Original Article

Histopathology of CNS Neoplasms

Histological Pattern of Central Nervous System Neoplasms

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ABSTRACT

Objective: To study the Histological Pattern of Central Nervous system Neoplasms.
Study Design: Retrospective study.
Place and Duration of Study: This study was conducted at the Section of Histopathology, Aziz Bhatti Teaching Hospital Gujrat and Idris Teaching Hospital Sialkot to check the frequency of all Central Nervous system neoplasms diagnosed here from January 2014 to December 2019.
Materials and Methods: A total of 451 Central Nervous system neoplasms were diagnosed. All samples were fixed in ten percent buffered formalin. Routinely processed under standard conditions for paraffin embedding, sectioned and finally stained with haematoxylin and eosin using standard procedures. When required, special stains such as PAS, reticulin etc. and immunohistochemistry by PapanicouIaeu technique using monoclonal antibodies against Glial fibrillary acidic protein, a wooden plaque bearing a prayer, Cytokeratins, Life-cycle assessment, Pan B and T etc. were performed. The histological characterisation of Central Nervous system tumors was done according to the World Health Organization histological typing of tumors of the Central Nervous system[7]. The grading of astrocytic neoplasms was done according to the Kernohan grading systems for astrocytomas[11].
Results: In case of primary Central Nervous system Neoplasmas highest incidence of the Glial tumours 41.01% and minimum incidence of primary Central Nervous system Neoplasms was Miscellaneous tumours 8.98 %. In case of Glial Neoplasms the highest incidence was of Astrocytomas 45.61% and lowest incidence was Gliosarcomas 3.50%. In case of Astrocytic Neoplasms the highest incidence of Grade 3-4 astrocytomas 49.29% and lowest incidence was Subependymal giant cell astrocytomas 1.40%. In case of Miscellaneous CNS neoplamas the highest incidence was of Hemangioblastomas 29.03% and lowest incidence was Endothelial tumours (Hemangiopericytomas)3.22%, Melanocytic Tumours (Malignant Melanoma) 3.22% and Pineal Parenchymal Tumours (Pineoblastoma) 3.22%. In case of 5 commonest categories of primary CNS Neoplasms the mean age was maximum 43.34 in age range 2-75 years and was minimum in age range 1-37 years (13.01).
Conclusion: Except for the high percentages of anaplastic recapitulate the appearance of the normal resident oligodendroglia of the brain & A type of brain tumor that begins in cells lining spinal cord central canal and the low percentage of metastatic tumours, most of our findings roughly concide with the published data (JPMA: 1 54;2001).
Key Words: Histological Pattern, Central Nervous System, Neoplasms.

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INTRODUCTION

No critical information on the recurrence of different kinds of focal sensory system neoplasms in Pakistan is accessible separated from two examinations by Irfan and Qureshi1 and Shah et al[2]. We have seen in our training in the Section of Histopathology, Aziz Bhatti Teaching Hospital Gujrat and Idris Teaching Hospital Sialkot to decide the recurrence of all Central Nervous system neoplasms analyzed here from first January 2016 to 31st December 2019. That Central Nervous system tumors are very regular in all age gatherings. A review study was along these lines completed to decide the histological example of all Central Nervous system neoplasms analyzed in our segment over a four-year time frame and to relate our discoveries with worldwide and Pakistani distributed information.

The yearly frequency of Central Nervous system tumors ranges as indicated by distributed Western information from ten to seventeen in one lakh people for intracranial tumors and one to two in one lakh people for inside spinal tumors; about half are essential tumors and the rest are metastatic[3,4]. Tumours of the Central Nervous system represent twenty percent of all malignant growths of childhood[5]. Harmful Central Nervous system tumors are the second commonest reason for death from malignancy in the under multiyear age bunch in the two male and females[6].

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Seventy Percent of youth Central Nervous system tumors emerge in the back cranial fossa while a comparative level of grown-up Central Nervous system tumours emerge inside the cerebral sides of the equator supratentorially[7]. By and large, gliomas represent forty to sixty-seven percent and tumours of meningies for nine to twenty-seven percent of essential tumors in populace based studies[8]. Around eighty percent of mind metastases are found in the cerebrum and ten to fifteen percent in the cerebellum[9]. With current neuron imaging strategies like Computed tomography scan and magnetic resonance imaging and progressively cautious post-mortem examination investigations of malignancy sick persons, it is turning out to be more clear that mind metastases as a gathering are really the most well-known inside brain tumors and somewhat dwarf essential cerebrum tumours in the people[10].

