Original Research Article

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Symptom Analysis and Surgical outcome of Supratentorial Meningioma: A Prospective Study

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Abstract

Aim: To analyse various presentations and surgical outcome of supratentorial meningiomas. *Materials and Methods:* In order to analyse the various presentations and surgical outcome of supratentorial meningiomas we did a prospective study in 42 patients and analysed headache, seizure, limb weakness, cognitive deficit and visual symptoms. we also correlated the location of meningiomas with age, sex, surgical outcome with respect to Simpson's grading, Discharge & death and stay in hospital. The results obtained were statistically analysed. *Results:* When the results were observed, among all the meningiomas convexity meningioma were the most common types with female predominance presented in the 5th decade of life. HPE grading GRADE 1 was the most commonly observed. Overall patients were discharged in 2 to 4 weeks but convexity meningiomas were discharged in less than 2 weeks. Most of them had complete resection with Simpson's grade I & II. Headache and seizure were commonly observed in convexity meningiomas. Cognitive deficit was observed frequently in convexity and falx meningiomas. Limb weakness observed most commonly among falx meningiomas. Paraseller, tuberculumsella,predominantly had visual disturbances. *Conclusion:* In this study of 42 patients we found good surgical outcome in terms of shorter hospital stay, Simpson's grade I & II resection and low mortality rates was observed with convexity and Falx meningioma. Longterm follow-up needed in assessing seizure control and other symptoms.

Keywords: Meningioma; Supratentorial Meningioma; Supratentorial Tumors.

Introduction

In 1614, Felix Plater first described a meningioma in an autopsy report [2,5]. A French surgeon, Antoine Louis, published the first report in 1754 that dealt specifically with meningiomas [5]. In 1847, Virchow described meningiomas as psammonas (sandlike) because of the presence of tumoral granules. In 1864, Bouchard termed meningiomas as epitheliomas, and in 1869 Golgi described them as endotheliomas. In 1922, Harvey Cushing first used the term meningioma. Pathologists subsequently have demonstrated the origin of meningiomas as arachnoid cap cells commonly found in association with arachnoid villi at the dural venous sinuses and veins [15].

The first case relating prior head trauma to causality of meningioma involved General Leonard Wood, Major General and Chief of Staff of the United States Army. In 1910, Cushing successfully performed surgery on Gen. Wood's parasagittal meningioma [4].

Meningiomas are the most common primary brain tumor.Hospital-based series have found ~20% of all primary brain tumors to be meningiomas, whereas autopsy reports are closer to 30% [3.4]. Despite a large majority being classified as benign lesions, there is great heterogeneity in histology, recurrence rates, aggressiveness, symptoms, and survival outcomes.

Meningiomas arise from arachnoidal cells of the leptomeninges and may occur anywhere arachnoidal cells are located. Tumor location is a critical factor determining prognosis and therapy options, especially surgical resectability. The majority of meningiomas are found in the supratentorial compartment, most commonly along the dural venous sinuses in the cerebral convexity, parasagittally, and in sphenoid wing regions [5]. Less common sites of

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supratentorial origin include the optic nerve sheath, cerebellopontine angle, and choroid plexus [5–8]. Spinal locations are the primary site in ~12% of patients with meningiomas and are the most common intradural spinal cord and cauda equina tumor [7, 8]. Multifocal lesions are found in ~9% of patients on imaging and 16% of patients in autopsy studies [5, 9, 10].

Materials and Methods

All patients included in the study are from Institute of Neurosurgery, MMC & RGGGH Chennai. The present study was performed between October 2016 to December 2017 after getting approval from the Institutional Ethics Committee, Madras Medical College, Chennai-600003.

Inclusion Criteria

All patients who were diagnosed to have Meningioma radiologically in all age groups and in both sex were included in this study.

Exclusion Criteria

1. All patients who did not consent to surgery
2. All patients who are not medically fit for surgical procedure
3. All patients age>80 years and severe co-morbidities were not included in the study.

