

ORIGINAL ARTICLE

Prevalence of Tumors in the Posterior Cerebral Fossa in Children and Adults, as well as their Histological Kinds: a Cross-Sectional Study

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ABSTRACT

Aim: To determine the prevalence of posterior fossa tumors in children and adults, as well as their histological kinds.

Study design: A cross-sectional study

Place and duration: From February 2012 to January 2019, the Department of Neurosurgery at Riyadh Care Hospital

Methodology: We undertook a descriptive analysis of patients with posterior fossa space-occupying lesions. The neurosurgical intervention was done in all of the instances due to the critical location. Specimens were sent for histological evaluation after surgery. The data from these patients, as well as histology reports, were examined. The data was analyzed using SPSS version 21.

Results: Males made up 57.14 percent (n=48) of the 84 patients, while children made up 41.66 percent (n=35). The most common tumor was schwannoma, seen in 34.52 percent (n=29) of cases, 72.41 percent of adults, and 27.58 % of children. In 22.61 %, 15.47 %, and 14.28 % of cases, meningioma, pilocytic astrocytoma (PCA), and Medulloblastoma were found, respectively. Metastasis was only seen in adults, and malignant round blue cell tumors were only found in children.

Astrocytoma and schwannoma were prevalent in adults. Children were more likely to develop Medulloblastoma, Pilocytic astrocytoma, and malignant round blue cell tumors.

Conclusion: High-grade Astrocytoma and Schwannoma are dominantly present in adults. Malignant round blue cell tumor, Pilocytic astrocytoma Medulloblastoma is more prevalent in children. Metastasis was only observed in adults. Because of their location, risk of excision, and involvement of the brain stem structures and fourth ventricle, posterior fossa tumors are widely known for their significant morbidity and mortality. Early diagnosis is now possible due to modern diagnostic and therapy technologies, which help to lower mortality rates and improve postoperative prognosis.

Keywords: posterior cerebral fossa tumors, children, adults

INTRODUCTION

A brain tumor is among the fatal cancers, mainly when it develops in the posterior cerebral fossa. Because tumors in this region induce brainstem compression, herniation, and death, they are deemed critical. (1-3) In children, the posterior fossa is a region of most brain cancers that occur in the posterior fossa; however, in adults, 15–20% of malignancies are present there. (4)

The clinical presentation is determined by the tumor's location, biological behavior, aggressiveness, and rate of growth. Because of the concomitant hydrocephalus, the patient frequently has an intense headache and frequent vomiting. These symptoms are caused by increased intracranial pressure and localized compression of the cerebellum or brain stem. (5)

Initially, Cushing reported a substantial number of malignancies in the posterior fossa. He provided data on 61 patients with Cerebellar Medulloblastoma, most of whom died. (1)

Brain tumors are still one of the top 10 causes of cancer-related death worldwide. Leukemia is the most prevalent tumor in children and it is followed by the brain tumors. Studies have narrated that more than 50% of all brain tumor in children originates in the posterior fossa, whereas in adults, this site is the location for nearly 20% of the tumors. (6)

Children are more likely to develop different types of posterior fossa tumors, including primitive neuroectodermal tumors (PNETs), ependymoma, Brainstem Glioma and pineoblastoma. Mixed gliomas are a type of glial tumor only found in children; 67% of them are located in the cerebellum, and most of them are benign. (7)

The clinical presentation, behavior, therapy, and prospects of posterior fossa tumors in children differ from adults. In children, glial tumors and PNET have a healthier prognosis than in adults. Despite being malignant, medulloblastoma, have a prognosis better than ependymoma, possibly due to invasiveness of the latter, along with advancement in imaging technologies and treatment facilities. (3) Increased mortality and morbidity are associated with delayed diagnosis; presentation, infiltration, and distant metastases. The risk of death and morbidity increases when benign lesions like meningioma re-curs. (8) This paper analysed the prevalence and histological types of different posterior fossa tumors in children and adults.

METHODOLOGY

This descriptive study of patients with posterior fossa space-occupying lesions was conducted from February 2012 to January 2019 at the Department of Neurosurgery at Riyadh Care Hospital. Permission was taken from the ethical review committee of the institute. Patients with

morning headaches, vomiting usually relieve headaches, lower cranial nerve involvement, altered sensorium, and intracranial hypertension features secondary to hydrocephalus were observed. For diagnosis MRI with T1WI, T1WI with Gad, T2WI, and Fluid Attenuated Inversion Recovery (FLAIR) scans were done.

Patients were hospitalized and examined for cardiac, pulmonary, and anesthetist fitness. Rheumatoid factor (RF), creatine kinase (CK), coagulation profile, and blood group was done. They were asked to fill out forms with information on their health. In this study, 84 patients of various ages were studied. Adults are children over the age of 12 were included.

