



Original Research Article

Clinicopathological study of meningioma from rural setup of central India : A 5 year experience

Prasheelkumar Gupta¹, Richa Goyal^{2,*}¹Dept. of Neurosurgery, Mahatma Gandhi Institute of Medical Sciences, Sevagram, Maharashtra, India²Dept. of Surgery, JN Medical College, Sawangi, Maharashtra, India

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ABSTRACT

Introduction: Meningioma comprises if 33.5% of total CNS tumors detected. There is lack of clinicopathological study of meningioma from rural setup in central India. The objective of this study is to give idea about the descriptive epidemiology, clinical presentation and histopathology for the central India rural population.

Materials and Methods: This study is retrospective observational study from the period of January 2014 to Feb 2019 in MGIMS, Sewagram. Inclusion criteria consists of all the histopathological proven cases of meningioma in department of Neurosurgery, MGIMS Sewagram during the same period. Rest of the CNS tumors were excluded from the study.

Results: Out of 168 cases of CNS tumors operated, meningioma consists of 44 cases accounting for 26.19% of total CNS tumors. The average age of presentation was 44.1 years. M:F ratio of 1:1.32. Most common affected age group was 30-50 years comprising 24 cases (54.54%) The most common clinical symptoms for intracranial meningioma were headache followed by vomiting and seizures. Among intracranial meningioma, the most common location was convexity meningioma (40.54%) followed by parasagittal (13.51%) and parafalcine meningioma (10.81%). Most common histopathological variety encountered was meningothelial in 42.72% cases. WHO grade I consists of majority of the tumors (95.45%) while grade II consists of 4.55%.

Conclusion: The descriptive epidemiology of meningioma in our rural setup roughly correlates with the epidemiology elsewhere in India apart from the male to female ratio; which could be due to lack of seeking medical care among females in our society.

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1. Introduction

In 1922, Harvey Cushing coined the term “meningioma”.¹ Meningiomas are mostly benign tumors (~95%) and usually accounts for 33.8% of the total CNS tumors.² In males, it accounts for ~20% while in females it accounts for 38% of total intracranial tumors.^{3,4} There is a feminine predominance of meningioma in most of the studies. The female-to-male ratio is about 2:1.⁵ Risk of tumour increases with age. Meningiomas constitute 0.4 to 4.6% of all brain tumors in children (younger than 16 years).⁶⁻¹¹ They are extremely uncommon in infancy. The average age of

presentation is 12.81 years as compared to 6.3 years in other paediatric brain tumors.^{12,13} Some of the possible risk factors associated are ionising radiation,^{14,15} head trauma,¹⁶ breast cancer¹⁷ and genetic factors.¹⁸ It is presumed that the tumour arises from “arachnoid cap cells”.

The distribution of intracranial meningiomas is approximately as follows: convexity (35%), parasagittal (20%), sphenoid ridge (20%), intraventricular (5%), tuberculum sellae (3%), infratentorial (13%) and others (4%).¹⁹ In children, the tumour may arise in unusual sites. Eleven percent of meningiomas in children are intraventricular, compared with 3.9% in adults.

* Corresponding author.

E-mail address: richa.goyal2005@gmail.com (R. Goyal).

The 2007 World Health Organization (WHO) classification of tumors of the CNS classified meningiomas under the heading “tumours of the meninges” and the subheading “tumours of meningotheial cells.” WHO recognizes three grades based on pathologic criteria and the risk of recurrence and aggressive growth as grade 1 (benign), grade 2 (atypical) and grade 3 (malignant).

