

ORIGINAL RESEARCH

Morphometric Assessment Of Frontal Horn Of Lateral Ventricles Of Left Side Of The Brain With Respect To Gender By Computed Tomography In Western Up Population

¹Ashutosh Yadav, ²Sumita Shukla, ³Alka Singh, ⁴Anshu Mishra

^{1,2}Assistant Professor, ^{3,4}Professor, Department of Anatomy, Rajarshi Dashrath Autonomous State Medical College, Ayodhya, Uttar Pradesh, India

Corresponding Author

Ashutosh Yadav

Assistant Professor, Department of Anatomy, Rajarshi Dashrath Autonomous State Medical College, Ayodhya, Uttar Pradesh, India

Email: yadavashutosh300@gmail.com

Received: 08 June, 2023

Accepted: 10 July, 2023

ABSTRACT

Background and Aim: The human brain undergoes many gross and histopathological changes with regression of the brain tissue leading to the enlargement of the ventricles as age advances. Knowledge of morphometry and size of normal ventricular system of the brain is of utmost importance to understand these changes. **Methods:** The present study was carried on 200 patients [100 males and 100 females] in the age group of 10-80 years. GE OPTIMA CT 660 was used for obtaining the scans and these were statistically analyzed. **Results:** With respect to side and gender, the length of frontal horn of left side was 31.1 mm, 29.9 mm in males and females respectively

Key words: Frontal horns, lateral ventricles, computed tomography.

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-Non Commercial-Share Alike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

INTRODUCTION

The ventricular system of brain contains cerebrospinal fluid which is mostly secreted by the choroidal plexuses of the ventricular system. Each cerebral hemisphere contains a lateral ventricle which is roughly a C shaped cavity lined by ependyma and filled with cerebrospinal fluid¹. The other two cavities of this system are the third and fourth ventricles, while the cerebral aqueduct of Sylvius is one of the interconnecting channels, and it ensures the communication between the third and fourth ventricles. The function of the ventricles is to house the cerebrospinal fluid (CSF) and provide the passage for its circulation, produce and contain cerebrospinal fluid (CSF), and the entire surface of the ventricular system is a well organized interconnecting system spanning every region of the brain. The channels connecting the lateral ventricles to the third (the midline ventricle) are called the interventricular foramen (or foramen of Monro).

MATERIAL AND METHODS

Data for the present study was collected from the CT scans done at the O.P GUPTA IMAGING CENTRE, MEERUT & MIMHANS NEUROSCIENCES HOSPITAL, MEERUT. The CT scans were randomly selected, which were reported by radiologists as normal. Two hundred (200) CT scans in the age group of 10-80 years were taken. The study group includes 100 males and 100 females. CT scans with history of head injuries, cerebral infarctions, local mass lesions and previous intracranial surgeries were excluded from the study. The details of the case such as name, age, sex, address, inpatient or outpatient number and indications for CT were collected. The CT scan machine used for this study at the O.P GUPTA IMAGING CENTRE, MEERUT was GE OPTIMA 660 Version 2.0, having a fan beam scanner with a scan time of 1 to 10 seconds.

RESULT

200 normal CT scans in the age group of 10-80 years were taken for the study in which 100 were CT scans of males and 100 were CT scans of females.

Table I: Length of frontal horns of lateral ventricle in between age groups and left frontal horns

Age (Yrs)	No.	Left Frontal Horn				P value
		Mean	SD	Min	Max	
10-19	32	30.1	2.4	23	34	>0.05
20-29	47	30.1	2.9	23	36	
30-39	30	30.3	2.0	25	33	
40-49	30	30.6	2.5	25	36	
50-59	35	30.7	2.5	26	35	
60-69	17	31.6	1.7	29	35	
70-79	09	31.4	2.4	28	34	
TOTAL	200	30.5	2.5	23	36	

Figure No.-I: Length of frontal horns of lateral ventricle in between age groups and left frontal horns

