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Histopathological Study and Categorization of Brain Tumors in Mangalore

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Abstract: ***WHO recently published its 4th edition of classification of tumours of central nervous system (2007), incorporating a substantial number of important changes to the previous version (2000). It is important to classify because each type has a specific set of outcome and the treatment of it differs. It is important to classify because each type has a specific set of outcome and the treatment of it differs. Neuroepithelial tumours were the most common histological type followed by meningiomas and pituitary tumours. Majority of malignant intracranial tumours were WHO grade I.***

Keywords: Brain, Cancer, Classification, Diagnoses, Histopathology.

1. Introduction

The clinicopathological aspect and role of pathologist in specific diagnosis of central nervous system (CNS) neoplasms is well understood .WHO recently published its 4th edition of classification of tumours of central nervous system (2007), incorporating a substantial number of important changes to the previous version (2000). The 4th edition introduces 10 newly codified entities, variants and patterns; changes in grading, changes in classification of existing brain tumours as well as 1 new genetic syndrome. In the present study attempt has been made to classify the intracranial tumours according to WHO (2007) 4TH edition.[1]

Primary brain tumors do not spread to other body sites, and can be malignant or benign. Secondary brain tumors are always malignant. Both types are potentially disabling and life threatening[2].

Although there has been a recent increase in the number of epidemiologic studies of brain cancer, little consensus exists regarding the nature and magnitude of the risk factors contributing to its development. In addition to the differences in methods and eligibility criteria used and in the representativeness of the patients studied, other confounding factors exist. There are a number of distinct types of brain cancers within the brain, and the treatments and their outcomes vary greatly based on pathologic and histologic diagnosis. More recently, researchers are identifying new therapies based on increased knowledge of cellular and molecular biology[3].

It is important to classify because each type has a specific set of outcome and the treatment of it differs.

The WHO (2007) classified it as follows:

2. Tumours of Neuroepithelial Tissue

Astrocytic tumours
Pilocytic astrocytoma
Pilomyxoid asrocytoma
Pleomorphic xanthoastrocytoma
Diffuse astrocytoma
Fibrillary astrocytoma
Gemistocytic astrocytoma
Protoplasmic astrocytoma
Anaplastic astrocytoma
Glioblastoma
Giant cell Glioblastoma
Gliosarcoma
Gliomatosis cerebri

Oligodendroglial tumors
Oligodendroglioma
Anaplastic oligodendroglioma

Oligoastrocytic tumours
Oligoastrocytoma
Anaplastic oligoastrocytoma

Ependymal tumours
Subependymoma
Myxopapillary ependymoma
Ependymoma
Cellular
Papillary
Clear cell
Tanycytic
Anaplastic ependymoma

Choroid plexus tumours
Choroid plexus papilloma
Atypical choroid plexus papilloma
Choroid plexus carcinoma

Other neuroepithelial tumours
Astroblastoma
Chordoid glioma of the third ventricle
Angiocentric glioma

Neuronal and mixed neuronal-glial tumours
Dysplastic gangliocytoma of cerebellum [Lhermitte-Duclos]
Desmoplstic infantile astrocytoma/ganglioglioma
Dysembryoplastic neuroepithelial tumour

Gangliocytoma
Ganglioglioma
Anaplastic ganlioglioma
Central neurocytoma
Extraventriular neurcytoma
Cerebellar liponeurocytoma
Papillary glioneuronal tumour of the fourth ventricle
Paraganglioma

Tumours of the pineal region
Pineocytoma
Pineal parenchymal tumour of intermediate differentiation
Pineoblastoma
Papillary tumour of the pineal region

Embryonal tumours
Medulloblastoma
Desmoplastic nodular medulloblastoma
Medulloblastoma with extensive nodularity
Anaplastic medulloblstoma
Large cell medulloblastoma
CNS primitive neuroectodermal tumour
CNS neuroblastoma
CNS ganglioneuroblastoma
Medulloepithelioma
Ependymoblastoma
Atypical teratoid/ rhabdoid tumour

Tumours of Cranial and Paraspinal Nerves
Schwannoma [neurilemoma, neurinoma]
Cellular
Plexiform
Melanotic
Neurofibroma
Plexiform
Perineurioma
Perineurioma, NOS
Malignant perineurioma
Malignant peripheralnerve sheath tumour [MPNST]
Epithelioid MPNST
MPNST with mesenchymal differentiation
Melanotic MPNST
MPNST with glandular differentiation

