



PINEAL CYST: A GROSS AND RADIOLOGICAL STUDY

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ABSTRACT Understanding the normal age-related macroscopic changes that occur in the human pineal gland will be useful for clinicians and neurologists to plan the course of treatment of various conditions affecting the gland. **AIM:** To study age-related cystic changes in the pineal gland. **MATERIALS AND METHOD:** Studied 24 cadaveric specimens and 100 MRIs of the Brain. **RESULT:** The pineal gland cyst was noted in 8 specimens (33.3%) in a gross study and 10 patients (10%) in a radiological study. There was no correlation between age and pineal gland cyst (chi-square = 0.421, p value = 0.936).

KEYWORDS : Pineal gland cyst

INTRODUCTION

The pineal gland (also called epiphysis cerebri or conarium or third eye) is a small, pinecone-shaped, reddish-gray organ situated in a depression between the superior colliculi¹. It is one of the neuroendocrine secretory circumventricular organs that is not a part of the blood-brain barrier².

The pineal gland typically measures around 7x6x3 mm in size and weighs 100-200mg. It has a profuse blood supply. The main blood supply is from the posterior choroidal arteries which arise from the posterior cerebral artery. Around 10 branches arise from the posterior cerebral artery. Venous drainage is through the internal cerebral veins. The pineal body is innervated by postganglionic sympathetic neurons located in the superior cervical sympathetic ganglia.

The main and most conserved function of the pineal gland is the nighttime secretion of melatonin. Melatonin has a lot of action in our body: mainly it regulates sleep patterns in both circadian and seasonal cycles. It also regulates the functions of the thyroid and pituitary glands and the new bone deposition, sexual development, onset, and frequency of the menstrual cycle. Therefore, the pineal gland is called as "master gland of the body"³

AIM AND OBJECTIVES

To study age-related cystic changes in the pineal gland.

MATERIALS AND METHOD

A cross-sectional observational study was conducted after obtaining Institutional Research Committee and Ethics Committee clearance certificates from Government Medical College, Kozhikode, Kerala.

The present study was conducted on 24 embalmed and formalin-fixed adult cadavers in the Department of Anatomy and retrospective evaluation of 100 MRI scans of the Brains of patients in the Department of Radiodiagnosis in the year 2020 – 2021. The dissection was carried out according to Cunningham's Manual of Practical Anatomy 16th edition, volume 3.

One hundred MRIs of the brains of patients with ages ranging from newborn to 86 years of both sexes were studied in the Department of Radiodiagnosis in the presence of a co-guide. The patients are grouped into four, depending on their age, Group A (0-20 years), Group B (21-40 years), Group C (41-60 years), and Group D (60 years). The inclusion criteria for the study were MRI of the Brain of all age groups, referred to the Department of Radiodiagnosis from various departments of Government Medical College, Kozhikode, Kerala. The exclusion criteria were Intracranial hemorrhage, abscess, and tumor. For statistical analysis, all qualitative data obtained were quantified according to the frequencies. Frequencies were calculated as percentages. The findings were compared with the previous study.

RESULTS

Of the 24 specimens of cadavers that were dissected, 20 were from males and 4 were from females. The pineal gland cyst was noted in 8 specimens (33.3%) (2 females (25%) and 6 males (75%).

Of the 100 MRI scans that were evaluated, 52 were from male patients and 48 were from female patients. Pineal gland cyst was noted in 3 patients (8.1%) in Group A, 2 (9.1%) in Group B, 3 (11.5%) in Group C, 2 (13.3%) in Group D. Total of 10 patients (10%) (4 males (40%) and 6 females (60%)), which shows that the frequency of pineal gland cysts increases as age increases. But there was no statistically significant correlation between age and pineal gland cyst (chi-square = 0.421, p value = 0.936).



Fig 1: Transverse Section Of Pineal Gland Showing Cysts (enlarged View); A-large Cyst, B- Two Small Cysts.

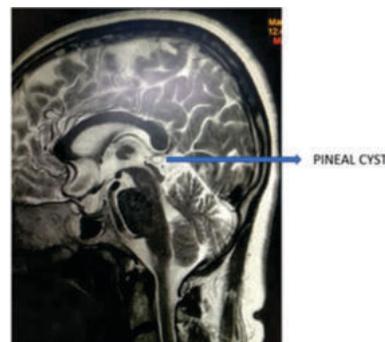


Fig 2: Pineal Cyst In Mri Of The Brain

DISCUSSION

The gross study showed 8 pineal cyst specimens (33.3%), of which 2 were females and 6 were males and the radiological study showed 10 pineal cyst cases (10%), of which 6 were females and 4 were males. The incidence rate is higher in the 40-60 age group. The prevalence of the pineal gland cyst in previous studies is tabulated in Table No. 1.