MATERIALS AND METHODS

A retrospective study was conducted in the Section of Histopathology, Aziz Bhatti Teaching Hospital Gujrat and Idris Teaching Hospital Sialkot to check the frequency of all Central Nervous system neoplasms diagnosed here from 1st January 2014 to 31st December 2019. During this six-year period, a total of four hundred and fifty-one Central Nervous system neoplasms were diagnosed. All samples were fixed in ten percent buffered formalin. Routinely processed under standard conditions for paraffin embedding, sectioned and finally stained with haematoxylin and eosin using standard procedures.

When required, special stains such as PAS, reticulin etc. and immunohistochemistry by PapanicouIaeu technique using monoclonal antibodies against Glial fibrillary acidic protein. A wooden plaque bearing a prayer, Cytokeratins, Life-cycle assessment, Pan B and T etc. were performed. The histological characterization of Central Nervous system tumors was done according to the World Health Organization histological typing of tumours of the Central Nervous system [7]. The grading of astrocytic neoplasms was done according to the Kernohan grading systems for astrocytomas[11.]

RESULTS

In case of primary CNS Neoplasmas highest incidence of the Glial tumours 41.01% and minimum incidence of primary CNS Neoplasms was Miscellaneous tumours 8.98 % as shown in table 1.

In case of Glial Neoplasms the highest incidence was of Astrocytomas 45.61% and lowest incidence was Gliosarcomas 3.50% as shown in table 2.

In case of Astrocytic Neoplasms the highest incidence of Grade 3-4 astrocytomas 49.29% and lowest incidence was Subependymal giant cell astrocytomas 1.40% as shown in table 3.

Table No: 1. Histological Type of Primary CNS Neoplasms

Histological type	No.	Percentage %
Glial tumours	73	41.01 %
Meningiomas	37	20.78 %
Never sheath tumours	18	10.11 %
Embryonal neuro-epithelial tumours	17	9.55 %
Primary CNS lymphomas (PCNSL)	17	9.55 %
Miscellaneous	16	8.98 %
Total	178	100 %

Table No: 2. Histological type of Glial Neoplasms

Histological type	No.	Percentage %
Astrocytomas	78	45.61 %
Oligodendrogliomas	37	21.63 %
Ependymomas	31	18.12 %
Mixed Gliomas	19	11.11 %
Gliosarcomas	6	3.50 %
Total	171	100 %

Table No: 3. Histological types of Astrocytic Neoplasms.

Histological type	No.	Percentage %
Grade 3-4 astrocytomas	35	49.29 %
Grade 1-2 astrocytomas	17	23.94 %
Pilocytic astrocytomas	13	18.30 %
Pleomorphic Xanthoastrocytomas	5	7.04 %
Subependymal giant cell astrocytomas	1	1.40 %
Total	71	100 %

In case of Miscellaneous CNS neoplamas the highest incidence was of Hemangioblastomas 29.03% and lowest incidence was Endothelial tumours (Hemangiopericytomas)3.22%, Melanocytic Tumours (Malignant Melanoma) 3.22% and Pineal Parenchymal Tumours (Pineoblastoma) 3.22% as shown in table 4.

Table No: 4. Miscellaneous CNS Neoplamas.

Histological type	No.	%age
Choroid plexus tumours	3	9.67 %
Neuronal and glioneuronal tumours	7	22.58 %
Germ Cell tumours	4	12.90 %
Endothelial tumours (Hemangiopericytomas)	1	3.22 %
Myogenous Tumours (Embryonal Rhabdomyosarcomas)	5	16.13 %
Hemangioblastomas	9	29.03 %
Melanocytic Tumours (Malignant Melanoma)	1	3.22 %
Pineal Parenchymal Tumours (Pineoblastoma)	1	3.22 %
Total	31	100 %

In case of 5 commonest categories of primary CNS Neoplasms the mean age was maximum 43.34 in age range 2-75 years and was minimum in age range 1-37 years (13.01) as shown in table 5.

