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Clinico Pathological Study of Intracranial Meningiomas- A Prospective Study.

Dr. Duttaluru Seshadri Sekhar[1], Dr. Bhavanam Hanuma Srinivas[2],
Dr. Ambati Vimala[3], Dr. Kesanakurthi Satyanarayana Murthy[4.]
[1,2] Assistant Professors, [3] Post Graduate, [4] Professor
Department Of Neurosurgery, Guntur Medical College, Guntur, Andhra Pradesh

Abstract:
Background: *Intracranial meningiomas are relatively common extra axial primary neoplasms which arises from arachnoid cap cells. The purpose of the study was to analyse the demographics, location, various clinical presentations, radiological characteristics, histological variants and grading of intra cranial meningiomas and their surgical outcome by simpson grading & recurrence if present.*
Materials and methods: *A prospective observational study at single centre with all surgically treated patients of intracranial meningiomas during the period of August 2013 to December 2015 were included for analysis. Age, Sex incidence, different clinical features, Radiological findings, Location of meningiomas , Grading and typing of meningiomas based on histological features, Simpsons Grade of Resection and recurrence were studied.*
Results: *A total of 52 patients of intracranial meningiomas managed surgically were included in this study. Follow up were available for all patients. Mean age was 44.96 yrs, 69.2% were females & 30.7% were males with male to female ratio of 1:2. The presenting symptom was headache in 69.2% patients and seizures in 40.38%. Convexity meningiomas corresponds to 57.7% of the tumors followed by 21.15% are parasagittal meningiomas. 50% of the cases were treated by Simpsons Grade II resection, followed by Grade I resection in 38.46% of cases. Tumor pathological grade was WHO grade 1 in 73.61% of patients, of which 30.77% were meningothelial meningiomas. Follow up period was 6 months to 3 years. Two cases in which Simpsons grade III and IV resection was done 2 had recurrence on followup.*
Conclusions : *Intra cranial meningiomas are more common in females especially in middle and late age of adulthood. Convexity meningiomas as well as grade I histological variants are predominant. Recurrence of tumor depends on Simpsons grading of excision and histological grade of tumor.*
Keywords: *Meningiomas, Simpsons grading, Recurrence*

I. Introduction

In 1922 the name Meningioma was coined by Harvey cushing, accounting for 15-30% 0f all primary intra cranial tumors with the estimated incidence in general population is 2.3/1,00,000 people.[1,2] Intracranial meningiomas are relatively common extra axial primary neoplasms which arises from arachnoid cap cells. Meningioma most commonly occurs in middle or later adult life but they are rare in childhood and adolescence.[3-5]Based on histology and clinical behavior, WHO classified meningiomas into 3 grades, Grade I (benign), II (atypical) and III (malignant).Grade II and Grade III meningiomas recur more frequently. Surgery is the treatment of choice for Grade I tumors where as Grade II and grade III tumors require both surgery and radiotherapy.

II. Materials And Methods

The present study was conducted in a tertiary care teaching hospital during a period of 2 years 4 months (August 2013 to December 2015) to study the various clinical presentations, pathological variants, radiological features, simpson grade of resection depending on the location, neurological deficits and recurrence,which includes a total of 52 patients.

Distribution of patients as per age group: In the present study, mean age in years was 44.92 and the predominant age group was 41-50 years (30.77%) followed by 31-40 years depicted in Table.01.

Distribution of Patients by gender: In the present study, females (69.2%) were most commonly affected than males (30.7%) with male to female ratio of 1: 2.1(Table 02)

Distribution of patients by clinical symptoms: In the study, the most common presenting symptom was headache (69.2%) and seizures (40.38%).Paresis was present in 36.54%, vomitings in 30.76%, visual desturbances in 21.1%, altered sensorium in 17.3%. The frequency of symptoms was described in Table 03

Distribution of patients by Clinical Findings: In the study, the most common examination finding was Paresis (38.46%) and Papilloedema (19.23%) .

