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Brain Tumour Types Managed At A Tertiary Neurosurgical Centre In Jos, North Central Nigeria.

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Abstract:
Background: *There are variations in the global, regional and local distributions of the histopathological types of brain tumour. A national brain cancer registry is necessary to document various types of brain tumours seen in various individual centres that deal with the management of brain tumours. This study aims to provide information about the various types of brain tumours presenting to our facilities.*
Methods*: This is a retrospective descriptive study of all consecutive patients with brain tumour presenting to the Jos University Teaching Hospital and who had surgical excision of the tumour either partly or as a whole between January 2012 and December 2020. Their case notes were obtained and data related to their demographics, presenting symptoms and their histopathologies were retrieved and entered into SPSS version 26 spreadsheet for analysis. The analysis was first done on all the patients combined and then patients were divided into the paediatric age group (16 years and below) and the adult age group (above 16 years) and analyzed separately. Age was summarized as median and interquartile range, whilst the remaining parameters were expressed as proportions and percentages.*
Results: *The median age in the paediatric age group was 6 years (IQR= 11) and 40 years (IQR= 20.5) in the adult age group. The male: female ratio was 1:3.4 in the paediatric age group and 1:0.95 in the adult age group. The most common symptom in both age groups was headache. The most common histological type in the paediatric age group was the gliomas whilst meningioma was the most common type in the adult age group.*
Conclusion*: The gliomas are the most common tumour type when all the age groups are combined. In the adult age group, meningioma is the most common tumour type, whilst in the paediatric age group, the gliomas have a much larger proportion than the other types.*
Key words: *Brain tumours, Histopathology, Jos, meningiomas, gliomas,*

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I. Introduction

Brain tumours are neoplastic masses arising from the brain parenchyma or from the surrounding meninges. Strictly speaking, a tumour is neoplastic in nature meaning that its growth exceeds that of the normal tissue and is uncoordinated and persists in this excessive manner even when the invoking stimulus has been removed. The term tumour can also be used colloquially to refer to any abnormal swelling. In the period between 2003 and 2007, the global incidence of malignant brain tumour was 4.25 per 100,000 person years with a figure of 6.76 in Europe and

2.81 in Africa.[1] In 2016, a systematic review for the global burden of disease revealed a global incidence of 330,000 new cases of central nervous system cancers of which brain tumour was a part. It was also observed that the age standardized rate increased by 17.3% between 1990 and 2016.[2] According to the International agency for Research on Cancer, there were 19.3 million estimated new cases of cancer worldwide in 2020. This figure was compiled for 185 countries. Of this figure, brain tumours accounted for 308,102 cases: thus brain tumour accounted for 1.6% of all cancers.[3] There is a significant geographical and regional variation in the incidence and prevalence of brain tumours. This variation may reflect the differences in the genetic and environmental factors as well as the differences in making diagnoses and the reporting of cases.[2] Differences have also been noted between tribes in the same country. Developed countries seem to have higher rates of brain tumours when compared to the less developed countries. Again this may be due to higher registration and

reportage rate seen in the developed countries. Like other cancers, brain tumours tend to increase with age. In childhood, brain tumours are the second most common cancers.[4] The cause of brain tumour is unknown, but usually involves an interplay between genetic predisposition and environmental factors such as ionizing radiation, infections and immune factors.[4] The classification of brain tumours continues to undergo transformation in a bid to improve the ability of the classification system to accurately classify the tumours based on morphology and correlate with genetic origin and clinical behavior.[5,6,7,8] The presentation of brain tumours varies with the tumour type, grade of tumour, location of tumour and the age of the patient. Generally, tumours produce symptoms by irritating, destroying or compression of the surrounding brain tissue. The symptoms may be focal or generalized which may be related to raised intracranial pressure.[9,10] In our environment, the absence of a brain cancer registry makes it difficult to estimate the incidence or prevalence of brain tumours/cancer in our population. What is usually available are single centre studies. The aim of this study is to provide data about brain tumours in our locality that would eventually, with other studies, provide a robust database towards the acquisition of a national brain cancer registry.

II. Materials and Methods

This is a retrospective cross-sectional study of all consecutive patients of all ages and sex presenting to the Jos University Teaching Hospital between January 2012 and December 2020.

