Original article:

Clinicopathological study and epidemiological spectrum of brain tumours in Rajasthan

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Abstract

Brain tumors are a mixed group of neoplasms that are present in the intracranial tissues and the meninges. Tumours that begin in the brain are primary brain tumours while those arising outside and then spreading to the brain are metastatic brain tumours. There was no epidemiological and statistical data regarding various features of brain tumors in the state of Rajasthan. Objective- To evaluate the clinical and pathological characteristics and epidemiological pattern of brain tumours in Rajasthan. Methods- All patients with primary and metastatic brain tumours reporting to various hospitals of Rajasthan were included between 2011 and 2014. Total 70 patients aged 2- 60 years were included and clinical symptoms and histopathological reports were evaluated. Results- incidence of brain tumours was found to be 1.84%. Most common symptoms of brain tumour were headache (65.33%), nausea and vomiting (46.6%), epilepsy (22.6%), mental change (22.6%), visual defect (20%) and difficulty in movement (17.33%). Other symptoms were fever (8%), vertigo (5.2%), anorexia (5.2%) and sensory loss (2.6%). On histopathology, Glioma was most common (51.42%) followed by meningioma (17.14%). These were followed by pituitary adenoma (10%) and developmental tumour and cysts (10%)

Introduction

Brain tumours comprise a diverse group of lesions that occur at almost any site in the intracranial tissues and in patient of any age. Primary neoplasms of CNS represent nearly two-thirds of all brain tumours. The term primary brain tumour encompasses neoplasm and related mass lesion that arise from the brain and its linings. Non-neoplastic intracranial cysts and tumour like lesion are also included, with pituitary tumours and local extension from regional tumours (e.g. craniopharyngioma and chordoma) that arise from adjacent structure such as skull base. The brain and meninges are also common sites of secondary tumour implantation and when this happens, the tumours are called metastatic brain tumours.

Central nervous system (CNS) tumours comprise 2% to 5% of all tumours. 80% involve the brain and 20% involve the spinal cord. Brain tumours cause approximately 2% of all cancer deaths. 60% to 80% of brains tumours are primary and rest 20% to 40% are metastatic[1].

Regional cancer epidemiology is an important basis for determining the priorities for cancer control in different countries worldwide. There is no reliable information about the pattern of brain tumours in Rajasthan, a state in north western India and hence an attempt was here made to evaluate the situation based on hospital data of brain tumours treated between 2012 and 2014.

Aims and objectives- The purpose of this review is to provide a sufficiently detailed perspective on

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epidemiologic studies of brain tumours in Rajasthan to encourage multidisciplinary etiologic and prognostic studies among surgeons, neuro-oncologists, epidemiologists, and molecular scientists for effective diagnosis and better management. The main aim to conduct this study is to find the incidence of brain tumour with its etiopathological aspects and clinical presentation.

Material and methods

The study included 75 patients of brain tumour admitted to Neurosurgery ward in various hospitals of Rajasthan between 2012 and 2014. After admission in ward, complaint of patient with clinical history and detailed thorough neurological examination was done and noted. All findings of patients investigation including plain X-ray, CT scan head, MRI brain was recorded in detail as per proforma. Intra-operative findings including site, size of tumour, its attachment and infiltration, gross appearance, vascularity and changes in surrounding brain was noted in each case. Details of histopathological findings from pathology department were carefully registered. Collected data was analyzed by using Statistical Package for Social Science (SPSS version 12.0).

Observations

Among the 4056 patients admitted in neurosurgery ward, 75 were having brain tumours. Incidence of brain tumour was found to be 1.84%. In our series, maximum patients (80%), were from rural area and 96% were Hindus, while maximum (82.6%) patients belong to lower socioeconomic group followed by middle class group (17.3%). Out of a total of 75 patients, 41 were males (54.6%) and 34 (45.3%) were females. Maximum patients (17) were seen in the age group of 21-30 years i.e. 3rd decade followed by 4th, 1st, 6th and 5th decade of life.

Most common symptoms of brain tumour were headache (65.33%), nausea and vomiting (46.6%), epilepsy (22.6%), mental change (22.6%), visual defect (20%) and difficulty in movement (17.33%). Other symptoms were fever (8%), vertigo (5.2%), anorexia (5.2%) and sensory loss (2.6%). In most of the cases more than one symptom were present (Table-1).

