Bangladesh Journal of Anatomy July 2009, Vol. 7 No. 2 pp. 68-72

Original Articles

Morphological Study on Age Related Changes of Prostate

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Abstract

Context: *Prostate related clinical conditions such as prostatic benign hyperplasia and carcinoma prostate are major medical conditions within aging population. Detailed morphological knowledge is essential for proper diagnosis and management of prostatic disease.*

Study design: *Descriptive type of study.*

Place and Period of study: *Department of Anatomy, Dhaka Medical College, Dhaka from August 2006 to June 2007.*

Materials: *Present study was performed on 70 post mortem human prostate. The samples were collected from unclaimed dead bodies that were under examination in the Morgue of Department of Forensic Medicine of Dhaka Medical College,*

Method: *The samples were divided into three age group; Group A (10-20 years), Group B (21-40 years), Group C (41-70 years). All samples were studied morphologically.*

Result: *Statistically significant positive correlation was found between age and weight, length, transverse diameter, antero-posterior diameter of prostate.*

Conclusion: *There were changes in the morphology of prostate in relation to age.*

Keywords: *Prostate, morphology.*

Introduction:

The prostate is a pyramidal fibromuscular gland[1]. It is a major accessory sex gland. It secrets thin milky fluids that constitute 30% of the semen[2]. The prostate is the site of two of the most frequent medical problems affecting elderly men, benign prostatic hyperplasia and prostatic cancer[3]. Prostate cancer is the most common cancer and the second leading cause of cancer mortality in males in industrialized countries[4].

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Estimation of prostatic weight has been used to select the surgical approach, TURP (transurethral resection procedure) preferred for small glands and open prostatectomy for larger ones[5]. As the prostate gland is dependent on androgen for its growth[6], the prostatic weight reflects the hormonal status of the subject[7].

The morbidity and mortality associated with prostatic disease affect an increasing number of men and is major medical condition within our aging population. Disease can be defined and measured only in terms of deviation from normal structure and function. A clear conception on the anatomy of prostate is a prerequisite for the diagnosis and treatment of prostatic disease.

Materials and Methods:

The samples of human prostate were collected from unclaimed dead bodies that were under examination in the Morgue of Department of Forensic Medicine of Dhaka Medical College, Dhaka from August 2006

to April 2007. After legal formalities the samples were collected within 24-36 hours of death without any sign of putrefaction. All the samples were collected from medicolegal cases. During collection appropriate age and cause of death were noted from morgue's record. The samples were brought to the Department of Anatomy, Dhaka Medical College. The samples were tagged immediately, which was bearing a code number for subsequent identification. Soon after collection each sample was gently washed in tap water on a dissection tray. Blood and blood clots were removed as far as possible. Then the samples were fixed in 10% formal saline solution. The collected samples were divided into three groups.

Table-I

Age distribution in different group

Group	Age limit (years)	No of samples
A	10-20	9
B	21-40	32
C	41-70	29

Variable Studied

1. Weight of prostate
2. Length of prostate
3. Transverse diameter of prostate
4. Anteroposterior diameter of prostate

Measurement procedure

1. Weight of prostate : The surfaces of each prostate were dried with blotting paper. Then the organ was weighed by means of an analytical balance in gms.
2. Length of prostate : Length of the prostate was measured from the centre of base to the apex of prostate. Measurement was done with the help of a slide caliper.
3. Transverse diameter of prostate : Transverse diameter was measured at the region of its maximum transverse level. Measurement was done with the help of a slide caliper.
4. Antero posterior diameter of prostate : Antero posterior diameter was measured at the region of its highest antero-posterior convexity. Measurement was done with the help of a slide caliper.

Result :

Weight of prostate: The mean ± SD weight of the prostate was 11.89 ± 2.69 gm in group A (10-20 years), 19.16 ± 2.98 gm in group B (21-40 years) and 25.88 ± 4.15 gm in group C (41-71 years).

The highest mean weight was found in group C and the lowest mean weight was found in group A. The mean difference in weight between the three group were significant (P< .001) positive correlation was present between age and weight of the prostate (r = +0.824 p < 0.001) (Table II, Fig.-1).

