Postoperative Clinical Outcome of Visual Acuity of Fifty Patients with Sellar and Suprasellar Tumors

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Abstract

**Background**: The sellar ,parasellar and suprasellar regions is an anatomically complex areas, A wide range of neoplastic, inflammatory,and many other lesions may embroil vital structures.

**Objectives:** This is a prospective study for post operative clinical outcome of visual acuity (VA) in patients with sellar and suprasellar tumors.

**Patients and methods:** Fifty cases were included in this study (28 females and 22 males). The age ranged from 31y to 55 y. All cases were operated at kasr El Aini Neurosurgical Department from June 2011 to February 2014. All patients had history, clinical examination, hormonal profile and radiological investigations in the form of CT scan, MRI and 4 vessels or CT angiography if needed. All cases had post-operative CT brain, hormonal profile and visual assessment 2 days and 4 months after surgerybyLamdolt broken ring,30 patients were operated by microscopic assisted endoscopic endonasal transsphenoid approach and 20 cases operated by transcranial approach.

**Results:**

Thirty two cases showed visual improvement by 2 lines in Lamdolt broken ring chart 48hrs after surgery. 16 cases had same preoperative VA. 10 cases of 16 showed gradually improvement within 4 months. The VA was hand movement in two cases in Rt. eye and became no PL postoperative. Total improvement of cases, after 4 months, were 42 case (84%) ,6 cases still had same pre and postoperative visual acuity (12%) and only 2 cases (4%) had post operative visual acuity deterioration .

**Conclusion:** Safe, careful surgery of tumors in sellar and suprasellar regions with good instruments and anesthesia can help improving visual acuity.

**Key words:**Suprasellar , Visual acuity,Lamdolt broken ring

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Introduction:

Sellar and parasellar regions with its suprasellar extension are very important areas within the intra cranial cavity that has many important structures1, such structures like pituitary adenoma,pituitary stalk,hypothalamus, both optic nerves, optic chiasm and many vascular structures like anerior circulation and cavernous sinus 2,contents of cavernous sinus such as itracavernous portion of carotid artey, venous network, and cranial nerves III,IV,VI that mainly controlling eye movments3,it extend inferiorly to base of sphenoid sinus laterally to cavernous sinus and superiorly to ventricular walls4,many lesions can affect these areas such as pituitary adenoma , meningioma, craniopharngioma, and epidermoid, arachnoid cysts and vascular lesions like aneuryzms of anterior circulation2.,Symptoms and signs of patients with these lesions varying from accidentally discovered, headache , hormonal imbalance, visual affection , proptosis and cranial nerve affection with intracavernous extension.1

Many diagnostic investigations are very crucial to reach proper diagnosis for proper management such radiological investigations in form of CAT scan(CT) of brain ,magnetic resonance imaging(MRI) and 4 vessels angiography or CT angiography to rule out relations of such lesions and vascular tree,hormonal profile is very important for replacement therapy pre and post operative5, visual impairment should be carefully investigated by clinical assessment ,perimetry and fluorescine retinal angiography1, deterioration of visual acuity is one of serious complications for these lesions that has to be treated rapidly to preserve visual function 5, many surgical approaches are available for surgical decompression of lesions in these areas like transcranial, microscopic and or endoscopic transsphenoid corridor3

This study aims to outlines postoperative visual acuity in cases of sellar and suprasellar tumors and impact of safe surgical resection on the patients visual prognosis.

Patients and methods :

Fifty cases with sellar and suprasellar tumors were included in this study. There were 28 females and 22 males. The age ranged from 31y to 55 years. All cases operated at Kasr El Aini Neurosurgical department from June 2011 to February 2014.

All patients had history, clinical examination, hormonal profile and radiological investigations in the form of CT scan, MRI and 4 vessels angiography, when needed, to outline relation between tumors and vascular tree ,thecases suffered from any local eye disease were excluded from this study.All patients had visual acuity assessment using visual Lamdolt broken ring chart pre-operatively (table1) and 48hrs and 4 months (table 2) after surgery

