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Suprasellar Meningiomas: The Visual Outcome

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Abstract

Background: Suprasellar meningiomas represent a unique set of surgical challenges due to their three-dimensional relationship with the optic apparatus, critical vasculature, and the pituitary stalk. These challenges are encountered with the context of a surgical goal that provides long-term tumor control, preservation or improvement of visual function and minimal morbidity.

Aim of Study: In this study, we reviewed the literature retrospectively to evaluate the symptoms, clinical manifestations, investigations and the surgical approach for suprasellar meningioma (SSM) to achieve the best visual outcome.

Patients and Methods: This is a retrospective study of 25 cases of suprasellar meningioma, operated by trans cranial (combined pterional and sub frontal approaches) within the period between 2019 and 2022 in Bani Suef University Hospitals and Kasr El-Aini Hospitals.

Neurological and visual examinations, radiological studies, hormonal assessment and follow-up were reviewed.

Result: Our study included 9 males (36%) and 16 females (64%). The mean age was 42.28 years. The side of visual affection within the left eye was in 11 patients (44%), right eye was in 9 patients (36%) and bilateral visual affection was seen in 5 patients (20%). Hormonal profile assessment showed a decrease in T3 & T4 in 2 patients (8%), was normal in 22 patients (88%) and only one patient had a decrease of cortisol (4%). The opposite symptoms were headache in 25 cases (100%), vomiting in 5 cases (20%), and left sided weakness in 1 case (4%).

Conclusion: Transcranial surgical excision through pterional and/or subfrontal approaches is efficient within the management of suprasellar meningioma and is related to visual improvement and good visual outcome in most of cases with accepted percentage of postoperative complications.

Key Words: *Supra sellar meningioma – Pterional approach – Sella – Vision.*

Introduction

MENINGIOMAS are the foremost common intracranial tumor, accounting for 32 you look after of all brain tumors and about 1 to three you look after sellarmasses. Although they'll pituitaryadenomas, they're more vascularized and invasive **[1,2,3].**

Suprasellar meningiomas represent a singular set of surgical challenges thanks to three-dimensional relationship with the optic apparatus, critical vasculature, and also the pituitary stalk. These challenges are encountered with the context of a surgical goal that has long-term tumor control, preservation or improvement of visual function and minimal morbidity. Suprasellar meningiomas usually present with visual deterioration, including decreased visual modality and/or field of vision defects **[4,5,6].**

Patients can even present with a chiasmal syndrome, cranial nerve atrophy, asymmetric bitemporal sight view deficits, anda non-expanded Sella **[7,8].**

Foster Kennedy syndrome, defined as ipsilateral optic atrophy and contralateral papilledema, occurs in 5 you look after patients. Other symptoms include hemiparesis (15%) and anosmia. MRI brain with contrast is completed to diagnose the accurate site of the tumor and its reference to the sella and also the carotid arteries. Surgical excision is achieved through the transcranial sub-frontal or the pterional approach **[9].**

Aim of the study:

During this study, we reviewed the literature retrospectively tojudge the symptoms, clinical manifestations, investigations and alsothe surgical approach for suprasellar meningioma to realize the simplest visual outcome.

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Abbreviations:

SSM : Supra sellar meningioma.
HC : Hydrocephalus.
CSF : Cerebrospinal fluid.

Patients and Methods

This isoften a retrospective study of 25 cases of suprasellar meningioma, operated by trans cranial (combined pterional and sub frontal approaches) within the period between 2019 and 2022 in Bani Suef University Hospitals and Kasr El-Aini Hospitals.

Neurological and visual examinations, radiological studies, hormonal assessment and follow-up were reviewed.

Results

Our study included 9 males (36%) and 16 females (64%). The mean age was 42.28 years. The side of visual affection in the left eye was in 11 patients (44%), right eye was in 9 patients (36%) and bilateral visual affection was seen in 5 patients (20%). Hormonal profile assessment showed a decrease in T3 & T4 in 2 patients (8%), was normal in 22 patients (88%) and only 1 patient had a decrease of cortisol (4%). The other symptoms were headache in 25 cases (100%), vomiting in 5 cases (20%), and left sided weakness in 1 case (4%).

