



### **Histopathological Evaluation of Meningiomas**

<sup>1</sup>Mohammad Khushnood,<sup>2</sup>Priya Vijaykumar Gameti, <sup>3</sup>Nitin Chaudhary, <sup>4</sup>Mala Jain

<sup>1</sup>Senior Demonstrator, Government Medical College, Dungarpur, Rajasthan

<sup>2</sup>Assistant Professor, Government Medical College, Dungarpur, Rajasthan

<sup>3</sup>Department of Cytology, AIIMS Jodhpur, Rajasthan

<sup>4</sup>Assistant Professor, Government Medical College, Dungarpur, Rajasthan

**Corresponding Author:** Priya Vijaykumar Gameti, Assistant Professor, Government Medical College, Dungarpur, Rajasthan

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#### **Introduction**

Meningiomas are the most frequent primary tumors of the central nervous system (CNS) constituting about 28–30% of primary Central Nervous System Tumours (1,2) They originate from the arachnoidal cap cell, a meningotheial cell in the arachnoidal membrane . Meningiomas account for 15% of all intracranial tumors and usually occur in fourth to sixth decades of life with mean age of 45 years at diagnosis(3) According to site meningiomas are located at parasagittal, convexity, sphenoid ridge, suprasellar, posterior fossa, olfactory groove, middle fossa, tentorial, peritorcular, lateral ventricle, foramen magnum , spinal, orbit or optic nerve sheath, few located at ectopic site. Females have meningiomas more often than males; ratio is 2:1 for intracranial and 4:1 for spinal meningiomas.(4) While they are benign in most instances and may be cured with gross total resection; however, approximately 9-22% of patients experience recurrence and rarely are they frankly malignant leading to metastasis.(5) Known risk factors for recurrence include histological malignancy grade, subtotal resection, young age, specific subtypes, brain infiltration, and high proliferative rate.(6)

On gross examination, typical meningioma is lobulated or single, solid mass that is widely attached to the dura mater. On sectioning, meningioma is soft and grayish, sometimes show rubbery consistency due to colonization. Calcification is often present and yellow foci are seen because of the accumulation of lipid within tumor cells. Sometimes grayish black pigmentation is seen because of the colonization of the hyperplastic leptomenigeal melanocytes.(7) Meningiomas (benign) are recognised by their histologic subtype and lack of anaplastic features. Grade II meningiomas (atypical) are defined by one or more of the following four criteria: 1) chordoid or clear cell histologic subtype, 2) four to 19 mitoses per ten high-power field (HPFs), 3) brain infiltration, and 4) three or more of the following five histologic features: small cell change, increased cellularity, prominent nucleoli, sheet-like growth, or necrosis. Grade III meningiomas (anaplastic/malignant) are defined by rhabdoid or papillary subtypes, a histological picture of frank malignancy resembling that of carcinomas, melanomas, or high grade sarcomas, or 20 or more mitosis per ten HPFs.(8)

The aim of the study was to investigate a large number of human meningiomas, consecutively operated during a five-year period, in order to record the frequency of various subtypes and malignancy grades according to the latest WHO classification (2016) (6)

**Materials And Methods**

A total of 50 cases of clinically diagnosed meningioma patients admitted in the teaching hospital were studied. A detailed history was taken and only cases of clinically and radiologically suspected meningiomas which were confirmed on histology in the Department of Pathology retrogradely during the period last five were enrolled in the study. Specimens received were immediately fixed in 10%buffered formalin. All the specimens were subjected to routine processing.Routine HES (Haematoxylin-Eosin-Saffron) stained paraffin sections were reviewed without knowledge of prior grading or patient outcome.The parameters like patient’s age, gender, location of tumor, microscopic appearance of tumor were studied.The tumours were classified into subtypes according to the dominate growth pattern (roughly 50% of a specimen on microscopic evaluation). The meningiomas’ initial grade was recorded, and WHO classifications of 2016 were applied on the material .

**Results and Observation**

**Table 1 : Age And Gender Distribution Of Pateints**

Age (in years)	number	Males	Females	Percentage (%)
0-10	-	-	-	-
11-20	01	-	01	02
21-30	01	-	01	02
31-40	11	04	07	22
41-50	19	05	14	38
51-60	05	03	02	10
61-70	08	02	06	16

71-80	03	01	02	06
81-90	02	-	02	04
<b>TOTAL</b>	<b>50</b>	<b>15</b>	<b>35</b>	<b>100</b>

**Table 2 : Signs And Symptoms Presented By Patients**

Signs And Symptoms	Number of Patients ( Out Of 50)	% of Patients
Headache	34	69
Vomiting	18	37
Visual Problem	13	26
Weakness	08	15
Numbness	05	10
Seizures	02	4
Hearing Loss	01	2
Ataxia	01	2

**Table 3 : Incidence Of Various Histological Types of Meningioma**

Type No.	Who grade	Number of cases (out of 50)	Percentage of cases (%)
Meningothelial	I	19	38
Transitional	I	12	24
Fibrous	I	06	12
Psammomatous	I	05	10
Angiomatous	I	03	06
Microcystic	I	01	02
Atypical	II	01	02
Papillary	III	01	02
Anaplastic	II	02	04
Total		50	100

**Discussion:**

**Table 4: %Wise Distribution of Cases in Different Studies According To Age**

Age (in years)	Pratik Desai et al	Maruf Raza et al	Patil P.R et al	Reddy et al	Present study
0-10	-	-	1.1	-	-
11-20	2	5.8	2.3	-	02
21-30	10	1.9	3.4	5.2	02
31-40	28	19.4	32.1	15.7	22
41-50	28	35	33.3	31.5	38
51-60	22	14.6	11.4	26.3	10
61-70	10	16.5	12.6	10.5	16
71-80		4.9	3.4	10.5	06
81-90		1.9	-	-	04

The present study showed maximum cases in the age group of 41-50 years which is comparable to most of the studies by different authors. Variations in some data between studies can be attributed to difference in study population.

