Endoscopic Endonasal Surgical Resection of Pituitary Adenomas: Outcomes Analysis

Radwan Nouby Mahmoud, Sherif E. Elkheshin, Ali R. Hamdan, Amr M. Tayel
Department of Neurosurgery, South Valley University and Tanta University, Egypt
Corresponding Author: Amr M. Tayel
amrtayel82@gmail.com

ABSTRACT

Background: The intracranial manipulation through the nose was already known to the ancient Egyptians. The transsphenoidal route is used for more than 95% of surgical indications in the sellar region due to its advantages. Aim: To evaluate the endoscopic trans-sphenoidal approach for resection of pituitary adenomas. Patients and methods: Retrospective and Prospective evaluation study of endoscopic transsphenoidal approach for the pituitary adenomas. This work was carried out on 30 patients during the period between May 2014 and October 2016. Results: Visual acuity and field improved in 75% of patients, endocrine remission occurred in 62% of patients, gross removal was achieved in about 47% of patients. Conclusion: The advantages of the endoscopic transsphenoidal approach to pituitary adenomas include high incidence of total adenoma removal, high incidence of hormonal remission and low post-operative complications incidence.

Keywords: Endoscopic, outcome, pituitary adenoma, surgical resection

1. INTRODUCTION

The endonasal route to the cranial cavity was used by the ancient Egyptians for the mummification process to evacuate the brain without disfiguring the face. A similar approach has been developed in the last decades as a surgical route for the treatment of pituitary adenomas(4,6,8). Transsphenoidal surgery is now considered the first-line treatment for pituitary adenomas(3,16). The advantages of the transsphenoidal approach are many including avoidance of the craniotomy; also it may be fit for patients with comorbidity. The transsphenoidal approach enables the surgeon to inspect the sellar cavity using the angled lenses. In addition, it is associated with minimal blood loss, shorter surgery time and short post-operative hospital stay(6,10,15,17).

2. METHODS

This is an observational retrospective and prospective study that was carried on 30 patients from May 2014 to October 2016 to assess the outcomes after the endoscopic endonasal surgical resection of pituitary adenomas. The patients in our study were subjected to history taking, laboratory investigations, neurological examination, ophthalmological evaluation and neuro-imaging study of the sella by MRI contrast study. Follow up included clinical and neurological...
assessment of the patients, laboratory measurement of the pituitary hormones and the radiological evaluation was done three months after surgery.

3. RESULTS

Age and sex distribution: The patients' age varied between 20 years and 60 years with a mean age of 40 years. Male percent represented 60% in our study. Clinical presentations: Headache was the most presenting symptom in our series, recorded in 25 patients (83%). The second most common presenting symptom was visual complaint. Upon examination of visual functions, 24 patients (80%) had deterioration of their visual acuity and visual field defect. Six patients (20%) presented with acromegalic manifestations. Five patients (17%) presented with galactorrhea. Four patients (13%) had ocular palsies at time of clinical consultation. Dysmenorrhea was recorded in five females while impotence was recorded four males. One patient (3%) presented by disturbed conscious level with GCS of 6/15.

Type of the adenoma: The non-functional adenoma type represented 47% of cases (14 patients) while the functional type represented 53% (16 patients), growth hormone secreting adenoma type was the most common.

Pre-operative endocrinal assessment: Hyperprolactinemia >150 ng/ml was recorded in 7 cases (44 % of functional adenomas), Elevated growth hormone levels was seen in 7 patients (44 % of functional adenomas) and 2 case had elevated both prolactin and growth hormone but prolactin level for those two case was <150ng/ml.

Adenomas size: Macroadenomas represented 80% of our cases while microadenomas represented only 20%.

Surgical management: Surgery was done to 33% of our patients within the first few days of presentation because of the severe deficit in the form of visual affection and deterioration of the conscious level. Other patients (67%) presented with less clinical manifestations.

Post-operative complications: CSF leak and epistaxis were the most common complications (6.66% for each). Diabetes isipidus and hyponatremia were also recorded.

Out comes: Visual acuity and field improved in 75% of patients, endocrine remission occurred in 62% of patients (more with prolactinoma); gross removal was achieved in 46.66% of patients while subtotal removal was achieved in 33.33%.

4. CASES PRESENTATION

Case NO. 1: Female patient aged 40y complained of headache, decreased vision, acromegalic manifestations and sleep apnea. Laboratory investigations revealed increased GH level. Ophthalmological assessment revealed decreased visual acuity more in the right side. Radiological imaging revealed a pituitary macroadenoma of 3*3*4 cm in antero-posterior, transverse and height dimensions respectively. Surgical intervention was done with subtotal removal and both visual acuity and field showed improvement. GH was decreased post-operative but it didn't return to normal, 1.5 years later, patient start to complain of increased acromegalic manifestations and sleep apnea attacks so laboratory and radiological follow up were done and they revealed increased GH again but MRI revealed stationary size so patient was referred to radiotherapy.

