

ORIGINAL ARTICLE

CT Scan Study of Third Ventricles Dimensions in Normal PopulationSARFRAZ AHMED¹, MUHAMMAD NAUMAN AKRAM², AMIR HUSSAIN ASHRAF³, AMINA NOOR⁴, FAIZA IRSHAD⁵, MUFASSAR NISHAT⁶¹Assistant professor of Radiology Allama Iqbal memorial teaching hospital khawaja Muhammad safdar medical college²Associate Professor Radiology Sahara Medical College / Sughra Shafi Medical Complex Narowal³Assistant Professor Radiology Aziz Fatimah Hospital Faisalabad⁴Assistant professor radiology Sahara Medical College Sughra Shafi Medical Complex Narowal⁵MBBS, Mphil Anatomy Associate professor Anatomy University medical & dental college. Faisalabad⁶MBBS, FCPS (Plastic surgery) Associate professor plastic surgery University medical & dental college. Faisalabad

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ABSTRACT

The human brain is not only one of the most important organs in the human body, but it is also one of the most convoluted and is still not fully understood. As the process of aging continues, the brain goes through a number of changes as a whole, including both physical and histological shifts

Study Design: Research utilizing a cross-sectional prospective study design

Study Duration: January 2021 and continuing through November 2021.

Place of Study: Allama Iqbal memorial teaching hospital khawaja Muhammad safdar medical college Sialkot

Methodology: The participants in the study were given a standardized questionnaire to complete, in addition to a variety of checklists, in order to complete their assessments. The data was transferred over to SPSS version 23 for additional analysis. In order to investigate the nature of the connection that exists between age and gender, in addition to the height and diameter of the third ventricle, we turned to Pearson's product-moment correlation coefficient.

Result: The analysis of variance (ANOVA), which calculates the mean difference between age groups, was performed. The p-value needs to be lower than 0.05 in order for the experiment to be considered statistically significant. The mean height of the third ventricle in males was 13.57 millimeters and the mean height in females was 13.52 millimeters. The mean diameter of the third ventricle in males was 2.98 millimeters and the mean diameter in females was 2.56 millimeters. When the size of the third ventricle in males was compared to that of the third ventricle in females, it was discovered that the size of the third ventricle in males is greater than that of the third ventricle in females.

Keywords: CT Scan, ventricles dimensions, hydrocephalus, schizophrenia, psychotic disorders

INTRODUCTION

The human brain is not only one of the most important organs in the human body, but it is also one of the most convoluted and is still not fully understood. As the process of aging continues, the brain goes through a number of changes as a whole, including both physical and histological shifts. One of these shifts is a loss of brain tissue, which leads to an enlargement of the ventricles. This is one of the alterations. The third ventricle can be located in a slit-like cleft that runs between the two thalami. This cleft houses the third ventricle. It is connected to the lateral ventricles anteriorly by the interventricular foramina, and it is connected to the fourth ventricle posteriorly through the cerebral aqueduct. Both of these connections are located at the front of the brain. In the morphometric research of the third ventricle in radiology practice in Pakistan, there was a paucity of literatures, and the reference values that are now being utilized were obtained from other populations and races that had different epidemiological, demographic, and anatomical distributions. In other words, the research was limited by the lack of available literatures. In addition, radiologists were frequently faced with challenges when attempting to determine whether or not ventricles fall within normal boundaries. A choice that is made solely on the basis of one's own individual experiences. In addition, ventriculomegaly is a clinically significant feature that has been associated to a wide variety of illnesses. An expansion of the third ventricle is linked to a wide variety of clinical conditions, such as schizophrenia, hydrocephalus, and malignancies, in addition to the natural process of aging, which can result in dementia. There is a paucity of information regarding the ranges of third ventricle diameters for adult Pakistanis in both the published literature and the clinical practice of radiology. This lack of knowledge is due to the fact that there are not enough measurements taken from adult Pakistanis. It is therefore of the utmost importance to have a good understanding of what the normal size of the third ventricle is in Pakistanis in order to evaluate the severity of ventriculomegaly in any illness condition that can impact the size of the third ventricle. This is because any illness condition that can impact the size of the third ventricle can cause ventriculomegaly. It is anticipated that

this research will make a major contribution to the existing body of research knowledge, both in a theoretical and practical sense. Because there is less information available regarding the size measurements of the third ventricle, and because no work has been done in Pakistani, the current study will be highly significant in shading a light for additional research.