Study design: Retrospective cross- sectional descriptive study.

Study location: This is a hospital based study carried out at the Division of Neurosurgery, Department of Surgery, Jos University Teaching Hospital. This hospital is a tertiary health facility that amongst others provides neurosurgical services to Plateau State and surrounding states in north central Nigeria.

Study Duration: From January 2012 to December 2020

Sample Size: Ninety two (92) patients

Sample Size calculation: This is a total sampling of the study population.

Subjects and selection method: The subjects were consecutive patients with brain tumour who presented to the Jos University Teaching Hospital between January 2012 and December 2020, who had surgical excision of their tumours as a whole or in part.

Inclusion criteria: Patients of all ages and sex with a histopathological diagnosis presenting within the above period.

Exclusion criteria: Patients with incomplete records.

Procedure Methodology:

The case notes of the patients were obtained and their demographics and clinical symptoms were retrieved. Their corresponding histopathological diagnoses were retrieved from their folders and where not available in their case notes were obtained from the histopathology department. The retrieved information was then entered SPSS spreadsheet.

Statistical analysis: The data was analyzed using the Statistical Package for the Social Sciences (SPSS) version 26. The data was first analyzed as a whole. The data was then categorized into the paediatric (16 years or below) and the adult age groups (age > 16 years), Age was summarized as median and interquartile range, sex, symptoms and histological types were expressed as proportions and percentages and represented in pie and bar charts.

III. Results

There was a total of 115 patients with brain tumours who presented within this period and who had surgical excision of their tumours. However, only 92 had complete records and these were the ones used for analysis. Analyzing the data as a whole, the median age of the patients was 37 years (IQR= 20). There was a slight female preponderance. There was also a slight preponderance of the gliomas for the combined group (figure 1).

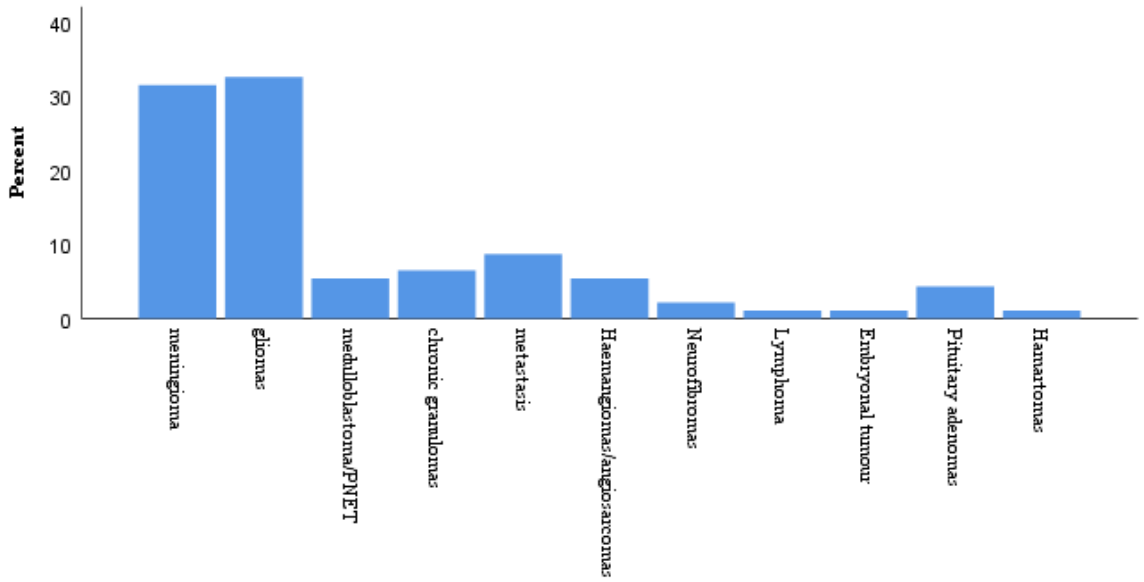

Fig 1- histopathological variants of all patients

The paediatric brain tumours constituted about 23.9% of all the brain tumours. The median age in this group was 6 years (IQR= 11). The peak age for the brain tumour in this group was in the 2.5-5.0 year class (Figure 2). The male: female ratio was 1: 3.4. The most common presenting symptom in this group was headache, followed by visual deterioration (Figure 3). In this age group also, more than half of the tumours were gliomas (54.5%) followed by medulloblastomas and PNETS. Figure 4.

