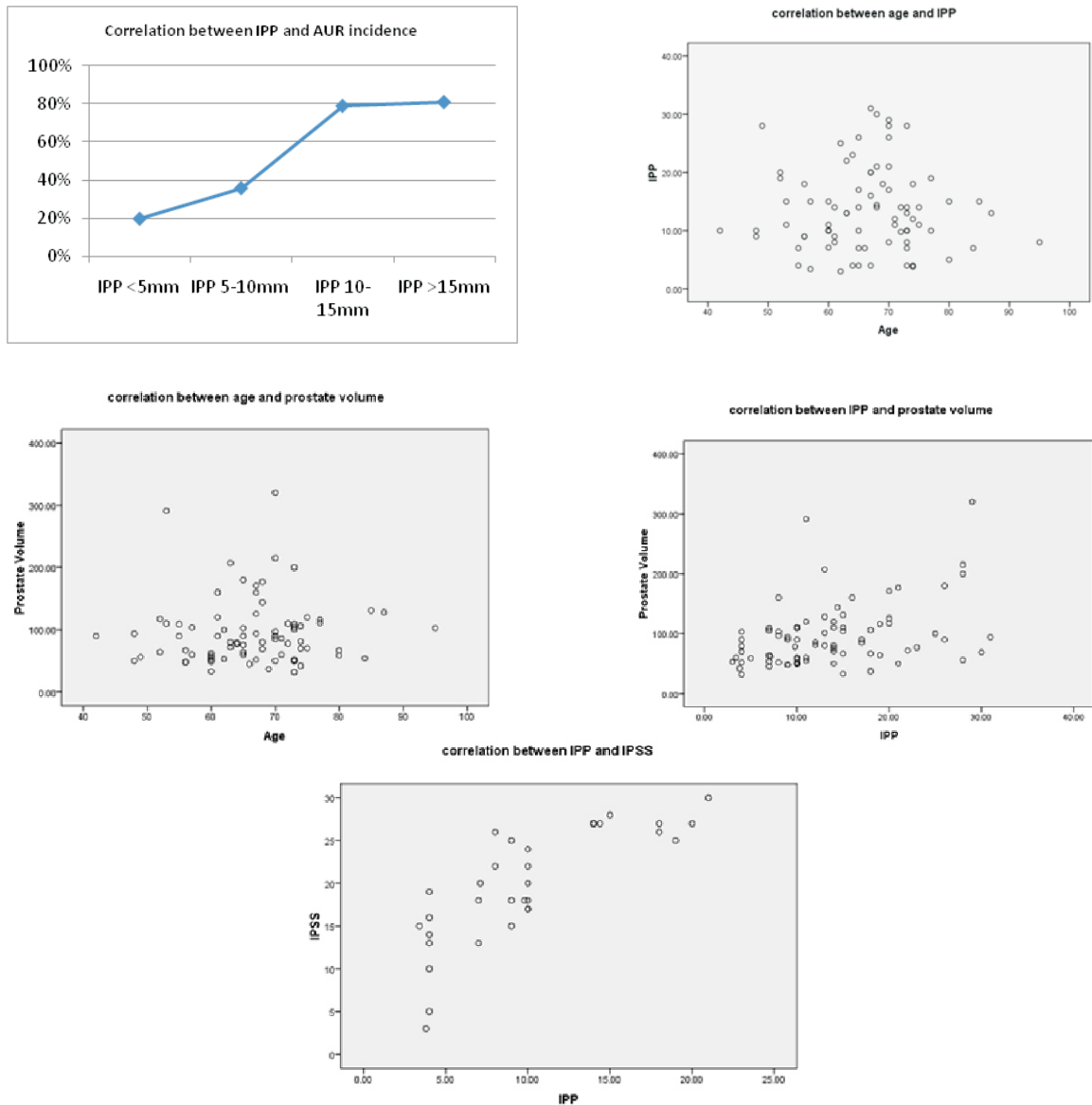
There was a significant correlation between the IPP and the IPSS (Spearman's Rho = 0.6, p < 0.05). The IPP was also significantly correlated with

Table 1. The distribution of clinical parameters according to AUR incidents.

Characteristics	Total (n = 80)		Condition		<i>p</i> value
			Urinary retention	Non urinary retention	
Age (years)	66.32 ± 9.38	68.25 ± 59.74	63.44 ± 8.65	0.869	
IPP (millimeters)	13.53 ± 7.10	15.91 ± 7.24	9.95 ± 5.21	0.032	
Prostate volume (cc)	95.25 ± 53.18	100 ± 9.44	73.23 ± 31.01	0.029	

Table 2. The distribution of clinical parameters according to IPP.

