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Correlation between prostate size and age of patients evaluated for symptomatic benign prostatic hyperplasia

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Abstract

Background: Benign prostatic hyperplasia (BPH) is the commonest cause of bladder outlet obstruction (BOO) in middle age and elderly men. Prostate size increases as a man ages. It has been documented that age and androgens are the greatest risk factors for BPH progression. The size of the prostate can predict the future need and outcome of BPH–related surgery. The aim of this study was to correlate prostatic size (volume) with age of patients evaluated for symptomatic BPH.

Patients and method: This was a retrospective study of one hundred and ninety two (192) patients that were evaluated for BPH in two (2) urology centers in Nigeria between January 2018 and June 2019. Patient's bio-data, findings on history and physical examination, relevant laboratory and imaging studies, in particular, trans-rectal ultrasound reports of the prostate were collated and analyzed using the statistical package for social sciences (SPSS) version 20.0.

Results: 192 men with a mean age of 64.23±9.47 years were evaluated. Majority of the patients presented in their 7th decade of life. Mean prostate volume was 67.59±45.70mls while mean prostate specific antigen (PSA) was 4.76±4.59ng/ml. Correlation between prostate volume and age was weak; r(192) = .172, P<0.05. Conclusion: Prostate size (volume) in our cohort of patients showed a weak correlation with age.

Key Words: Prostate size (volume), Age, Benign prostatic Hyperplasia.

Introduction

BPH has been known worldwide as a disease affecting aging males. It is noted to be a progressive disease whose greatest risk factor for progression is age.[1] Androgens have also been documented apart from age.[2] Prostate gland is a male organ that typically increases in size throughout a man's lifetime and noted to predict the outcome and future need for BPH–related surgery.[3] It can also be used to determine episodes of acute urinary retention,[4] therefore it is quite needful to study the natural history of BPH as a follow up with age. Some authors had documented a steady increase in prostate volume with age and a peak at between 56-65 years and thereafter a rapid decline[5] which will require longitudinal studies to confirm. This however could be explained by atrophy of the peripheral zone in BPH.

Growth of the transitional zone tends to be the major contributor to increase in prostate size attributed to changes in androgen level and nodular size.[6] There are several modalities of measurement of prostate size including digital rectal examination (DRE), trans-rectal ultrasound scan (TRUS), trans-abdominal ultrasound scan (TAUS) and magnetic resonance imaging (MRI). Each of these has its own merits and demerits. Imaging techniques are

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preferred over DRE where available and where reliability is critical. Our study centered on the need to correlate prostate volume with age since the former tends to increase as a man ages. However, we have observed that most of our patients do not know their true age which may affect our result to some extent.

Patients and method

This was a retrospective study of 192 patients who presented with lower urinary tract symptoms (LUTS) for care in the urology clinic of our hospital and urology clinic at Nigerian Christian Hospital, Nglagu, Abia State, Nigeria between January 2018 to June 2019. Data from the records library of the two hospitals were collated and entered into a proforma. These included patient's bio-data, findings on history and physical examination with focused DRE of the prostate, relevant laboratory investigation results including PSA, full blood count, renal function test, urinalysis, urine culture and documentation of TRUS findings of the prostate. Data was analyzed using SPSS version 20.0. Statistical significance was set at 5% (p value = 0.05).

Results

Total number of patients was 192 with a mean age of 64.23 ± 9.47 years ranging from 42 to 92 years. Most of the patients presented in their 7th decade of life (60 – 69 years) (table 1). Retired civil servants formed the majority 83/192 (43.2%), mean prostate volume was 67.59 ± 45.7mls. Prostate volume peaked in the 7th decade and thereafter showed a steady decline. Most patients had a prostate volume between 30 and 50mls (39.1%). Mean total PSA was 4.76 ± 4.59ng/ml. Correlation between prostate volume and age was weak r(192) =.172, P<0.05.

Discussion

BPH is a common disease of the aging male. It is noted to be a progressive condition with age and androgens being major risk factors.[1,2] It was reported to be the most common cause of BOO in men older than 70 years of age.[7] Bushman[8] and Lee et al[9] noted differently that BPH is age-related whose prevalence also increases with age. Same author[8] documented the prevalence of pathological BPH (histologically diagnosed) as 8% and 50% in the 4th and 6th decade of life respectively.