Tumours of the Meninges
Tumours of meningothelial cells
Meningioma
Meningothelial
Fibrous [fibroblastic]
Transitional [mixed]
Psammomatous
Angiomatous
Microcystic
Secretory
Lymphoplasmacyte-rich
Metaplastic
Chordoid
Clear cell
Atypical
Papillary
Rhabdoid
Anaplstic [malignant]

Mesenchymal tumours
Lipoma
Angiolipoma
Hibernoma
Liposarcoma
Solitary fibrous tumour
Fibrosarcoma
Malignant fibrous histiocytoma
Leiomyosarcoma
Rhabdomyosarcoma
Chondroma
Chondrosarcoma
Osteoma
Osteosarcoma
Osteochondroma
Haemangioma
Epithelioid haemangioendothelioma
Haemangiopericytoma
Anaplastic haemangiopericytoma
Angiosarcoma
Kaposi sarcoma
Ewing sarcoma-PNET

Primay melanocytic lesions
Diffuse melanocytosis
Melanocytoma
Malignant melanoma
Meningeal melanomatosis

Other neoplasms related to the meninges
Haemangioblastoma

Lymphomas and Haematopoietic Neoplasms
Malignant lymphomas
Plasmacytoma
Granulocytic sarcoma

Germ Cell Tumours
Germinoma
Embryonal carcinoma
Yolk sac tumour
Choriocarcinoma
Teratoma
Mature
Immature
Teratoma with malignant transformation
Mixed germ cell tumour

Tumours of the Sellar Region
Craniopharyngioma
Adamantinomatous
Papillary
Granular cell tumour
Pituicytoma
Spindle cell oncocytoma of the adenohypophysis

Metastatic Tumours

Tumours of Pituitary Gland
Pituitary adenomas.
Pituitary carcinomas.

Aims and Objectives

To identify and classify brain tumours using histopathology techniques.

3. Materials and Methods

The material used in this study was done in Tejaswini Hospital, Mangalore. The specimens were obtained from 38 cases of intracranial tumours, over a period of 2 years from May 2009 to May 2011.

Complete clinical history and clinical diagnosis were noted down in all the cases. All the specimens were from biopsy of operated tumours received in 10% formaline. They were processed by the routine paraffin embedding technique. All the tissue bits that were received were embedded, wherever necessary in multiple paraffin blocks and and sections from all these blocks were studied. Paraffin sections of 4 microns thickness were obtained from each block and stained with haematoxyline and eosine stain using standard procedures. Histochemical stains were performed wherever indicated.

4. Results

India and Abroad

Histological Type	*Present Study*
Neuroepithelial tumour	31.6
Cranial nerve tumours	10.5
Meningeal tumours	30.0
Tumours of sellar region	2.6
Lymphomas	2.6
Metastatic tumour	7.9
Pituitary tumour	15.8
Total	38

5. Discussion

When the present study is compared with the other study the following are noted

Histological type	*Present study*	*Banerjee et al, Chandigarh* [52]	*Pal AK and Chopra et al ,Lucknow* [89]	*Dastur And Lalitha et al. Bombay* [123]	*Verma et al , Pune* [32]	*Katsura e t al, Japan* [33]	*Fan et al , USA* [124]
Neuroepithelial tumour	31.6	55.40	64.7	50.25	61.68	31.68	65.79
Cranial nerve tumours	10.5	6.80	5.0	9.77	4.95	11.85	2.83
Meningeal tumours	30.0	20.30	15.1	13.67	14.83	15.71	13.84
Tumours of sellar region	2.6	1.7	4.2	0.60	3.18	9.44	--
Lymphomas	2.6	--	--	0.60	0.71	-	--
Metastatic tumour	7.9	1.7	--	7.60	3.89	4.28	--
Pituitary tumour	15.8	3.4	7.6	6.95	7.6	10.84	9.69
Total	38	177	100	1844	283	3367	16311

6. Conclusion

- Neuroepithelial tumours were the most common histological type followed by meningiomas and pituitary tumours.
- Majority of malignant intracranial tumours were WHO grade I.
- Rare variant like clear cell type was also observed.
- .Craniopharyngiomas do not necessarily occur in 4-6 years as projected in other studies because occurrence at 54 years has been recorded in the present study.
- Most meningiomas were of grade I, but most astrocytomas were of higher grade.
- Germ cell tumours were rare, in the present study their incidence was nil.
- One case of neuroblastoma was interesting for family study but was not possible due to insufficient follow up.

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