Research Article

A study of meningioma in relation to age, sex, site, symptoms, and computerized tomography scan features

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Abstract

Background: Meningioma, named by Harvey Cushing in 1922, is a group of heterogeneous tumors that arise from meningothelial cells. Meningiomas are predominantly benign tumors usually attached to the dura that arise from the meningothelial cell of the arachnoids. Meningioma may be found along with any of the external surface of the brain and within the ventricular system, where they arise from the stromal arachnoids cells of the choroid plexus.

Objective: To evaluate the incidence of meningioma, its frequency in to the various parts of the brain, and age and sex distribution of meningioma.

Materials and Methods: A total of 50 cases of meningioma (clinically diagnosed and histologically proved) of patients admitted in neurosurgery units of a teaching hospital were studied. A detailed history was taken. Finding was recorded in the pro forma designed for the study.

Result: In this study, we found that the most common location is the intracranial in 44 cases (88%), male to female ratio is 1:2.12, common age for meningioma is 31–50 years, the most common site in intracranial is the convexity of brain in 31 cases (70.46%), and the most common symptom is headache.

Conclusion: A total of 50 cases of meningioma were studied for their incidence in relation to age, sex, and site of occurrence. The most common site is intracranial location, female have higher incidence than male subjects. In intracranial meningioma, the most common site is the convexity of brain, age group is 31–50 years, and symptom is headache.

KEY WORDS: Meningioma, brain, clinical features, CT scan

Introduction

Meningioma is mostly a benign tumor that commonly attached to the dura that arise from the meningothelial cell of arachnoid. Meningioma can be found along any of the outer surface of the brain and in the ventricular system in which it arise from the stromal arachnoid cell of the choroid plexus.[1] Meningioma is the most common primary nonglial intracranial brain tumor. It constitutes about 15% of all primary intracranial neoplasms.[2] It contains 25% of spinal cord tumors. Meningioma most commonly occurs in middle or later adult life but they are also seen in the childhood and adolescence.[3–5] Male subjects are affected less commonly than female subjects; so female preponderance is seen in meningioma, especially in the spinal meningioma. In addition, some studies suggest increased incidence in female who suffer from mammary carcinoma[4]. Moreover, rare meningioma contains metastatic cells from primary mammary carcinoma[6]. Meningioma is a very slow-growing tumor, and they produce clinical signs and symptoms owing to compression of the nearest structure[7]. Ideally, they are benign and slow-growing tumor but they have tendency to recurrent[8]. Multifocal meningioma is associated with type 2 neurofibromatosis; genetic abnormalities associated with it are found on the chromosome 22q12. Allelic loss involving this band is the common feature for the meningioma.

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Ionizing cranial irradiation is also a significant risk factor for the meningioma, and radiation-derived meningioma is more commonly multifocal, aggressive, and histologically contains more atypia.[9]

Materials and Methods

A total of 50 cases of meningioma (clinically diagnosed and histologically proved) of patients admitted in neurosurgery units of a teaching hospital were studied. A detailed history was taken. Finding was recorded in the pro forma designed for the study.

Macroscopic examination of the entire biopsy specimen was done. The specimens were studied by paraffin sectioning and routine hematoxylin and eosin staining and special staining such as reticulin stain and PAS stain were carried out as and when required. All the microscopic findings were carefully noted and grading and histological typing of meningioma were made on the basis of established criteria and positivity for certain special stains.