Prostate size can be estimated by DRE as well as imaging studies such as TRUS, but data from several epidemiologic studies actually showed that DRE over-estimates smaller prostates[8,10] while larger prostate sizes are under-estimated compared to TRUS measurements.[11] Roehrborn CG et al[12] also noted that TRUS is superior to DRE in terms of prostate volume estimation.

Table 1: Age distribution of patients

Age (years)	Frequency(n)	Percent(%)	Cumulative Percent (%)
40-49	9	4.7	4.7
50-59	52	27.1	31.8
60-69	72	37.5	69.3
70-79	48	25.0	94.3
80-89	10	5.2	99.5
90-99	1	5.0	100.0
Total	192	100.0	

Table 2: Prostate volume categories

Prostate Volume(mls)	Frequency(n)	Percent (%)	Cumulative Percent (%)
<30	18	9.4	9.4
30-50	75	39.1	48.5
>50-80	54	28.1	76.6
>80	45	23.4	100
Total	192	100.0	

Table 3: Descriptive statistics for variables

Variables	Mean	Std. Deviation
Age	64.23	9.47
PSA	4.76	4.59
Prostate volume	67.59	45.70
Number 192		

Table 4: Cross tabulation: age/prostate volume categories

Age categories	Prostate volume categories(mls)				
	<30	30-50	>50-80	>80	Total
40-49 years	4(2.1%)	2(1.0%)	1(0.5%)	2(1.2%)	9(4.7%)
50-59 years	1(0.5%)	24(12.5%)	17(8.9%)	10(5.2%)	52(27.1%)
60-69 years	9(4.7%)	27(14.1%)	18(9.4%)	18(9.4%)	72(37.5%)
70-79 years	4(2.1%)	16(8.3%)	15(7.8%)	13(6.8%)	48(25.0%)
80-89 years	0(0.0%)	6(3.1%)	2(1.0%)	2(1.0%)	10(5.2%)
90-99 years	0(0.0%)	0(0.0%)	1(0.5%)	0(0.0%)	1(0.5%)
Total counts	18(9.4%)	75(39.1%)	54(28.1%)	45(23.4%)	192(100.0%)

Table 5: Correlation between prostate volume and age

		Age	Prostate volume
Age	Pearson Correlation	1	.172
	Sig. (2 tailed)		.017*
	N	192	192
Prostate Volume	Pearson Correlation	.172	1
	Sig (2-tailed)	.017*	
	N	192	192