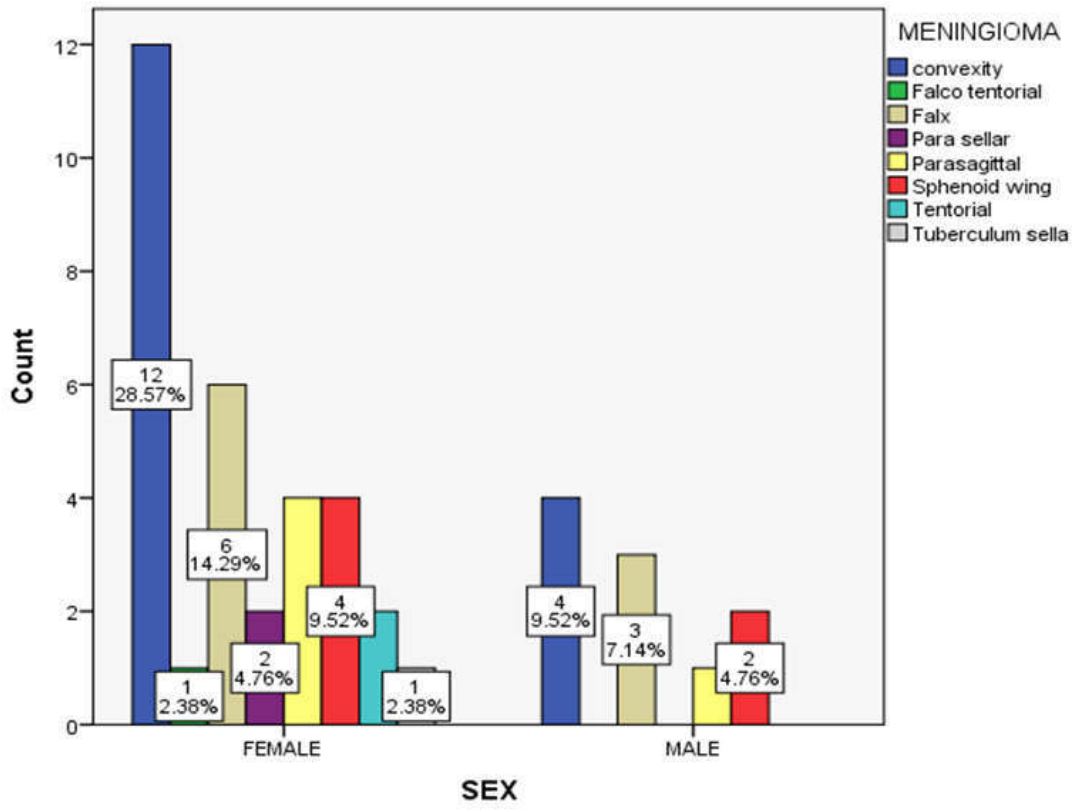
In this study about 74 patients were taken and only 42 patients were included rest of them were excluded according to the above said exclusion criteria.

All those 42 patients included in this study underwent surgery and excision of tumor. Data obtained was analysed statistically.

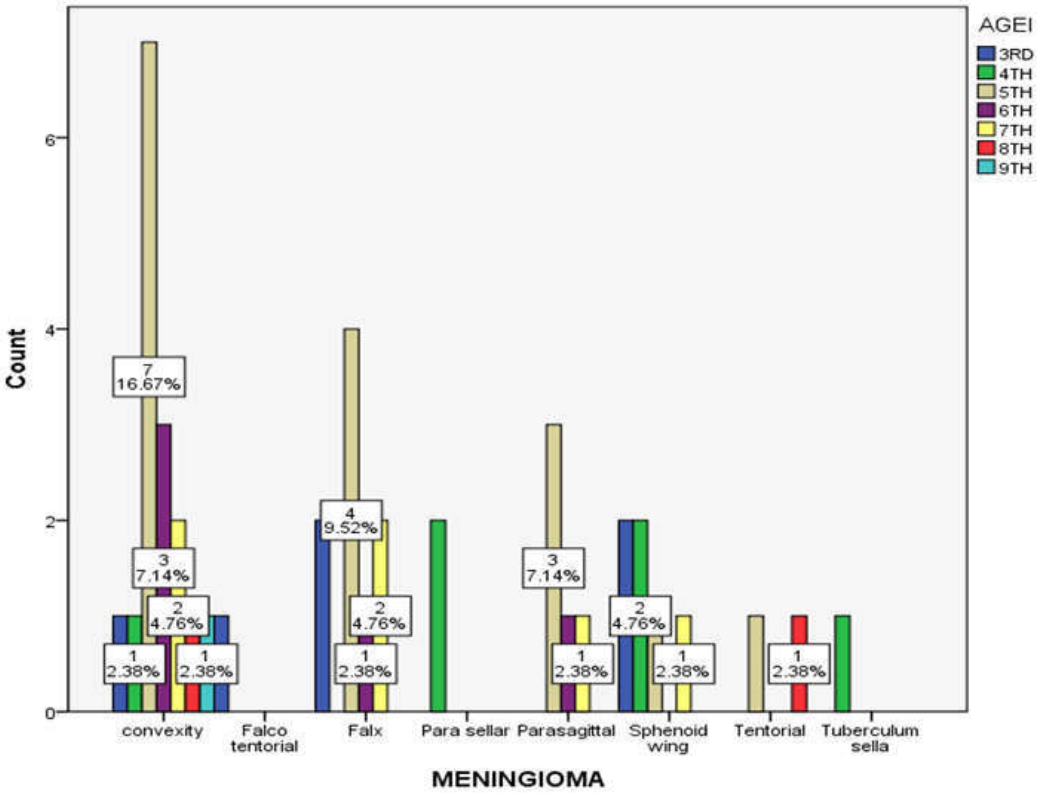
Data Analysis& Results

Bar chart 1 Shows various location of meningiomas in relation to sex , females patients were about 76.2% (32) and male patients were 23.8% (10). Male to female ratio is 1:3.2.

Bar chart 2 Shows age Iincidence ranged from 3rd to 8thd decade of life with peak incidence I in 5th decade with 38.1% (16).



