

Extensive Surgical Exposures for Enormous Skull Base Meningiomas: A Single Institutional Experience

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ABSTRACT

Background: Huge, sizeable, anterior skull base meningiomas are relatively common in tertiary care hospitals. Here, a single institutional experience dealing with such lesions is presented.

Material and Methods: A retrospective review of 30 consecutive patients was done, who were treated for a variety of anterior skull base meningiomas at Department of Neurosurgery, Lahore General Hospital, Lahore. Management and outcome were noted and analyzed.

Results: In this study, thirty skull lesions were identified in 21 female (70%) and 9 male (30%) patients, with a mean age at diagnosis was 39.7 years. These benign lesions commonly presented with headache ($n = 19$), visual deterioration ($n = 9$) & seizures ($n = 5$). Olfactory groove ($n = 15$) was the most frequent site encountered in this study followed by planum ($n = 5$), tuberculum sellae ($n = 4$) and clinoidal area ($n = 2$). Gross total resection achieved in all patients by fronto-orbital craniotomy ($n = 15$), while frontal craniotomy alone or with temporal extension performed in other patients ($n = 13 + 2$). Complications observed more in frontal craniotomy patients, than fronto-orbital craniotomy patients.

Conclusions: Majority of the extensive anterior skull meningiomas can be addressed by enormous frontal exposure including supraorbital rim to reduce the intraoperative brain retraction, with wide surgical exposure & great surgical freedom for gross total excision with ease. Recurrence is uncommon after gross total resection.

Keywords: Meningiomas, anterior skull base, headache.

INTRODUCTION

Today is an era of advanced minimal invasive surgery, minimal invasive surgery is not only fascinating for patients but effective as well for hospital administration and surgeons, regarding less morbidity and mortality, better recovery, shorter hospital stay, and least management cost.^{1,2} Infratentorial skull base surgery is highly specialized minimal invasive surgical technique to tackle lesions at underside of brain, skull base & even upper vertebra of spinal column.² Unfortunately in developing countries, especially thickly populated, even at tertiary care centers, operative facilities are not magnificent, neuroendoscopes are not available for all operations, more all surgeons are not trained in minimal invasive procedures. Still conventional microscopic surgeries are preferred and practiced for huge

basal skull lesions like meningiomas.³⁻⁵

Meningiomas constitute commonest primary brain tumors. Anterior skull base meningiomas, constitutes 8 – 10% of intracranial meningiomas. Mostly meningiomas are benign only 10 percent are malignant. Careful neurological evaluation & specialized radiological evaluation including the skull x-rays, computerized tomogram and magnetic resonance imaging are mandatory for strategic treatment. Mainstay of treatment is surgical excision that relieved pressure of tumor on adjacent vital structure & provide histopathological diagnosis.^{6,7}

Surgical management of anterior skull base meningiomas are quite challenging, precise surgical strategies⁷ required for planning and gross total excision of these meningiomas. Mostly huge in size prior to sur-

gery so their resection is possible at expense of brain retraction, specially having extensive posterior encroachment. Most important the skull base is really a complex and technical challenge for neurosurgeons.^{8,9}

We are presenting a single centre experience of anterior skull base meningiomas.

OBJECTIVES

To present a review of clinicoradiological features, surgical management and outcome of skull base meningiomas at a tertiary care hospital, with specific focus on effectiveness of wide surgical exposure, during past five years.

MATERIALS AND METHODS

After obtaining approval from the ORA (Office of research affairs), a retrospective review of medical records was done to identify 30 consecutive patients treated for anterior skull base meningiomas (both operated with and without removal of supraorbital rim) from 2011 to 2016. The clinical information including age, gender, presenting symptoms, imaging studies, treatment (surgical exposure), post operative morbidity and mortality and recurrence was analyzed. Statistical analysis of data was done using SPSS version 22. All the variables were identified. Demographic variables of the patients were analyzed using simple descriptive statistics. Mean and Standard deviation were calculated for age. Frequency and percentages were determined for qualitative variables i.e. gender, location of lesion, extent of surgical exposure & excision & post operative complications.