The adult brain tumours accounted for 76.1% of all the brain tumours in our series. The median age of presentation was 40 years (IQR= 20.5) with peak age of presentation in the 35-40 year class (figure 5).There was a slight male preponderance (51.4%) in this age group. The most common symptom was headache (51.4%) followed by seizure (32.9%), then vomiting (18.6%). Unlike the paediatric group, meningioma was the most common tumour in the adult (38.6%), followed by gliomas in 25.7%, then metastases in 11.4% of cases (figure 6).

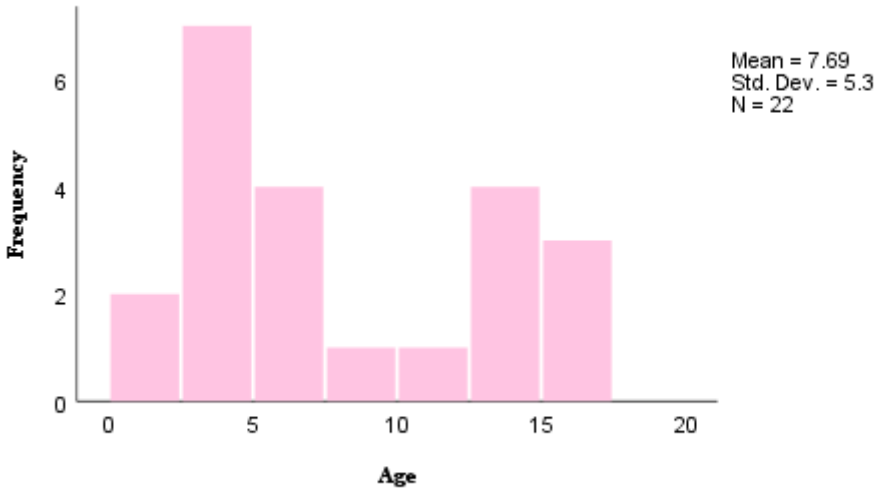

Figure 2- Age distribution in the paediatric group with a peak at 2.5-5.0 age class