Grossly, meningiomas are tan, well-demarcated solitary masses with a firm, broad-based dural attachment and smooth or bosselated surfaces. Falcine or tentorial meningiomas may have a bilobed, dumbbell shape. Except for aggressive variants, meningiomas are readily detachable from underlying brain or spinal cord. Similarly, haemorrhage and necrosis are usually restricted to malignant tumors. Increased vascular markings, calcification and hyperostosis are the characteristic findings that can be appreciated on plain radiographs.¹⁹ On NCCT(Non contrast CT), meningiomas are typically isodense to mild hyperdense compared with surrounding brain parenchyma.¹⁹ Calcification may be seen in some cases. Meningiomas usually have intense homogenous enhancement. On T1 weighted MRI, 60% of meningiomas are isointense and 30% are mildly hypointense compared with surrounding grey matter. On T2-weighted images, the tumors are isointense or mild to moderate hyperintense in approximately 50% of the cases. Hyperintensity on T2-weighted images corresponds higher water content which suggests friable tumour that could be easily suctioned out during surgery. Meningiomas usually have intense homogenous enhancement after injection of dye showing typical dural tail sign.¹⁹

Hospital based registry system forms the bulk of the reporting system in India. As per the literature, previously no studies have been published yet portraying meningioma incidence in rural population of central India. The aim of this study was to determine the incidence of Meningioma among all CNS tumors occurring in the study period, age and sex predilection, location, site preference for a population in a rural setup of central India.

2. Materials and Methods

This study is retrospective observational study from the period of January 2014 to Feb 2019 in MGIMS, Sewagram. Ethical board permission was taken. Inclusion criteria consists of all the histopathological proven cases of meningioma in department of Neurosurgery, MGIMS Sewagram during the same period. Rest of the CNS tumors will be excluded from the study. WHO 2007 classification of brain tumor was used for grading and typing of meningioma. Age, sex incidence and location of meningiomas was also studied. We also compared our results with other related studies.

3. Results

Out of 168 cases of CNS tumors operated, meningioma consists of 44 cases (26.19%). Out of 44 cases 37(84.09%) were intracranial meningioma and 7(15.91%) were spinal meningioma. The average age of presentation was 44.1 years. M:F ratio of 1:1.32. Most common affected age group was 30-50 years comprising 24 cases (54.54%) (Table 1). The M:F ratio in this age group was 1:2.4. The most common clinical symptoms for intracranial cases were headache followed by seizures and vomiting (Table 2). Among intracranial meningioma, the most common location was convexity meningioma (40.54%) followed by parasagittal (13.51%) and parafalcine meningioma(10.81%) (Table 3). Most common histopathological variety encountered was meningotheial in 42.72% cases. WHO grade I consists of majority of the tumors (95.45%) while grade II consists of 4.55%. In our study there was no grade III tumour reported. Out of 7 intraspinal meningioma the most common location was dorsal spine with 5 cases (71.42%).

Table 1: Age and sex incidence of meningioma.

Age	M	F	Total	Percent
<20	1	0	1	2.27
20-30	4	3	7	15.91
31-40	3	8	11	25
41-50	4	8	12	27.27
51-60	4	3	7	15.91
>60	3	3	6	13.63

Table 2: Presenting complaints

Symptoms	n
Headache	22
Seizure	14
Vomiting	8
Paresis	7
Visual Disturbance	5
Alt. Consciousness	4

Table 3: Location of meningioma

Location	No. of patients	Percent
convexity	15	40.54
parasagittal	5	13.51
parafalcine	4	10.81
SW	3	8.1
basifrontal	2	5.4
cp angle	2	5.4
sellar	2	5.4
olfactory groove	1	2.71
cerebellum	1	2.71
foramen magnum	1	2.71
intraventricular	1	2.71

Table 4: Comparison of location with other studies

Location	Present study (%)	Ruberti et al (%) ²⁰	Rohringer et al (%) ²¹	Howng and Kwan (%) ²²	Shrilakshmi et al (%) ²³
Convexity	40.54	23	34.71	42.2	37.27
Parasagittal	13.51	30	22.27	15.7	5.45
Sphenoid wing	8.1	15	17.09	8.4	14.54
Suprasellar	5.4	14	3	12.1	3.64
C.P angle	5.4	0	2	0	9.09
Others	27.05	18	20.93	21.6	30.01

