

Role of Endoscopic Assisted Microsurgery for Pituitary Tumors

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ABSTRACT

Objective: To determine the outcome of endoscopic assisted microsurgery for pituitary tumors in terms of gross tumor removal and visual field improvement.

Materials and Methods: This Descriptive case series conducted at Department of Neurosurgery, Lahore General Hospital Lahore over a period of six months from July 2012 to December 2012. Sixty five patients were included through non-probability purposive sampling technique. All cases of pituitary tumor diagnosed on MRI/CT scan of either gender having age 18 – 80 years and patients with recurrent cases, sellar and with suprasellar extension (assessed on CT and MRI findings). Informed consent was taken from the patients. All laboratory tests were done in hospital laboratory and reported by hospital pathologist Shaukat Khanum Memorial Hospital Lahore. Pre- and post-operative visual field status (at least 3 months after surgery) was analyzed. Surgery was performed by a single team of surgeons. Surgical procedure involves introduction of 4-mm to 2.7mm endoscope to visualize the sphenoid recess. The bilateral sphenoid Ostia are entered. The posterior nasal septum was incised at middle turbinate and it was patients resected. All the data was entered and analyzed by using SPSS 20. Frequency and percentages were calculated for all qualitative variables like gross removal rate and visual field improvement.

Results: The mean age of the patients was 50.46 ± 17.80 years. There were 64.62% male patients and 35.38% female patients. Gross removal of tumor was observed in 56 (86.2%) and visual field improvement was found in 92.31% patients. 56 patients were those in which gross removal of tumor was observed in which 34 were males and 22 were females, similarly in 9 patients them was subtotal resection of tumor in which 8 were males and only 1 was female.

Conclusion: In this study, gross removal of tumor as well as visual field improvement was found in maximum number of patients and it is concluded that endoscopic assisted microsurgery for pituitary tumors is a better technique for such surgeries.

Key words: Endoscopic, microsurgery, pituitary tumors, gross tumor removal, visual field.

INTRODUCTION

Pituitary tumors are abnormal growths that develop in our pituitary gland. Some pituitary tumors cause excessive production of hormones that regulate important functions of our body. Other pituitary tumors can restrict normal functions of our pituitary gland, causing it to produce lower levels of hormones.^{1,2}

Estimates of the prevalence of pituitary adenomas are variable, and are often based upon autopsy or MRI series.³ According to other epidemiological studies,

the prevalence of pituitary adenomas is 16.5% and the majority of them are incidentalomas.⁴

Most pituitary adenomas exceed 10 mm in size and have an estimated prevalence of 16.7% (14.4% in autopsy studies and 22.5% in radiologic studies).⁵ Pituitary tumors are usually benign but are associated with substantial morbidity. Their etiology is largely unknown.⁵

The symptoms of pituitary disorders are often non-specific; disturbances of pituitary function, com-

pression symptoms, hypophysis apoplexy or accidental findings may help the diagnosis.⁴ In a series analyzing 40 cases of pituitary apoplexy, the presenting signs and symptoms included headache (63%), vomiting (50%), visual field defects (61%), ocular paresis (40%), mental deterioration (13%), hyponatremia (13%), and syncope (5%); in only four cases pituitary tumor was diagnosed prior to presentation.⁶

Treatment of pituitary tumor depends on the type and size of the tumor, whether the tumor is making hormones, whether the tumor is causing problems with vision or other symptoms, whether the tumor has spread into the brain around the pituitary gland or to other parts of the body and whether the tumor has just been diagnosed or has recurred.⁴

Surgical resection is usually successful in removing the bulk of the tumor, resulting in improvement in visual disturbance.⁷ Endoscopic microsurgery has remained the primary treatment for most patients with non-functioning pituitary microadenomas or functioning microadenomas.⁸

Endonasal endoscopy is a promising minimally invasive surgery for the treatment of pituitary adenomas; it is also a good alternative to traditional sublabial or endonasal microsurgery. With visual field improvement in 62% of patients.⁹ After endonasal endoscopic surgery according to Cappabianca et al. the gross tumor removal rate was 62%.¹⁰

On the other hand a recent Meta-analysis also reported, among patients who underwent endoscopic surgery and were followed for periods ranging from 3 months to 6 months the reported rate of visual field improvement 92% of patients and gross tumor removal rate was 89%.¹¹ In a local study there was improvement in visual field was noted in 74% of cases.¹²