Based on the location of the infratentorial tumor in the posterior fossa, the neurosurgical intervention was performed in all of the cases. After surgery specimens were sent for histological assessment. Patients' data, as well as histopathology reports, were analyzed by using SPSS version 21.

RESULTS

In the current study, data of 84 patients were evaluated. Out of 84 patients, 57.14 (n=48) were males and 42.85% (n=36) were females. There were 35 (41.66%) children and 64 adults (58.33%) (As shown in Table 1) In a histopathological examination, it was found that Schwannoma was the most prevalent tumor and reported in 34.52% (n=29) cases followed Meningioma, Pilocytic astrocytoma, and Medulloblastoma in 22.61%, 15.47%, and 14.28% cases, respectively. (As shown in Table 2)

Table 1: Demographic Characteristics of the study participants

Variable	Frequency (n=84)	Percentage
Gender		
Male	48	57.14
Female	36	42.85
Group		
Children	35	41.66
Adults	49	58.33

Table 2: Types of tumors in study participants

Types	No. of cases	Percentage
Schwannoma	29	34.52
Meningioma	19	22.61
Pilocytic astrocytoma	13	15.47
High-grade Astrocytoma	06	7.14
Medulloblastoma	12	14.28
Metastasis	03	3.57
Malignant round blue cell tumor	02	2.38
Total	84	100

Table 3: Distribution of Tumour according to Age Category

Types	Children N (%)	Adults N (%)
Schwannoma	08 (27.58)	21 (72.41)
Meningioma	06 (31.57)	13 (68.42)
Pilocytic astrocytoma	11 (84.61)	02 (15.38)
High-grade Astrocytoma	01 (16.66)	05 (83.33)
Medulloblastoma	07 (58.33)	05 (41.66)
Metastasis	00 (00.00)	03 (100)
Malignant round blue cell tumor	02 (100.0)	00 (0.00)
Total	84	100

We found that schwannoma was present in 72.41% of adults and 27.58% of children. Malignant round blue cell tumor was only present in children, and metastasis was only found in adults. (As shown in Table 3)

DISCUSSION

The current paper aimed to determine the frequency of Posterior fossa tumors in cases admitted from January 2019 to March 2020. Because of the limited space the posterior fossa lesions easily affect brain stem functions and the hydrocephalus develops due to the compression of fourth ventricle. It is due to the critical structure around posterior fossa brain tumors are among the deadliest types of human illness. When compared to more conservative surgery, modern neurosurgery procedures allow for total or near-complete resection with little or no increase in morbidity and mortality.

Individuals of all ages are included in our study. Our study population has more males than females. This corresponds to a prior study, which revealed a male-dominated population. (9) However, Khokar et al. reported contrasting results, and their study had an overwhelming female population. (10)

According to WHO criteria, (11) the histological classification of tumors in the posterior cerebral fossa, in the current study, the most prevalent tumor in adults was schwannoma also known as cerebellopontine angle tumor. Another study had a similar finding with most cases occurring in adults. (12) Children's brain tumors are quite prevalent. (13) In a study affecting 3983 children aged 1 to 14 years out of a population of 4.4 million children in a Nordic study conducted between 1985 and 2006 high prevalence of the tumor was reported. (14) In our study, the most common posterior fossa tumor in children was Medulloblastoma, which is similar to many previous studies. (2, 10, 15)

Particular tumors are frequent in adults, and certain tumors identified in our study are common in adults. According to our research, meningioma was more common in adults than in children. Similar findings are reported in another study. (16, 17) Metastasis is more prevalent in aged individuals (18), as evidenced by the fact that all of the instances in our study were seen in adults.

When a brain tumor develops in the posterior fossa, it has a turbulent course. Brainstem compression, and obstructive hydrocephalus needs to be addressed promptly, delay in treatment can be lethal. The intra-axial and extra-axial locations of pulmonary function tests (PFT) can be widely differentiated. Cerebellar astrocytoma, primary neuroectodermal tumors, Medulloblastoma, ependymoma, and other malignancies are common. Children more likely to have abnormal PFT than adults. (19)

CONCLUSION

High-grade Astrocytoma and Schwannoma are dominantly present in adults. Malignant round blue cell tumor, Pilocytic astrocytoma Medulloblastoma is more prevalent in children. Metastasis was observed in adults. Because of critical site, risk of excision, and involvement of the brain stem structures and fourth ventricle, posterior fossa tumors are widely known for their significant morbidity and mortality.

Early diagnosis is now possible due to modern diagnostic and therapy technologies, which help to lower mortality rates and improve postoperative prognosis.

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