Table 5: Comparison of tumour histopathology

Types of meningioma	Present study (%)	Sanghamitra et al (%) ²⁴	Nasrin et al (%) ²⁵	S Babu et al (%) ²⁶	Gursan et al (%) ²⁷
meningothelial	47.72	36.7	65.1	9	50
psammomatous	13.63	8.3	0.8	2.3	
transitional	13.63	13.4	17.2	35.33	29.2
fibroblastic	11.36	21.6	92	15.67	16.3
angiomatous	9.09	5	1.3	2.67	
atypical	4.54	1.8		23.3	1.8

4. Discussion

Meningioma accounts for 33.8 percent of brain tumor.² In our study it consists of 26.19% of brain tumor similar to the studies by Ruberti RF et al²⁰ and AB shah et al.²⁸ Our study had female preponderance with M:F ratio of 1:1.3. In other study by Rohringer et al,²¹ M:F ratio was 1:2 while in study by Howng and Kwan the ratio was 1:1.94.²² The cause of less male to female ratio as compared to other studies is not known. It could be due to less reporting of female for medical care in rural setup. In our study, 27.2% of our study population falls in 40-50 age group while 54.5% falls in 30-50 age group, which was similar to the study by Ruberti R.F.²⁰ For 30-50 years study population the male:female ratio observed was 1:2.4. In our study we have only one case of pediatric meningioma. The most common location of tumor was convexity meningioma followed by parasagittal meningioma, which correlates well with study done by Rohringer et al²¹ and Howng and Kwan et al²² (Table 4).

Spinal meningiomas comprised of 15.9% of total meningiomas in our study. In study done by Solero CL et al spinal meningiomas consist of 7.5-12.7% of all CNS meningiomas. Dorsal spine is reported as the most common location for spinal meningioma.²⁹⁻³¹ Out of 7 meningioma cases, 5 tumor cases were present in dorsal spine (71.4%). The male:female ratio for spinal meningioma was 1:6 which was similar to the study done by Shrilakshmi et al having ratio of 1:7.²³

The most common histopathological entity encountered in our study was meningothelial variant (47.72%). Other variants observed in our study were Psammomatous (13.63%), transitional (13.63%), fibroblastic

(11.36%), angiomatous (9.09%) and atypical (4.54%) variant. Sangamithra et al,²⁴ Nasrin Samadi et al,²⁵ Gursan et al,²⁷ all reported meningothelial as the most common variety. S Babu et al²⁶ reported transitional as most common variety (Table 5). Singh Avninder et al. reported that papillary meningiomas and anaplastic meningiomas constitute 1–2.5% of all meningiomas hence being rarest.³²

Meningiomas are graded into Grade I, Grade II and Grade III with incidence in a ratio of 95.45%, 4.55%, 0% in this study. Nasrin Samadi et al²⁵ reported as 86.1%, 8%, 5.9% while Konstantinos Violaris et al³³ as 89.82%, 5.82%, 4.36% for Grade I, Grade II and Grade III tumours respectively. Gross total resection (GTR) was done in 39 cases (88.63%) and subtotal resection was done in five cases (11.36%) in the present study. The major postoperative complication in our study was postoperative seizures (22.72%) followed by hemiparesis and behavioral changes.

5. Conclusion

At present there is no clinicopathological study about meningioma for rural population of central India. Being a major tertiary centre in rural area, the population of this study could roughly represent the rural population.

From our study, we conclude that most common histopathological variants of meningioma are meningothelial meningioma, followed by psammomatous meningioma. Most common WHO grade is grade 1. The most common age group for presentation of meningioma is third to fifth decade of life, and it is least common among children. Although the male to female ratio in our study is 1:1.3 it is less as compared elsewhere in world. It could be due to

less reporting of female for medical care in rural setup.

6. Source of funding

None.

7. Conflict of interest

None.

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Author biography

Prasheelkumar Gupta Assistant Professor

Richa Goyal Assistant Professor

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