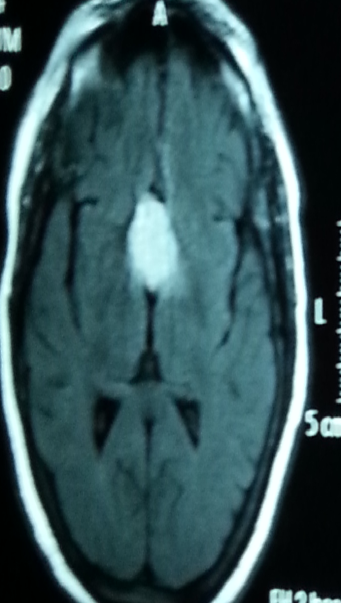
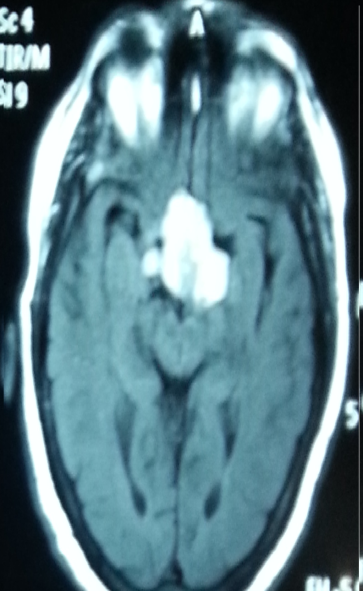
Thirty patients were operated by microscopic assisted endoscopic endonasal transsphenoid approach for better visualization of optic apparatus postoperatively and20 cases operated by transcranial approach(12 cases by pterional approach and 8 cases by subfrontal approach). All cases had CT scan with sellar cuts and pituitary hormonal assessment on the second postoperative day. The visual acuity was assessed and recorded 48 hours and 4 months after surgery.

Fourty cases were discharged within 5 days post operative. Seven caseswere discharged 10 days after surgery due to post operative Diabetes insipidus. The last 3 cases were discharged after 2 weeks due to chest infection.

Results:

Fourty three cases were operated by near total excision and 7 cases were operated by subtotal excision being adherent to vital structure. Twenty five cases were pituitary adenoma, 17 cases were Craniopharyngioma (figure1), and 8 cases were Meningioma.Post operative results were obtained by visual assessment using Lamdolt broken ring chart 48hrs after operation and 4months later. 30 patients were operated by microscopic endonasal transsphenoid approach and 20 cases operated by transcranial approach.

Of the 7 cases subtotal excision, 3 cases were craniopharyngioma, 2 cases were pituitary adenoma and 2 cases were meningioma. In the 2 meningioma cases subtotally excised, the visual acuity improved. In the 3 craniophryngioma cases, 2 cases showed deterioration (no PL) in Rt.eye only and third had VA improvement. Two cases of pituitary adenoma, with subtotal resection, had same pre and postoperative visual acuity.



(a) (b)

Fig. 1: Acase of 48yrs old male with suprasellar craniopharyngioma showing pre (a) and post (b) operative images

|  |  |  |
| --- | --- | --- |
| Visual acuity | Rt . | Lt. |
| 6/18 | 30 | 25 |
| 6/36 | 0 | 5 |
| 6/60 | 12 | 20 |
| HM | 8 | 0 |

Table (1) showing pre operative visual acuity in both eyes

|  |  |  |
| --- | --- | --- |
| Visual acuity | Rt. | Lt. |
| 6/6 | 5 | 5 |
| 6/9 | 20 | 20 |
| 6/18 | 17 | 22 |
| 6/36 | 0 | 3 |
| HM | 6 | 0 |
| No PL | 2 | 0 |

Table(2) showing post operative visual acuity in both eyes4 months after surgery.

Thirty two cases showed visual improvement by 2 lines in the lamdolt broken ring chart 48hrs after surgery ( 8 meningioma,18 pituitary adenoma,6 craninopharyngioma). sixteen cases had same preoperative VA( 10 cases of them improved gradually within 4 m ( 4 pituitary and 6 craniopharyngioma) and 6 cases were HM pre and post operative( 3 pituitary adenoma and 3 craniopharyngioma). The VA was hand movement in two cases in right eyeonly and became no PL postoperative. These 2 cases were pathologically proven to be craniopharyngiomas.After 4 months, 42 case showed improvement (84%),6 cases still had same pre and postoperativeVA (12%) and only 2 cases (4%) had post operative visual acuity deterioration (table 1, 2) .

48 patients had an uneventful surgery. These cases have their vision improved or remained as pre-operative. In the last two cases (craniopharyngeoma), the tumor was large and adherent to the surrounding. It compressed the optic pathway thus affecting the visual acuity preoperative to HM, an attempt was made to separate the tumor from the optic apparatus. This attempt ended in injury of the optic pathway and deterioration of vision.

