Original Article

Micromorphological Study on Number of Concretion of the Prostate Gland of Bangladeshi Cadaver

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Abstract

Prostatic concretion or corpora amylacea is a frequent microscopic finding in radical prostatectomy specimens from men undergoing treatment for prostate cancer. Prostatic calculi which potentially represent calcified form of prostatic concretion are less common in both central & peripheral zone of prostate but can cause urological diseases including urinary retention and prostatitis. Benign prostatic hyperplasia affects the transitional zone and carcinoma of the prostate affects the peripheral zone of prostate. A cross sectional descriptive study was conducted in Department of Anatomy, Mymensingh Medical College, Mymensingh to find out the difference in number of prostatic concretions of the prostate gland of Bangladeshi people in relation to age. The present study was performed on 67 postmortem human prostate glands collected from the morgue in the Department of Forensic Medicine, Mymensingh Medical College by nonrandom purposive sampling technique. The specimens were collected from Bangladeshi cadaver of age ranging from 10 to 80 years. All the specimens were grouped into three categories Group A (up to 18 years), Group B (19 to 45 years) and Group C (above 45 years) according to age. Dissection was performed following standard autopsy techniques. In the present study, total 60 slides were made for histological study from both central and peripheral zone of the prostate which were examined under low power objectives. The number of the prostatic concretion of the prostate gland were counted and recorded. The mean number of the prostatic concretion of the prostate gland was 1.58, 5.54 and 7.70 in Group A, B and C respectively in central zone and 1.95, 6.56 and 8.74 in Group A, B and C respectively in peripheral zone of the prostate. Variance analysis shows that mean differences were highly significant between Group A & B and non-significant between Group B & C and Group C & A in central zone of the prostate. Mean differences were non-significant among all three groups in peripheral zone of the prostate. The number of the prostatic concretion of prostate gland was increased up to certain age limit but decreased in extreme age. In statistical analysis, differences between age groups were analyzed by using students unpaired 't' test. The present study will help to increase the information pool on the number of the prostatic concretion of the prostate gland of Bangladeshi people at different age group.

Keywords: *Prostate, Prostatic concretion, Histomorphology, Central zone and Peripheral zone.*

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Introduction

Prostate is a pyramidal shaped fibromusculoglandular organ[1]. The alveoli of the prostatic glands, especially those in older men, often contain prostatic concretions (corpora amylacea) of varied shape and size, often up to 2 mm in diameter. They appear in sections as concentric lamellated bodies are believed to be formed by precipitation of secretory material around cell fragments[2]. Some of the glandular acini contain proteinaceous prostatic secretion. Other glandular acini contain spherical prostatic concretions that are formed by concentric layers of condensed prostatic secretions. The prostatic concretions are characteristic features of the prostate gland acini. The number of prostatic concretions increases with the age of the individual and they may become calcified[2,3,4]. During fourth decade, the size of prostate remains constant and involution starts. After the third decade, the size of the prostate remains virtually unaltered until 45-50 years, when the epithelial folding tend to disappear, follicular outlines become more regular, and amyloid bodies increase in number [1, 2, 3].

Considering the increasing day-to-day of its clinical importance and insufficient histological data of different age group in Bangladeshi people, the present study was carried out. There is a limitation of published work on histological variations of the prostate gland of Bangladeshi people. We mainly depend on foreign text and literatures. However, we need our own standard baseline from which we can compare the number of prostatic concretions of central and peripheral zone of prostate gland of our own population. Therefore, it has been designed to study the number of prostatic concretions of this gland to see the age-related variation in Bangladeshi people and to compare with the values in Western people.

Materials and Methods

The study was carried out in the Department of Anatomy, Mymensingh Medical College, Mymensingh from January 2015 to December 2015. A total 67 human prostate were collected by purposive sampling technique from April 2015 to September 2015. The specimens were collected from Bangladeshi cadaver of age ranging from 10 to 80 years from autopsy laboratory of the Department of Forensic Medicine of Mymensingh Medical College and all the collected specimens were from medico-legal cases. Only fresh specimens from persons who died within the preceding 12 hours were chosen. Each specimen was duly tagged by a piece of waxed cloth which bore an identifying number representing individual serial number. For convenience of differentiating the number of prostatic concretions of central and peripheral zone of the prostate gland in relation to age, collected specimens were categorized into three groups: Group A (upto 18 years), Group B (19 to 45 years) and Group C (above 45 years).