Table No.5: Age range and mean ages for 5 commonest categories of primary CNS Neoplasms

Histological types	Age range (years)	Mean age (years)
Glial tumours	1-90	42.11
Meningiomas	2-75	43.34
Never sheath tumours	3-74	37.90
Embryonal neuro-epithelial tumours	1-37	13.01
Non-hodgkin lymphomas	1-65	41.30

DISCUSSION

Minimal big information in relation to the most common or rate of Central Nervous system neoplasms in Pakistan is accessible and there are not very many findings on the repeatedly occurring of different histological types of Central Nervous system neoplasms. As per introductory outcomes from the Karachi Cancer Registry[12], Central Nervous system neoplasms positioned at No. Fourteen between every single threatening tumor in both male & female: while in another nearby study[13], they positioned ninth between every single harmful tumor in men. In both these neighborhood examines, Central Nervous system neoplasms neglected to make the best ten dangerous neoplasms in females.

The examination by Irfan and Qureshi[1] was the main critical neighborhood information on different histological types of inside the brain space possessing injuries. Be that as it may, they included pituitary neoplasms just as non-neoplastic conditions like tuberculosis. The examination by Shah et al[2] took a gander at children inside the brain neoplasms. Our investigation took a gander at absolutely neoplastic Central Nervous system sores in all age gatherings. Nonetheless, pituitary tumours like a type of non-cancerous tumor and a tumor of the brain near the pituitary gland as were prevented. We additionally prevented all non-neoplastic sores including different types of non-neoplastic growths, vascular contortions, tuberculous and contagious diseases and so forth.

Numerous tumors of the central nervous system established the commonest tumours in our arrangement containing forty-one point zero one percent of all essential Central Nervous system neoplasms, trailed by tumours of meningies which involved forty-three point thirty-four percent. These discoveries are like distributed Western information as indicated by which gliomas represent forty to sixty-seven percent and tumours of meningies for nine to twenty-seven percent of essential Central Nervous system tumours[8]. In Irfan and Qureshi's study[1], gliomas represented thirty-two point one percent and tumours of meningies for thirteen point seven percent. Be that as it may, as referenced over, this investigation included pituitary tumors just as non-neoplastic conditions. Nerve sheath tumors represented ten point eleven percent of all essential Central Nervous system neoplasms in our investigation, while they involved five point four percent in the above examination. Embryonal neuroepithelial tumors involved nine point fifty-five percent of every single essential neoplasm in our examination, though they contained six point two percent in Irfan and Qureshi's Series[1]. Among the glial tumors, astrocytomas were the biggest gathering in our investigation containing forty-five point sixty-one percent of every single numerous tumors of the central nervous system. There were three hundred one diffuse fibrillary astrocytomas (grades I-IV) which involve forty-nine point twenty-nine percent of all essential Central Nervous system neoplasms. This makes them the commonest essential Central Nervous system neoplasms. Western information bolsters this[14]. These were trailed by a type of non-cancerous tumor involving twenty-one point sixty-three percent and a tumor of the brain near the pituitary gland eighteen point twelve percent. As referenced in results, twenty-one point sixty-three percent a type of non-cancerous tumor and eighteen point twelve percent a tumor of the brain near the pituitary gland were anaplastic. This comprises a fundamentally high level of or specialized features as in malignant tumours sores. Because of this high rate, each case so detected was checked on basically by the senior expert of pathology in the investigation. The nearness of the accompanying rules was observed as basic for a determination of specialized features as in malignant tumours a type of non-cancerous tumor or a tumor of the brain near the pituitary gland: thick cellularity, prominent mitotic action, endothelial hyperplasia and foci of coagulative rot. As shown by Irfan and Qureshi's study[1], astrocytomas include around eighty percent and a type of non-cancerous tumor eight point eight percent of every numerous tumors of the central nervous system. In our finding, high-grade (III and IV) astrocytomas were prevalent over poor quality (I and II) astrocytomas containing twenty-three point ninety-four percent of the astrocytornas. However, in Irfan and Qureshi's study1, poor quality astrocytomas (I % II) involve sixty-three point seven percent of all numerous tumors of the central nervous system. While glioblastomas involve just sixteen point nine percent. NHLs involved three point sixty-one percent of all essential Central Nervous system neoplasms in our arrangement, however there is no notice of lymphomas in Irfan and Qureshi's study[1].