Discussion:

Sellar and suprasellar region has an intimate relation to many vital structure like vessels, hypothalamus, Pituitary gland and stalk,cranial nerves ,cavernous sinus and optic apparatus. Such delicate structures make surgery in this area difficult and very challenging. Good anesthesia, proper instruments and safe careful surgery without severely damaged optic apparatus had a good impact on post operative results especially on VA.Data from cancer registries suggest that prevalence of primary central nervous system (CNS) tumors is 130–230 cases per 100,000 of the population 6 .Lesions of the sellar and suprasellar region are very common, accounting for 10–15% of intracranial masses7.

In this series of fifty cases of suprasellartumours, 84% had post operative improvement of VA, 12% had same pre and postoperative VA, and finally 4%had postoperative deterioration of VA(no PL). In the deteriorated cases, the tumor was large craniopharyngeoma adherent to the surrounding. It compressed the optic pathway thus affecting the visual acuity to HM. An attempt was made to separate the tumor from the optic apparatus ,this attempt ended in injury of the optic pathway and deterioration of vision.

This results correlates with [Koutourousiou M](http://www.ncbi.nlm.nih.gov/pubmed?term=Koutourousiou%20M%5BAuthor%5D&cauthor=true&cauthor_uid=24678782),8 et al. In their series in 2014, they documented good postoperative VA in 75 cases of suprasellar meningioma treated by endoscopic endonasal surgery. They had only 2 cases of visual acuity deterioration.However, their tumour pathology differs from this study where craniopharngeoma and pituitary adenoma were also included. The 8 cases of meningioma, in this study, were operated upon transcranially. The all improved. This may be attributed to better visualization of optic nerve during the transcranial approach.However eight cases is a small number and further study should be done to draw a conclusion.

The result, in this study, is quiet similar with [Sinha S](http://www.ncbi.nlm.nih.gov/pubmed?term=Sinha%20S%5BAuthor%5D&cauthor=true&cauthor_uid=24441323)9 et al 2013.They reported 70% improvement of VA of intrancranially treated 48 cases of suprasellar tumors. This study reported 20 cases of sellar,suprasellar tumors operated transcranially with 75%improvement in visual acuity. This slight difference may be attributed to the difference in tumor pathology.[Han S](http://www.ncbi.nlm.nih.gov/pubmed?term=Han%20S%5BAuthor%5D&cauthor=true&cauthor_uid=24142197)10 et al 2014 also reported 82% improvement of post operative VA in 29 patients with large suprasellar craniopharyngioma treated transcranially. This study reported 17 cases of craniopharyngioma (12 cases treated transcranial and 5 cases transsphenoid) with 70% postoperative improvement.

Conclusion :

Safe, careful surgery of tumor in sellar and suprasellar regions with good instruments and anesthesia and without severely affected optic nerve can improve visual acuity.

References :

1-Ruscalleda J. Imaging of parasellar lesions. European Radiology.2005;15:549–59.

2- Smith JK. :Parasellar Tumors. Suprasellar and Cavernous Sinuses. Top Magnetic Resonance Imaging.2005;16:307-15.

3-- Melmed S.:. Medical progress: Acromegaly. New England Journal of Medicine,.2006; 355:2558-73.

4- Freda PU, Post KD. Differential diagnosis of sellar masses. Endocrinology and Metabolism Clinics of North America.1999; 28: pp. 81-117.

5- Bonneville J-F, Bonneville F, Cattin F. Magnetic resonance imaging of pituitary adenomas. European Radiology.2005;15, pp. 543-8.

6-Davis FG, Kupelian V, FreelsS,McCarthy B, Surawicz T. Prevalence estimates for primary brain tumors in the United States by behavior and major histology groups. Neuro-oncology 3.2001 ; 3: pp. 152–8.

7- Terada T, Kovacs K, Stefaneanu L ,Horvath E. Incidence, pathology, and recurrence of pituitary adenomas: study of 647 unselected surgical cases. Endocrine Pathology.1995; 6:301–10.

8 - [Koutourousiou M](http://www.ncbi.nlm.nih.gov/pubmed?term=Koutourousiou%20M%5BAuthor%5D&cauthor=true&cauthor_uid=24678782), [Fernandez-Miranda JC](http://www.ncbi.nlm.nih.gov/pubmed?term=Fernandez-Miranda%20JC%5BAuthor%5D&cauthor=true&cauthor_uid=24678782),[Stefko ST](http://www.ncbi.nlm.nih.gov/pubmed?term=Stefko%20ST%5BAuthor%5D&cauthor=true&cauthor_uid=24678782), [Wang EW](http://www.ncbi.nlm.nih.gov/pubmed?term=Wang%20EW%5BAuthor%5D&cauthor=true&cauthor_uid=24678782), [Snyderman CH](http://www.ncbi.nlm.nih.gov/pubmed?term=Snyderman%20CH%5BAuthor%5D&cauthor=true&cauthor_uid=24678782), [Gardner PA](http://www.ncbi.nlm.nih.gov/pubmed?term=Gardner%20PA%5BAuthor%5D&cauthor=true&cauthor_uid=24678782) . Endoscopic endonasal surgery for suprasellar meningiomas: experience with 75 patients.[JNeurosurg](http://www.ncbi.nlm.nih.gov/pubmed/24678782).2014;120(6):1326-39.

