FREQUENCY OF CNS LESIONS IN A TERTIARY CARE HOSPITAL – A 5 YEAR STUDY

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ABSTRACT

Background and Objectives: *Central nervous system (CNS) lesions range from inflammatory to infectious to neoplastic. Histological spectrum of non-neoplastic and neoplastic lesions is broad and it varies among extremes of age groups. With the aim of determining the diversity of CNS lesions, the study was conducted in a tertiary care hospital in Lahore.*

Material and Methods: *A total of 185 CNS lesions were studied in the Department of Pathology, Allama Iqbal Medical College Lahore in collaboration of Neurosurgery Unit, Jinnah Hospital Lahore from January 2010 to December 2014. The diagnosis was made on routinely processed tissue. The H&E stained sections in all cases were reviewed and diagnosis was confirmed applying revised World Health Organization classification, 2007.*

Results: *A total of 185 CNS lesions were analysed. 107 (58%) were males and 78 (42%) were females. Minimum age of case was 8 years and maximum was 75 years. The most common lesions were of neoplastic nature among which glioma was more common (n = 51) 35% followed by Meningioma (23%). Other lesions include fungal infections, pituitary adenoma, schwannoma, neurofibroma, carotid body paraganglioma, craniopharyngioma, arachnoid cyst, medulloblastoma and medulloepithelioma.*

Conclusion: *This study gives spectrum of non-neoplastic and neoplastic CNS lesions. Moreover, this also gives incidence of various CNS malignancies.*

Key Words: *Spectrum, glioma, meningioma, neurofibroma, medulloblastoma, medulloepithelioma, craniopharyngioma, paraganglioma.*

INTRODUCTION

The human Central Nervous System (CNS) is unique and complex that process and link the information between body and outside world.[1,2] CNS diseases range in aetiology from infective, inflammatory to neoplastic. The space occupying lesions in CNS cause grave life threatening outcome irrespective of their nature. The reason behind is that these lesions grow in a confined space and are present close to vital structures.[3] Therefore, It is of great importance to establish the accurate diagnosis for timely neurosurgical intervention.[4] CNS tumours accounts for 2-5% of all body tumours. About 80% involve brain and 20% involve spinal cord.[5] These tumours affect more commonly males than females.[6,7] They are also different in adults and children in respect to their frequency, location and type.[1,8] CNS lesions involve supratentorium in adults while infratentorium is the commonest location in children.[1,9] In Western population, metastasis is reported to be the most common malignancy than primary CNS tumours. The reverse is true for Asian regions where primary CNS tumours are found more commonly.[5,10] There has been a tremendous progress in evaluation of various genetic pathways responsible for glial tumours. Although the established risk factors involve genetic mutations (Li Fraumeni syndrome) and ionizing radiations.[11] But the exact aetiological and risk factors involved in pathogenesis of glial tumours are still not clear.[10] However, new therapeutic and diagnostic modalities have been devised by understanding molecular and morphological characteristics of tumours that includes tumour subtypes and histological grades.[10]

It is very important to study spectrum of CNS lesions. However the accurate CNS tumour epidemiology in our country is not present that makes early treatment difficult.[12] The purpose of this study is to provide a spectrum of CNS lesions with which patients suffer and to assess the tumour burden in patients coming to a tertiary care hospital.

MATERIALS AND METHODS

In this study we retrospectively analyzed the data of CNS biopsies from Neurosurgery Department, Jinnah Hospital Lahore and Histopathology Department,

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Allama Iqbal Medical College Lahore.Total number of 185cases received in Neurosurgery department from January 2010 till December 2014. These were patients who underwent operative procedures for space occupying lesions of the brain, spinal cord lesions and carotid body tumour. The cases that were received in Histopathology Department, Allama Iqbal Medical College were diagnosed on H&E stained slides on routinely processed tissue. Immunohistochemistry was performed on a few cases. Tumour were categorised and graded according to World Health Organization (WHO) 2007 classification. The cases that were not received in Histopathology Department of Allama Iqbal Medical College, Lahore, were collected from Neurosurgery data register. The patient's data and their Histopathological diagnosis from reports of outside labs were included.