Table 1: Distribution of patients acc to presenting symptom

Symptoms	No. Of cases	Percentage
Headache	49	65.3%
Nausea and vomiting	35	46.6%
Epilepsy	17	22.6%
Mental change	17	22.6%
Visual defect	15	20%
Difficulty in movement	13	17.3%
Fever	6	8%
Vertigo	4	5.2%
Anorexia	4	5.2%
Sensory loss	2	2.6%

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Most of the patients (62.6%) presented after 1 month of onset of symptoms and before 6 months. While 20% patients presented within one month of onset of symptoms and 12% after one year.

Table 2: Duration of symptoms on admission

Duration	No. Of cases	Percentage
<1 month	15	20%
1-6 months	47	62.6%
7-12 months	4	5.3%
>1 year	9	12%

52% of patients had normal fundus with no evidence of papilloedema. 32% of cases had evident papilloedema and in 3% of patients the papilloedema had progressed to optic atrophy.

Table 3: Distribution of patients according to fundus examination

Fundus	No. Of cases	Percentage
Normal	39	52%
Pallor of disc	02	2.6%
Early papilloedema	08	10.6%
Severe papilloedema	24	32%
Optic atrophy	02	2.6%

In our study of 75 cases, histopathological type was known in 70 cases, 5 cases remain unverified. Glioma was most common (51.42%) followed by meningioma (17.14%). These were followed by pituitary adenoma (10%) and developmental tumour and cysts (10%).

There were 3 cases of acoustic neuroma (4.28%) and 1 cases of metastasis (1.42%).

Table 4: Distribution of patients according to pathology

Type	Total no. Of cases	Percentage
Gliomas	36	51.42%
Meningiomas	12	17.14%
Acoustic neuroma	3	4.28%
Pituitary adenoma	7	10%
Metastasis	1	1.42%
Developmental tumour and cysts	7	10%
Undifferentiated carcinoma	1	1.42%
Miscellaneous	3	4.28%
Total	70	100%

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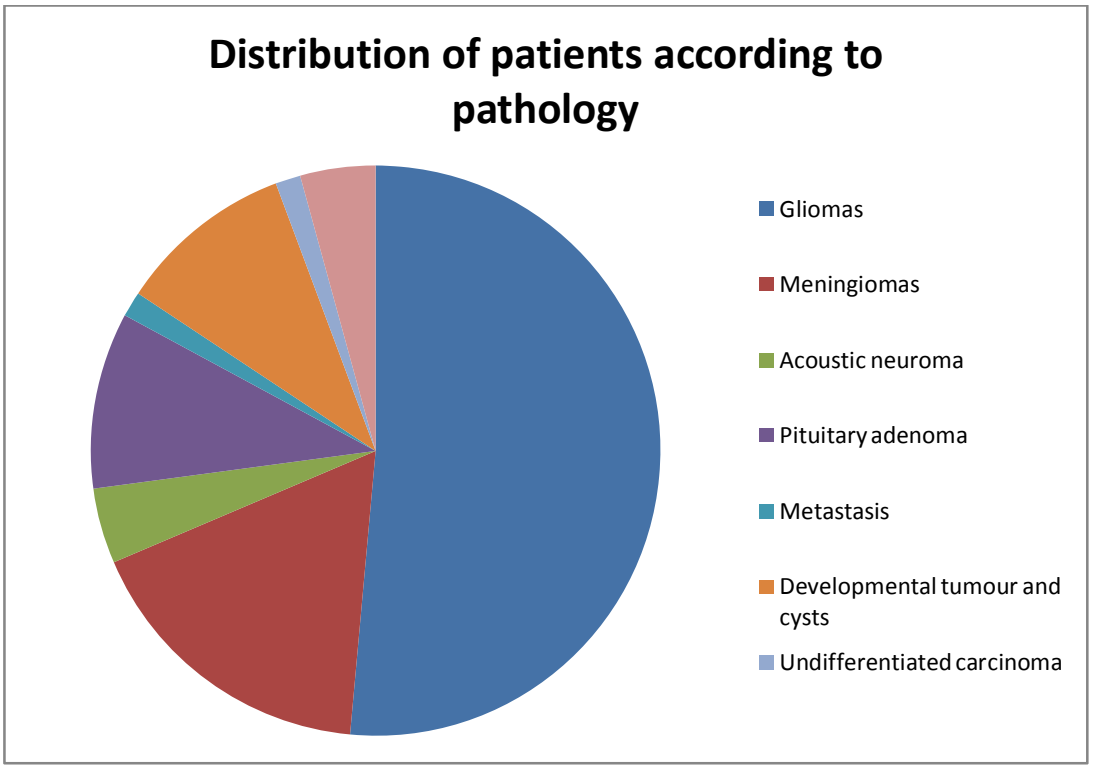

Glioblastoma multiforme and anaplastic astrocytoma were the most common (70.8%) astrocytomas in our series followed by pilocytic and grade II astrocytomas.