Distribution of Computer tomography findings: In the present study, majority are homogenously enhancing leisons (69.23%) while 61.53% had midline shift , 30.7% were nonhomogenously enhancing leisons and 30.77% had surrounding hypodensity depicted in Table 04.

Distribution of Tumour Location: In the present study, 57.7% of the tumours located in convexity which is most common location, 21.15% in parasagittal region and the rest of the tumour location as follows, described in Table 05.

Distribution of Simpsons Grade of Resection and Recurrence: In the present study, 50% of cases resected by Simpsons Grade II, followed by Grade I resection in 38.46%, depicted in Table 6.

Surgical Complications: The Commonest post operative complication, convulsions 11 patients (21.1%) which were subsequently controlled, another common complication being infection 9 patients (17.3%) is the main cause of morbidity and mortality in our series. Post operative CSF leak noted in 5 patients (9.62%), meningitis in 6 patients (11.53%), haematoma in 2 patients (3.84%).

Distribution of patients by Histological variant and Grade of tumour: In the present study, Meningiothelial Meningioma (30.77%) was the most common histological variant followed by Transitional histological variant.

Followup and Recurrence: Followup period was 6 months to 3 years. 2 cases of recurrence are noted on followup.

III. Discussion

This is a Hospital based prospective study in which 52 cases of meningioma (between August, 2013 to December, 2015) were included in this study. In the present study, 52 cases of all Meningiomas are taken as study group among the 200 CNS tumor cases. They comprised 26% similar to various studies done by AB Shah et al,[6] Ruberti R F,[7] Intisar SH Patty et al,[8] Zalata et al,[9] and Ejaz Butt et al.[10]

Comparison of Predominant Age Group: The most common age group involved was the 40-50year was similar to studies done by Srilaxmi et al,[11] Pratik B Desai et al,[12] Ruberti R F et al[13] .One case involved the paediatric age group, constituting 1.92% which was similar to the study on meningiomas in children done by Nirav Mehta et al[14] where childhood meningiomas accounted for 1.92% of all meningiomas and a study done by Isabelle M Germano et al[15] where the incidence was 2.9%.

Comparison of Gender distribution: Females (69.20%) were more commonly affected compared to males (30.77%) was similar to studies done by Srilaxmi et al,[11] Pratik B Desai et al,[12] and Ruberti R F et al.[13]

A female preponderance for meningioma correlates with an endogenous hormone level and exogenous hormone replacement in postmenopausal women (in whom an increased incidence of meningioma is seen) as compared with postmenopausal women who have not taken exogenous hormone replacement therapy.

Comparison of Clinical Symptoms: In the present study, the most common presenting symptom was Headache 69.2%, followed by Seizures 40.38%, which was similar to Pratik B Desai et al.[12]

Comparision of Clinical Findings: In the present study, the most common examination finding was Paresis 38.46% which was similar to Jason Rockhill et al[16] Papilloedema is more common clinical sign in this study.

Distribution of Computed Tomography findings: In the present study, the most common Computed Tomography findings of the tumour is Homogenous enhancement (69.23%) followed by Midline shift (61.53%) and Nonhomogenous (30.77%) which are similar to studies of Pratik B Desai et al [12], Rohringer et al[17]

Distribution of Tumour Location: In the present study, the most common location of the tumour is Convexity(57.7%),followed by Parasagittal (21.15%) which is correlating with Srilaxmi et al,[11] Pratik B Desai et al,[12] Jason Rockhill et al[16] and in contrast with Ruberti R F et al[13] where parasagittal location was more common.

Distribution of Simpsons Grade of Resection and Recurrence: In our series of 52 cases of meningiomas, even though the goal in every surgery is total removal of tumor, but we could not perform total removal in all the cases. As per Simpson's grades of tumor resection, a complete resection (Simpson's grade I & Il) performed in 88.4% of cases, incomplete resection (Simpson's grade III, IV & V) done for 11.6% of cases. This is comparable to various other studies like Ruberti R F et al.[13]

1.Deliberate incomplete resection for tumors located close to major neurovascular structures (tumors located at sellar, parasellar region, medial sphenoid wing tumors and tumors involving the sagittal sinus in posterior parasagittal region).

