The Frequency of Pediatrics and Adult Brain Tumors: A Hospital-Based Study a Multi-center Study

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ABSTRACT

The frequency of brain tumors in both children and adults is shockingly high. The Multicenter Study pathology records from the Department of Neurosurgery lady reading hospital Peshawar, Pakistan, served as the data source for this investigation, January 2016 and February 2021 Patients as young as two years old and as elderly as 82 years old had biopsies of brain tumors performed between 2010 and 2014. Diagnostic, morphological, and immunohistochemical blunders were encountered often. Twenty-one individuals ranging in age from 2 to 14 were involved in the incidents (14-82 years). High-grade tumors occurred in almost 47% of adults and 33.3% of children. Benign tumors accounted for the vast majority of pediatric cancers (craniopharyngioma, choroid plexus papilloma, astrocytoma, medulloblastoma, ependymoma, and small round blue cell tumor). The most prevalent tumors in adults were astrocytoma (20%), meningioma (21%), pituitary adenoma (7%), and glioblastoma (1%). Other uncommon tumors accounted for 22% of the total. Finally, glioblastoma is the most frequent tumor in adults, whereas craniopharyngioma is the most common tumor in children. Both morphology and immunohistochemistry are useful in making an accurate diagnosis. Several brain tumors, including gliomas, craniopharyngiomas, and medulloblastomas, are rather common.

Keywords: Frequency, Pediatrics, Adult, Brain Tumors

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INTRODUCTION

Brain tumors strike older adults more often, both male and female[1]. Moreover, a quarter of all

tumors identified in children are brain tumors, making them the second most frequent malignancy in children behind leukemia[2]. While adults account for the vast majority of cases, a few histological subtypes are mostly seen in children and rarely seen in adults[3]. It has also been suggested that the molecular biology and behavior of glial tumors in children and adults are distinct. The Implications for future study, therapy, and prognosis are substantial[4]. They are the most lethal form of pediatric cancer and account for a disproportionate share of deaths among children aged 0–14 in various regions of the globe. Increased life expectancy directly results from better diagnostic tools and treatment options. Therapy-induced damage to brain tissue is terrible. The longer people live, the more likely they are to develop neurocognitive and endocrine diseases that lower their quality of life[5]. A second neoplasm is more likely to occur in survivors later in life[6]. There are documented differences in the epidemiology of brain tumors among geographic regions, sex groups, anatomical sites, and histological subtypes[7]. Options for therapy, prognosis, and risk factors vary greatly depending on tumor location and histological type[9]. This information is valuable for future studies and the strategic planning of the healthcare delivery system. The majority of these cancers may be diagnosed using morphological criteria; however, in situations when tumors are poorly differentiated or the material presented is inadequate, immunohistochemistry and radiographic assessment is very useful in making a definitive diagnosis[9].

MATERIALS AND METHODS

The Pathology division of the Department of Neurosurgery, Leh, Peshawar, Pakistan, this Multi center Study provided the study's data. Patients who were received, diagnosed and operated on for brain tumors between January 2016 and February, 2021 had their histology data examined. Patient information, such as sex and age, was recorded along with tumor kind and location. Patients were separated into two age categories, one for those between 0 and 14 years old and another for those between 14 and 82, to emphasize the gender breakdown and age frequency within each age group.

RESULTS

During the study period, one hundred and nineteen individuals aged 2 to 82 years old had surgery for brain tumors. Eighty-two men (69%) and 37 females (31%). 2.4 males for eve female. Patients had a mean age of 6.73 years (0.21 standard deviation). All tumor forms had a significant male preponderance. Among children's brain tumors, medulloblastoma was the most frequent kind (24%). Our research found that astrocytoma represented 23% of all tumors. While astrocytomas accounted for 47% of all tumors seen in adulthood, meningiomas accounted for 21%. (Tables 1 and 2).

Table 1: Frequency of pediatric brain tumours

Identification	n	%age
Caring	08	38
Minor Round Blue Cell Tumor	03	19
Medulloblastoma	05	24
Great grade glioma	02	9.5
Short-grade glioma	02	9.5
Glioblastoma multiforme	01	4.25
Total	21	100

Table 2: Brain tumor prevalence in adults

Identification	n	%age
GBM	23	23.4
Meningioma	21	21.4
Benign	21	21.4
Low-grade glioma	20	20.4
Metastatic carcinoma	03	03
High-grade glioma	02	02
DLBCL	01	01
Mesenchymal chondrosarcoma	01	01
Nondiagnostic	06	06
Total	98	100