RESULTS

The age range of patients was 8 to 75 years with mean age of 37 years ± 2 SD. Most of the patients were in age group of 13 – 40 years. Among 185 patients with CNS lesions, n = 107 (58%) were males and n = 78 (42%) were females. About 144 (78%) patients were diagnosed as neoplastic and 41 (22%) were diagnosed having other non-neoplastic causes. Among neoplastic lesions n = 85 were males and n = 59 were females. Non-neoplastic causes include necrotizing granulomatous inflammation (6.5%), degenerated disc material (3.8%), fungal infection (3.2%), abscess (2.2%), dermoid cyst (2.2%), epidermoid cyst (1.6%), AV malformation (1.1%), arachnoid cyst (0.5%), colloid cyst (0.5%) and meningiocele (0.5%).

Neoplastic lesions include glial tumours as the most common type. Glial tumour were n = 51 (35%) followed by meningioma n = 33 (23%), neural tumours n = 17 (11.8%) and metastasis n = 12 (8.3%).

Table 1: *Table showing frequency of various CNS lesions.*

Diagnosis	*Frequency*	*Percent*
Meningioma grade I	33	17.8
GBM Grade IV	24	13.0
Schwannoma	16	8.6
Metastasis	12	6.5
Necrotizing Granulomatous Inflammation	12	6.5
Pituitary Adenoma	12	6.5
Diffuse Astrocytoma Grade II	11	5.9
Fungal Infection	6	3.2
Oligoastrocytoma grade III	5	2.7
Anaplastic Astrocytoma Grade III	4	2.2
Dermoid Cyst	4	2.2
Medulloblastoma	4	2.2
Chordoma	3	1.6
Epidermoid Cyst	3	1.6
Pilocystic Astrocytoma Grade I	3	1.6
AV Malformation	2	1.1
Choroid Plexus Papilloma Grade I	2	1.1
DLBCL	2	1.1
Oligoastrocytoma Grade II	2	1.1
Plasma Cell Tumour	2	1.1
Arachnoid Cyst	1	.5
B Cell NHL	1	.5
Carotid Body Paraganglioma	1	.5
Colloid Cyst	1	.5
Craniopharyngioma	1	.5
Ependymoma	1	.5
Ewing Sarcoma/PNET	1	.5

DISCUSSION

It is of great importance to have a retrospective epidemiological review of spectrum of CNS lesions. In this way, we can compare this data from upcoming future research and see the changing spectrum of CNS lesions.[7] The study of spectrum and age distribution of CNS lesions can help us in the early diagnosis and intervention of various neoplastic and non-neoplastic lesions.

In the present study, 185 patients who presented with CNS lesions during a period of 5 years from January, 2010 to December, 2014 were included. In this study, patients presented with a wide age range that is from 8 years to 75 years. About 107 out of 185 patients were male and 78 out of 185 patients were females. The results in our study are concordant with many studies done in Asian regions where various CNS lesions were found to be more common in males as compared to females..[2,8,10,11] In the present study, 41 cases were diagnosed as non-neoplastic lesions and 144 as neoplastic. The results in our study were found to be concordant with other studies by Alam et al. Nibhoria et al. and Dogar where neoplastic lesions