Bar chart 1: Sex



Bar chart 2: Shows age

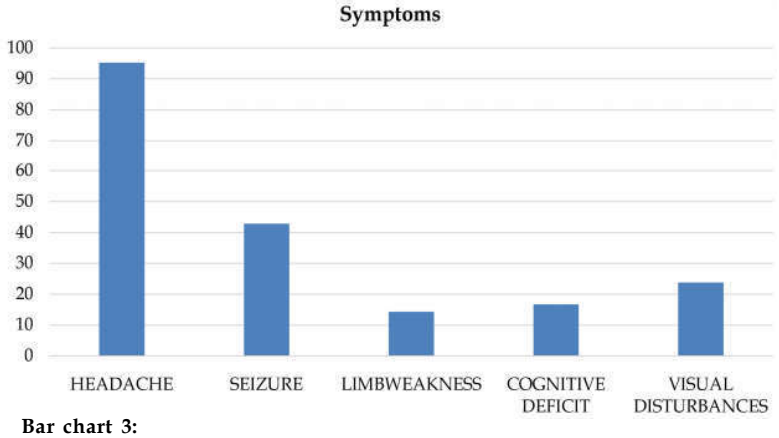
Table 1: Meningioma *Age Crosstabulation

	Age in Decade						Total
	3rd	4th	5th	6th	7th	8th	
Convexity	1	1	7	3	3	1	16
Falco tentorial	1	0	0	0	0	0	1
Falx	2	0	4	1	2	0	9
Para sellar	0	2	0	0	0	0	2
Parasagittal	0	0	3	1	1	0	5
Sphenoid wing	2	2	1	0	1	0	6
Tentorial	0	0	1	0	0	1	2
Tuberculum sella	0	1	0	0	0	0	1
Total	6	6	16	5	7	2	42

Symptom Analysis

Table 2:

Symptoms	Patients
Headache	95.2%(40)
Seizure	42.9(18)
Limbweakness	14.3%(6)
Cognitive deficit	16.7%(7)
Visual disturbances	23.8%(10)



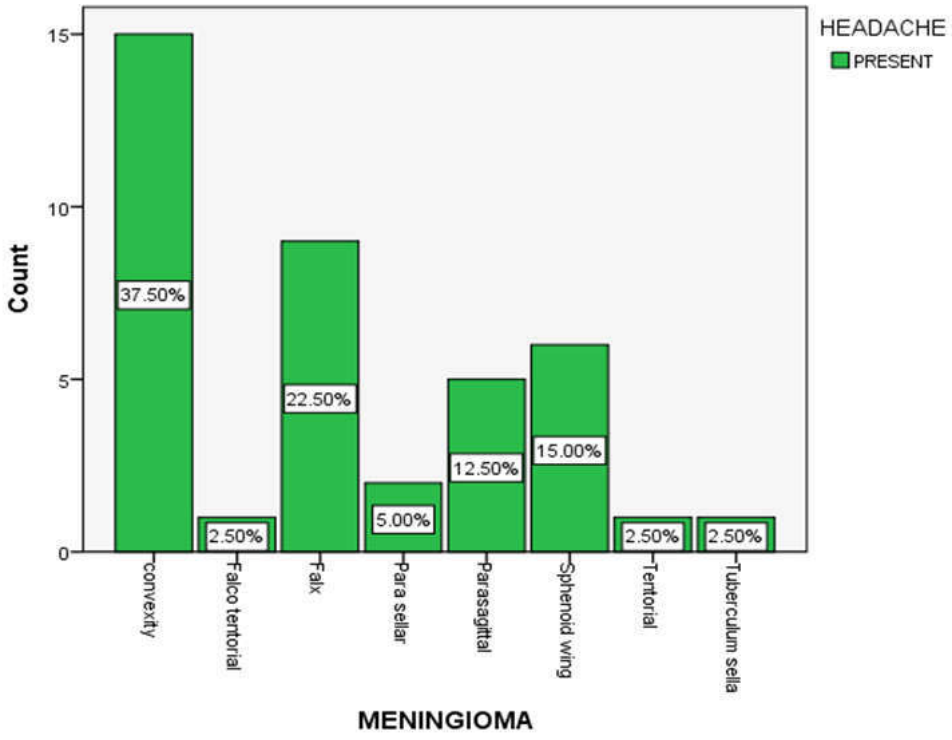
Bar chart 3:

Bar chart 4 Shows percentage of headache 95.2% (40) in various locations of meningioma.

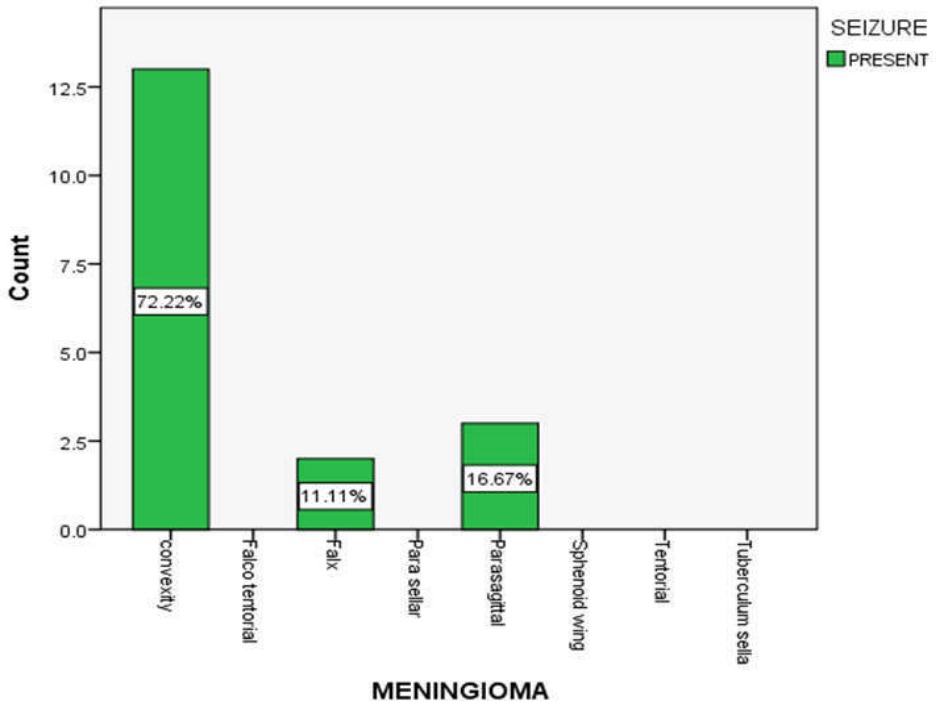
Bar chart 5 Shows percentage of seizures 42.9% (18) in various locations of meningioma.