For microscopic study, 12 slides from Group A, 24 slides from Group B and 24 slides from Group C were collected from both central and peripheral zone of the prostate. From each specimen two slides were taken. Tissue block for histological preparation was taken not more than 1 cubic mm in size. Then samples were placed in 10% formol-saline. After fixation, each segment of tissue was washed in tap water and was processed for dehydration, infiltration and embedding in liquid paraffin separately. Six-micron thick sections were prepared from the blocks. Tissue samples were processed routinely by following standard histological procedures, then sections were stained with hematoxylin and eosin (H&E) stain. Then permanent slides were made.

Total 60 slides were examined under low power (×10) objectives from both central and peripheral zone. For estimation of the number of prostatic concretions, the stained sections on the slide were divided into four equal parts by drawing two lines which are perpendicular to each other, on the cover slip from the center of the tissue (Fig. 1). From each division one microscopic field was chosen close to the center as far as possible for study, thus from each slide four fields were chosen and the number of prostatic concretions at those fields were counted and noted. Therefore, from each age group, microscopic fields were taken and examined for study for counting the number of prostatic concretions. All prostatic concretion were counted and noted and the values were put down in a tabulated form for convenient processing which led to a conclusion.

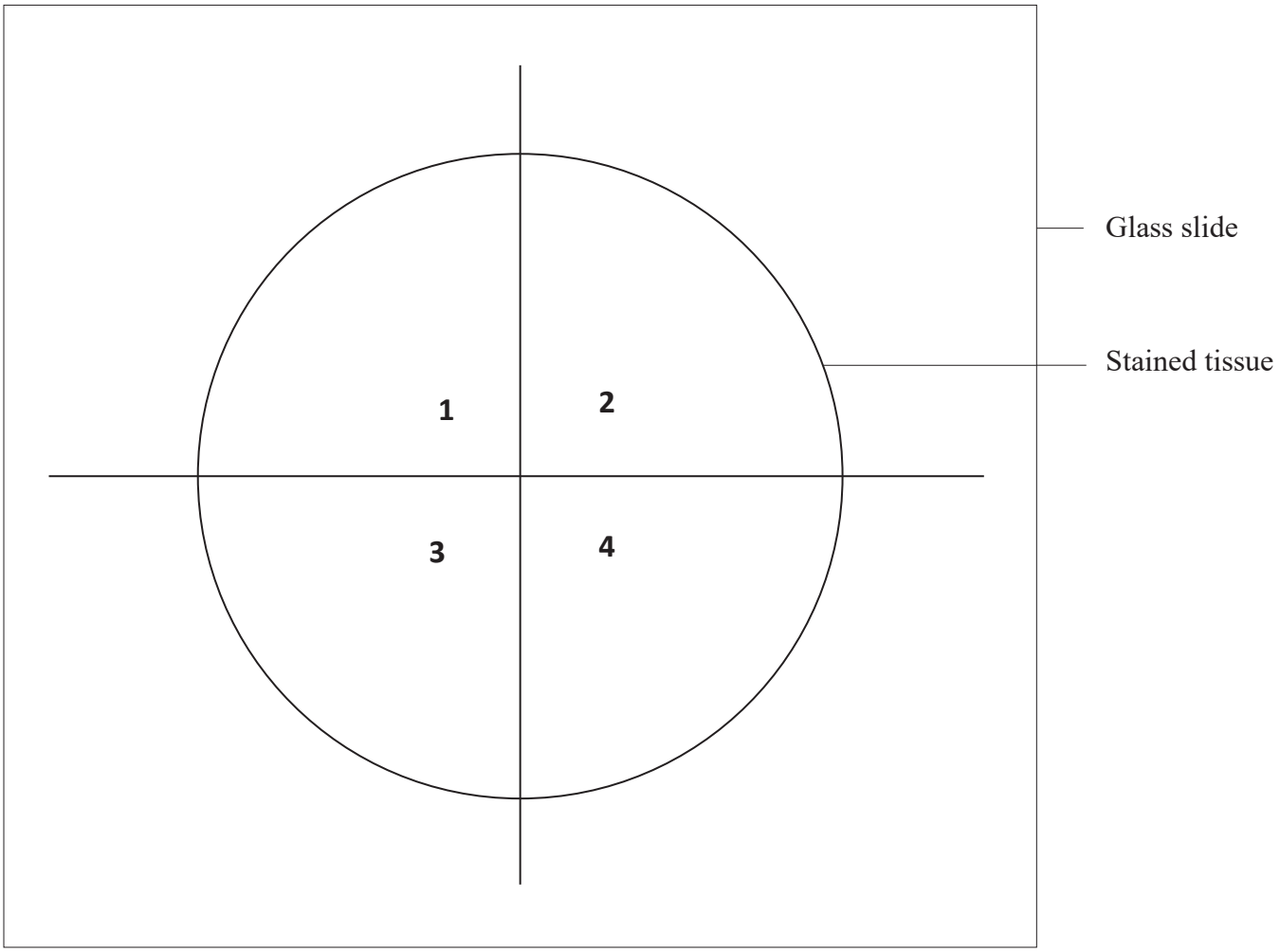

Figure 1: Diagram showing quadrants of microscopic field for counting number of prostatic concretion of prostate gland in both central and peripheral zone

Results

Number of prostatic concretions per low power area of microscopic field in the central zone of the prostate