The tumor was located in sellar and supra sellar region in 25 (100%) of cases, with extension to the olfactory groove region in 1 case (4%), planum sphenoidal in 4 cases (16%). 1 patient with neurofibromatosis type 2 showed multiple meningiomas: (Falcine, temporal, posterior fossa & sellar- and suprasellar).

The surgical approach was sub frontal in 20 cases (80%), pterional in 1 case (4%), combined pterional and sub frontal in 4 patients (16%).

Postoperative complications included: Visual loss in one patient (4%), CSF leak was in 2 cases (8%), hydrocephalus (HC) in 1 case (4%), tension pneumocephalus in 1 case (4%), wound infection in 1 case (4%), and death in 1 case (4%) due to hypothalamic infarction.

The visual outcome was good in 23 cases (88%), while 1 patient died due hypothalamic infarction, and 1 patient (4%) had a postoperative visual loss.

Case 1:

55 years old female patient was complaing of diminution of vision in the right eye and also had headache. MRI brain with contrast showed meningioma in the sellar & suprasellar region. Sub frontal approach was used for tumor excision. Her vision has improved postoperatively.

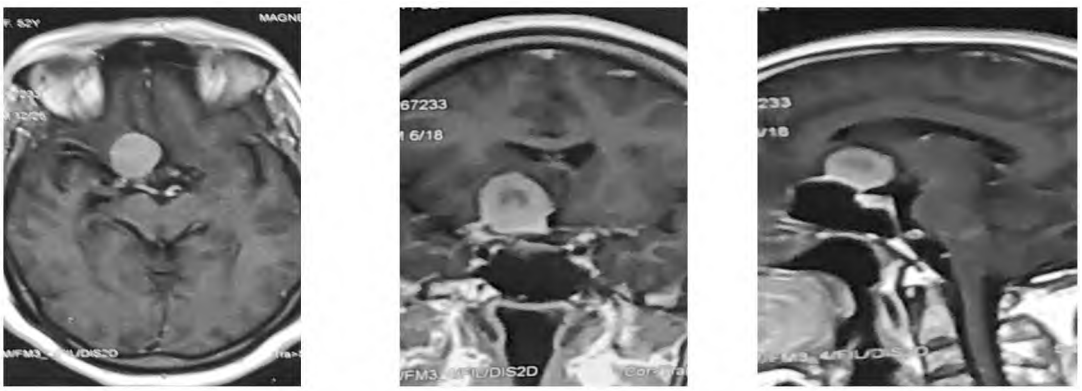

Fig. (1): Pre operative MRI with contrast.

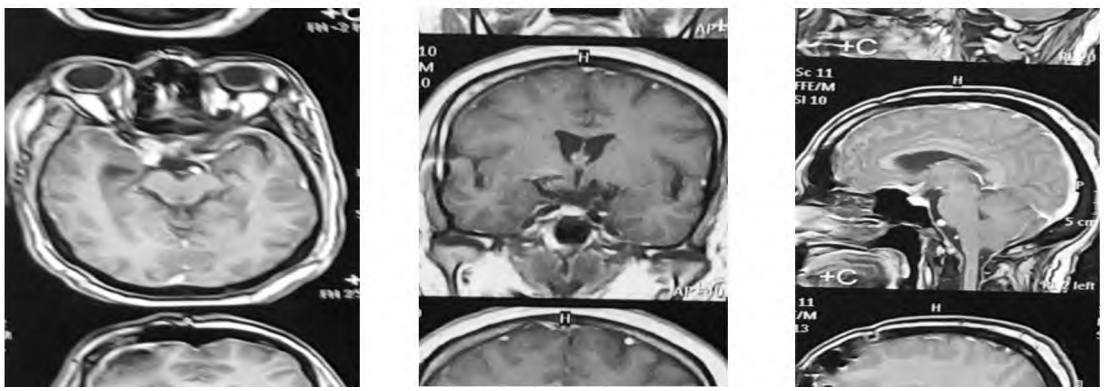

Fig. (2): Post operative MRI with contrast.

Case (2):

45 years old female patient with planum sphenoidal meningioma presenting with right side eye diminution of vision (perception of light). Sub frontal approach is done for tumor excision, the vision had improved without complications and the patient was discharged with good visual come.