Bar chart 6 Shows percentage of Limb weakness 14.3%(6) in various meningioma.

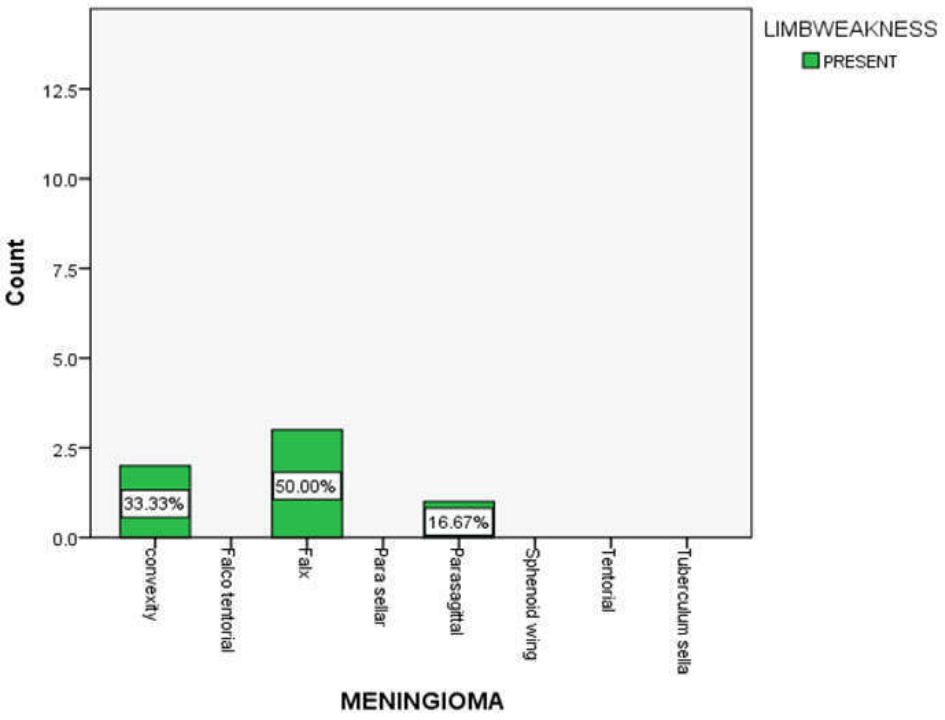
Bar chart 7 Shows percentage of visual disturbances 23.8%(10) in various meningioma.



