

Original Research Article

A study of retrospective analysis of the outcome of parasagittal meningioma

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ABSTRACT

Background: Meningioma is a common benign tumours treated by neurosurgeons. They develop from arachnoid cap cells within the thin spider web-like membrane covering the brain and spinal cord. The arachnoid is one of the three protective layers of the central nervous system collectively known as the meninges surrounding the brain and spinal cord. The aim of our study is to analyze the outcome of parasagittal meningioma.

Methods: The details of the patients diagnosed with parasagittal meningioma and operated upon during the study period of 2009-2013 were retrospectively collected from the medical records kept in the department of neurosurgery and different study parameters were documented for analysis.

Results: Out of the total 40 patients with meningioma 15 (37.5%) patients had parasagittal meningioma in anterior 1/3rd of sagittal sinus, 21 (52.5%) patients had parasagittal meningioma in middle 1/3rd of sagittal sinus and 4 (10%) patients had parasagittal meningioma in posterior 1/3rd of the sagittal sinus and 28 (70%) patients are treated by gross total resection (GTR), 7 (17.5%) patients were treated by subtotal resection (STR) and 5 (12.5%) patients were treated by dendritic cell (DC) and postoperatively 22 patients (55%) did not develop any complications. Weakness develops for 12 patients (30%), followed by recurrence in 3 patients (7.5%) and 3 patients (7.5%) died.

Conclusions: Conservative resection of the tumour with residual lesion within the sagittal sinus followed by adjuvant treatment with modalities like radiotherapy, chemotherapy or targeted therapy for the residual lesion is an accepted mode of treatment.

Keywords: DC, Gross total resection, Parasagittal meningioma, Recurrence, STR

INTRODUCTION

Meningioma is one of the common tumours treated by neurosurgeons. The outcome in meningioma treatment depends on the advances in neurosurgery and advancements in neurosurgery are put to maximal use to improve the outcome of meningiomas.¹ A historical account of meningiomas and their surgical management highlights that meningiomas have left their mark in the form of hyperostosis on human skulls.² In 1864 John Cleland, professor of in Glasgow, observed that two tumours which he had found in the dissecting room, one from the cribriform plate and other from the right frontal

region near the superior longitudinal sinus, originated from the arachnoid rather than the dura. He observed that their structure resembled the Pacchionian granulations. In 1915, Cushing and Weed documented that meningiomas were derived from arachnoid cell clusters.³ Meningiomas form 10-15% of all intracranial neoplasms.^{4,5} It is generally accepted that the anatomical incidence of meningiomas roughly parallels the distribution of arachnoid villi. This study attempts to analyze this complex matter from the experience of a specialized tertiary care centre, serving a large population. A large number of patients with meningiomas were operated upon in our institute in that Parasagittal meningiomas

form a substantial percentage of them. We had a reasonably good follow up of the majority of these patients and records can be recovered easily for follow up and reference. This has been utilized for this retrospective statistical study. The study is expected to improve our understanding of clinicopathological, management and prognostic aspects of parasagittal meningiomas in this part of the world, and to set realistic goals in the future management of patients with this complex clinical problem.

The aim of our study is to analyze the outcome of parasagittal meningioma.

METHODS

This retrospective study was done by the department of neurosurgery and study people includes the patients diagnosed with parasagittal meningioma and operated upon during the period of 2009-2013 were collected from the department of neurosurgery and different study parameters like age of presentation, location of meningioma involvement of sagittal sinus, grade of resection and histopathological type with respect to the outcome (motor weakness, recurrence and death) were documented for analysis.

Those patients were traced and were followed up until 2016 January, thus making the maximum follow up to be seven years with a minimum follow up of two years. The outcome of those patients was statistically analysed using the Statistical Package for Social Studies (SPSS) 24. Out of the patients treated in our institution, 40 patients met the inclusion criteria and different study parameters above mentioned were documented in a proforma and patients who were not willing to participate in the study during follow up period were excluded from the study and were statistically analysed and the results were discussed.