RESULTS

Thirty anterior skull base meningiomas were identified in 9 male (30%) and 21 female (70%) patients. The mean age at the time of diagnosis was 39.7 years \pm 8.77 (range = 23 years to 56 years). Clinical presentation included a headache (n = 16), visual deterioration (n = 9), seizures (n = 5), alone and in various combinations. Olfactory groove (n = 19) was the most frequent site encountered in this study followed by planum sphenoidale (n = 5), tuberculum sellae (n = 4) and clinoidal area (n = 2). Gross total resection achieved in all patients by fronto-orbital craniotomy (n = 15), as well as frontal craniotomy alone (n = 13), or with temporal extension (n = 2) performed in other patients, Complications observed more in frontal craniotomy

patients. Post operative moderate to severe brain oedema observed in (n = 6) patients, almost the double in no than those in whom supraorbital rim was removed (n = 3). All patients managed conservatively n improved. Seizures observed four times more in those in whom supraorbital rim was not removed, similarly hematoma formation observed exclusively in same group (n = 6). Only one patient was explored for evacuation. CSF leakage incidence was same in both groups (n = 1), while wound infection was slightly higher in patients of fronto-orbital craniotomy group (n = 3). All patients were followed in outpatient clinic on 6 monthly basis with a mean follow-up swelling was in time of 2.8 years (range = 6 months to 3 years), no recurrence was found on follow-up.

Age Distribution

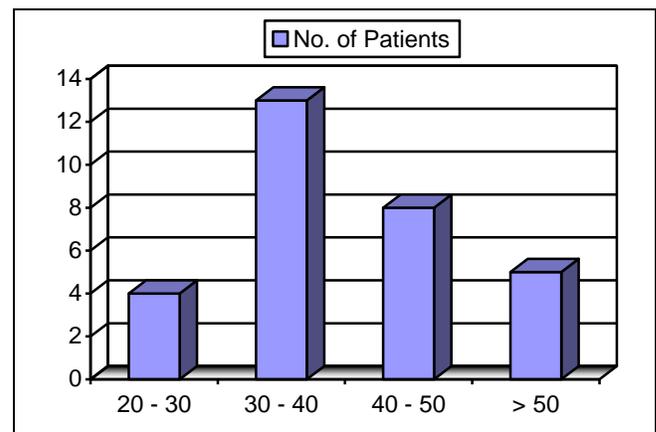


Fig. 1: Age Distribution.

Sex Distribution

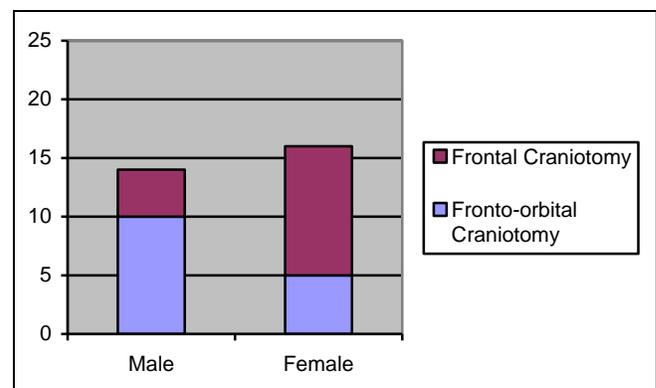


Fig. 2: Sex Distribution.

Site of Meningioma

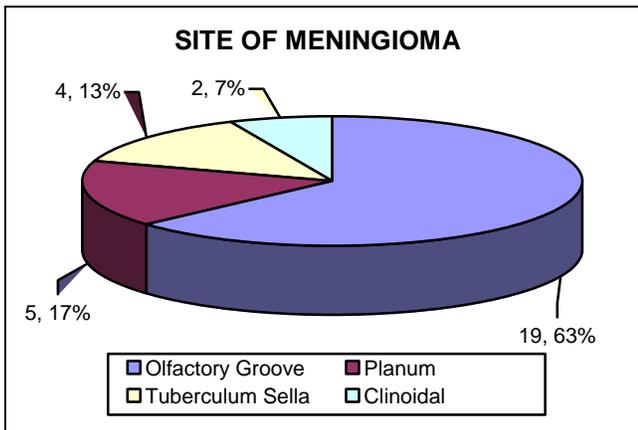


Fig. 3: Site of Meningioma.

Selection of Surgical Approach

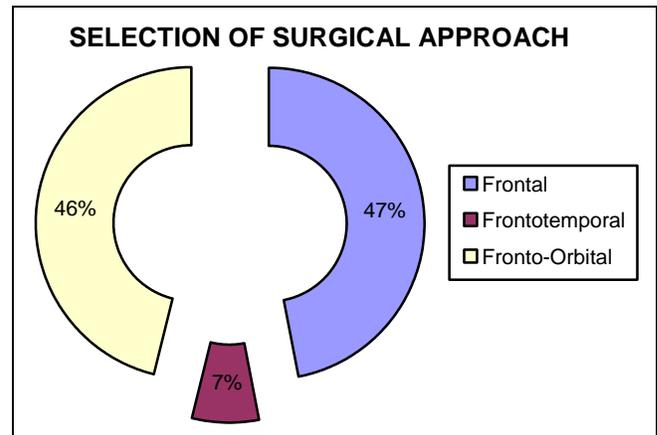


Fig. 4: Selection of Surgical Approach.