Result

A total of 50 cases of meningiomas were studied. Among them, 44 (88%) cases were intracranial type and 6 (12%) cases intraspinal type. Among 50 cases, 16 (32%) patients were male and 34 (68%) female subjects. So, male to female ratio is 1:2.12. This finding is well-correlated with the established findings of female preponderance for meningiomas. As shown in Table 1, common age for meningioma was found to be 31–50 years, 28 (56%) cases fall in this age group, followed by 11 (22%) cases in 51–60 years age group. The sole case of meningioma in the age group 0–20 years is a 20-year-old adult. In this study, not a single case of meningioma in childhood was found [Table 2]. This conform to the observation in another study that incidence of meningioma in childhood is <2%. Among 44 cases of intracranial meningioma, the site of distribution differs [Table 3]. Among them, the most common site is convexity of brain [31 (70.46%) cases], followed by sphenoid wing [3 cases (6.82%)], parasagittal and posterior fossa [each with 2 (4.54%) cases], and tentorial, tubercular sellas, and cerebellopontine angle [each with 1 (2.27%) case] [Table 4]. In 50 cases of meningioma, 29 (58%) patients were with headache, followed by seizures in 20 (40%) cases, vomiting in 12 (24%) cases, visual disturbance in 9 (18%) cases, and altered level of consciousness in 7 (14%) cases [Table 5]. In computerized tomography (CT) scan, among 44 intracranial meningiomas, 30 (68.18%) cases showed homogeneous enhancement, 12 (27.27%) cases nonhomogeneous enhancement,

Table 1: Gender distribution in meningioma

	Number of cases	%
Male	16	32
Female	34	68
Total	50	100

Table 2: Age distribution in meningioma

Age (years)	Number of cases	%
0–10	0	0
11–20	1	2
21–30	5	10
31–40	14	28
41–50	14	28
51–60	11	22
>61	5	10
Total	50	100

Table 3: Distribution of meningioma

Site	Number of cases	%
Intracranial	44	88
Intraspinal	6	12
Total	50	100

Table 4: Distribution of intracranial meningioma in various sites

Site	Number of cases	%
Convexity	31	70.46
Parasagittal	2	4.54
Sphenoid wing	3	6.82
Tentorial	1	2.27
Tubercular sellas	1	2.27
Cerebellopontine angle	1	2.27
Posterior fossa	2	4.54
Other	3	6.82
Total	44	100

Table 5: Symptoms found in meningioma

Symptoms	Total number of cases	%
Headache	29	58
Seizure	20	40
Vomiting	12	24
Paresis	11	22
Visual disturbance	9	18
Altered level of consciousness	7	14

Table 6 : Computerized tomography findings in meningioma

Findings	Number of cases	%
Homogeneous enhancement	30	68.18
Nonhomogeneous enhancement	12	27.27
Adjacent hypodensity	30	68.18
Midline shift	27	61.36
Calcification	10	22.73

Table 7: Comparison of male to female ratio in intracranial meningioma

	Present study	Rohringer et al.[10]	Howng and Kwan[11]
Male to female ratio	1:1.93	1:2	1:1.94

Table 8: Comparison of various locations in intracranial meningioma

Location	Present study (%)	Rohringer et al.[10] (%)	Howng and Kwan [11] (%)
Convexity	70.45	34.71	42.2
Parasagittal	4.54	22.27	15.7
Sphenoid wing	6.82	17.09	8.4
Tentorial	2.27	4	—
Suprasellar	2.27	3	12.1
Cerebellopontine angle	4.54	2	—
Others	9.11	16.93	21.6

Table 9: Comparison of computerized tomography findings (intracranial meningioma)

Findings	Present study (%)	Rohringer et al.[10] (%)
Homogeneous enhancement	68.18	69.43
Nonhomogeneous enhancement	27.27	25.9
Adjacent hypodensity	68.18	55.44
Midline shift	61.36	78.75
Calcification	22.73	25.38

30 (68.18%) cases adjacent hypodensity, 27 (61.36%) cases midline shift, and 10 (22.73%) cases calcification [Tables 6 and 7].