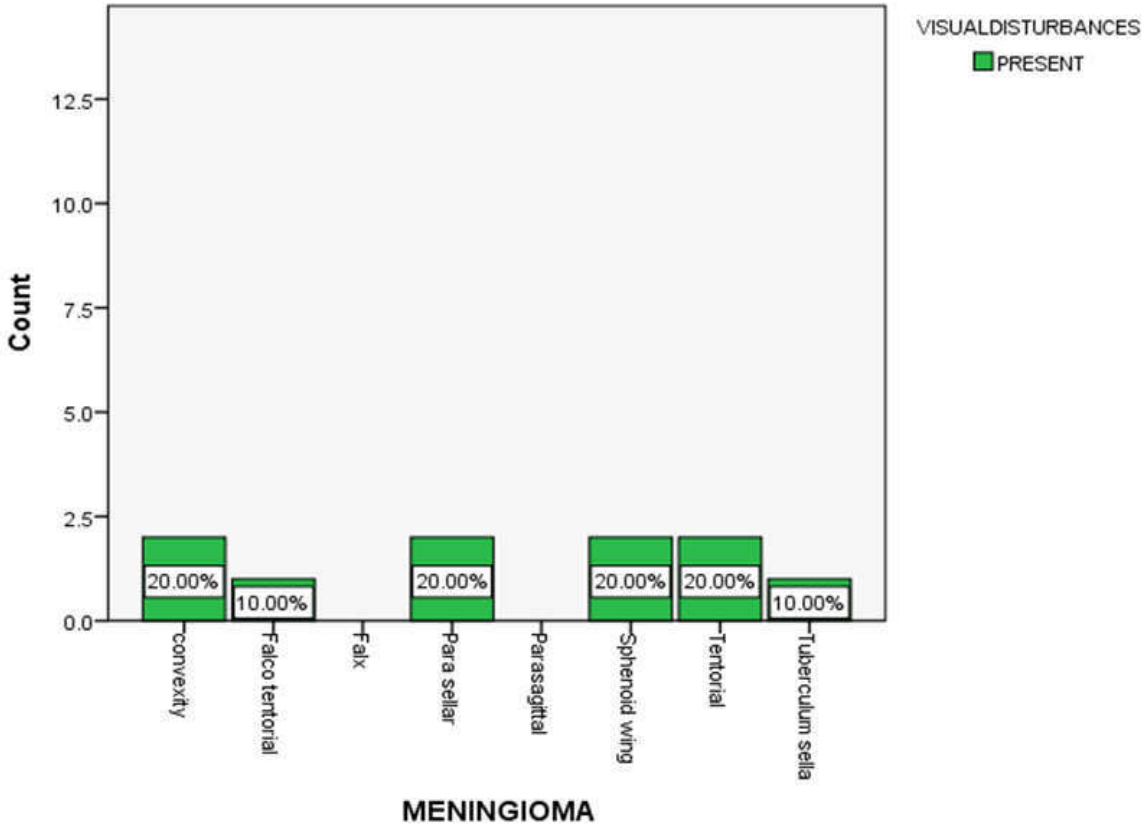
Bar chart 4: Headache



Bar chart 5: Seizure



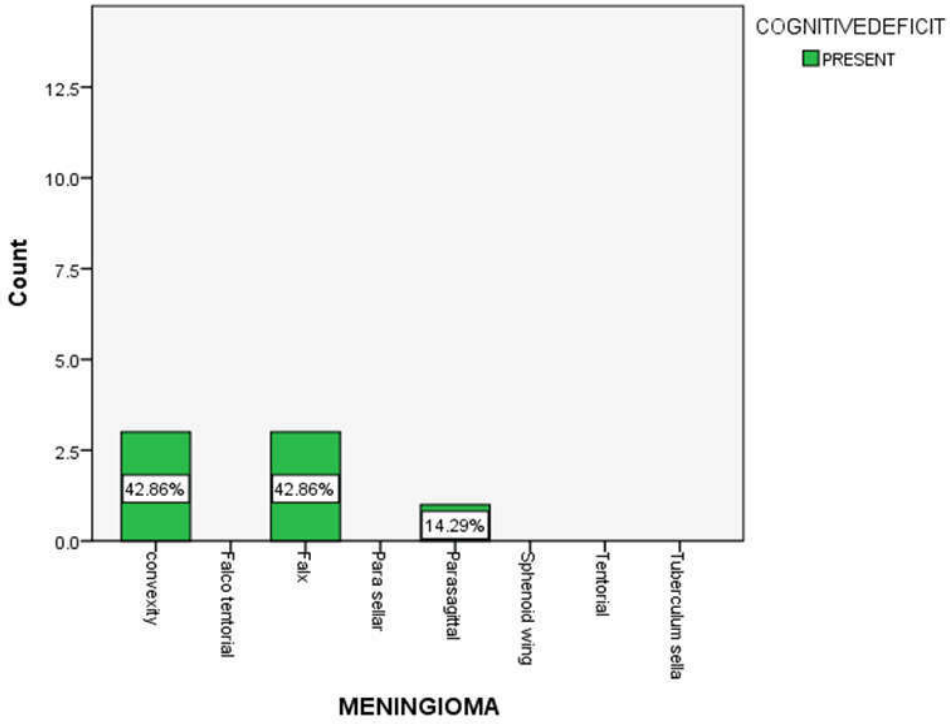
Bar chart 6: Limb Weakness



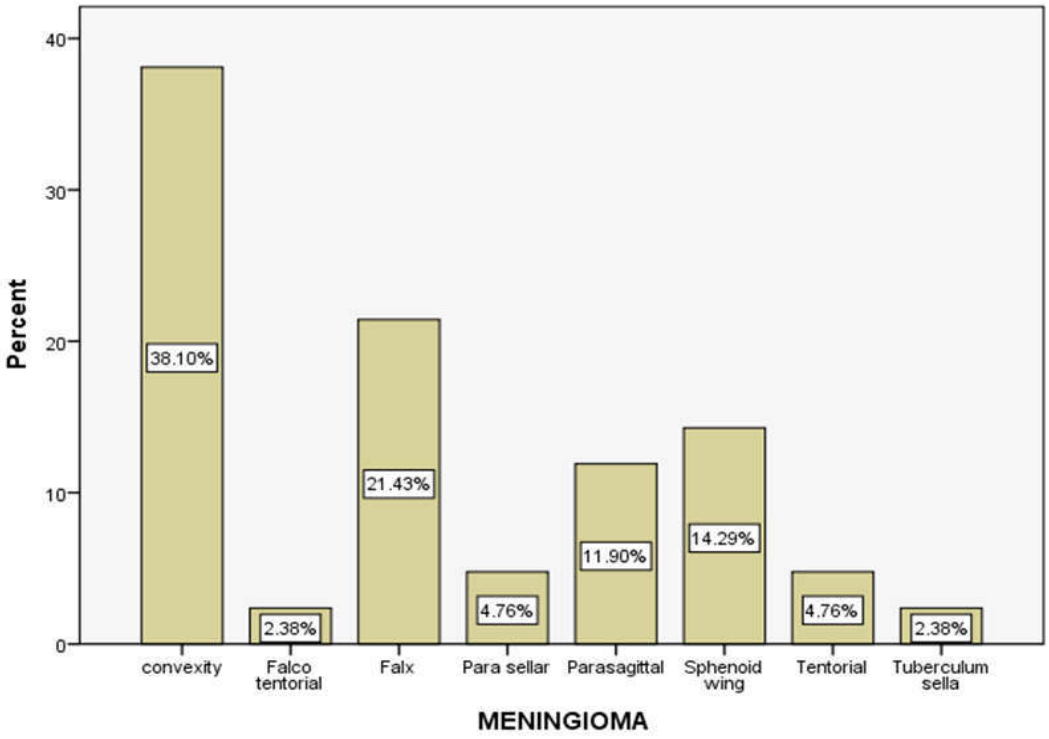
Bar chart 7: Visual disturbances

Bar chart 8 Shows percentage of patients with cognitive deficit16.7% in whichConvexity and Falx meningioma had 42.86% cognitive deficit while parasagittal had 14.29% hadcognitive deficit.

Bar chart 9 Shows Convexity of 38.10%, Falx-21.43%, Sphenoid wing 14.29%, Parasagittal 11.9%, Paraseller 4.76% Falco tentorial and tuberculum Sella being 2.38% .