In our examination, the male to female proportion was 1.6: 1. Most United States libraries report a higher cerebrum tumor rate in male than in females (normal proportion 1.4)[15]. In Irfan and Qureshi's examination', SR was 2.

Western information likewise shows that the sex proportion (SR) shifts significantly by related to histology type. Gliomas are higher in guys (SR). while meningionlas are higher in females (SR 0.6)[16]. Our examination shows comparative findings. The SR was two for numerous tumors of the central nervous system, with men involving sixty-six point seventy-two percent and females thirty-three point twenty-seven: while SR was zero point seven percent for meningiomas, with male containing forty-two point thirty percent and females fifty-seven point sixty-nine percent. As per the SEER information for the interim 1973-80, in youngsters not as much as age fifteen years at analysis, twenty-three percent were medulloblastomas, twenty-five percent second rate astrocytomas. Twelve percent cerebellar astrocytomas and eleven percent supratentorial astrocytornas[17]. As shown by a neighborhood study[2], astrocytomas contained thirty-nine percent, trailed by medulloblastomas eighteen point six percent and ependymomas thirteen percent. As per this equal investigation, forty-three point five percent of children mind tumors were in the back fossa. In our examination, one hundred sixty-one sick persons (fourteen point five percent) were fifteen years or more youthful in age and in forty-nine point six percent sick persons fifteen years or more young, the tumors were situated in the back cranial fossa, which is like the discoveries appeared in the finding by Shah et al[2]. Be that as it may, these figures are lower than the figures of seventy percent cited in western data[7].

The mean ages and age scopes of the significant tumor types in our study relate generally with the distributed western data[18].

As shown by Western studies[10]. metastatic tumors are the most well-known inside the brain tumours and somewhat dwarf essential cerebrum tumors in the people. Be that as it may, in our study, they include ten point twenty-seven percent of all Central Nervous system tumors. As shown by lrfan and Qureshi's examination', they contain just three point four percent of all Central Nervous system injuries. As referenced over, this finding likewise included pituitary tumors and non¬neoplastic sores. The error between western and neighborhood information concerning metastatic tumors to the Central Nervous system might be because of the way that western information not just considers present day imaging strategies and samples yet additionally dissection contemplates. In our nation, in any case, a large extent of Central Nervous system tumors which are detected as metastatic by imaging procedures are not sent for biopsy.

We trust that this enormous arrangement which is, as far as we could possibly know the biggest investigation from this nation, will give a complete gauge information about the recurrence of Central Nervous system neoplasms in Pakistan and give more clear thought relating their prevalence.

As shown by our examination, numerous tumors of the central nervous system establish the commonest Central Nervous system neoplasms followed by Meningiomas between the numerous tumors of the central nervous system, astrocytomas contain the biggest gathering, and high evaluation (III and IV) astrocytomas are the prevalent tumors among astrocytomas. The occurrences of anaplastic oligodendrogliomas and ependymomas are critical when contrasted with other nearby and western examinations.

By and large, Central Nervous system tumors are progressively normal in male. In any case, meningiomas are increasingly normal in females. Practically fifty percent of all Central Nervous system tumors in sick persons fifteen years or more young are in the back fossa. Metastatic tumors are a lot of lower when contrasted with the west. Be that as it may, this might be because of the way that western information considers present day imaging strategies and biopsies just as post-mortem examination survey.

CONCLUSION

Except for the high percentages of anaplastic recapitulate the appearance of the normal resident oligodendroglia of the brain & A type of brain tumor that begins in cells lining the spinal cord central canal and the low percentage of metastatic tumours, most of our findings roughly concide with the published data (JPMA: 1 54;2001).

Author's Contribution:

Concept & Design of Study:	Fatima Kashif
Drafting:	Faisal Iqbal,
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Revisiting Critically:	Fatima Kashif, Faisal Iqbal
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Conflict of Interest: The study has no conflict of interest to declare by any author.

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