Table 5: Histopathological frequency of various astrocytomas

Grade	No. Of cases	Percentage
Grade I (pilocytic)	4	16.6%
Grade II Astrocytoma	3	12.5%
Grade III Anaplastic	11	45.83%
Grade IV Glioblastoma multiforme	6	25%

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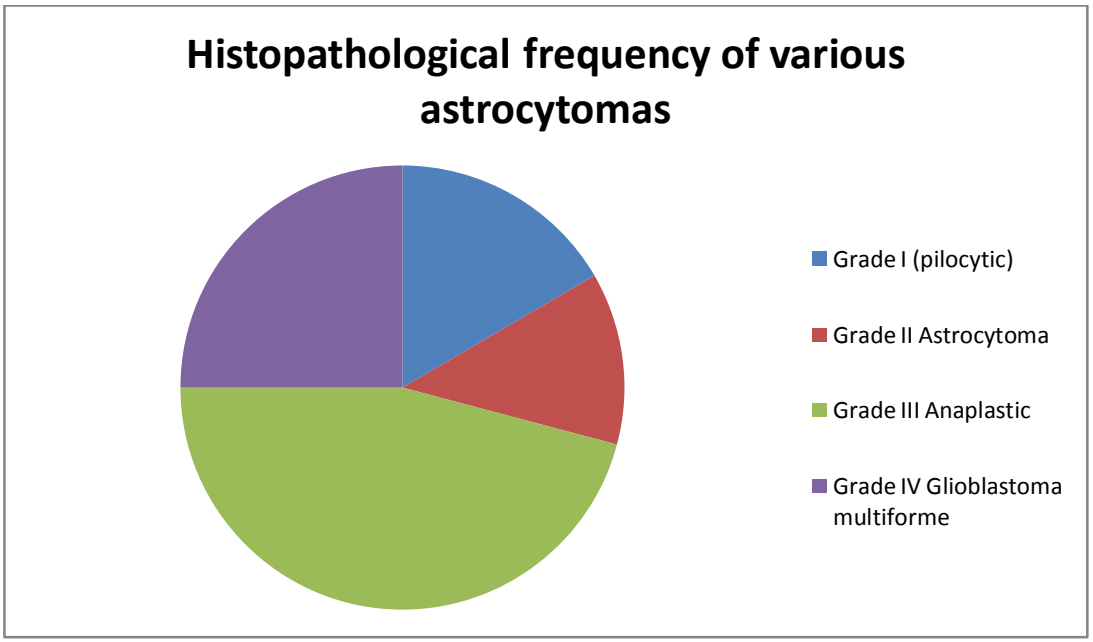

Of the 75 cases, 55 tumours were present in supratentorial region whereas, 20 were present in infratentorial region. 72 % of Gliomas were present in supratentorial region and remaining 28% were infratentorial. Meningiomas were also located mainly in supratentorial region 83%, remaining 17 % were infratentorial. All pituitary adenomas were in supratentorial region. In one case of metastasis, secondaries were multiple.

Table 6: Supratentorial and Infratentorial distribution

Type	Supratentorial	Infratentorial	Total
Gliomas	26	10	36
Meningiomas	10	2	12
Acoustic neuroma	1	2	3
Pituitary adenoma	7	0	7
Metastasis	1	-	1
Developmental tumour and cysts	6	1	7
Undifferentiated carcinoma	1	0	1
Unverified tumour	2	3	5
Miscellaneous	1	2	3
Total	55(73.3%)	20(26.6%)	75