The maximum number of prostatic concretions per low power area of microscopic field in the central zone of the prostate was 2.25 in Group A, 12.5 in Group B and 23.75 in Group C and minimum number of prostatic concretions was 0.75 in Group A, 2 in Group B and 1.5 in Group C. The mean (±SD) number of prostatic concretions per low power area of microscopic field in the central zone of the prostate was 1.5833±0.6645, 5.5417±3.2313 and 7.7083±8.2976 in Group A, B and C respectively. The maximum mean number of prostatic concretion per low power area of microscopic field in the central zone of the prostate was in Group C (7.70) and minimum was in Group A (1.58). The mean difference of number of prostatic concretions per low power area of microscopic field in the central zone of the prostate was statistically highly significant between Group A & B and (where P=0.010) and non-significant between Group B & C and Group C & A (where P=0.408 and 0.094). All the above findings are shown in Table I.

Table I: Number of Prostatic concretions Per Low Power Area of Microscopic Field in the Central Zone of the Prostate in Different Age Groups

Age Group	Number of specimen	Mean ± SD (Minimum- Maximum)
A (up to 18 years)	6	1.5833±0.664 5 (0.75 -2.2 5)
B (19 to 45 years)	12	5.5417 ±3.2313 (2-12.5)
C (above 45years)	12	7.7083±8.2976 (1.5 -23.75)

Comparison of Number of Prostatic concretions Per Low Power Area of Microscopic Field in the Central Zone of the Prostate among the Age Groups

Comparison between Variables		Mean Difference	Std. Error	P	Level of Significance
A	B	-3.95833	1.35244	0.010	Highly significant
B	C	-2.16667	2.57053	0.408	Non significant
C	A	6.125	3.44502	0.094	Non significant

$P \leq 0.01$ is considered as Highly significant

$P < 0.05$ is considered as Significant

$P \geq 0.05$ is considered as Non-significant

Table I (Fig. 2) depicts that the mean (±SD) number of prostatic concretions per low power area of microscopic field in the central zone of the prostate was 1.5833±0.6645, 5.5417±3.2313 and 7.7083±8.2976 in Group A, B & C respectively. It was evident from the result that the mean number of prostatic concretions per low power area of microscopic field in the central zone of the prostate was maximum in Group C and minimum in Group A.