Bar chart 8: Cognitive deficit

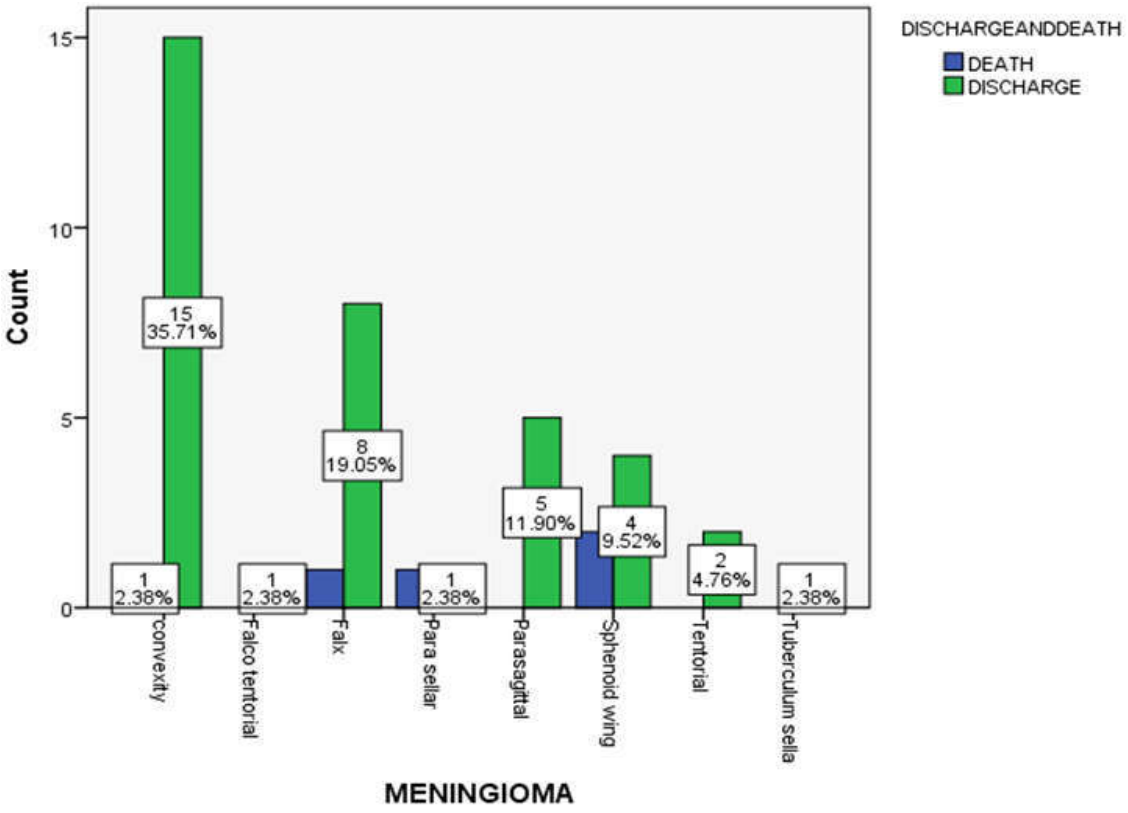


Bar chart 9: Location

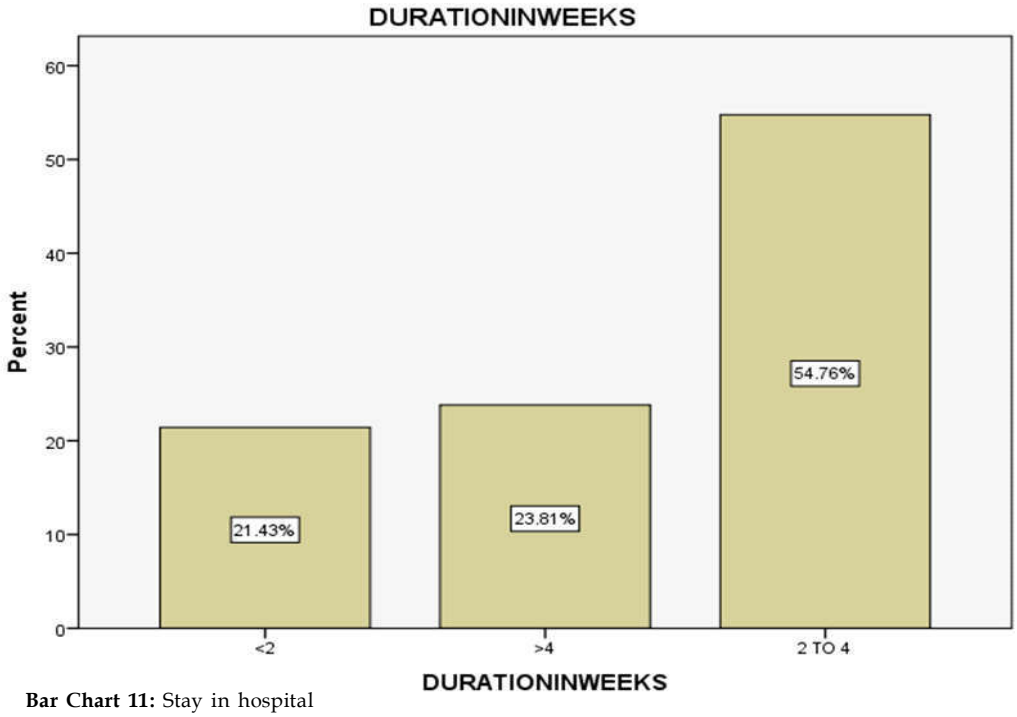
Surgical Outcome

Bar chart 10 Shows percentage 88.1% (37) patients were discharged and death was 11.9% (5).

Bar chart 11 Shows 54.8% (23) discharged in hospital for 2 to 4 weeks, while 23.8% (10) patients discharged in about more than 4 weeks. 21.4% (9) patients discharged in less than 2 weeks.



Bar Chart 10: Discharge and death



