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Original Articles

Microscopic Study on the Diameter of the Pineal Calcification of Bangladeshi Cadavers

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Abstract:

Context: *The human pineal gland is characterized by the presence of calcified concretions, called 'pineal acervuli' or brain sand. These are basophilic extracellular bodies. The study was carried out to describe the microscopic features of pineal calcifications and to find out age related changes.*

Study Design: *Cross sectional descriptive type of study.*

Place and period of study: *Department of Anatomy, Dhaka Medical College, Dhaka, from July 2009 to June 2010.*

Materials*: 60 postmortem human pineal glands were collected from unclaimed dead bodies that were under examination in the morgue of Department of Forensic Medicine, Dhaka Medical College, Dhaka.*

Methods: *The samples were divided into four different age groups, i.e. Group-A (15-30 years), Group-B (31-40 years), Group-C (41-50 years) and Group-D (>50 years). Histological study was carried out on relatively 27 fresh samples.*

Results: *The mean diameter of the pineal calcifications were 351.14±111.69 µm in group A, 600.00±232.69 µm in group B, 909.43±124.18 µm in group C and 1541.67±224.54 µm in group D. The differences in diameter of the pineal calcifications between group A & C, A & D, B & C, B & D and C & D were statistically significant.*

Conclusion: *Age related changes were found in the diameter of pineal calcifications.*

Key words: *Pineal gland, pineal calcification, cadaver.*

Introduction:

The pineal gland (or the epiphysis cerebri) is a small, piriform, reddish grey organ, occupying a depression in between the superior colliculi[1]. In human the pineal glands (also known as the epiphysis cerebri or glandula pinealis) was the last endocrine gland to have its function discovered[2]. The pineal gland is capable of influencing or modifying the activity of the pituitary gland, islets of Langerhans, the parathyroid gland, adrenal gland and the gonads[3]. The pineal gland through its hormone, melatonin influences many functions of the human, like circadian rhythm, mood, psychiatric disorder, sexual maturation, reproduction and aging[4]. Melatonin, a potent antioxidant provides protection against damaging free radicals of oxygen[5]. The human pineal gland is characterized by the presence of the calcified concretions, called 'corpora aranacea' or brain sand. The concretions are recognizable in childhood and increase in number with age[6]. Corpora aranacia were in two locations, intrapineal in the pineal parenchyma and extrapineal in the pineal capsule[2]. Various clinical problems occur because of an abnormal melatonin secretion .

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by the pineal glands. For the perfect and complete evaluation of various clinical conditions of the pineal gland, detailed histomorphological knowledge is essential.

Materials and Methods:

The samples of human pineal gland were collected from the whole brain of unclaimed dead bodies that were under examination in the Department of Forensic Medicine, Dhaka Medical College, Dhaka from July 2009 to June 2010.

The collected samples were divided into four groups (according to Golan et al. 2002)

Table-I

Group distribution according to age

Group	Age limit (in years)	Number of samples	
		Male	Female
A	15-30	09	09
B	31-40	17	08
C	41-50	08	03
D	>50	06	00

Procedure for histological study

For the measurement of the diameter of pineal calcifications, from group A, B & C, seven slides from each group were selected and from group D six slides were selected.

Preparation of the slide:

Tissue blocks were fixed in 10% formol saline in a plastic container. The tissues were washed in running tap water, dehydration was done with ascending grades of alcohol, cleared with xylene, infiltrated and embedded in paraffin. Paraffin blocks were cut at 5 mm thickness and were stained with routine Harris' Haematoxylin and Eosin (H & E) stain.

Measurement of the diameter of the pineal calcification:

For the measurement of the diameter of the pineal calcification, a total of 27 slides were examined. Three different fields were chosen from each slide. From each field different calcified areas that were clearly visible were chosen. The diameter of the calcified area was measured by using a stage micrometer and ocular micrometer. Two measurements were taken for each calcified area. One measurement was taken at its maximum transverse diameter and another at perpendicular to the first one. So, the average diameters were measured by taking the mean of the two diameters (Fig. 1,2) for each of them i.e.

(Maximum transverse diameter + Maximum perpendicular diameter) ÷ 2

The stage micrometer calibration was focused under the objective to be used and the ocular micrometer calibration was superimposed on them in such a way that the starting mark on the ocular micrometer matched exactly with a starting mark on the stage micrometer. Then the markers on the stage and ocular micrometer that correspond to each other most closely were noted.

