



ORIGINAL RESEARCH PAPER

Radiodiagnosis

APPROACH TO DIFFERENCES IN HEIGHT OF NORMAL PITUITARY GLAND ON MRI : BETWEEN AGE GROUPS AND SEXES

KEY WORDS: Pituitary gland ,Height ,Magnetic Resonance Imaging,Normal range

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ABSTRACT

The pituitary gland shows physiological variations in its size and shape in different age groups in both males and females. Measurement of the height of the pituitary gland is the most important in the detection of abnormal increase in the size. This determination is currently made from measurements using Sagittal and Coronal magnetic resonance images of the pituitary gland in endocrinologically normal individuals of different sex and age groups .

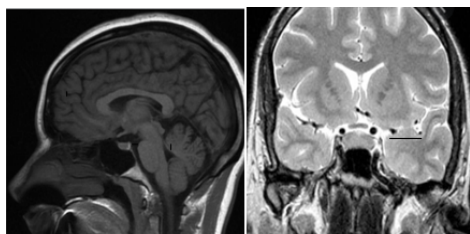
Introduction :

The normal size and shape of Pituitary gland varies in different age8 and sexes . Sometimes the findings are very subtle so systematic approach of the pituitary region is very important . For complete assessment of pituitary gland, we should be aware of its normal anatomy with the physiological variations in its size and shape in different age groups in both males and females.The pituitary enlargement can be significant to cause a sellar enlargement,the sella turcica may enlarge independently from an increase in the volume of the pituitary gland as well as the pituitary gland may enlarge without causing enlargement of the sella l '9-15) .The purpose of this study was to obtain data related to the pituitary gland dependent on age, then to evaluate it by age and sex in a large population.

Materials and Methods :

Measurement of the pituitary gland height is performed on magnetic resonance (MR) images of 150 subjects (78 females, 72 males) who had no evidence of hormonal disorders or other pathologies.

MRI examinations were performed using philips1.5 Tesla scanner.The coronal and sagittal views were displayed using the midline plane of both T1-weighted sagittal spin-echo and T2- weighted coronal spin-echo images. The mid-sagittal T1W image was used to obtain pituitary gland height (cranio-caudal), width (transverse) was measured on a coronal T2 weighted slice through the pituitary stalk.The heights of the pituitary glands were determined by measuring the greatest distance between the base and the top of the gland. The width is measured at the maximum distance to the right and left sides of the pituitary gland.



[Fig-1]: a) Mid sagittal T1W MR image. Black line indicate the height (CC) of pituitary gland; b) Coronal T2W MR image. The black line indicate width of pituitary gland.

Study design:Record based cross sectional study
 Study location : Department of Radiodiagnosis at Maharaja Institute of Medical Sciences, Nellimarla, Vizianagaram, Andrapradesh.
 Study duration : study conducted fromSeptember 2018 to

February 2020.
 Sample size :150

Statistical Analysis

Relation between mean height and age were done by ANOVA test, Chi-square test and p-value<0.05 is considered as significant. Mean and Standard deviations of pituitary height were calculated in the scale of mm.

Results : In this study 150 subjects were studied. They were 78 females and 72 males.

The mean pituitary height in our study is 6.2 ± 0.41 mm. The heights of the pituitary gland increased from birth to 11-20 years of age group (7.4 ± 0.2 mm and 7.6 ± 0.4 mm for males and females, respectively) and the value is higher in females than in males, and then the height decreases with increasing age. It is also observed the activity of the pituitary gland increases in the 51-60 year age range (6.5 ± 0.4 mm and 6.7 ± 0.7 mm for males and females, respectively). p-value for relation of pituitary height with age 0.03 (<.05) which is statistically significant,

The mean pituitary widths (8.9 ± 1.2 mm and 9.3 ± 1.6 mm) and depths (9.5 ± 1.31 mm and 9.5 ± 1.37 mm) in males and females, respectively, did not show remarkable changes with age and sex in the individuals studied