**Table 5: %Wise Distribution Of Signs And Symptoms Presented By Patients In Different Studies**

Signs And Symptoms	AUTHOR		
	Maruf Raza Et Al	Nasrin Samadi Et Al	Present Study (%)
Headache	53.3	46.4	69
Vomiting	14.6		37
Visual Problem	4.9	27.9	26
Weakness	5.8	24	15
Numbness	3.9	-	10
Seizures	10.7	13.3	4
Hearing Loss	1.9	4.3	2
Ataxia	-	5.2	2
Others			

Concordant observations are seen when signs and symptoms of patients with meningiomas are compared with studies by different authors with most of patients complaining of long standing head ache with vomiting.

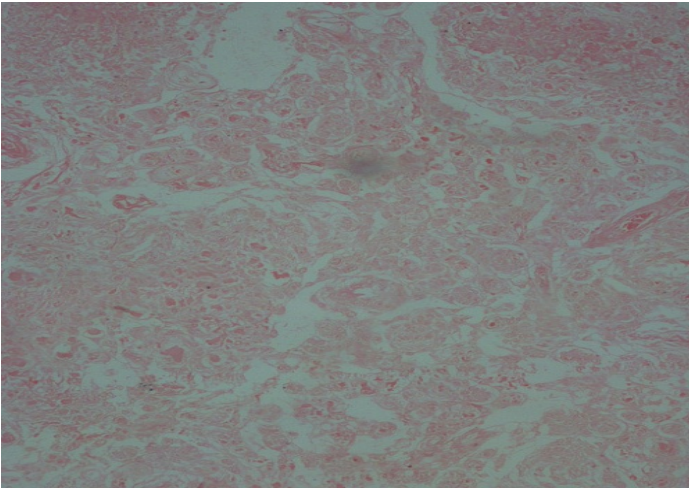
**Table 6 : %wise Distribution of patient by histological subtype in different studies**

Types of meningiomas	AUTHORS						
	Pratik Desai et al	Patil P.R et al	Maruf Raza et al	Reddy et al	Smita et al	Nasrin Samadi et al	Present study
Meningothelial	64	43.68	61.1	42.1	37	65.1	38
Transitional	-	24.13	15.5	10.5	10	17.2	24
Fibrous	6	5.75	4.9	5.2	16	9.2	12
Psammomatous	10	10.34	4.9	26.3	19	0.8	10
Angiomatous	8	-	4.9	5.2	-	1.3	06
Microcystic	2	2.30	-	-	08	0.4	02
Atypical	6	2.30	4.9	5.2		-	02
Clear cell	2	2.30	0.9	-	04	0.8	-
Papillary	2	1.15	-	5.2	-	0.4	02
Anaplastic	-	3.45	-	-	-	-	04
Others		6.9	2.8		06	4.8	

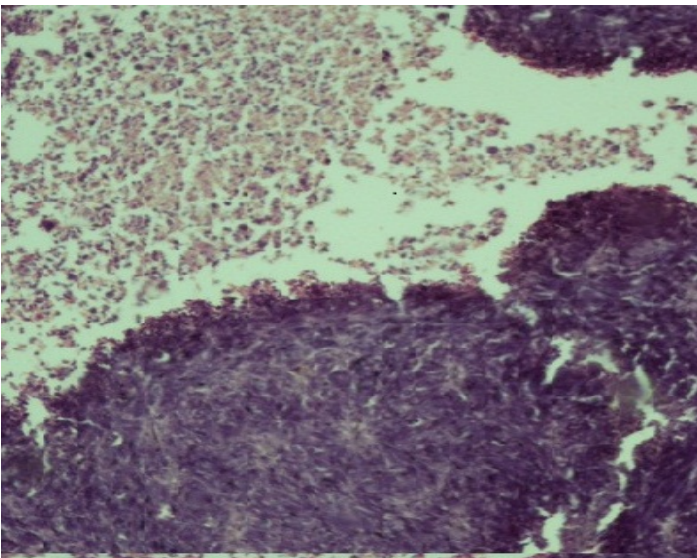
On comparing frequency of subtypes of meningiomas maximum number of cases were found to be of meningiothelial type followed by transitional, fibrous and other subtypes which are similar and comparable to other studies.

**Conclusion:** Meningiomas are common intracranial tumors occurring more frequently in females and adults are more affected then their elderly counterparts. Patients most commonly present with headache of longer duration and vomiting. The cyto and histopathological criterias contribute to a global classification system as desired by the WHO which should be applicable in every

neuropathological set up especially where genetic screening is not accessible.



**Diagram 1: GRADE II Meningioma H&E stain 10x view**



**Diagram 2: GRADE III Meningioma H&E stain 20x view**

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