DISCUSSION

Meningiomas are common benign tumors, arising from arachnoid cap cells that are found not only in brain but in spinal cord as well. Constituting, approximately 8 – 10 percent meningiomas of anterior skull base. At our centre we encountered with huge size anterior skull base meningiomas.¹⁰ Mainly females were frequent sufferers than males as in many other studies. Mostly found in third and fourth decade of life in our study that is comparable with other international studies.^{8,9} We noticed that mainly headache visual deterioration and seizures were common presentation.¹¹ Scarce presentation of behavioral changes as compared to that reported in literature, was noticed. It could be due to illiteracy, lack of awareness, male dominated society or social constraints.

Predominantly olfactory groove was the most affected area, as in other studies.^{8,12} Infact we did not included the tuberculum sellae and clinoidal meningiomas in our study as at our centre we basically addressed them by pterional approach. We only included few cases having predominant or most of tumor at

Post Operative Complications

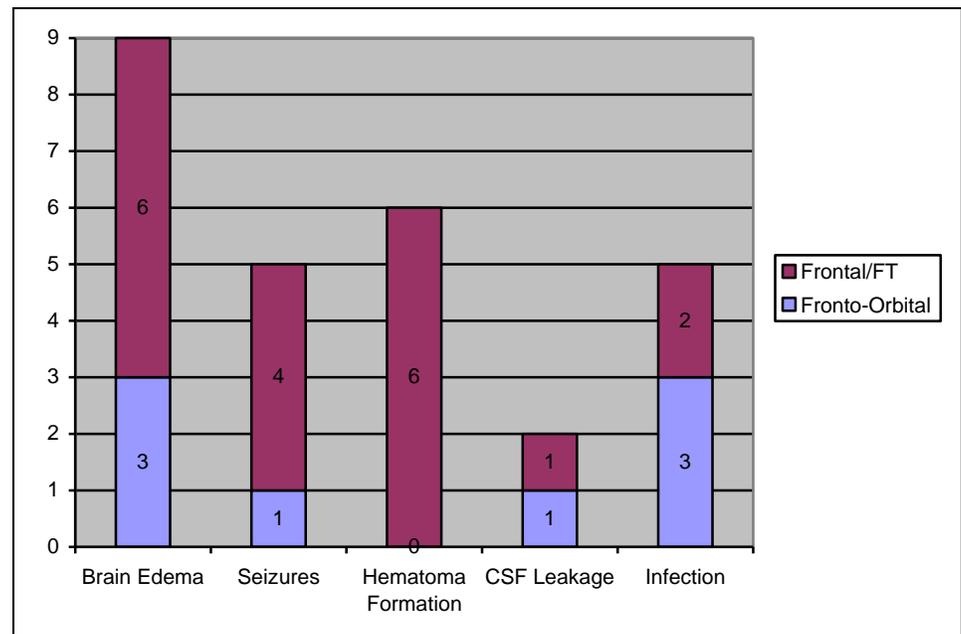


Fig. 5: Post Operative Complications.

anterior skull base, even among them in two cases we did modified frontal craniotomy with some temporal exposure.

The idea was to devise an approach suitable for handling huge tumors with available resources. With microscope the visual axes cannot support to look at nook & corners. More, enormous lesions need excessive brain retraction, To overcome such limitations the supraorbital rim was removed for surgical freedom

of movement, and with excellent direct excess to origin of lesion.^{5,13} Surgical window or corridor was simply expanded, and post operative results were monitored. Likewise, we noticed better outcome in terms of brain edema, post op haematoma, and seizures.

Mainstay of treatment is surgery for anterior skull base meningiomas. Gross total resection is possible at this location.^{6,9} We did gross total resection in all patient, our results are comparable. The recurrence rate is dependent on extent of surgical excision.^{11,14} As we remained successful in achieving gross total resection so no recurrence observed.

CONCLUSION

Majority of the extensive anterior skull meningiomas can be addressed by enormous frontal exposure including supraorbital rim to reduce the intraoperative brain retraction, with wide surgical exposure & great surgical freedom for gross total excision with ease. Recurrence is uncommon after gross total resection.

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