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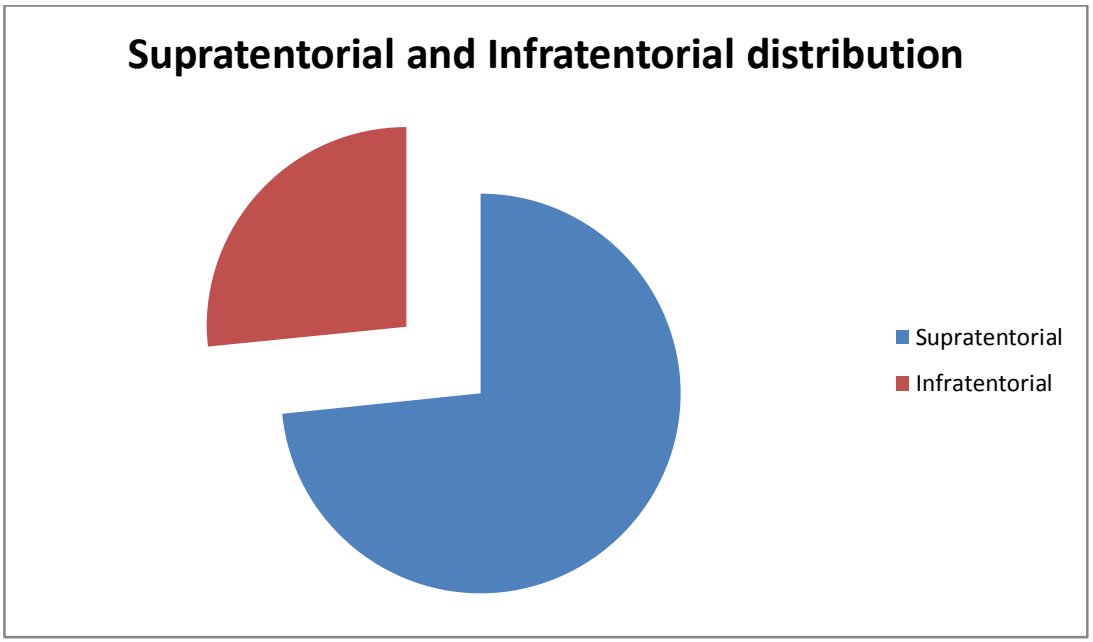

The incidence of brain tumors has been reported to be around 3.9 and 3.2 /one lakh/year in males and females respectively (Ferlay et al., 2010)[2]. Incidence in our study is 1.84%, which is less and it may be because only one neurosurgeon is working here and our centre is a newly created one.

The incidence does not vary markedly between regions or populations as proven by Stewart and Kleihues et al[3]. But there has not been any study in this region which prompted us to conduct this study in our region. In our series, maximum patients (80%) were from rural areas and 96% were hindus. In this study maximum patients belong to low socio-economic group. Inskip PD et al[4] found there is no association between geography, ethnic variation and brain tumours.

The incidence of Glioma in our series was 51.42% which is comparable to the incidence reported by Dastur and Lalita et al[5] (50.9%). Among Gliomas, astrocytomas formed about 50% of cases, which is in close correlation to the incidence reported by Dastur et al[6]. The maximum incidence occurred in fourth decade which was followed by 3rd and 5th decade. Similar figures ahve been reported by Zulch et al[7].

73.33% tumours were located in supratentorial region whereas, 26.66% were presented in infratentorial region.

In our series, headache was the leading symptom, in 65.33% which is comparable to study conducted by Roth and Elvidge et al[8], who reported the incidence to be 74%. Although, nausea, vomiting and vertigo are no longer considered among the earlier symptoms but in the present study we have seen that nausea and vomiting are still encountered often and is quite common. Due to ignorance on the part of general public and the late arrival of the patients to hospital, we report a higher incidence of this late feature of raised intracranial tension. In the present study, 46.6% of the patients complained nausea and vomiting at the time of admission, which were very much higher than reported by Roth and Elvidge - 0.8% of 2295 cases.

In the present study, we have considered the time elapsed between appearance oif first symptom and admission. In most cases, the earliest symptom was either headache associated with vomiting or

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epilepsy. In some silent growths, neurological deficit was the first indication of disease process. Twenty percent of cases were admitted within one month of the appearance of the first symptom, most of the cases(62.6%) were admitted within 6 months of appearance of first symptom. About 17% of cases had come after 6 months.

Conclusion

Majority of brain tumours were sporadic. Very little association was present between brain tumours and smoking, alcohol consumption. Incidence, general distribution, clinical presentation and management of brain tumours ananyzed in this series were comparable to that described in literature. Anaplastic astrocytomas were more common than Glioblastoma in this series. Precise detection of nature, location and extent of brain tumours has placed CT in the forfront of investigating modalities. Timely CT scanning can prove useful, in not only diagnosing a particular lesion, but also in deciding the therapeutic approach and rapid implementation of treatment at early stage which result in reduction of mortality and morbidity.

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