2.Technical difficulty of total removal in cases of tentorial meningiomas, clival tumors and posterior parasagittal meningiomas involving sagittal sinus.

3. Anaesthesia and patient related complications like haemodynamic instability, intraoperative brain swelling, intraoperative cardiac arhythmias.

4. Two stage operations were performed in some cases which are vascular and bleed profusely in first operation. Complete resection done for all tumors involving cerebral convexity, olfactory groove meningiomas, anterior third para sagittal meningiomas and lateral sphenoid wing tumors.

Surgical Complications: Bone flap removal was done for 2 cases due to intraoperative brain swelling.Immediate complication was haematoma in 2 cases(3.84%), for which reexploration was done. Major post operative complications in our study were convulsions 21.1% , wound infection 17.3%, CSF leak in 9.62%, meningitis in 11.53%, of cases. All the patients before surgery were adequately treated with anticonvulsive therapy. Postoperatively 15% of cases developed convulsions within 48 hrs after surgery. They were controlled with increase in the dose of anti epileptics or addition of another antiepileptic drug. The major morbidity in our series was post operative infection, in the form of wound infection, CSF leak, and meningitis.

Distribution of patients by Histological variant and Grade of tumour: In the present study, the most common Histological variant is Meningothelial (30.77%), followed by Transitional (19.23%) and Fibroblastic (15.38%) which are similar to studies of Srilaxmi et al,[11] Konstantinos et al,[18] Nasrin samadhi et al[19]

Followup and Recurrence: Followup period was 6 months to 3 years. Cases were followed up with CT brain in symptomatic patients. Two cases of recurrence are noted on followup for which incomplete resection was done. Any how followup period was not enough to assess the recurrence as meningiomas are slow growing tumours.

IV. Conclusions

Intra cranial meningiomas are more common in females especially in middle or late age of life. Convexity meningiomas as well as grade I histological variants are very predominant with high success rate after simpson grade 1 excision of tumor. Recurrence of tumor depends on Simpsons grading of excision and histological grade of tumor.

Table 1. Distribution of patients as per age group

Age group	Frequency	Percentage (n=52)
<20	1	1.92%
21-30	5	9.62%
31-40	15	28.85%
41-50	16	30.77%
51-60	10	19.23%
61-70	3	5.77%
71-80	2	3.85%
Total	52	100%

Table.02: Distribution of patients by gender

Gender	Frequency	Percentage
Male	16	30.77%
Female	36	69.2%
Total	200	100%

Table.03. Distribution of patients by symptoms

Symptoms	Frequency	Percentage
Headache	36	69.2%
Seizures	21	40.38%
Vomitings	16	30.76%
Paresis	19	36.54%
Visual disturbances	11	21.1%
Altered sensorium	9	17.3%

Table 4: Distribution of Computer tomography findings

CT Finding	Frequency	Percentage
Homogenous Enhancing	36	69.23%
Nonhomogenous Enhancing	16	30.77%
Surrounding Hypodensity	16	30.77%
Midline Shift	32	61.53%
Calcifications	11	21.15%
Hyperostosis	16	30.77%

Table 05 : Distribution of Tumour Location

Tumour Location	Frequency	Percentage
Convexity	30	57.7%
Parasagittal	11	21.15%
Sphenoid	2	3.84%
Tentorium	1	1.92%
Tuberculum sella	1	1.92%
Cerebellopontine angle	2	3.84%
Posterior fossa	2	3.84%
Olfactory groove	2	3.84%
Others	1	1.92%

Table 06: Distribution of Simpsons Grade of Resection and Recurrence

Simpsons Grade	Frequency	Percentage	Recurrence
I	20	38.46%	Nil
II	26	50%	1
III	3	5.77%	Nil
IV	2	3.84%	1
V	1	1.92%	Nil

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Legend 1 : Left Frontoparietal convexity Meningioma

Legend 2: Left posterior 1/3 rd Parasagittal Meningioma.