Characteristics	Group A (n = 10)	Group B (n = 25)	Group C (n = 24)	Group D (n = 22)	<i>p</i>
Age (years)	66.12 ± 2.62	61.27 ± 2.52	67 ± 3.11	62.8 ± 3.61	0.081
Prostate Volume (cc)	66.01 ± 8.54	76.56 ± 8.10	80.82 ± 23.08	68.70 ± 15.20	0.342
IPSS	11.88 ± 1.95	19.53 ± 0.95	27.25 ± 0.25	27 ± 0.837	0.032
AUR	2 (20%)	10 (36%)	19 (79%)	17 (81%)	0.000
Without AUR	8 (80%)	15 (64%)	5 (21%)	4 (19%)	0.000
OR to AUR	0.3	2	3.95	4.02	
Sensitivity to AUR	4.2%	19.1%	40%	36.1%	
Specificity to AUR	75%	54.5%	84.3%	87.5%	
Positive predictive value to AUR	20%	37.5%	79.1%	80.4%	
Negative predictive value to AUR	34.7%	32.1%	49%	48.2%	

**Figure 1.** Relation between IPP and other parameters. IPSS and AUR is correlated with IPP.

the AUR (Spearman's $Rho = 0.8$, $p < 0.05$). Increased IPP, risk of AUR is higher with $OR = 15$. However, no significant correlations were noted between the IPP and prostate volume (Spearman's $Rho = 0.34$, $p = 0.715$), or the age of the patients (Spearman's $Rho = 0.188$, $p = 0.081$) (Fig. 1).

DISCUSSION

AUR is a health condition that seriously decreases the patient's quality of life. Although many etiologic factors have been identified (which are classified under three main categories obstructive, neurogenic and myogenic), BPH is thought to be the most prevalent.² The exact causative mechanism of AUR remains under debate.¹⁰ Several community- and population-based studies have clearly demonstrated that the incidence of AUR increases with age.

TAUS is a non-invasive method for identifying the IPP, and estimated prostate volume. Franco et al. suggested that suprapubic ultrasound for calculating prostate volume and IPP are simple, noninvasive, accurate systems to assess AUR risk in patients with LUTS due to BPH.¹¹

TAUS measured the vertical distance from the tip of the prostatic protrusion to the circumference of the bladder at the base of the prostate gland in the midsagittal line. Lim et al. demonstrated that prostate specific antigen, prostate volume and IPP correlate well with one another. They suggested that IPP, as a non-invasive clinical parameter, predicts AUR better than prostate specific antigen and prostate volume.¹² TAUS for evaluating the prostate is easily performed in patients with rectal pathologies that underwent rectal surgery. And it is a non-invasive method to assess the upper urinary tract. On the other hand, for TAUS of the prostate, a filled bladder is essential. The loss of acoustic window (an empty bladder) makes measurement of the IPP difficult and unreliable. Yuen et al. showed that the mean IPP decreases with increasing bladder volume.¹³

In a study by Roehrborn et al.,¹³ large prostatic volume were found to be the strongest predictors of the occurrence of AUR. Kefi et al.¹⁴ reported that there was no difference between the patients with and without AUR with respect to prostatic volume. Bosch et al. demonstrated that prostate volume was not useful for prediction of AUR.¹⁵ They suggested that the IPP assessed by TAUS is a better and more reliable predictor of AUR than prostate volume and symptom severity.¹⁶ Nose

et al. also suggested that IPP grading correlated well the BOO index and the combination of the IPP grading, and Doppler urodynamic study may be a novel standard in the diagnosis of BOO in male patients.¹⁷ Keqin et al. showed that BOO index was significantly higher and incidence of acute urinary retention appeared higher in the significant IPP group. Thus, they suggested that the IPP is a useful predictor for evaluating the AUR. They also suggested that the significant IPP patients, especially those presenting with AUR, may benefit from early surgical intervention.¹⁸ Lieber et al. showed that, overall, 10% of men had an IPP of 10 mm or greater in their community-based study. They also showed that men with an IPP of 10 mm or greater were more likely to use medications for BPO/LUTS compared with those with an IPP lower than 10 mm.¹⁹ Lee et al. showed that a higher IPP grade is associated with a higher risk of clinical progression in benign prostate enlargement. Thus, they suggested that the IPP is a useful non-invasive predictor for clinical progression in benign prostate enlargement.²⁰ Yuen et al and Chia et al have proposed the IPP grading system determined by transabdominal ultrasonography for risk of AUR and found that IPP is an excellent predictor.^{21,22} In our study show that IPP had strong correlated with AUR ($p < 0.05$, $r = 0.6$). Increase number of IPP correlated with increasing number of AUR with the largest frequency of AUR occurred in IPP more than 15 mm (81%) with OR to AUR incidents is 2.

CONCLUSION

IPP can be used as predictive factor for acute urinary retention in BPH Patients.

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