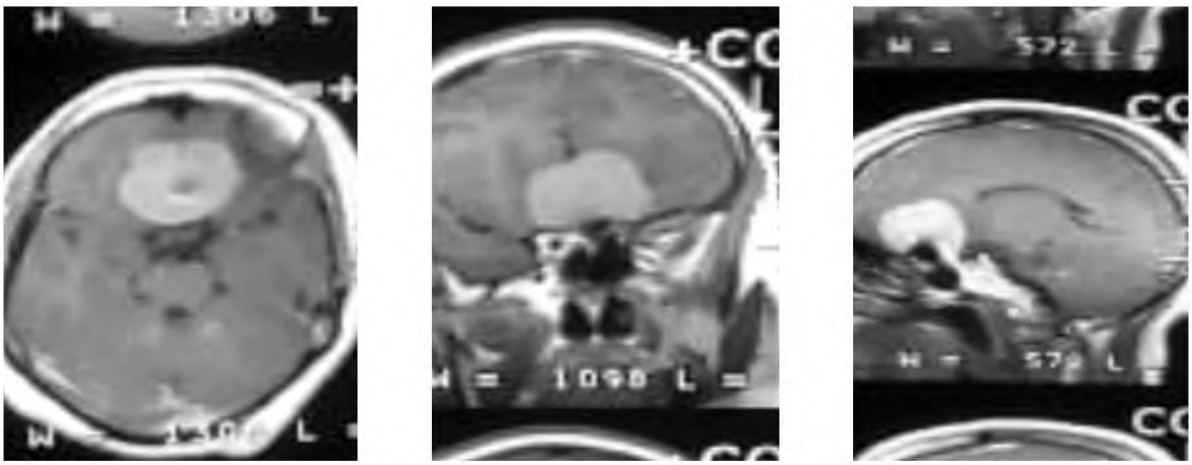

Fig. (3): Pre operative MRI with contrast showing planum sphenoidal meningioma.

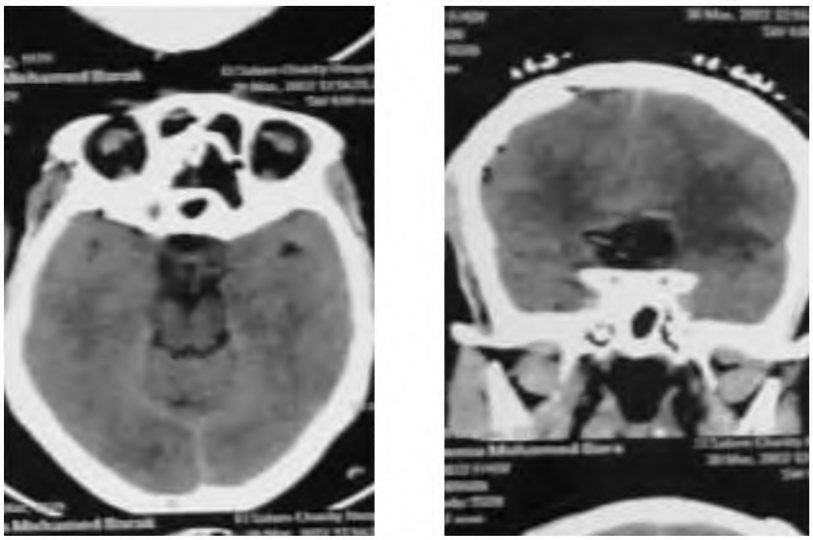

Fig. (4): Post operative CT brain of planum sphenoidal meningioma.

Discussion

Surgical excision remains the main treatment for suprasellar meningioma **[10]**.

Total excision while minimizing postoperative morbidity and mortality is the main challenge for neurosurgeons because of the close relation with the optic apparatus, anterior circulation arteries, hypothalamus and pituitary stalk this is with Ciric et al. **[11]**.

The visual outcome is of great interest in these cases because of the risk associated with dissection around the already compromised optic apparatus.

In our study, we reviewed 25 cases of suprasellar meningioma to determine the effect of surgical treatment on the visual outcome.

The mean age in our study was 42.28 years, while the meanage in literature was 50 years (range 30-78) **[12,13,14]**.

A higher incidence rate was found in females (64%) compared to (36%) only in males which matched most other studies in the literature **[15]**.