RESULTS

In this study out of the total 40 patients with meningioma 15 (37.5%), patients had parasagittal meningioma in anterior 1/3rd of sagittal sinus, 21 (52.5%) patients had parasagittal meningioma in middle 1/3rd of sagittal sinus and 4 (10%) patients had parasagittal meningioma in posterior 1/3rd the sagittal sinus (Figure 1).

All the 14 patients who developed weakness had the tumour in the middle 1/3rd of the superior sagittal sinus (Table 1).

Data wise 28 (70%) patients are treated by gross total resection (GTR), 7 (17.5%) patients were treated by STR and 5 (12.5%) patients were treated by dendritic cell (DC) (Figure 2).

The patients who had undergone gross total resection (28 patients) had no recurrence. 2 out of 7 patients who had

undergone subtotal resection had shown recurrences and 4 out of 5 patients who had undergone decompression craniotomy had a recurrence. Out of the 40 patients, taken for the study, postoperatively 22 patients (55%) did not develop any complications. Weakness was the most common complication with 12 patients (30%) developing it in the postoperative period, followed by recurrence in 3 patients (7.5%). 3 patients (7.5%) died, of whom one patient had a weakness, one patient had a recurrence and one had both weakness and recurrence.

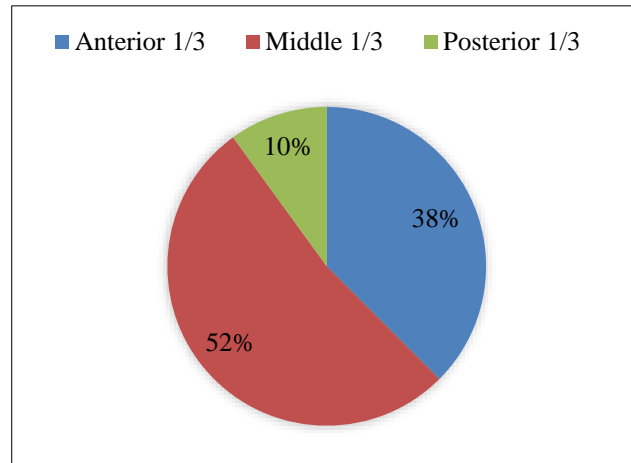


Figure 1: Location of parasagittal meningioma.

Table 1: Cross-tabulation between location and weakness.

| Location of the original tumour | Weakness present | No weakness |
|---|------------------|-------------|
| | N (%) | N (%) |
| Anterior 1/3 rd of sagittal sinus | 0 (0) | 15 (100) |
| Middle 1/3 rd of sagittal sinus | 14 (66.7) | 7 (33.3) |
| Posterior 1/3 rd of sagittal sinus | 0 (0) | 4 (100) |

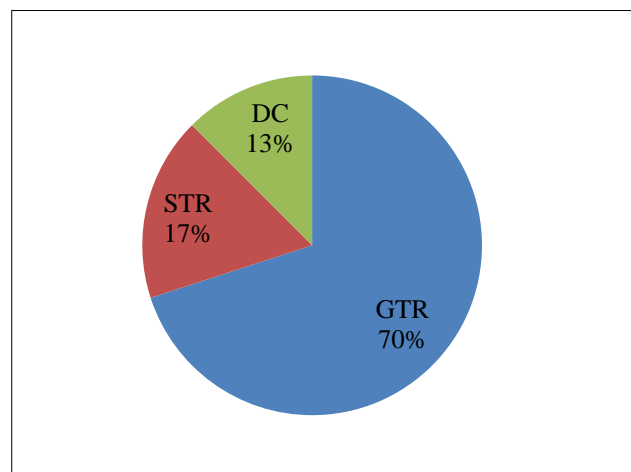


Figure 1: Extent of resection.