Table no 1 : Sex and Age distribution

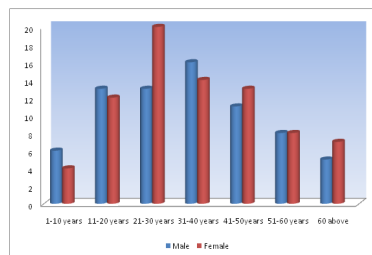


Table-2)Mean value of pituitary height in different age groups

Age group	Mean Height in mm (SD)
1 - 10 years	5.2(±0.6)
11 - 20 years	7.5(±0.3)
21 - 30 years	6.7(±0.4)
31 - 40 years	6.3(±0.4)
41 - 50 years	6.1(±0.3)
51- 60 years	6.6(±0.5)
≥ 60 years	5.0(±0.4)

Table-2: Mean value of pituitary height in different age group and in both sex

Age group	Sex	Mean Height in mm (SD)
1 - 10 years	Male	5.3(±0.7)
	Female	5.1(±0.5)
11 - 20 years	Male	7.4(±0.2)
	Female	7.6(±0.4)
21 - 30 years	Male	6.3(±0.3)
	Female	6.9(±0.5)
31 - 40 years	Male	6.2(±0.5)
	Female	6.4(±0.4)
41 - 50 years	Male	6.0(±0.3)
	Female	6.3(±0.5)
51 - 60 years	Male	6.5(±0.4)
	Female	6.7(±0.7)
≥60 years	Male	5.0(±0.2)
	Female	5.1(±0.6)

Discussion :

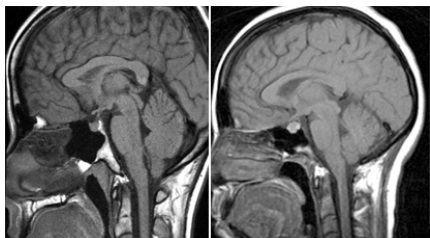
The dimensions of the pituitary gland is different in different age groups. It is due to changes in the hormonal status of the gland at different phases of life, young adults have larger glands than older individuals. Some authors found that these changes are also significantly different between sexes, with larger glands found in females.

The height of the pituitary gland increases gradually, reach its maximum height at puberty. This can be explained by the rapid hormonal changes at puberty, especially in the levels of gonadotropins (LH and FSH). In our study the height of the pituitary gland reaches maximum height during second decade of life in both sexes, with higher values found in females. Faisal et al. reported that females achieved the peak heights in their second decade, while in males it was achieved in the third decade. They explained that peak height is a determinant factor for the development of puberty and this is achieved in females 5 years earlier than in males. They believe that this fact could be responsible for early achievement of maximal height in females.

In our study a second peak in pituitary gland height is noted at the sixth decade of life, which is also greater for females. This findings are similar to findings of Tsunoda et al. and Denk et al. This second peak is due to age-related decrease in circulating gonadal steroids hormones and compensatory hypertrophy after a significant decrease in gonadal steroid feedback effect.

Pituitary height more than 9mm in 21-30 years age group and more than 8mm in other age group was considered as abnormal.

In our study most common shape of the pituitary gland is flat, seen in 42% of people (n=63), convex shape is seen in 34.7% (n=52) and concave shape is seen in 23.3% (n=35) in all the age groups and both the sexes.



[Fig-2]: Pituitary gland showing flat upper margin
[Fig-3]: Pituitary gland is large in size showed convex upper border

Conclusion

Measurement of the height is accurately determined by using

MRI, a good method to evaluate the size of the pituitary gland. Pituitary size can be and should be correlated with the patient's age and sex for further correlation. Pituitary gland size increased during puberty and it completely fills the pituitary fossa. Decline in gland size with age reflect the endocrinology of aging and physiological atrophy, which will facilitate assessment and diagnosis in patients with abnormalities in pituitary function.

LIMITATION

Limitation of our study is selection bias as MRI is expensive test, so normal individuals are difficult to include in this study. Patients with other conditions without clinical or imaging evidence of neuroendocrine or neuropsychiatric pathology were selected.

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