MATERIALS AND METHODS

This prospective study was comprised of data collected from subjects who were undergoing computerized tomographic evaluation of Adults at the Department of Radiology of Allama Iqbal memorial teaching hospital and Khawaja Muhammad safdar medical college between the months of January 2021 and November 2021. The participants in the study were provided with information regarding the purpose of the study in addition to the procedures that were going to be used. At the time that the data were being gathered, informed verbal consent was obtained from each and every individual who participated in the study. A CT scanner Bright speed 4slices with a slice thickness of 5 mm was utilized on the participants for the purpose of imaging the head and brain. This was done because various customers' image requirements varied greatly from one another. The participants in the study had no history of alcoholism, substance abuse, head trauma, cerebral infarction, local mass lesions, likely communicating hydrocephalus, cerebral mass lesions, or previous intra-cerebral surgery. In addition, they did not have any local mass lesions or cerebral mass lesions. In addition to this, demographic information was recorded, which included the ages, genders, and other characteristics of the people who participated. After ensuring that there was no rotation or tilt of the midsagittal plane while the patient was on the CT table, the patient was then positioned in the supine position. Measurements were taken from the axial portion of the CT scans with the use of the Radi AntiDiacom Works Software. The maximum height of the third ventricle and the maximum width of the third ventricle were both measured in millimeters. Figure 1 shows the maximum width, while Figure 2 shows the maximum height. Residents in the medical specialty of radiology were the ones who were in charge of

carrying out the measurements. While the numerical data were being collected and subsequently transmitted to the statistical computer package used for social sciences, there were at least three rounds of checking the accuracy of the numerical data to ensure that it was accurate (SPSS). Before beginning the study, the data that had been acquired were put through a series of checks to ensure that they were complete, accurate, and easy to interpret. The data were analyzed using IBM SPSS Statistics version 23. To calculate the means (including standard deviation), ranges, minimum, and maximum values, as well as the confidence intervals for the mean at 95%, calculations were done. This was done in order to account for the actual population mean in 95% of the cases

RESULTS

In terms of their socioeconomic standing, the patients' characteristics are as follows: The inclusion criteria led to the recruitment of a total of 120 patients for the study, with 60 of them being female (representing 50.0% of the total). At the time that they were originally examined, the patients' ages ranged anywhere from 18 to 80 years old. The age range of 18 to 29 years old was represented by 44.7% of the total patients who were taken into consideration for the study. When it comes to the origins of the participants, 87.42 percent were from more rural parts of the country. In terms of the participants' ancestral backgrounds, 97.41 percent were of Punjabi heritage. There was a discernible constant increase in the transverse diameter of the third ventricle from the age group of thirty to forty-two years old all the way up to the age group of more than fifty years old. It was revealed that the mean height of the third ventricle had attained its maximum value in patients between the ages of 41 and 50 years old

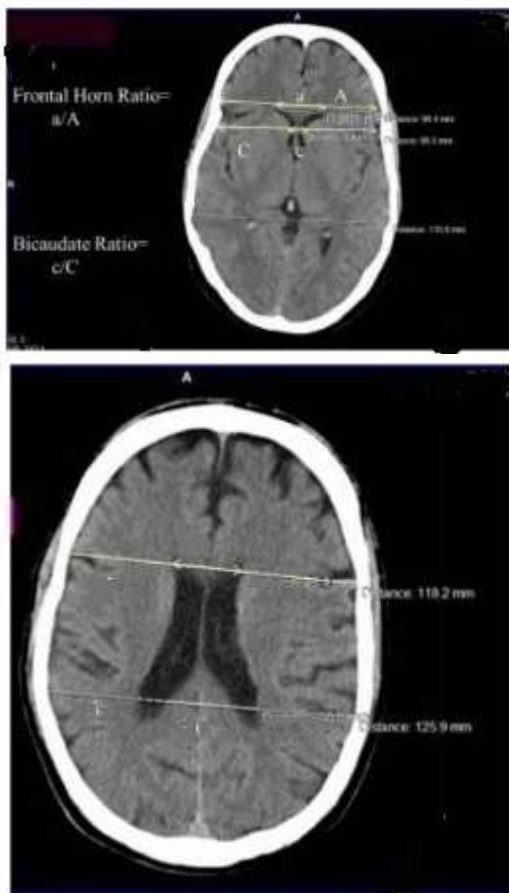


Figure 1:

DISCUSSION

The ventricular system is the name given to one of the cavities that are found within the brain. The diameter of the third ventricle was found to be 2.92 millimeters in males and 2.87 millimeters in females, as determined by the outcomes of this research. The third ventricles of males, on average, were larger than those of females. There was a correlation between the subjects' age and the size of their third ventricles, and this correlation held true for both male and female participants. The adult subjects' third ventricles became larger as they got older. There was a statistically significant but not overly strong positive association between the age of the patients and the size of the third ventricle ($r = .199$, $P < 0.009$ for third ventricle transverse diameter, and $r = .186$, $P < 0.019$ for third ventricle height respectively). This association was positive but not overly strong. The research provided morphometric information regarding the third ventricle that was beneficial in the diagnosis of numerous ailments. Some of these illnesses include hydrocephalus, schizophrenia, and psychotic disorders. It is generally agreed that statistical significance is achieved when the p-value is at least 0.05 points lower than the threshold. There was a correlation found between the age of the patient and the size of the third ventricle. The two-tailed t-test was used to assess the variations in constantly varying features that were discovered between two separate groups in order to draw conclusions about the significance of those differences.

Before making a diagnosis of aberrant third ventricular enlargement, a clinician needs to be conversant with the typical morphometry of the third ventricle. As we age, the physical structure of the brain, as well as its histological make-up, goes through a variety of shifts. Regression of brain tissue, which leads to an expansion of the ventricles, is one of the alterations that can occur as a result of this condition. Therefore, it is vital to have understanding of the changes that occur in the brain as a result of aging before attempting to analyze any data that are considered to be anomalous. According to the findings of this study, the width of the third ventricle ranged from 1.86 millimeters to 6.76 millimeters in females and from 2.12 millimeters to 7.32 millimeters in males. In the meantime, the diameter of the third ventricle ranged from 8.23 millimeters to 18.12 millimeters in males and from 6.85 millimeters to 16.48 millimeters in females. This finding was a significant amount lower than what Saudi Arabia had previously declared in the past. It's conceivable that this is due to the fact that the new study used a smaller sample size than the previous one did, but nevertheless, the underlying pattern that the third ventricle diameters of males were bigger than those of girls was confirmed. In addition to this, the diameters of the third ventricles in the males were found to be larger than those seen in the females. The findings of this discovery were similarly consistent with those of studies conducted on Zimbabweans. According to the findings of those research, the size of the third ventricle in men is much larger than the size of women's hearts. However, an earlier study that was carried out in India with eleven normal patients reported a mean third ventricle width of 4.06 mm; this disparity may be related to the fact that their study used a smaller sample size. The current study discovered that the mean diameter of the third ventricle was 2.92 mm; however, the earlier study reported a mean third ventricle width of 4.06 mm. The size of the third ventricle on the left side of the heart, when measured next to the size of the third ventricle on the right side of the heart, is greater than the size of the third ventricle on the right side of the heart. In later research, it might be able to make comparisons between HIV-positive and HIV-negative patients by drawing parallels between their experiences. The samples for the current study were taken from a relatively small population of patients who were receiving diagnostic care at a comprehensive specialty hospital that is affiliated with the University of Gondar. This is in contrast to earlier studies, which were for the most part carried out in developed nations. In addition, the findings of the CT scans that were used in this study as well as those that were used in the aforementioned earlier research were sampled from individuals who had health

concerns that required a CT scan examination of the brain, such as headaches. These individuals were sampled from the same group of people who were used in the current study. Despite the fact that the results of this study might prove to be useful as a foundation for more, more in-depth research in prospective studies to be conducted in the future. Because of the implications that this has, the findings of this study need to be regarded with extreme caution if they are to be extended to the overall population of Pakistan. As a consequence of this, it was proposed that future study ought to compare the outcomes of healthy individuals selected with due care from the general population of Pakistanis with the outcomes of patients who were experiencing neurological diseases.

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