Bar Chart 11: Stay in hospital

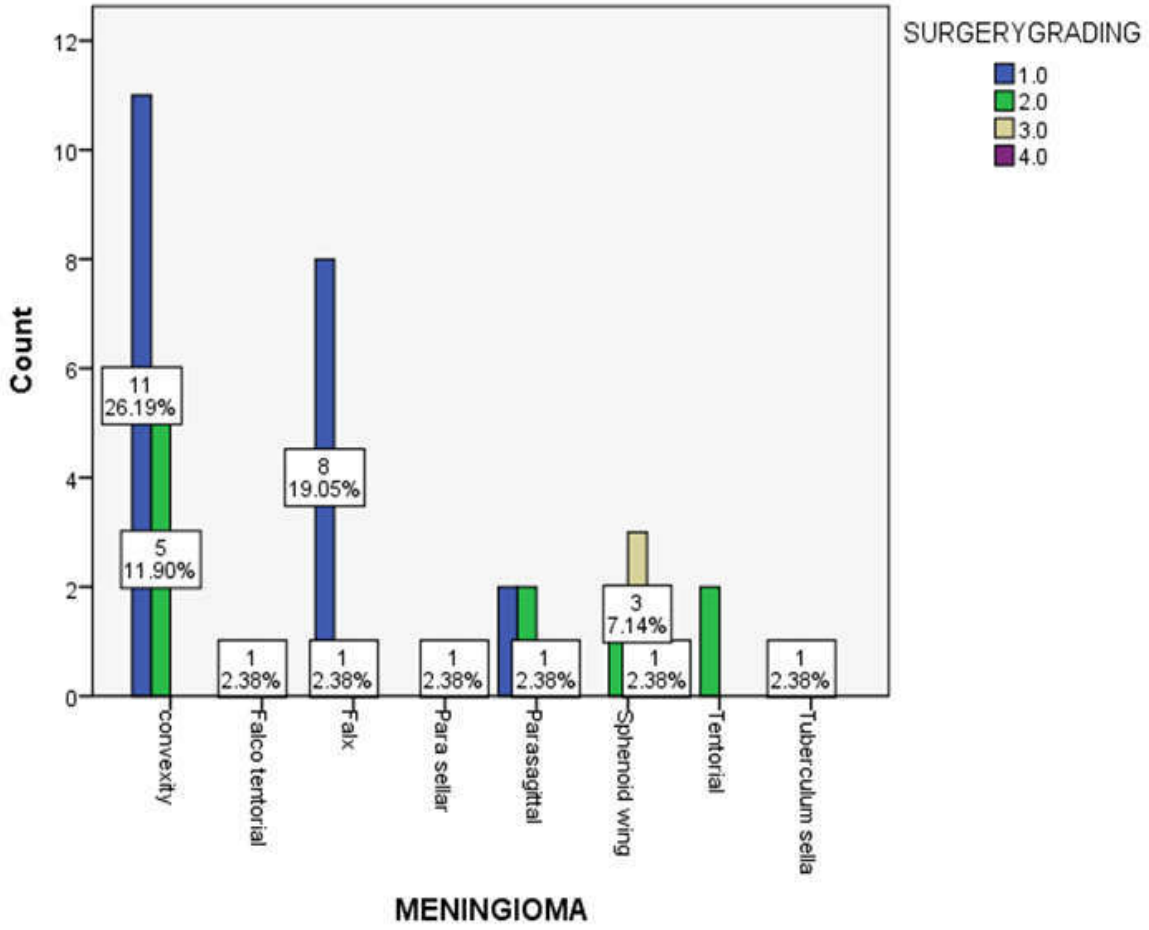
Bar chart 12 Shows in convexity meningiomas 26.19% (11) patients had Simpson's grade 1 resection and 11.9% (5) had grade 2 resections. In Falco tentorial meningioma 2.38% and Tuberculum Sella meningioma had 2.38% had grade 2 resections. About 19.05% (8) Falx meningiomas had grade 2 resection. 7.14% (3) of sphenoid wing meningioma had grade 3 resection and about 2.38% (1) Sphenoid wing meningiomas had grade 4 resection.