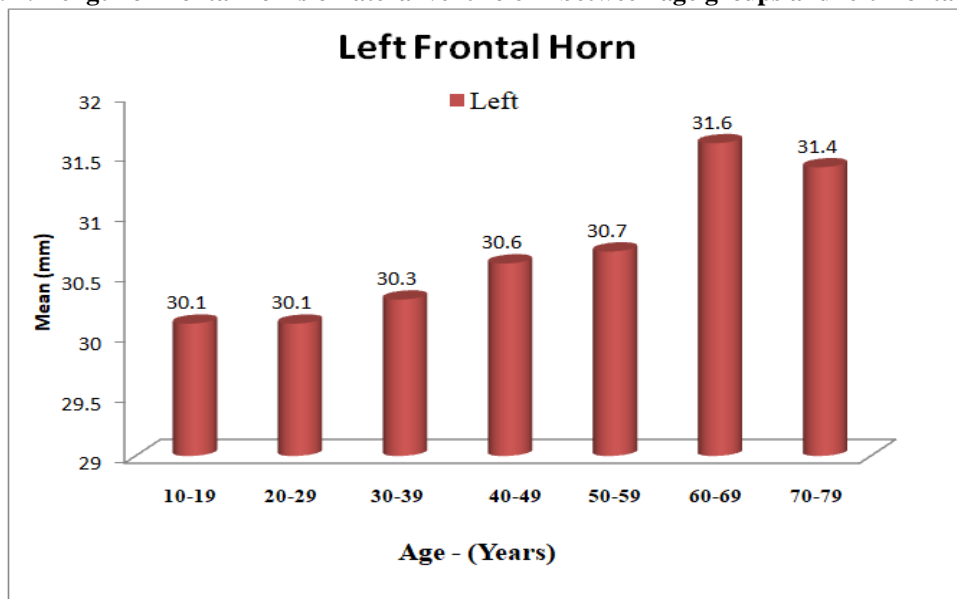


Table No.- II: Gender wise changes in the length of frontal horn on left side

	MALE				FEMALE				TOTAL	
	No.	Mean[mm]	SD	p-value	No.	Mean[mm]	SD	p-value	No.	Mean[mm]
LEFT	100	31.1	2.5	<0.0001	100	29.9	2.3	<0.002	200	30.5

Figure No.-II: Gender wise changes in the length of frontal horn on left side

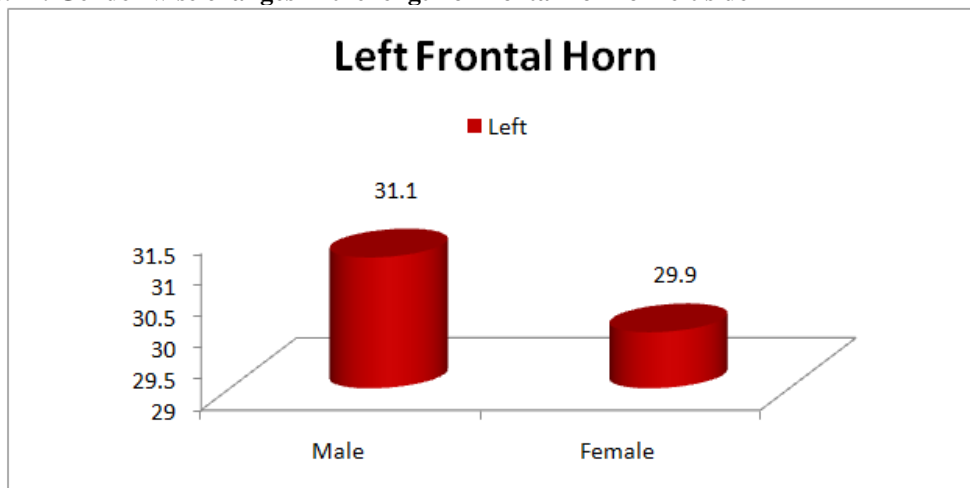
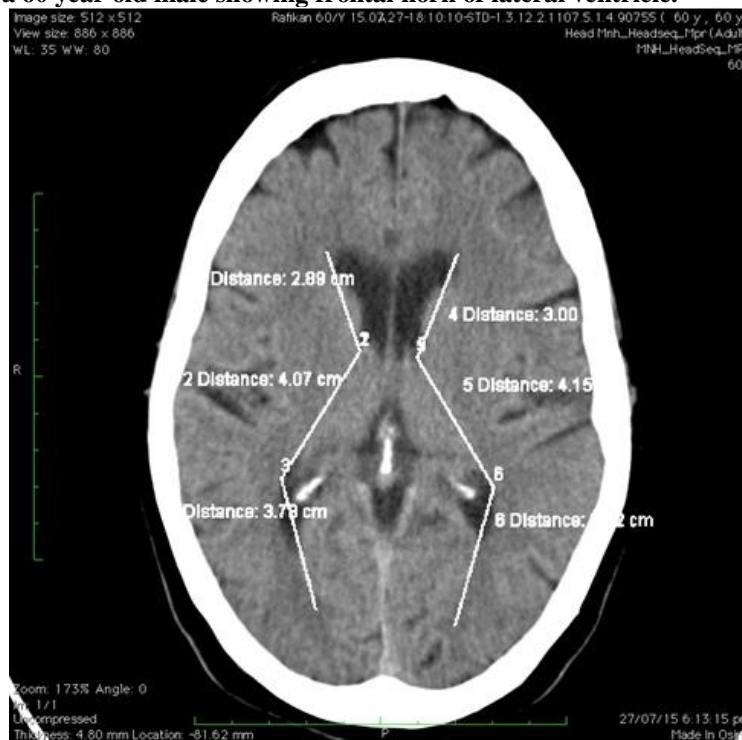