Table No: 1 Comparison Of Incidence Of Pineal Gland Cysts

Sl No.	Authors	Sample Size	Year	Percentage of Prevalence	Type of Study
1	Jinkins et al. ⁶	250	1995	10.8	Radiological

2	Pu Y et al. ³	100	2007	23	Radiological
3	Lacroix-Boudhrioua et al. ⁹	172	2011	11	Radiological
4	Rabia et al. ⁵	30	2016	26.7	Morphological
5	Sigurdardottir ¹⁰	126	2016	59	Radiological

In 1995, Sawamura et al.⁷ found a peak incidence of PC occurring in ages between 21-30. In 2009, Al-Holou et al.⁸ described Pineal cysts in patients of all ages, with an increased prevalence in older patients. Sing R et al.² (2014) found PC in all age groups but there is an increase in their number and size with advancing age.

The present study findings are closely related to the study of Jinkins and Lacroix-Boudhrioua et al.

CONCLUSION

The pineal gland cyst was noted in 8 specimens (33.3 %) in the cadaveric study. The pineal gland cyst was noted in 10 patients (10%) in a radiological study. There was no correlation between age and pineal gland cyst (chi-square = 0.421, p value = 0.936).

In brief, the observations made on the pineal gland at different age groups show that the gland does undergo significant changes in age. Knowledge of this may be useful in future studies.

REFERENCES

1. Susan Standing. Gray's Anatomy, The Anatomical Basis Of Clinical Practice. Churchill Livingstone Elsevier International edition 41st, 2016; Page no. 503
2. Singh, R., Ghosh, S., Joshi, A., & Haldar, C. (2014). Human pineal gland: Histomorphological study in different age groups and different causes of death. *Journal of the Anatomical Society of India*, 63(2), 98–102. <https://doi.org/10.1016/j.jasi.2014.11.004>
3. Molecules | Free Full-Text | Pineal Calcification, Melatonin Production, Aging, Associated Health Consequences and Rejuvenation of the Pineal Gland [Internet]. [cited 2019 Nov 4] Available from: <https://www.mdpi.com/1420-3049/23/2/301>
4. Pu, Y., Mahankali, S., Hou, J., Li, J., Lancaster, J. L., Gao, J.-H., Appelbaum, D. E., & Fox, P. T. (2007). High prevalence of pineal cysts in healthy adults demonstrated by high-resolution, non-contrast brain MR imaging. *AJNR. American Journal of Neuroradiology*, 28(9), 1706–1709. <https://doi.org/10.3174/ajnr.A0656>
5. Rabia, D. A., Hayat, N., Nadir, S., & Tahir, M. (2016). Age-related Cyst Formation in Human Pineal Gland. *Pakistan Journal of Medical and Health Sciences*, 10, 448–451.
6. Jinkins, J. r., Xiong, L., & Reiter, R. j. (1995). The midline pineal "eye": MR and CT characteristics of the pineal gland with and without benign cyst formation. *Journal of Pineal Research*, 19(2), 64–71. <https://doi.org/10.1111/j.1600-079X.1995.tb00172.x>
7. Sawamura, Y., Ikeda, J., Ozawa, M., Minoshima, Y., Saito, H., & Abe, H. (1995). Magnetic resonance images reveal a high incidence of asymptomatic pineal cysts in young women. *Neurosurgery*, 37(1), 11–15; discussion 15–16. <https://doi.org/10.1227/00006123-199507000-00002>
8. Al-Holou, W. N., Garton, H. J. L., Muraszko, K. M., Ibrahim, M., & Maher, C. O. (2009). Prevalence of pineal cysts in children and young adults. *Clinical article. Journal of Neurosurgery. Pediatrics*, 4(3), 230–236. <https://doi.org/10.3171/2009.4.PEDS0951>
9. Lacroix-Boudhrioua, V., Linglart, A., Ancel, P. Y., Falip, C., Bougnères, P. F., & Adamsbaum, C. (2011). Pineal cysts in children. *Insights into Imaging*, 2(6), 671–678. <https://doi.org/10.1007/s13244-011-0117-0>
10. Sigurdardottir, L. G., Markt, S. C., Sigurdsson, S., Aspelund, T., Fall, K., Scherhammer, E., Rider, J. R., Launer, L., Harris, T., Stampfer, M. J., Gudnason, V., Czeisler, C. A., Lockley, S. W., Valdimarsdottir, U. A., & Mucci, L. A. (2016). Pineal Gland Volume Assessed by MRI and Its Correlation with 6-Sulfatoxymelatonin Levels among Older Men. *Journal of Biological Rhythms*, 31(5), 461–469. <https://doi.org/10.1177/0748730416656948>