9- [Sinha S](http://www.ncbi.nlm.nih.gov/pubmed?term=Sinha%20S%5BAuthor%5D&cauthor=true&cauthor_uid=24441323), [Kumar A](http://www.ncbi.nlm.nih.gov/pubmed?term=Kumar%20A%5BAuthor%5D&cauthor=true&cauthor_uid=24441323),[Sharma BS](http://www.ncbi.nlm.nih.gov/pubmed?term=Sharma%20BS%5BAuthor%5D&cauthor=true&cauthor_uid=24441323). Bifrontal basal interhemispheric approach for midline suprasellar tumors.our experience with forty-eight patients. [Neurol India](http://www.ncbi.nlm.nih.gov/pubmed/24441323).2013;61(6):581-6.

10- [Han S](http://www.ncbi.nlm.nih.gov/pubmed?term=Han%20S%5BAuthor%5D&cauthor=true&cauthor_uid=24142197), [Tie X](http://www.ncbi.nlm.nih.gov/pubmed?term=Tie%20X%5BAuthor%5D&cauthor=true&cauthor_uid=24142197), [Qin X](http://www.ncbi.nlm.nih.gov/pubmed?term=Qin%20X%5BAuthor%5D&cauthor=true&cauthor_uid=24142197), [Wang Y](http://www.ncbi.nlm.nih.gov/pubmed?term=Wang%20Y%5BAuthor%5D&cauthor=true&cauthor_uid=24142197), [Wu A](http://www.ncbi.nlm.nih.gov/pubmed?term=Wu%20A%5BAuthor%5D&cauthor=true&cauthor_uid=24142197).Frontobasalinterhemispheric approach for large superasellarcraniopharyngiomas.do the benefits outweigh the risks?,ActaNeurochir (Wien).2014;156(1):123-30.

الملخص العربى

ان منطقة السرج وما فوق السرج من اهم المناطق داخل المخ وذلك لقربها من الأوعيه الرئيسية للمخ وكذلك قربها من الجهاز البصرى وايضا قربها من البطين الثالث وتحت المهاد. من اكثر الأورام انتشارا فى تلك المنطقة ورم الغدة النخامية واورام القحف البلعومى وكذا اورام المخ السحائية, من اهم تاثيرات تلك ا لأورام التاثير على الرؤية العصبية وهو مجال البحث ,اجرى هذا البحث على خمسين مريض ,ثمانية وعشرون انثى واثنين وعشرون ذكر تتراوح اعمارهم من واحد وثلاثين الى خمس وخمسين عاما , تم فحص جميع الحالات اكلينيكيا وتم عمل اشعة مقطعية ورنين مغناطيسى وكذا عمل اشعة بالصبغة على شرايينالمخ اذا اقتضت الحاجة ,خمس وعشرون حالة كانوا يعانون من ورم بالغدة النخامية وسبعة عشرة حالة من ورم القحف البلعومى وثمانية من اورام سحائية, تم اجراء ثلاثون حالة عن طريق الوتدى با لانف بالميكروسكوب ومساعدة المنظار وعشرون حالة عن طريق المخ,تم استئصال الورم كليا فى ثلاث واربعين حالة وجزئيا فى سبع حالات اثنين وثلاثون حالة تحسنت قوة الابصار لديهم بعد الجراحة بيومين وستة عشرة حالة كان لديهم نفس قوة ابصار ما قبل الجراحة تحسن منهم عشرة حالات بعد مرور اربعة اشهر وستة لم يتحسنوا ,وبذلك يكون عدد المرضى الذين تحسنوا اثنين واربعين حالة بمعدل اربعة وثمانين بالمئة وحالتين تدهور النظر بعد الجراحة ال عدم رؤية كاملة بمعدل اربعة بالمئة. وقد تبين من ذلك البحث ان الجراحة الناجحة وكذلك حالة العصب البصرى قبل الجراحة من اهم العوامل التى تؤدى الى نتائج ايجابية ملموسة بعد اجراء الجراحة.