DISCUSSION

The purpose of this research was to count brain tumors between January 2016 and February 2021 We found a male-dominated population with a male-to-female ratio of 2.4:1, consistent with findings from other research [10]. Since this is a hospital-based research project, tumor incidence cannot be determined. Earlier research indicated a lower frequency[11]. According to the Bombay Cancer Registry13, 8.2 percent of cases were reported by Grover and Hardas. Tumors of the brain are quite uncommon in children, with just a 9% incidence rate recorded by Khan et al. 12. The vast majority of our patients in this research were between the ages of 6 and 8, which is quite close to the findings of a prior study by Ahmed et al.10, who found that same age range was most prevalent. Aside from that,

Velema and Most instances were seen in younger age groups, as described by Percy; and Memon et al. [13]. Our results showed that the median age for the onset of tumors was 6.73 years. Previous research by Farwell et al. found a mean age of 6, but studies by Ahmed et al.10 and Mehrzin et al. found far older averages of 8.8 and 8.7 years, respectively. Our findings that medulloblastoma accounts for 24% of all pediatric tumors are consistent with those found in studies by Young et

al. and Ahmed et al. When compared to our analysis; previous research has shown that astrocytoma is the most prevalent tumor in children. In previous studies, meningioma, neuroma, and glioma were identified as the most commo forms of juvenile malignancies. However, our research disproves these findings[14]. The prevalence of ependymoma in the current research (9.5%) is comparable to that seen in studies[15]. The prevalence of ependymoma is lower in several studies[16]. This research should be interpreted with caution due to its single-center design. Diagnosis and subtyping of these biopsies rely heavily on morphology, but this alone is insufficient. A clinical history, radiological correlation, and representative sample are also required. Correct diagnosis is often possible using just classical morphological criteria[17].

Some tumors present challenges because of their uncommon morphology, poor differentiation, or mixed-type nature. Diagnostic difficulties may arise when dealing with metastatic malignancies that have spread from another organ or body part. In such situations, immunohistochemistry is quite useful for making a definitive diagnosis[18]. Survival rates for patients diagnosed with medulloblastoma, oligodendroglioma, and astrocytoma have increased since the mid-1970s, even after accounting for age at diagnosis. Regarding primary brain tumors, glioblastoma multiforme (GBM) remains the most difficult to treat. For adults, astrocytomas accounted for 47% of all tumors, with meningiomas coming in at 21% [19]. In comparison to global averages, this is around average[20]. Most brain cancers could be identified just via morphological analysis. Immunohistochemistry was required to definitively diagnose medulloblastoma and tiny round blue cell tumors in youngsters[21].

Metastatic carcinomas and lymphomas in adults necessitated the use of immunohistochemistry[22]. Therefore, a set of immunohistochemical stains, including CK, S100, GFAP, EMA, LCA, CD20, CD56, chromogranin, and synaptophysin wer employed to establish a definitive diagnosis.Imrana Tanvir, Rahat Malik, Rizwan Ullah Khan et al[23].

CONCLUSION

There needs to be a morphological classification of pediatric brain tumors in Pakistan, as well as community-based research to determine the cancer burden caused by brain malignancies in this population. Traditional hematoxylin and eosin staining is still the gold standard for pathological diagnosis, but immunohistochemistry (IHC) has become increasingly important for differentia diagnosis and improving diagnostic accuracy in difficult cases, particularly in neurooncology pathology and general surgical pathology.

Ethical consideration:

The study was authorized and endorsed by the Institutional Research and Ethical board (IREB) of Institute of Lady reading hospital Peshawar, Pakistan. All participant's attendants delivered informed consent by the Helsinki declaration.

Declaration:

Ethical consideration and consent to participate:

Authorization and endorsement of the study were done by Institutional Research and Ethical board (IREB) of Lady reading hospital Peshawar, Pakistan. All participant's attendants delivered informed consent according to the Helsinki declaration. The ethical approval and no objection certification is enclosed under related files.

Consent for publication

The consent for publication has been taken from the Institution. The non-objection certificate is enclosed under the related files section.

-Availability of data and material

Analyzed data files will be provided on request.

Competing interests

There are no competing interests.

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Authors' contributions

The contributions of the authors were also described as **ZK**(Zakir khan) prepared the figures, **SS** (Seema Sharafat) wrote the main manuscript text, took ethical approval and reviewed the manuscript, revised of manuscript and interpretation of statistical analysis, **NUH** (Naeem ul Haq) and,**SNS**(Syed Nasir shah) carried out statistical analysis, revision of manuscript, and preparation of tables, **MIH** (Main ifthakar ul Haq and **GA (Gohar Ali)** acquisition of data.

All the authors have agreed to be personally accountable for their contributions and have read and approved the manuscript.

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