Correlation is significant at the 0.05 level (2-tailed): r (192) = .172, P<.05*

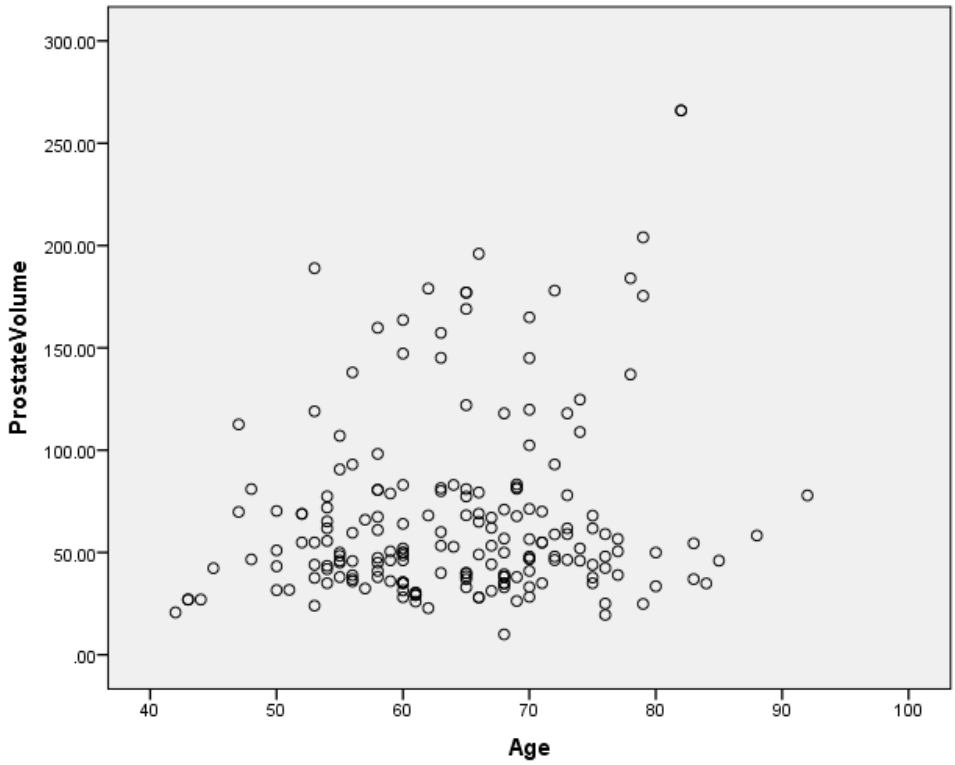

Fig. 1: Scatter plot for age and prostate volume.

In this study, the mean age of the patients was 64.23±9.47 years similar to another study by Rupam et al[13] in Asian men. In a study of Indonesian men with BPH, Ida et al[14] reported a slightly older population (66.09±8 years) although in the same decade bracket. The mean prostate volume (PV) was 67.57±45.70mls higher than a similar study by Ida et al[14] although they evaluated older group of patients. This difference may be due to ethnic, genetic and racial factors between Nigerian and Indonesian men. Our study also documented a significant higher PV values than in Saudi, Japanese and Korean men.[15,16,17] This apart from the expected ethno-racial and genetic contributing factors, patients in these countries may likely present early for evaluation unlike patients in our locality who present late for care. Also in our work, more patients had prostate volume >50mls similar to a report by Rupam et al[13] who also evaluated men in the same age bracket with BPH. The implication here is that, patients in our cohort will likely benefit from a combination therapy with α – adrenergic blockers and 5α–reductase inhibitors and possibly open surgery when indicated, whereas patients of Indonesian, Japanese, Saudi and Korean extractions may likely benefit from monotherapy with α – adrenergic blockers and minimal access prostate surgery by reason of prostate size. Although this may be interpreted with caution where the study design, sample size, techniques of measurement, methodology and populations studied are quite different. In this article, men in their 7th and 8th decade of life had larger prostate sizes that showed a decline thereafter (Table 4) although fewer older patients were evaluated. This could be due to prostatic atrophy in older population which however will need a longitudinal study to confirm.

The mean PSA was 4.76 ± 4.59ng/ml which was higher than studies of men with BPH in Korea[17], Japan[16] and India[13] but lower than a cohort of men in Taiwan[18] who also recorded smaller mean prostate volume. A possible explanation is that Taiwanese men may likely produce more PSA per unit prostate tissue. However, this will need further studies to confirm. Correlation between prostate size and age was weak (Table 5) ; r(192 = .172, P<0.05). Other studies also documented weak relationships; r=0.182, P<0.01[19], r=0.12, P<0.001.[14] Stronger correlations had also been reported by some investigators as follows; Sasanka et al; r=0.84, P=0.001[20], Collins et al; r = 0.44 P<0.001[21] and Oesterling et al; r=0.43 P<0.001.[22] Other authors on

the other hand failed to demonstrate any significant relationships.[18,23] This wide discrepancy in results may likely be due to differences in the population of patients studied with background diverse ethnic or geographical factors influencing the biology of prostate growth and development.

The limitation of this study was that patients were hospital-based who presented late for care hence their advanced age and larger prostate sizes compared to other studies. Many of our patients also do not know their true age due to the absence of birth registry when they were born, high level of illiteracy and ignorance all of which may have affected our results in some ways. However, our findings are in concordance with many other studies agreeing that prostate size increases with age especially in BPH patients. Accurate prostate size measurement in symptomatic BPH patients can guide decision making as to medical (mono or combination therapy) or surgical (minimal access or open) management, age being an important variable.

Conclusion

Despite inconsistencies in the literature, compatible studies have documented varying degrees of correlation between prostate size and age including our study. The differences may be ascribed to diversities in the population studied with its ethnic and genetic component that can modulate the biology and developmental growth of the prostate. Different methodologies and sample sizes can also influence the results. However, the fact remains that prostate size is age-related.

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