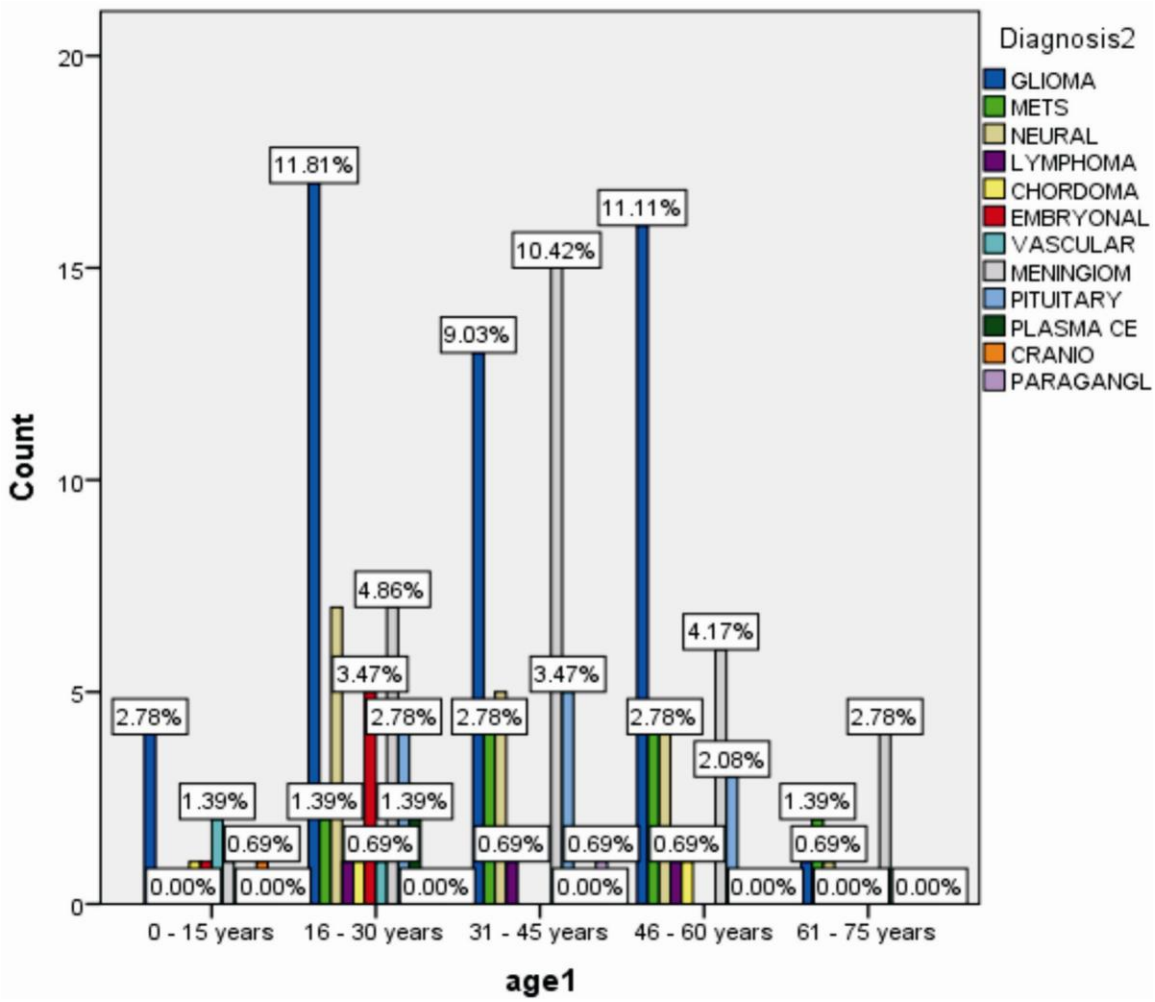


Fig. 1: *Distribution of neoplastic lesions among age groups.*

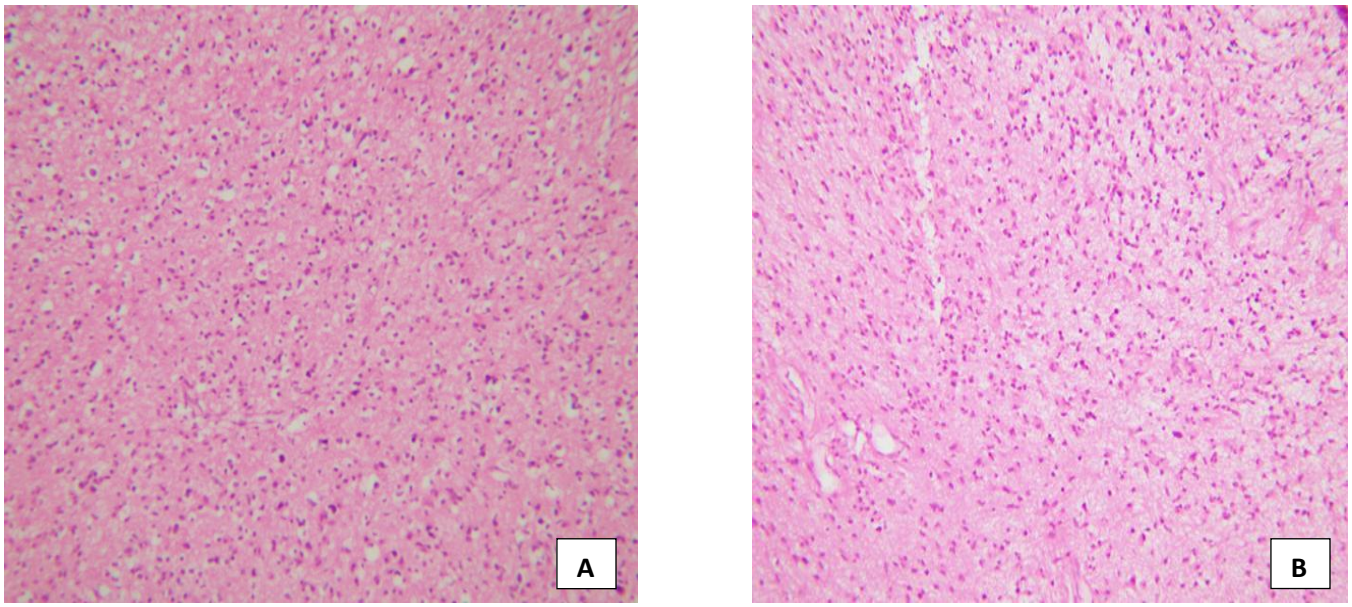


Fig. 2: *A-Photomicrograph showing Oligodendroglioma WHO Grade II (H/E; 200X), B-Photomicrograph showing Diffuse Astrocytoma WHO G II (H/E; 200X).*