Visual disturbance was the main presenting symptom in our study being unilateral in 80% in cases and bilateral in 20% of cases, similar to the previous series in literature which found that uni-

lateral visual deterioration is the main symptom of suprasellar meningioma **[16]**.

Headache was associated in all cases of our study but it wasn't the main presenting symptom.

Hormonal affection is not uncommon in suprasellar meningiomas with affection of the prolactin level, mainly due to stalk compression with the hormonal level mainly below 100ng/ml with no much clinical impact **[17]**. However, in our study, 8% of cases had decrease in T3 and T4 and 4% of cases had decrease in cortisol level in contrast to other studies.

Unilateral weakness is a rare presentation of suprasellar meningioma which wasn't reported in most of the previous series and it was found in 4% only of cases in our study.

Although endoscopic endonasal approach is increasingly used for suprasellar meningioma excision, it was not included in this study. The surgical approach used in our cases was transcranial either subfrontal, pterional or combined approach.

The postoperative complications encountered were: Lost vision in one patient (4%), cerebrospinal fluid (CSF) leak was in 2 cases (8%) which stopped after conservative management, hydrocephalus in 1 case (4%) which was operated upon by ventriculo peritoneal shunt, tension pneumocephalus in 1 case (4%) which was managed conservatively by Oxygen mask and proper positioning, wound infection in 1 case (4%) managed conservatively by regular dressing and topical antibiotics, and death in 1 case (4%) due to hypothalamic infarction.

The visual outcome was good in 23 cases (92%), The prognosis was bad in 2 cases (8%).

These results are better than Andrews and Wilson results who had 72% good outcome and 28% bad outcome as regards visual improvement although they had no immediate postoperative mortalities.

Another study by Ahmed Galal et al., had visual improvement in 60% of patients and the vision remained unchanged in the remaining 40% while R. Kwancharoen et al., reported visual improvement in up to 80% of cases.

Conclusion:

Transcranial surgical excision through pterional and/or subfrontal approaches is efficient in the management of suprasellar meningioma and is associated with visual improvement and good visual outcome in most of cases with accepted percentage of postoperative complications.

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نتائج النظر فى الورم السحائى فوق السرجى فى المخ

المقدمة : يعتبر الورم السحائى السرجى فى المخ من الأورام الفريدة والمهمة فى المخ حيث أنه له علاقة بالعصب البصرى والغدة النخامية والشريان السباتى بالمخ، ويتم عمل أشعة رنين مغنا.

الهدف من الدراسة : مراجعة الأبحاث العلمية لمتابعة الأعراض والفحوصات الأزمة لعمل أحسن الطرق لأجراء العملية الجراحية لاستئصال الورم السحائى السرجى.

طرق الدراسة ومكوناتها : تتكون الدراسة من ٢٥ مريض يعانون من وجود ورم سرجى سحائى بالمخ ضاغط على العصب البصرى فى مستشفيات جامعة القاهرة وجامعة بنى سويف وتم عمل عملية جراحية عن طريق فتح عظمة المخ الأمامية.

وقت الدراسة : وكانت الدراسة فى الفترة ما بين ٢٠١٩ و ٢٠٢٢.

حجم العينات : كانت الدراسة تشمل ٢٥ مريض، ٩ رجال ٣٦٪ و١٦ سيدات ٦٤٪ وكان متوسط العمر ٤٢.٢٨. وكان مكان الورم من الناحية اليسرى فى ١١ مريض ٤٤٪ واليمنى فى ٩ مرضى ٣٦٪ والناحيتين فى ٥ مرضى ٢٠٪. وتم عمل تحليل هرمونات وكان هرمونات الغدة الدرقية وكان قليل فى ٢ مرضى ٨٪ وكان الكورتيزول قليل فى مريض واحد ٤٪ وكان الصداع موجود فى كل المرضى ١٠٠٪.

معايير الاقصاء : تدهور فى درجة الوعى.

معايير الانضمام : المرضى الذين يعانون من وجد ورم سحائى سرجى بالمخ وفى وعى كامل حيث درجة الوعى ١٥/١٥.

التوصيات : يعتبر استئصال الورم السحائى السرجى بواسطة عملية جراحية من أحسن الطرق لتحسن حالة النظر وإزالة الضغط من على العصب البصرى.