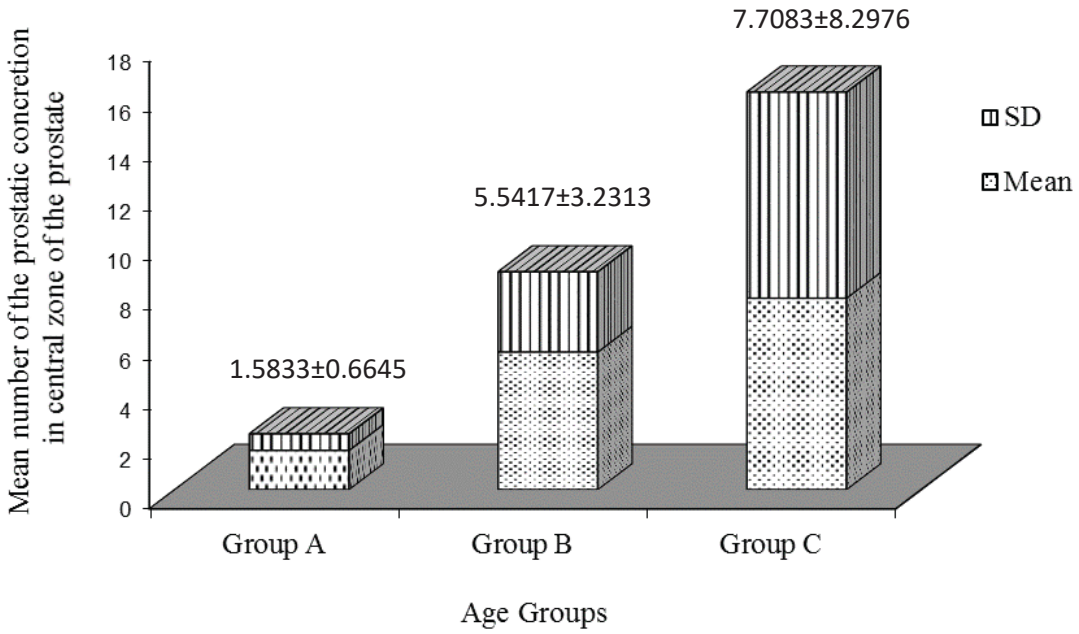

Figure 2: Bar diagram showing the mean (±SD) number of prostatic concretions per low power area of microscopic field in the central zone of the prostate in different age groups

Number of prostatic concretion per low power area of microscopic field in the peripheral zone of the prostate

The maximum number of prostatic concretions per low power area of microscopic field in the peripheral zone of the prostate was 3.75, 22.5 and 33.75 in Group A, B and C respectively and minimum number of prostatic concretions was 1 in Group A, 0.75 in Group B and 1.25 in Group C. The mean (±SD) number of prostatic concretions per low power area of microscopic field in the peripheral zone of the prostate was 1.9583±0.99268, 6.5625±7.48341 and 8.4792±9.70617 in Group A, B and C respectively. The maximum mean number of prostatic concretion per low power area of microscopic field in the peripheral zone of the prostate was in Group C (8.4792) and minimum was in Group A (1.9583). The mean difference of number of prostatic concretions per low power area of microscopic field in the peripheral zone of the prostate was statistically non-significant among all Groups (where P=0.159, 0.593 and 0.125 respectively). All the above findings are shown in Table II.

Table II: Number of Prostatic concretions Per Low Power Area of Microscopic Field in the Peripheral Zone of the Prostate in Different Age Groups

Age Group	Number of Specimen	Mean ± SD (Minimum −Maximum)
A (up to 18 years)	6	1.9583 ±0.99268 (1-3.75)
B (19 to 45 years)	12	6.5625±7.48341 (0.75 -22.5)
C (above 45 years)	12	8.4792±9.70617 (1.25-80)

Comparison of Number of Prostatic concretions Per Low Power Area of Microscopic Field in the Peripheral Zone of the Prostate among the Age Groups

Comparison between Variables		Mean Difference	Std. Error	P	Level of Significance
A	B	-4.60417	3.11484	0.159	Non -significant
B	C	-1.91667	3.53802	0.593	Non -significant
C	A	6.52083	4.03352	0.125	Non -significant

Table II (Fig. 3) depicts that the mean (±SD) number of prostatic concretions per low power area of microscopic field in the peripheral zone of the prostate was 1.9583±0.99268, 6.5625±7.48341 and 8.4792±9.70617 in Group A, B & C respectively. It was observed from the result that the mean number of prostatic concretions per low power area of microscopic field in the peripheral zone was maximum in Group C (8.4792) but minimum in Group A (1.9583).