Table II

Weight and length of prostate in different study group

Group (n)	Weight (in gm) mean±SD (range)	Length (in cm) mean±SD (range)
A	11.89±2.69	2.36±0.48
(9)	(5.0 14.0)	(1.2 3.0)
B	19.16±2.98	2.55±0.40
(32)	(14.0 26.0)	(1.9 3.2)
C	25.88±4.15	2.72±0.56
(29)	(15.0 35.0)	(1.5 3.5)
	P value	
A vs B	<0.001***	>0.10ns
A vs C	<0.001***	>0.05ns
B vs C	<0.001***	>0.10ns
Group A :	Age 10 20 years	
Group B :	Age 21 40 years	
Group C :	Age 41 70 years	

Statistical analysis was done by ANOVA (multiple comparison), ns = not significant, *** = significant

Length of prostate**:** The mean ± SD length of the prostate was 2.36 ± 0.48 cm in group A, 2.55 ± 0.40 cm in group B and 2.72 ± 0.56 cm in group C. The mean difference in length between group A, group B and group C was statistically not significant. Positive correlation was present between age and length of prostate (r = + 0.36 P < 0.001) (Table-II, Fig.-2).

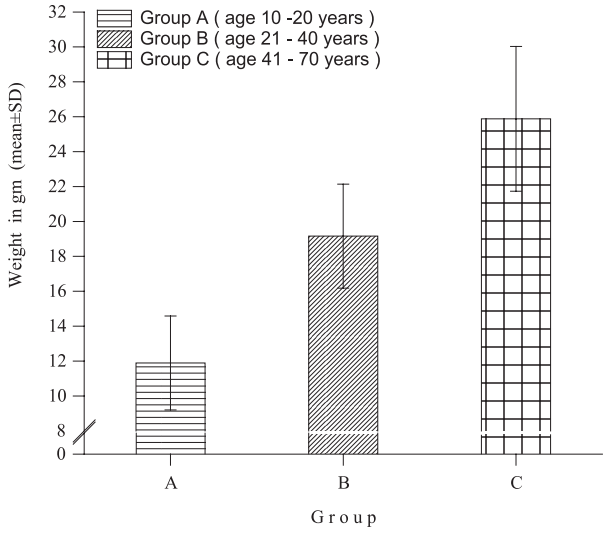

Fig.-1: *Weight of prostate in different study group*

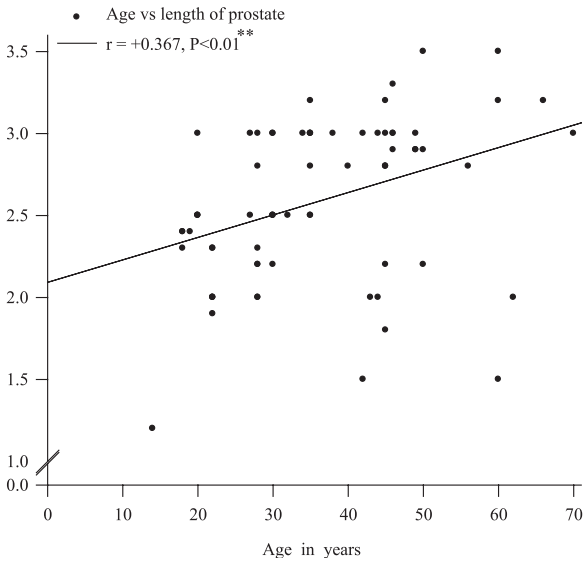

Fig.-2: *Scatter diagram showing relationship between age and length of prostate*

Table III
Transverse and anteroposterior diameter of prostate in different study group

Group (n)	Transverse diameter (in cm) mean±SD (range)	Anteroposterior diameter (in cm) mean±SD (range)
A	2.94±0.78	1.92±0.53
(9)	(1.1 3.8)	(0.9 3.0)
B	3.50±0.40	2.20±0.37
(32)	(2.4 4.3)	(1.5 3.0)
C	3.81±0.57	2.68±0.51
(29)	(2.2 4.6)	(1.5 3.4)
P value		
A vs B	$<0.01^{**}>0.10^{ns}$	
A vs C	$<0.001^{***}$	$<0.001^{***}$
B vs C	$<0.05^{*}<0.001^{***}$	
Group A	: Age 10 20 years	
Group B	: Age 21 40 years	
Group C	: Age 41 70 years	

Statistical analysis was done by ANOVA (multiple comparison), ns = not significant, */**/*** = significant

Transverse diameter **:** The mean ± SD transverse diameter of the prostate was 2.94 ± 0.78 cm in group A. 3.50 ± 0.40 cm in group B and 3.81 ± 0.57 cm in group C. The highest mean transverse diameter was in group C and lowest mean was in group A. The mean difference in transverse diameter between group A and group B (P<.01), group A and group C (P<.001) group B and group C (P<.05) were statistically significant. Positive correlation was present between age and transverse diameter of prostate (r = + 0.515 P<0.001) (Table III Fig.-3).