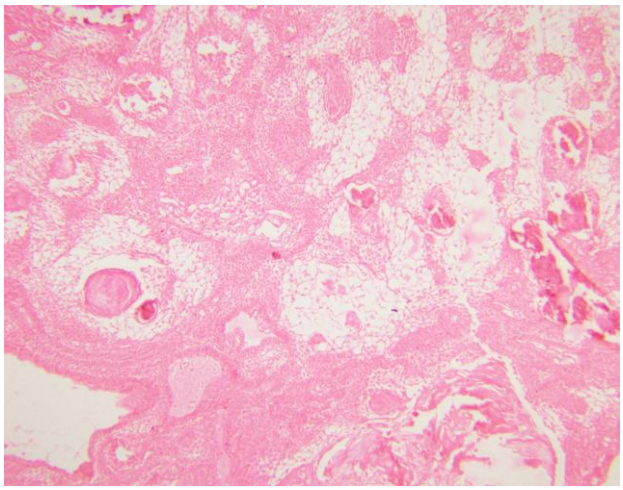
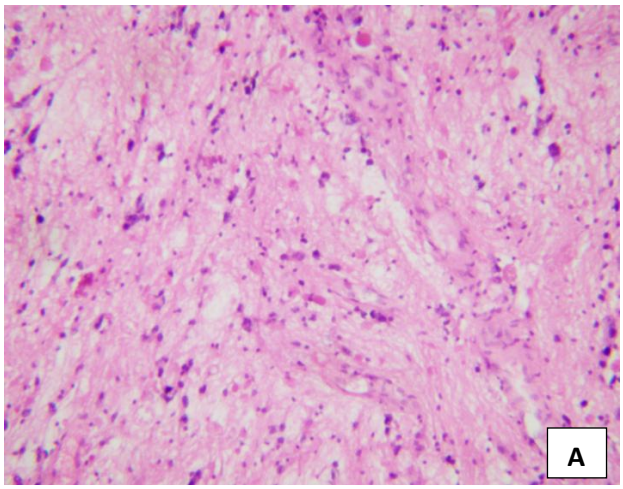


Fig. 3: *Photomicrograph showing Craniopharyngioma (H/E; 200X).*



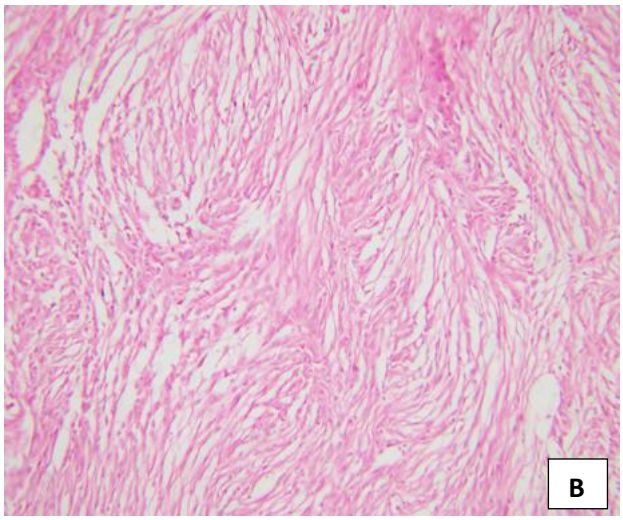
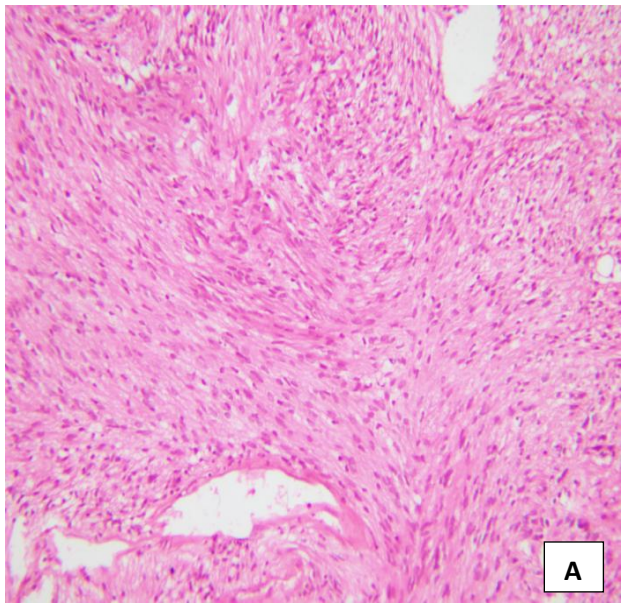