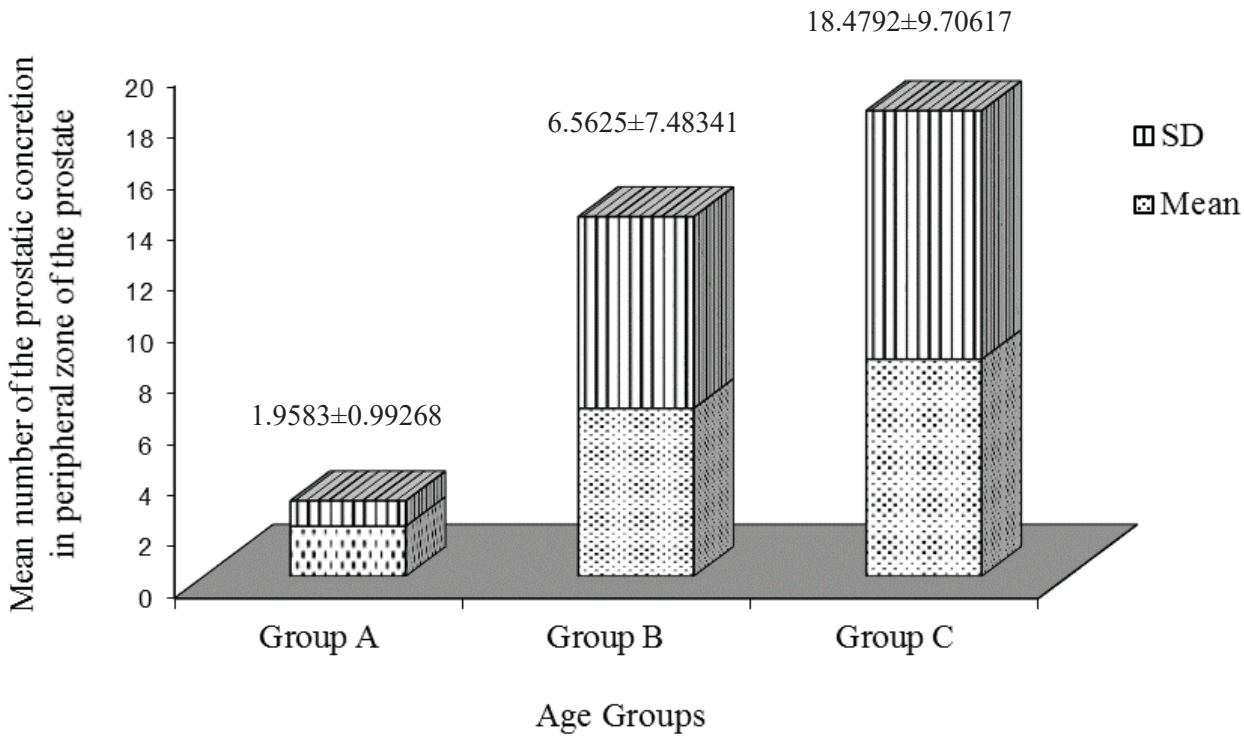

Figure 3: Bar diagram showing the mean (±SD) number of prostatic concretions per low power area of microscopic field in the peripheral zone of the prostate in different age groups