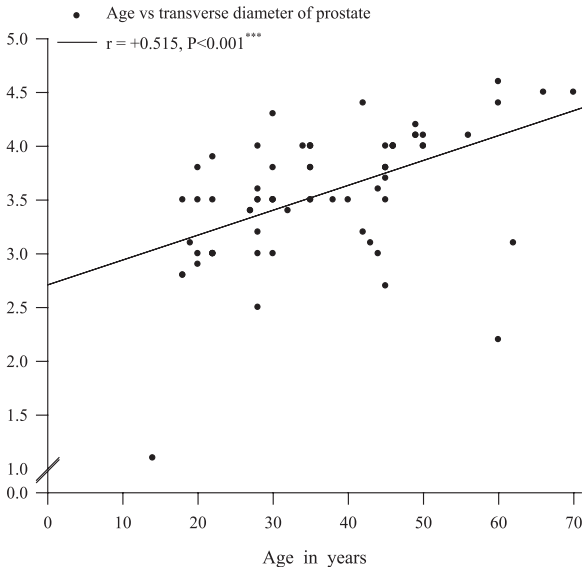

Fig.-3: *Scatter diagram showing relationship between age and transverse diameter of prostate*

Antero posterior diameter : The mean ± SD antero posterior diameter of the prostate was 1.98 ± 0.53 cm in group A, 2.20 ± 0.37 cm group B and 2.68 ± 0.51 cm in group C. The highest mean antero posterior diameter was in group C and lowest mean in group A. The mean difference in antero posterior diameter between group A and group C, group B and group C was statistically significant (P < .001). Positive correlation was present between age and antero posterior diameter of prostate which was statistically significant (r = + 0.547 P < 0.001) (Table III Fig.-4)

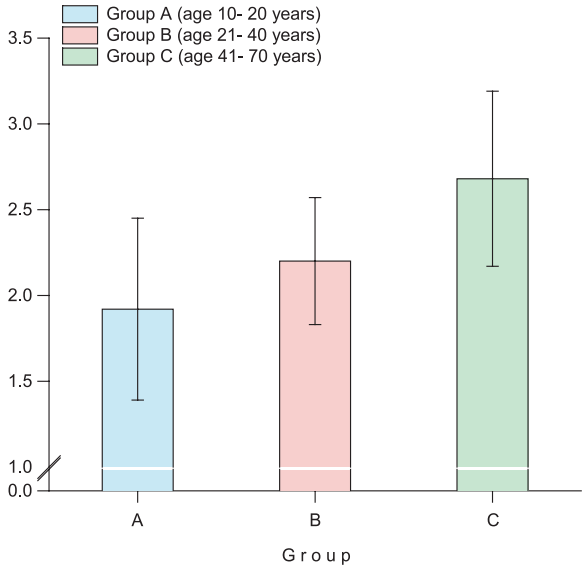

Fig.-4: *Anteroposterior diameter of prostate in different study group*

Discussion :

The weight of prostate described by Kumar[7], Roehrborn and Mc Connell[8] is 20gm and 18 gm respectively and their results are similar to the present study. Mean prostatic weight observed by Gearhart, Yang, Leonard, Jeffs, Zerhouni[9] was 21.7 ± 8.6 gm which conforms to the present study. Begum[10] studied 36 prostates of Bangladeshi people ranging from 10 to 70 years. She observed that in different group weight ranged from 11.27 gm to 24.11 gm. The weight of different group observed by Begum[10] is similar to that of the present study. Tisell and Leissner[6] described that mean prostatic weight for the adult man was 11.3 gm. This finding is much lower than the present study. The reason behind is that they used a special dissection technique to delimit the prostate proper (i.e. to exclude the periurethral tissue). The length of the prostate observed by Glass and Mundy[1], Rogers and Jacob[11] is 2 cm. That result corresponds to the present study. Khan[12] found that the length of the prostate was 2 cm to 2.96 cm which is similar to the present study.

Glass and Mundy[1], Rogers and Jacob[11] stated that the transverse diameter of prostate is 4 cm which is similar to the result of the present study. Begum[10] observed mean transverse diameter ranging from 3.21 cm to 4.08 cm which corresponds to the present study.

Glass and Mundy[1], Rogers and Jacob[11], Moore[13] observed that anteroposterior diameter is 2 cm, 2.5 cm and 1.89 cm to 2.17 cm respectively. Those findings have got similarity with the present study finding. Begum[10] found the mean anteroposterior diameter was 1.91 cm 2.63 cm in different study group. Her finding has got similarity with the present study finding. From the observation of Khan[12] and Begum[10] it was revealed that length, transverse diameter, anteroposterior diameter increased with increase of age. Mean difference in transverse diameter and anteroposterior diameter was statistically significant among the different age group. This finding corresponds with the present study findings.

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