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Establishment Of Normal Prostate Sizes Within Age Groups In South East Nigerians

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ABSTRACT

Prostrate size viz: Prostate length, longitudinal thickness, transverse thickness and volume were measured by trans-abdominal ultrasound among selected 113 subjects in South East of Nigeria. The subjects ranged from age 15 to 85. The result showed statistically significant relationship between age and prostate size ($P < 0.01$). It also established a normogram of the prostate sizes within the selected age groups.

Key words: Prostate size, age, ultrasound

The prostate is the largest accessory organ of the male reproductive system. It is a solid organ, which lies in the pelvic cavity behind the pubis and separated from it by the puboprostatic ligament, fibro-fatty tissue and blood vessels. It extends from the bladder neck to the urogenital diaphragm (MCMINN 1990). Its secretions give the semen its characteristic odour and adds to its volume (Guyton & Hall 1996). The prostate is of considerable medical interest because of its benign nodular hyoperplasia, carcinoma and other disease conditions, which may easily lead to sterility in men if untreated.

As a result of the vulnerability of this organ serial research studies have been embraced on the gland (Castineras et al 1999). With strong relationship between prostate size and age in the Southeast Nigerians (Anyanwu et al 1999) and within Caucasians (Handelsman et al, 1999) it becomes very imperative to establish a normogram of the sizes of the organ within categorised age groups. This is in view of the direct significant relationship established between the two ($P < 0.01$). The result of this research work will thus, establish an index for normality within each of the categorized-aged groups, which will in turn, enhance and facilitate surgical procedures on the organ.

MATERIALS AND METHOD

This is a one year clinically based research study carried out between the month of April 2001 and March 2002. The study population investigated consisted of adult males from the age of 15 and above. This study was carried out at a referral radio-imaging centre in Enugu, that has the South East geopolitical entity as its catchment area.

A sample size of hundred and thirteen (113) was used. The subjects consisted of healthy adults with no history or apparent urinary disease symptoms or changes related to malignancy of prostate or neoplasm or any other debilitating general illness.

These 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 with the subject lying supine viz: transverse, sagittal, and longitudinal planes.

RESULTS AND DISCUSSION

The different prostate dimensions,; prostate length, longitudinal thickness and transverse thickness have been represented with the symbols; x_1, x_2, and x_3.

The Prostate volume (x_4) has been calculated using the formula $4\Pi abc/3.Z$ (McGraw 1971). The symbols a, b, c represents the different diameters while Π represents a constant with value 3.142.

The different prostatic diameters with their frequencies and percentage representations have been made in tables 1, 2, and 3. Table 4 is the record of the mean prostate diameters and volumes with the age categories.

Table 1: Data summary of the frequency of prostate length. (n = 113).

Length (mm)	Frequency	% Composition
15-24	10	9.0
25-34	61	54.0
35-44	38	34.0
45-54	3	2.5
55-64	1	0.5
Total	113	100.0

Table 2: Data Summary of frequency of prostatic transverse thickness

Length (mm)	Frequency	%Composition
15-24	3	2.5
25-34	25	22
35-44	62	55
45-54	21	19
55-64	2	1.5
Total	113	100

Table 3: Data Summary of frequency of prostatic longitudinal thickness (n = 113)

Frequency	Percentage	Representation (%)
15-24	25	22.0
25-34	71	63.0
35-44	16	14.5
45-54	1	0.5
55-64	-	0.0
Total	113	100

Table 4: Data summary of the mean prostatic diameters and volume with age (n = 113)

Age range (Years)	Frequency	x_1(mm)	x_2(mm)	x_3(mm)	x_4(mm)
15 - 20	4	24	15	26	29
21 - 30	20	28	33	31	65
31 - 40	37	32	36	32	78
41 - 50	27	35	37	33	91
51 - 60	13	35	37	37	97
61 - 70	6	37	44	36	126
71 &above	6	41	45	35	141

From Tables 1,2, 3, the modal diameters for the length, transverse thickness and longitudinal thickness were shown to be 35 44, 35 44, and 25 34 respectively. Table 4 showed different mean prostatic diameters for the selected age groups ($P < 0.01$) thus establishing normograms for these age groups. This direct age relationship with prostatic diameters is a direct function of its structural composition (Lawrence et al 1995). The prostate has a system of ducts embedded in a stroma, which forms part of the gland. Hyperplasia and squamous metaplasia of the epithelium of the ducts (Colliculus seminalis and prostatic utricle) precede birth. After birth there is a period of regression in this activities and a period of quiescence lasting for 12-14 years. At puberty between ages 14 and 18, the prostate gland enters a maturation phase and in approximately 12 months during this time, it more than doubles in size due almost entirely to follicular development and also modification of the ductal branches. Within the third decade, the epithelium grows by irregular multiplication of the epithelial infoldings into the lumen of the follicles. After the third decade, the size remains virtually unaltered until 45-50 years when the epithelial foldings tend to disappear. These changes are signs of prostatic involution. From fifty years and above the prostate may undergo benign hypertrophy increasing in size until death or alternatively it may undergo progressive atrophy (Lawrence et al 1995).

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