Figure (1): A, B- MRI brain, coronal and sagittal cuts show a pituitary macroadenoma of 3, 3, 4 antero-posterior, transverse and height dimensions respectively. C- Pre-operative GH level.
Case NO. 2: Male patient aged 23y complained of headache, decreased vision and acromegalic manifestations. Laboratory investigations revealed increased GH and prolactin level but the later was less than 150ng/ml. visual acuity was no PL in left eye while it was 6/12 in the right one. Radiological imaging revealed a pituitary giant adenoma of 4, 2.6, 4.7 cm in antero-posterior, transverse and height dimensions respectively. Surgical intervention was done, both visual acuity and field showed improvement, GH was decreased post-operative but it didn’t return to normal, post-operative imaging revealed most partial removal.

Figure (2): post-operative MRI brain done 7 months post excision show subtotal excision.

Figure (3): A- MRI brain, sagittal cuts show a pituitary macroadenoma of 4*2.6*4.7 cm in antero-posterior, transverse and height dimensions respectively. B- Pre-operative hormonal assessment.

Figure (4): post-operative CT brain sagittal cuts show residual tumor.
5. DISCUSSION

This study that was carried on 30 patients who were admitted to the neurosurgery department, South Valley and Tanta University hospitals from May 2014 to October 2016 for evaluation of transsphenoidal approach for resection of pituitary adenomas. In this study, the incidence of female patients was higher as it represented 60% while male patients' incidence was 40%; this is similar to Dusick et al. 2007(7) study but different from Shou et al. 2005(14) study who reported equal incidence rate between females and males. In our study, headache was the most predominant complain as it was present in 83% followed by visual complain in 80% out of patients. Acromegalic manifestations were reported in 37.5% of patients, while galactorrhea was noticed in only 31%. Frequent vomiting was found in 17%, cranial nerves palsy was found in 13%. The visual deficit may be referred to upward and lateral tumor extension with compression of the optic system. Visual complain represented only 24% in Benveniste et al. 2005(2) study while it represented 80% in this work, this variation may be due to large number of patients with micro adenomas included in their study as the micro adenomas are usually too small to compress the optic apparatus. In this study, the functional pituitary adenomas represented 53%, most of them were growth hormone secreting adenomas (56%) followed by prolactinomas (44%). The incidence of secretory adenoma in Zada et al. 2003(18) was 51%, however, the non-secretory pituitary adenoma incidence was higher in Sudhakr et al. 2004(15) (53%) and Dusick et al. 2007(7) (55%). The GH secreting pituitary adenoma incidence was the highest in Arbolay et al. 2013 study as it was 57% similar to our results, but in Zada et al. 2003(18) study prolactinoma was the most common. The increasing incidence of GH secreting adenomas is due to the progress in the medical management of the prolactinomas. In this work, gross total resection was reported in 47%, subtotal resection was reported in 33%. Gross total removal was reported in 89.6% of patients in Arbolay et al. 2013(11) study while it was 26% in Benveniste et al. 2005(2) study, all patients included in Benveniste study had recurrent adenomas. Many factors control grade of resection especially tumor consistency, the extent of sella exposure and sphenoidotomy. In our series, hormonal remission occurred in 63% of patients with functional adenoma, it was 71% for prolactinoma and 56% for growth hormone secreting adenoma. Hormonbl remission was 92% in Arbolay et al. 2013(11) study and 80% in Wang et al. 2014(17) study. Rotariu 2011(12) study reported 60% hormonal remission for growth hormone secreting adenoma. Lampropulos et al, 2013(9) study reported 54-86% remission for the prolactin hormone. Best outcome regarding hormonal remission was noticed when total or near total adenoma excision. The percent of post-operative improvement in visual deficit was 75% in our study while it was 94% in Mattozo et al 2006(11) study. The visual improvement is best seen when early tumor resection is accompanied by total or near total adenoma excision. Regarding the post-operative complications, CSF rhinorrhea was the most common (7%). Only one patient (3%) complained of transient diabetes insipidus. Death was reported in one patient (3%) but actually his pre-operative GCS was 5/15. The post-operative CSF leak incidence had a wide range as it was 2.3%, 4.2% and 7% of patients in Cappabianca et al. 2002(5), Rotariu 2011(12) and Sala et al. 2014(13) studies respectively. The different studies showed that CSF leak is more common with huge adenomas having significant suprasellar extension especially if associated with tough fibrous nature.

6. CONCLUSION

Outcomes after the transsphenoidal surgery are excellent, with high rates of clinical improvement, high rate of endocrinial remission, and minimal post-operative morbidity and mortality.

REFERENCES