Fig. 4: *A-Photomicrograph showing Pilocytic Astrocytoma WHO G I (H/E; 200X), B-Photomicrograph showing Meningiotheliomatous meningioma WHO G I (H/E; 200X).*



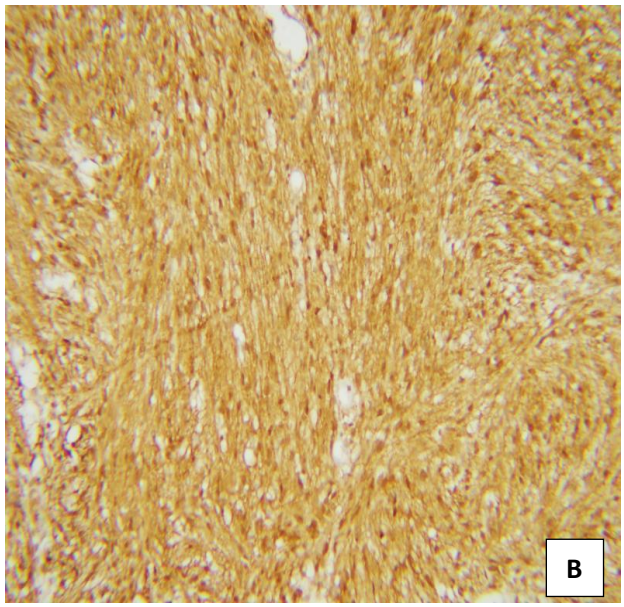


Fig. 5: *A-Photomicrograph showing Schwannoma at CP angle of brain (H/E; 200X). B-Immunohistochemisry with S100 (H/E; 200X).*

were more common than non-neoplastic lesions.[3,8] Amongst non-neoplastic lesions, 12 were diagnosed as necrotizing granulomatous inflammation, 7 as prolapsed disc, 6 as fungal infection and 4 as abscess.

Among 144 neoplastic lesions, 51 cases of glial tumours found, present in 34 males and 17 female. Commonest age group of patients with neoplastic lesions is found to be 16 to 40 years. In glial tumours, the most common type was GBM WHO Grade IV. About 24 patients were diagnosed with GBM. Most of these patients were above 40 years. Our results are also concordant with Hashmi et al. Nibhoria et al. and others

where the most common tumour was glioma among neoplastic lesions.[5,8,10] The results are discordant with Ghanghoria et al.[2]

Thirty three cases were diagnosed as meningioma affecting 15 males and 18 females. Meningioma was found to be more common in females as compared to males. The results in our study are concordant with the Reddy et al. and Gadgilet al.[13,14]

Rest of the tumour categories were peripheral nerve origin tumours, pituitary tumours, craniopharyngioma, embryonal tumours, chordoma and metastasis. Primary brain tumours were more common than metastasis and glioma were highest in incidence in males.

In ***conclusion*** this study highlights the spectrum of various non-neoplastic and neoplastic CNS lesions and also gives us frequency of various CNS malignancies in a tertiary care hospital in Lahore.

Gliomas are commonest tumours followed by meningioma. GBM patients in this study suffer from delayed mostly diagnosis and management.

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Authors' Contribution
HAA: Data collection at Histopathology department, AIMC, literature search, material and methods, results and discussion writing. UAK: Data collection at Neurosurgery department, Jinnah Hospital Lahore that was not sent to AIMC Histopathology department, contributed in literature search and discussion writing. SM: Contributed in literature search, data analysis and discussion writing. IAA: Did overall supervision.

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