Table 2: Cross-tabulation between type of resection and recurrence.

| Type of resection | Recurrence present | No recurrence |
|---------------------------------|--------------------|---------------|
| | N (%) | N (%) |
| Gross total resection | 0 (0) | 28 (100) |
| Subtotal resection | 2 (28.6) | 5 (71.4) |
| Decompression craniotomy | 4 (80) | 1 (20) |

DISCUSSION

In this study, patients in the age group of 61-70 were most commonly found to have parasagittal meningioma (38%). Colli et al showed that the age group of about 54.9 ±5.8 were most commonly affected, Awadalla et al showed that the age group of about 58.8±4.3 were most commonly affected and DiMeco et al showed that the age group of about 57.5±5.4 were most commonly affected.⁶⁻⁸ The percentage of females was 60% in this study. Colli et al showed that 64.2% of the patients were female, Czepko et al showed that 60% of the patients were female, Awadalla et al showed that 64% of the patients were female and DiMeco et al showed that 67.6% of patients were female.⁶⁻⁹ The distribution of the tumour in relation to the sagittal sinus in this study was anterior 1/3rd -38%, middle 1/3rd-53% and posterior 1/3rd -10%. DiMeco et al showed that the location of tumour in relation to sagittal sinus was anterior 1/3rd -14.8%, middle 1/3rd -70% and posterior 1/3rd -14.8%.⁸

In this study, the infiltration of superior sagittal sinus by the tumour was noted in about 35% of patients and 65% of patients were free of sinus infiltration. Skudas et al showed that the infiltration of the superior sagittal sinus was noted in about 33.3% of patients and 66.7% of patients were free of sinus infiltration.¹⁰ In this study, the histopathological analysis showed that 80% of patients were of benign pathology and 20% of the patients were either atypical or malignant histopathology. DiMeco et al showed that 79.6% of the patients were of benign pathology and 20.4% of the patients were of atypical/malignant pathology, Awadalla et al showed that 84% of the patients were of benign pathology and 16% of patients were of atypical / malignant pathology.^{7,8} In this study, the analysis of the extent of resection showed that 70% of patients underwent GTR. Colli et al showed that 85% of patients underwent GTR and Skudas et al showed that 79.5% of patients underwent GTR.^{6,10} In this study results showed that 15% of patients had a recurrence in the prescribed follow up period DiMeco et al showed that 13.9% of patients had recurrence, Awadalla et al showed that 8% of the patients had recurrence, Bi et al showed that 20% of the patients had recurrence, Mathiesen et al showed that 10% of patients had recurrence, Pettersson et al showed that 47% of patients had recurrence.^{7,8,11-13} The huge variations in the recurrence rate in various studies

may be due to the different follow-up period ranging from one year to twenty-five years. In this study results showed that 35% of patients had developed weakness in the postoperative period. Skudas et al showed that 16% of patients had developed weakness in the postoperative period, Czepko et al showed that 10% of patients had developed weakness in the postoperative period, Bi et al showed a postoperative weakness in 34% of their patients.⁹⁻¹¹ The wide range of variation in the results may be due to the presence of preoperative weakness status and also the location of tumour close to the motor cortex region.

In this study, the preoperative mortality (in the form of death) was noted in 7.5% of patients due to various reasons, DiMeco et al showed that 3% of the patients died, Skudas et al showed that 3% of the patients died, Czepko et al showed that 10% of the patients died and Awadalla et al showed that 4% of the patients died.⁷⁻¹⁰ This study revealed that there was no statistically significant association between age of presentation and recurrence, between sex of patient and recurrence, between histopathology and recurrence, between sex of patient and weakness, between the extent of resection and weakness, and between histopathology and weakness as the p value is more than 0.05. This study also revealed that there was statistically significant association between the sinus involvement and recurrence, between extent of resection and recurrence, between the location of tumour and weakness, between involvement of superior sagittal sinus and weakness, between superior sagittal sinus involvement and death and type of resection and death as the p value is less than 0.05. These observations correlate with the clinical and literature data.⁶⁻¹³

CONCLUSION

Recurrence of the tumour is mainly associated with the extent of resection and more recurrences were noted in the patients who underwent subtotal resection when compared with the patients who underwent gross total resection. The goal of the treatment of parasagittal meningioma is to obtain maximal safe resection without worsening the neurological status and the quality of life of the patients. Conservative resection of the tumour with residual lesion within the sagittal sinus followed by adjuvant treatment with modalities like radiotherapy, chemotherapy or targeted therapy for the residual lesion is an accepted mode of treatment.

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