Fig No.-III: CT Scan of a 50 year old male showing frontal horn of lateral ventricle



Fig-IV: CT Scan of a 60 year old male showing frontal horn of lateral ventricle.



DISCUSSION

In the present study, computerized Tomographic Scans (CT Scans) of 200 patients (Males-100 and Females-100) were examined for the various morphometric measurements of the lateral ventricles of the brain and it was observed that the length of the frontal horns on the left side was 31.1 ± 2.5 mm and 29.9 ± 2.3 mm in the males and females respectively.

In D'Souza study², computerized Tomographic Scans (CT Scans) of 1000 patients were examined for the various morphometric measurements of the ventricles of the brain and it was observed that the anteroposterior extent of the frontal horns on the right side was $27.4+3.6$ mm and $25.5 + 3.3$ mm in males and females and $27.8 + 3.7$ mm and on the left side was $25.8 + 3.5$ mm in males and females.

Both left and right ventricles were large in males compared to females. This is because males skull were heavier and bigger, the capacity of the skull is more compared to female skull and also because the brain size is more in males compared to females³. Older studies by Gawler et al⁴ revealed that the greatest distance between the roof and the floor of the fourth ventricle was less than 10.8 mm⁵.

In 2007, D' Souzae, Dias Medora C, Natekar Prashanth F examined the CT scans of 1000 patients (500 males and 500 females) in the age group of 30-50 years for various morphometric measurements of ventricles of brain. It was observed that the anteroposterior extent of the lateral ventricles (inclusive of their frontal horns on the right side was 6.96 ± 0.76 cms and 6.57 ± 0.75 cms in males and females, and on the left side was 7.09 ± 0.78 cms and 6.73 ± 0.77 cms in males and females. Anteroposterior extent of the frontal horns on the right side was 2.74 ± 0.36 cms and 2.55 ± 0.33 cms in males and females, and 2.78 ± 0.37 cms and on the left side was 2.58 ± 0.35 cms in males and females. It was found that left lateral ventricle was greater than right one and both were larger in males. The lateral ventricular contour are relatively constant except for occipital horns².

A study by Matsuzawa, Goldestien et al. shown that the left lateral ventricle was larger than the right one and both were larger in the female⁶.

CONCLUSION

In CT study, it was observed that length of frontal horn on the left side was 31.1 mm, 29.9 mm in males and females respectively.

The present study has defined the morphometric measurements of frontal horns of lateral ventricles of the brain by CT, which has clinical correlations in diagnosis, treatment and surgical intervention. Morphometric analysis of cerebral ventricular system is important for evaluating changes due to growth, ageing, intrinsic and extrinsic pathologies⁷.

REFERENCES

1. Dutta AK. Essentials of human embryology. 5th ed. Kolkata: Current Books International 2007; pp. 261-3.
2. D' Souza e Dias, Medora C, Natekar Prashanth E. Morphometric study of the ventricular system of brain by computerised tomography. Journal of Anatomical Society of India 2007;56(1):1924.
3. Williams PL, Bannister LH, Berry MM, Collins P, Dyson M, Dussek JM. Gray's Anatomy: The Anatomical Basis of Medicine and Surgery. 38th Edition, Elsevier Churchill Livingstone, Edinburgh. 1995; 1205-1209.
4. Galwar J, Bull JWD, Du Boulay GH, Marshall J. Computerized axial tomography: the normal EMI scan. Jour of Neurol, Neurosurgery and Psy 1975; 38: 935-947
5. Soininen H, Puramen M, Riekkinen PJ. Computed Tomography Findings in Senile Dementia and Normal Ageing. Jour of Neurol, Neurosurgery and Psy. 1982; 45: 50-54.
6. Takeda S, Matsuzawa T. Age-related change in volumes of the ventricles, cisternae, and sulci: a quantitative study using computed tomography. J Am Geriatr Soc. 1985; 33: 264-268.
7. Aziz, Aamer, Hu, Qing M, Nowinski, Wieslaw L. Morphometric analysis of cerebral ventricular system from MR images. Med Imag 2004;5369:574-82