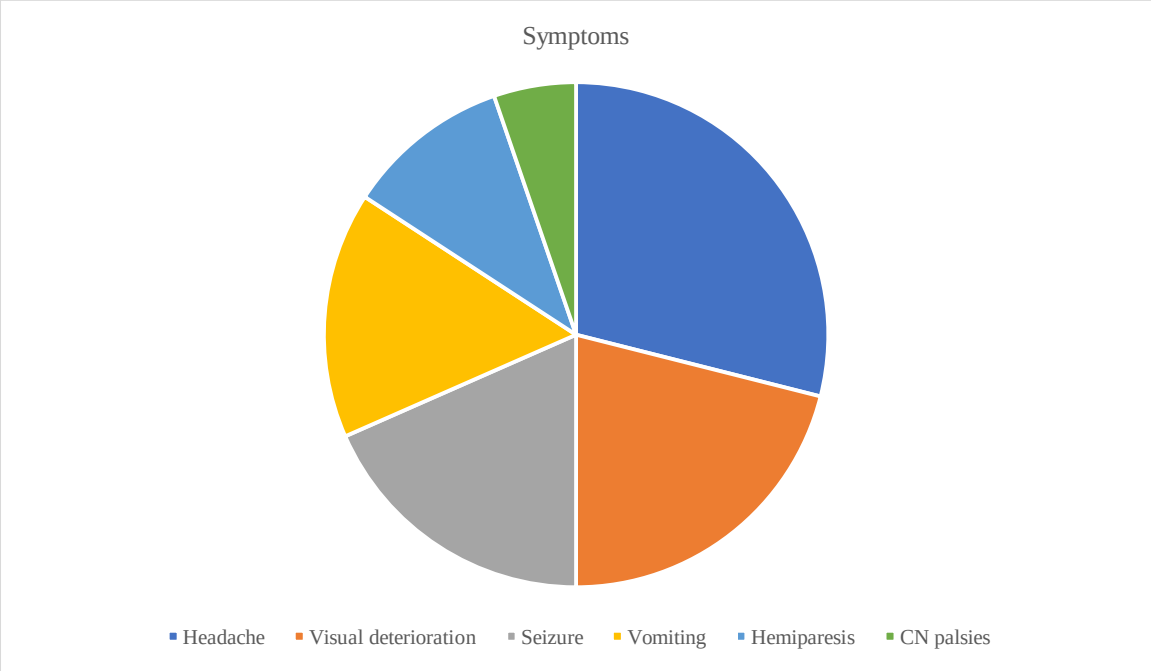

Figure 3. Pie chart showing the most common symptoms in the paediatric age group.

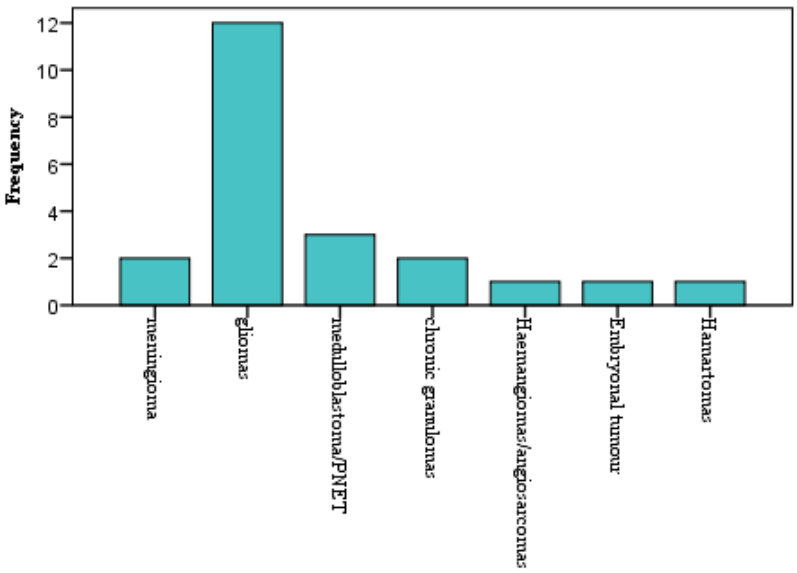

Figure 4- Histopathological variants in paediatric group

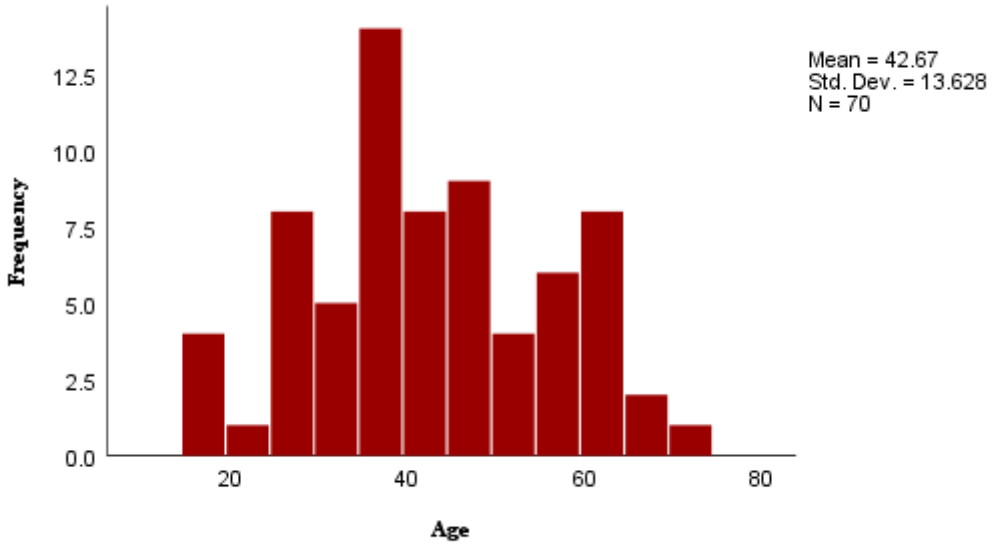

Figure 5- Age distribution in the adult age group showing a peak at the 35-40 year class

