

Relationship Of Measured Prostate Diameters With Age In Southeast Nigerians

E. ANYANWU, F.C. AKPUAKA, C. I. P. ANIBEZE, S. MGBOR.

Department of Human Anatomy, College of Medicine and Health Science, Abia State University Uturu.

ABSTRACT

Prostate sizes were obtained from a total of 113 subjects using ultrasound in a 12 months sampling period. Individuals with no apparent urinary disease symptoms and other debilitating diseases qualified for sampling. Result showed a direct relationship between the prostate size and ages of individuals sampled. The diameters, prostate length, transverse thickness and longitudinal thickness have statistically significant relationship with age ($p < 0.01$). The standard deviation of the different age groups was found to vary markedly at age group 71-84 and 15-20.

Key words: Prostate size, ultrasound, benign hyperplasia

Varying studies have been carried out on the prostate organ (Atalan et al., 1999; Benoit et al., 1993; Jin et al., 1999; Pegato & Spjut, 1977). Some of these studies have established the normal size of the organ in Caucasians (Banister & Dyson, 1995; McGraw, 1971). The prostate is a cone shaped partly muscular and partly glandular organ. It is located in the Pelvic cavity beneath the bladder and above the urogenital diaphragm (McGraw, 1971). The organ undergoes hyperplastic or hypertrophic enlargements of its tissues as a result of either senility (i.e benign prostatic hyperplasia) or cancer (Benoit et al., 1993). It has also been on record that ethnic and geographical factors such as migration and environment influence prostate growth and size (McMinn, 1990; Jin et al., 1999) Atalan et al., (1991) carried out an ultrasonographic estimation of prostate size in normal dogs and found statistically significant correlation between bodyweight or age and Length, width, transverse depth and the depth of longitudinal length. It is our view that the establishment of normograms of prostate sizes will enhance early detection of enlargement due to benign hyperplasia. It also would provide information, which would allow differentiation from normality of size changes associated with disease, which may facilitate the reduction of male infertility as a result of prostate dysfunction.

Materials and method:

This clinically based research study lasted for a period of one year. Data collection was from the month of April 2000 to March 2001. The study population investigated consisted of adult males from the age of 15 years. The research was carried out in Enugu in a private out patient clinic with specialization in radiological examination. This clinic examines referred cases from all the Parts of the country, more especially Southeastern part of the country. Only healthy subjects (i.e. those with no history or apparent urinary disease symptoms or changes related to malignancy of prostate or neoplasm or any other debilitating general illness) were selected. A sample size of hundred and thirteen (113) was used.

The subjects were scanned with well-filled bladders. The scanning tool was a multipurpose ultrasound machine (Philip Sterling). A single observer was used. Also all data collected was scanned using only one machine. Scanning was done in 3 planes viz: transverse, sagittal and longitudinal planes. The formula $411abc$ was used for calculating the volume of the prostate from the diameters. (McMinn, 1990).

In this formula, the symbols a,b,c, are the diameters of the cartesian plane of analytical geometry. Π – represents a constant equal to 3.142. The diameters used are the prostate lengths, prostate transverse thickness and longitudinal thickness.

Result and Discussion

The data in Table 1 is a summary of the hundred and thirteen subjects passed through scanning. The ages obtained from the subjects were broken into sub-groups. The mean prostate volumes and the deviation from mean were recorded. The volume has statistical significant relationship with age ($r=0.4, p<0.01$).

The bar chart in Fig.1 and the scatter diagram in Fig.2 were used to illustrate the relationship of the prostate size with volume. From Table 1 the modal age group is age group 31 – 40 while the least frequent age group is age 15 –20. The highest deviation from mean came from age group 71 – 84 followed by age group 15 – 20. The least deviation came from age group 31 – 40.

This study has established that prostate sizes increase gradually as ages increase (Jin et al., 1999). This direct relationship between age and prostate diameters indicates age as a single direct predictor for prostate size. The periods of sharpest response of prostate diameters to age changes are ages 71 – 84 which is the result of senile enlargement. This is followed by age 15 – 20 which is the age of enlargement due to maturation of organ. Ages 61 – 70 followed, which also is a result of senile enlargement. The least response is age group 31 – 40. After the third decade, the size of prostate remains virtually unaltered until 45 – 50 years, when the epithelial folds tend to disappear, follicular outlines become more regular and amyloid bodies increase in number. All these changes are signs of prostate involution (del-Regato & Spjet, 1997).

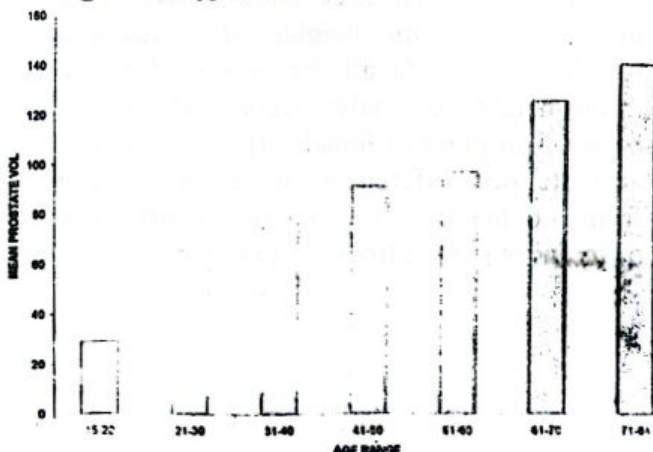


Fig.1 BAR CHART SHOWING MEAN PROSTATE VOL VS AGE RANGE

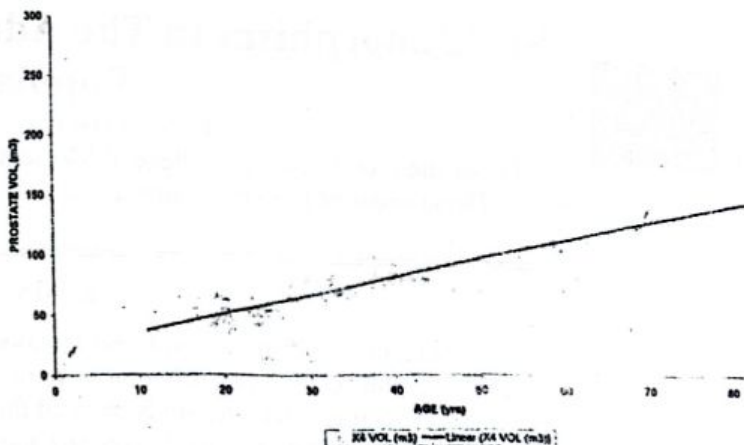


Fig.2 SCATTER DIAGRAM SHOWING THE RELATIONSHIP OF PROSTATE VOL AGAINST AGE WITH THE LINEAR REGRESSION

Table 1: Data summary of mean prostate volume with age range and frequency.

Age Range (yrs)	Frequency	Mean prostate volume (m ³)	Deviation from Mean
15-20	4	29	-54.91
21-30	20	65	-18.91
31-40	37	78	-5.91
41-50	27	91	7.09
51-60	13	97	13.09
61-70	6	126	42.09
71-84	6	141	57.09

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