Table 3 Shows overall about 50% (21) had grade 1 resection , 35.7% (15) had grade 2 resection , 11.9% (5) had grade 3 resection and 2.4% (1) had grade 4 resection.

Discussion

In our study (Bar chart-1) females 76.2% (32) were predominantly affected than males 23.8% (10) and the male: female ratio in the study is 1: 3.2. Various other series (Kallio et al., Martin et al.) [11] described the incidence being 1: 2which is comparable with our series.

The incidence of meningioma as increases with age (Table 1). Same is observed in this study. Peak incidence in the fifth decade of life (Bar chart 2) which is comparable to international series [2].A dip after sixth decade noted. Possibly be explained



Bar Chart 12: Simpson's Grade

Table 3: Simpson's Grading

Simpson's Grade	Frequency	Percent	Valid Percent	Cumulative Percent
1.0	21	50.0	50.0	50.0
2.0	15	35.7	35.7	85.7
3.0	5	11.9	11.9	97.6
4.0	1	2.4	2.4	100.0
Total	42	100.0	100.0	-

by several factors such as neglect or failure to attend elderly problems, less aggressive surgical approach in elderly etc.

The commonest initial presenting symptom (Bar chart-3,Table-2) is headache (Bar chart-4) noted in 95.2% of cases. This is in comparison with other studies showed as commonest initial presentation in about 35–50% of total cases. The high percentage of headache as initial complaint may be due to long duration of symptoms, initially considered as nonspecific. Epilepsy as presenting symptom noted in 42.9% of patients, which is comparable to various other series.The propensity for convexity tumors to cause seizures has been previously described,(Lieu AS, Howng SL et al.,) [17] and may be related to the extent of cortex affected by meningiomas in these locations, although tumor size itself was not identified as a risk factor in our study. Limbweakness 14.3% (6) and cognitive deficit 16.7% (7) were found in convexity meningiomas. However, Frontal meningiomas showed cognitive deficit on measures of working memory, attention, and executive functions. 3 patients with limbweakness showed improvement in weakness in immediate postoperative period and cognitive deficit needed longer followup. Visual disturbances in 23.8% (10) patients found in parasellar and tentorial meningiomas which also needs further followup to access the improvement.

In our study cerebral convexity being commonest location of meningiomas, (Bar chart 9) noted in 38.1% of patients followed by falx in 23% and sphenoid wing being 14.29%. Kallio et al. [11], of their 935 cases of meningiomas, Parasagittal and Falx being commonest location noted in 27% of patients, while convexity lesions noted in 22%. In another series of Martin et al of his 193 cases of meningiomas cerebral convexity noted in 34% of cases.

In our series of 42 cases of meningioma, even though the goal in every surgery is total removal of tumor, but we could not perform total removal in all the cases (Tale-3, Bar chart-12). As per Simpson's grades [14] of tumor resection, a complete resection (Simpson's grade I & II) performed in 85.7% of cases, incomplete resection (Simpson's grade III, IV & V) done for 13.3% of cases. This is comparable to various other studies (Jääskelainen J. Seemingly et al.) [15].

There are 5 deaths i.e., 11.9% of cases in our series (Bar chart-10). The literature shows mortality rate as high as 16% (Pertuiset et al. 7%, Jan et al. 14.3%, Jaaskelain et al. 7% mortality rate, Meixensberger J, Meister T et al.) [12,13,16]. The reasons in their series being poor preoperative neurological status, pulmonary complications and post-operative intracranial hematoma. In our series, reasons for mortality were, two cases related to intraoperative anaesthetic and patients related complications, one casebecause of fulminant meningitis. Two cases were related to postoperative pulmonary complications.

In our study analysingthe duration of stay (Bar chart 11) 54.8% (23) discharged in hospital in 2 to 4 weeks, while 23.8% (10) patients discharged in about more than 4 weeks. 21.4% (9) patients discharged in less than 2 weeks. Majority of them were discharged between 2 to 4 weeks. Although postoperative complications were potent predictors of length of stay, much of the variance was attributable to preoperative characteristics.

Conclusion

In our study The management of meningiomas remains a major challenge to neurosurgeons. With the advance of better imaging technique, tumors are identified earlier. Surgical technique using operative microscope, intraoperative monitoring and neuro navigation facilities and improved understanding of anatomy will allow tumors to be resected totally with better results thereby better surgical outcome in terms of complete resection, shorter length of stay in hospital and low mortality.

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