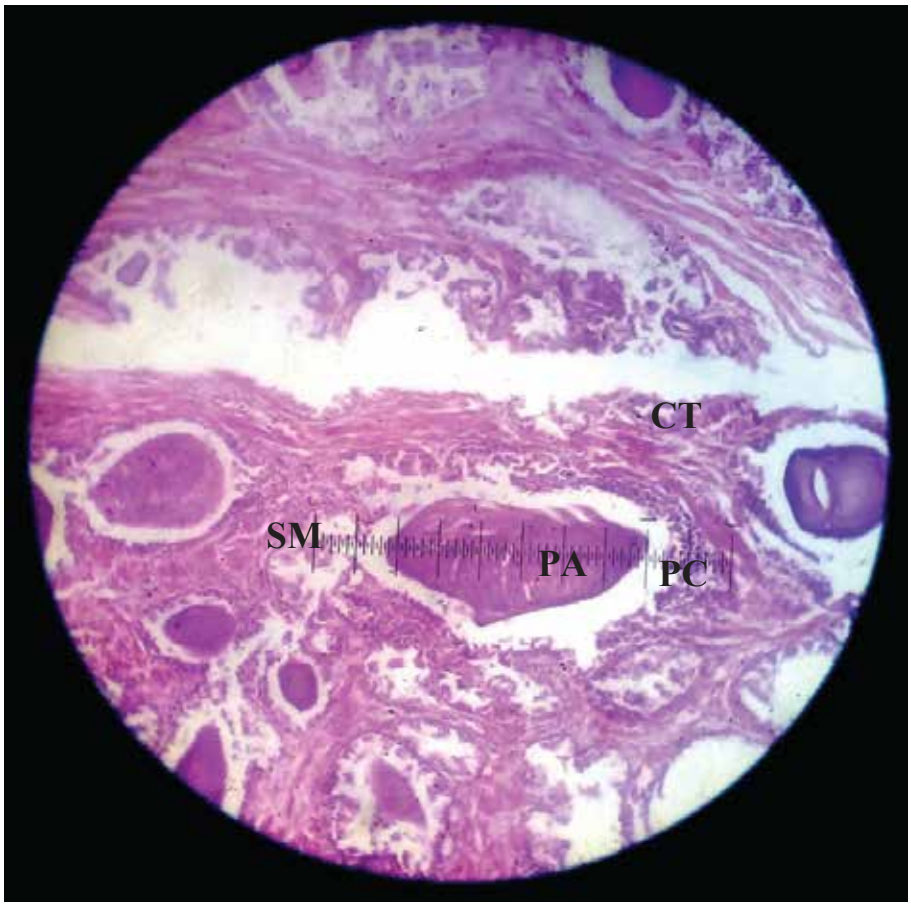

Figure 4: Section of prostate showing prostatic acini (PA), connective tissue (CT), prostatic concretion (PC) and smooth muscle (SM) under ×10 objectives stained with H&E stain

Discussion

The mean (±SD) number of prostatic concretions per low power area of microscopic field in the central zone of the prostate was 1.58±0.66, 5.54±3.23 and 7.70±8.29 in Group A, B and C respectively. The maximum mean number of prostatic concretion per low power area of microscopic field in the central zone in the prostate was in Group C and minimum in Group A. The mean (±SD) number of prostatic concretions per low power area of microscopic field in the peripheral zone was 1.95±0.99, 6.56±7.48 and 8.47±9.70 in Group A, B and C respectively. The maximum mean number of prostatic concretion per low power area of microscopic field in the peripheral zone in the prostate was in Group C and minimum was in Group A.

The mean difference of number of prostatic concretions per low power area of microscopic field in the central zone of the prostate was statistically highly significant between Group A & B. The mean difference of number of prostatic concretions per low power area of microscopic field in the peripheral zone was statistically non-significant among all groups.

Mescher, Gunasegaran, Singh I observed that number of prostatic concretions increases with age but they seem to have no physiological or clinical significance[4,5,6].

McConnell observed that corpora amylacea are more abundant in older individuals[7].

Variation of the result might be due to difference in method of collection, fixation, staining, magnification and different methods of measurement. The findings of the present study are nearly similar or less than other authors. It may be due to hardening and shrinkage of specimens or more likely to be due to the racial factors[8].

No previous study analyzing the number of the prostatic concretion in the central and peripheral zone of the prostate per low power area of microscopic field has been available to compare.

Conclusion

From the present study, it was concluded that the mean number of prostatic concretions per low power area of microscopic field in both central and peripheral zone of the prostate was maximum in Group C and minimum in Group A. The mean difference of number of prostatic concretions per low power area of microscopic field in the central zone of the prostate was statistically highly significant between Group A & B and non-significant between Group B & C and Group C & A. The mean difference of number of prostatic concretions per low power area of microscopic field in the peripheral zone of the prostate was statistically non-significant among all groups. The number of the prostatic concretion of prostate gland was increased with advanced ages.

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