Discussion

As evident from Table 8, common location of intracranial meningioma is convexity of the skull. In this study, it is 74.45%, while in the study by Rohringer et al.,[10] it is 34.71% and, in the study by Howng and Kwan,[11] 42.2%. Hence, the most common location is same in all these three studies. The second most common region is also similar in these three studies (4.54%, 22.27%, and 15.7%, in this study, in the study by Rohringer et al.,[10] and the study by Howng and Kwan,[11] respectively). These findings of locations of meningioma in this study more or less correlated well with the study by Rohringer et al. and Howng and Kwan. CT scan is a very useful radiological investigation for central nervous system tumors. As evident in Table 9, common findings in meningioma are homogeneous enhancement, adjacent hypodensity, and midline shift. In this study, the homogeneous enhancement was 68.18% and, in the study by Rohringer et al., 69.43%; therefore, the result matched in both the studies. Nnonhomogeneous enhancement in this study was 27.27% and, in the study by Rohringer et al., 25.9%. The CT scan findings of meningioma in this study correlate well more or less with the study by Rohringer et al. Male to female ratio is 1:2.12. This finding also well-correlated with the established findings of female preponderance in meningiomas. The sole case of meningioma in age group 0–20 years is a 20-year-old adult. In this study, not a single case of meningioma in childhood was found. This conform to the observation in another study that incidence of meningioma in childhood is <2%.

Conclusion

A total of 50 cases of meningioma were studied for their incidence in relation to age, sex, and site of occurrence. Most common site is intracranial location, female have higher incidence than male subjects. In intracranial meningioma, the most common site is the convexity of brain. Most common age group is 31–50 years and most common symptom is the headache.

References

1. Kumar V, Fausto N, Abbas A. *Robbins and Cotran Pathological Basis of Disease*, 7th edn. Philadelphia, PA: WB Saunders 2005. pp. 1409–10.
2. Perry A, Giannini C, Raghavan R, Scheithauer BW, Banerjee R, Margraf L, et al. Aggressive phenotypic and genotypic features in pediatric and NF2-associated meningiomas: a clinicopathologic study of 53 cases. J Neuropathol Exp Neurol 2001;60(10): 994–1003.
3. Kepes JJ. *Meningiomas: Biology, Pathology and Differential Diagnosis*. New York, NY: Masson, 1982.
4. Longstreth WT Jr, Dennis LK, McGuire VM, Drangsholt MT, Koepsell TD. Epidemiology of intracranial meningioma. Cancer 1993;72(3):639–48.
5. Perry A, Louis DN, Scheithauer BW, Budka H, von Deimling A. Meningiomas. In: *WHO Classification of Tumours of the Central Nervous System*. Loius DN, Ohgaki H, Wiestler OD, Cavenee WK (Eds.). Lyon, France: IARC Press, 2007.
6. Zon LI, Johns WD, Stomper PC, Kaplan WD, Connolly JH, Morris JH, et al. Breast carcinoma metastatic to meningioma. Case report and review of the literature. Arch Intern Med 1989;149(4): 959–62.
7. Maiuri F, De Caro MB, Esposito F, Cappabianca P, Strazzullo V, Pettinato G, et al. Recurrences of meningiomas: predictive value of pathological features and hormonal and growth factors. J Neurooncol 2007;82(1):63–8.

8. Commins DL, Atkinson RD, Burnett ME. Review of meningioma histopathology. Neurosurg Focus 2007;23(4):E3.
9. Al-Mefty O, Topsakal C, Pravdenkova S, Sawyer JR, Harrison MJ. Radiation-induced meningiomas: clinical, pathological, cytokinetic, and cytogenetic characteristics. J Neurosurg 2004;100(6): 1002–13.
10. Rohringer M, Sutherland GR, Louw DF, Sima AA. Incidence and clinopathological features of meningioma. J Neurosurgery 1989;71(5 Pt 1):665–72.
11. Howng SL, Kwan AL. Clinopatholoical study of intracranial meningiomas : Gaoxing Yi Xue Ke Xue Za Zhi 1992;8(6):312–9.
12. Rosai J. *Rosai and Ackerman's Surgical Pathology*, 10th edn. Mosby 2011. pp. 2388–95.

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