IV. Discussion

Our study revealed a total of 115 patients over a nine year period, thus appearing relatively low when compared to other neurosurgical cases like trauma seen in our environment. Whilst this value is relatively low, it must be stated that a significant number of patients diagnosed with brain tumour on imaging had inoperable tumours, or had an initial procedure like a ventriculo-peritoneal shunt and did not present again for their definitive surgeries. The yield from cytology of cerebrospinal fluid specimen obtained at initial surgery is poor in our setting. In one of the earliest documentation about brain tumours in Nigeria Odeku et al in Ibadan south western Nigeria and later Ohaegbulam et al in south eastern Nigeria showed that contrary to the belief that brain tumours were rare in Africans, brain tumours were relatively common although the absolute numbers and types differed in their proportions.[11] In a study of 30 patients in our centre about 20 years ago, brain tumour was the third most common tumour amongst all the tumours seen within that period. Again this was a pointer to fact that brain tumours were not as uncommon as previously thought.[12] The median age of presentation of all the patients in our study was 37 years indicating a significant proportion being relatively young. This is similar to the previous study done in our setting.[12] Headache was the most common symptom in both age groups. This was followed by visual deterioration and then seizure and vomiting. On the other hand, in the adult age group, headache is followed by seizure and then vomiting. Studies on symptoms of brain tumours in our environment have similar features with ours as headache, seizure, visual deterioration feature prominently.[10,13,14,15] Thus in our environment any patient presenting with headache, seizure, visual deterioration and vomiting either singly or in combination should raise the suspicion of a possible underlying brain tumour. There is a significant variation in the presentation and histopathological types amongst the adult and the paediatric patients. The peak age of presentation of brain tumours in the paediatric age group in our series was the 2.5 to 5 year class and the median was 6 years. There is variation in the mean or median age of presentation across our country.[16,17,18] The most common type of tumour seen in the paediatric group in our study is glioma. The gliomas are an amorphous group with the astrocytomas being the most prominent and frequent. This compares well with other studies globally and in Nigeria.[16,17,19,20] The median age of presentation in our adult population was 40 years with a peak at the 35- 40 year class. This again shows a relatively young population developing brain tumour. This is disturbing because this young age group is the active socioeconomic stronghold of a nation. Though tumours generally increase with age, our study is showing a relatively younger age group. There may be need to begin to reevaluate the risk factors for brain tumours in our environment. Even though relatively fewer persons develop brain tumours in their life times when compared to other non-communicable diseases, the morbidity and mortality associated with brain tumours is distressing. Patients can have long term disabilities even after having an intervention. The most common tumour type in our adult population was the meningioma. There has been an unwritten question about what the most common type of brain tumour in the Nigerian population is. Studies on this question and the results obtained have not fully answered the question. This issue is depicted in the various studies carried out at different periods across various regions of our country. A large study in Ibadan, south western Nigeria between 1980 and 1990 analyzed 210 specimens. The commonest tumour type was the gliomas

(20.4%) followed by pituitary adenomas (17.1%), meningioma's (11.4%).[20] A similar large study of 252 specimens in Enugu, south eastern Nigeria between 2006 and 2015 showed meningioma(32.9%),gliomas (23.8%).[21] In Abuja, north central Nigeria, a study of 121 brain tumour specimens of patients who presented between 2005 and 2015 showed meningioma(41%),pituitary (22%),gliomas(20%).[19] In Sokoto, north western Nigeria, of the 151 brain tumour specimens of period 2008- 2017, meningioma (39.1%), gliomas (23.2%), pituitary (7.3%).[22] From these different regional data on brain tumour in Nigeria done at different times, it may appear on the surface that the meningiomas predominate, it is difficult to clearly and objectively determine the most prevalent tumour type in our country and to also determine if there is a changing trend. This again underscores the importance of having a national brain tumour/cancer registry.

V. Conclusion

Brain tumours are fairly common in our environment. The issue of what tumour is most prevalent in our environment would be resolved if we are able to design and populate a national brain tumour/cancer registry.

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