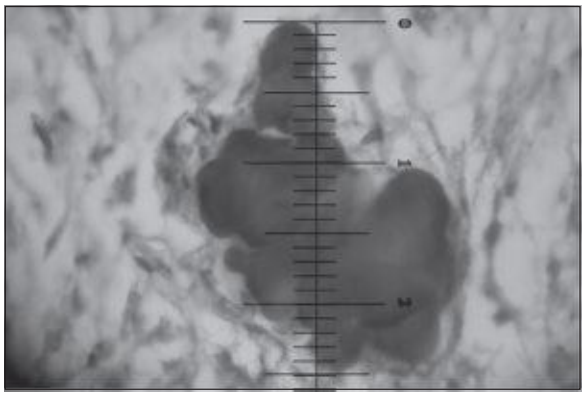

Fig.-1: *Photomicrograph showing measurement of maximum perpendicular diameter of the Pineal calcification (× 40 objective × 10 eyepiece) (H & E stain).*

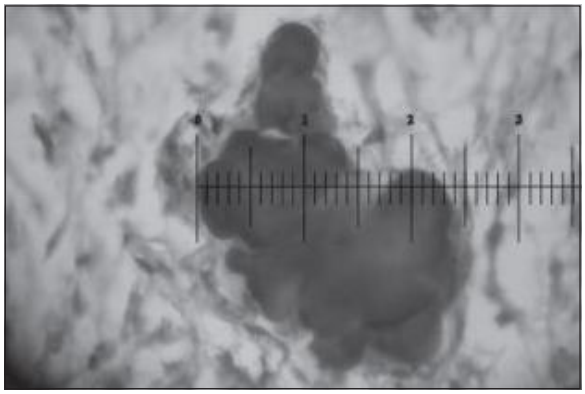

Fig.-2: *Photomicrograph showing measurement of maximum transverse diameter of the pineal calcification (× 40 objective × 10 eyepiece) (H & E stain).*

Results:

In the present study, the mean ±SD diameter of the pineal calcification in the microscopic field was 351.14±111.69µm in group A, 600.00±232.69 µm in group B, 909.43±124.18 µm in group C and 1541.67±224.54 µm in group D. The highest mean diameter was found in group D and the lowest was found in group A. The differences of diameter of the pineal calcifications between group A & C, A & D, B & C, B & D and C & D were statistically significant ($p<0.05$) (Table-II, Fig-3).

Table-II

Diameter of pineal calcification in different age groups

Age groups	Diameter in (µm) Mean ± SD
A	351.14 ± 111.69
(n=7)	(215.00 - 516.00)
B	600.00 ± 232.69
(n=7)	(340.00 - 960.00)
C	909.43 ± 124.18
(n=7)	(730.00 -1020.00)
D	1541.67 ± 224.54
(n=6)	(1200.00 - 1800.00)
	P value
A vs B	>0.05^{ns}
A vs C	<0.001**
A vs D	<0.001***
B vs C	<0.05*
B vs D	<0.001***
C vs D	<0.001***

Figures in parentheses indicate range. Comparisons between groups done by One way ANOVA (PostHoc), ns = not significant, */*** = significant

Group A : Age 15 - 30 years
Group B : Age 31 - 40 years
Group C : Age 41 - 50 years
Group D : > 50 years

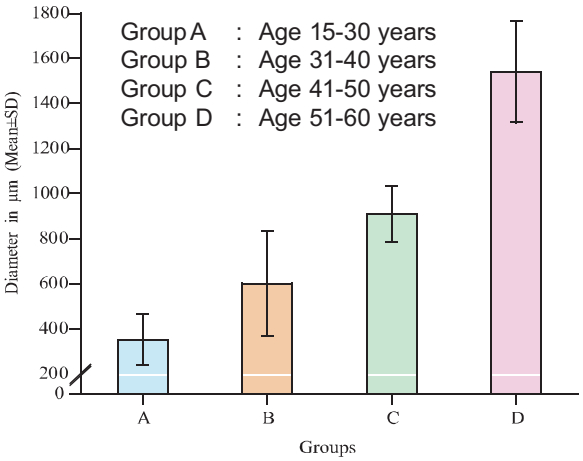

Fig.-3 : *Diameter of pineal calcification in different* age groups

Discussion:

In the present study, the mean±SD diameter of pineal calcification in the microscopic field were found 351.14±111.69µm in group A, 600.00±232.69 µm in group B, 909.43±124.18 µm in group C and 1541.67±224.54 µm in group D. According to Izadi[7], the usual diameter of the pineal calcification is 3-5 mm. Antic et al[8]. (2004) found the diameter of pineal calcification to be ranged from 400 µm to 3 mm. The findings of this study are similar with Antic et al[8] and dissimilar with Izadi[7].

Conclusion:

In the present study, it was observed that a significant change of pineal calcification occur with advancing age.

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