The rationale of this study is to see the outcome of endoscopic assisted microsurgery for pituitary tumors in our population. We conduct this study so that we can generate local data not only for visual field improvement but also for gross tumor removal. Moreover also a huge variation of gross tumor removal (62% and 89%)^{13,14} and visual field improvement (62% and 92%) is available in literature internationally.^{10,13}

PATIENTS AND METHODS

This descriptive case series study conducted at Department of Neurosurgery, Lahore General Hospital Lahore over a period of six months from July 2012 to December 2012. Sixty five patients were included through Non probability purposive sampling techni-

que. All cases of pituitary tumor diagnosed on MRI/CT scan of either gender having age 18 – 80 years and patients with recurrent cases, sellar and with suprasellar extension (assessed on CT and MRI findings). All laboratory tests were done in hospital laboratory and reported by hospital pathologist. Pre- and post-operative visual field status (at least 3 months after surgery) was analyzed. Surgery was performed by a single team of surgeons. Surgical procedure involves introduction of 4-mm to 2.7mm endoscope to visualize the sphenoid recess. The bilateral sphenoid Ostia are entered. The posterior nasal septum is incised and resected.

All the data was entered and analyzed by using SPSS 20. Mean and standard deviation was calculated for quantitative variable like age. Frequency and percentages were calculated for qualitative variables like gender, gross removal rate and visual field improvement.

RESULTS

The mean age of the patients was 50.46±17.80 years with minimum and maximum ages of 19 and 79 years respectively. In this study 64.62% patients were males whereas 35.38% patients were females. Gross removal of tumor was observed in 56 (86.2%) patients and it subtotal removal was not observed in 9 (13.8%) patients. The visual field improvement was found in 92.31% patients and it was not found in 7.69% patients. There were 56 patients in which gross removal of tumor was observed of that 34 were males and 22 were females, similarly in 9 patients with subtotal removal of tumor there were 8 males and only 1 female. Statistically insignificant difference was found between the gross removal rate and sex of the patients i.e. p-value = 0.14. The study showed that visual field improvement was found in 60 patients in whom 38 patients were males and 22 were females, similarly visual field improvement was not found in 5 patients in which 4 were males and only 1 was female. Statis-

Table 1: Distribution of patients by gross tumor removal according to sex (n = 65).

Gross Tumor Removal	Male	Female	Total
Yes	34	22	56
No	8	1	9
Total	42	23	65

tically there is insignificant difference was found between the visual improvement and sex of the patients i.e. p-value = 0.45.

Table 2: *Distribution of patients by visual field improvement according to sex (n = 65).*

Gross Field Improvement	Male	Female	Total
Yes	38	22	60
No	4	1	5
Total	42	23	65

DISCUSSION

Endoscopic endonasal trans-sphenoidal surgery is indicated in sellar and suprasellar tumors.¹⁵⁻¹⁷ Staged or combined endoscopic trans-sphenoidal-transventricular approach for resection of a giant pituitary adenoma with ventricular extension can achieve a gross total removal.¹⁸⁻²⁰

Endoscopic endonasal transposition of the pituitary gland and its stalk can provide a valuable corridor to the retroinfundibular tumor.²¹ Endoscopic surgery is a better technique in removal of a suprasellar tumor than the microscopic approach due to the better visualization.²²

A recent population study from Belgium found a prevalence of clinically relevant pituitary adenomas of 94 per 100,000. Of this group, 66% were prolactinomas, 14.7% were not endocrine – active, 13.2% had acromegaly, 5.9% had Cushing's disease, and 20.6% had hypopituitarism.²³

In our study gross removal of tumor was observed in 86.2% and visual field improvement was found in 7.69% patients. Different authors showed the following results related to our study results. In a recent paper Schramm and coworkers published the results of visual outcome in patients with pituitary adenomas and preoperative chiasma syndrome, according to them the syndrome completely regressed in 42.9%, improved in 38.3%, remained unchanged in 11.2% and worsened in 7.4% of the patients postoperatively.²⁴

Sanai and colleagues reported results using the direct, endonasal approach (using the operating microscope) in 64 patients with challenging pituitary tumors. These included large macroadenomas (> 3cm diameter), tumors with cavernous sinus invasion, and craniopharyngiomas, they reported complete removal in

49% and near gross total removal in 9%. Of those patients who presented with visual deficits, 81% showed improvement post-operatively.²⁵

Zhang and colleagues reported results using the purely endoscopic, endonasal approach in 78 patients with invasive pituitary adenomas (including 11 microadenomas). They achieved complete removal in 79.5% of patients and improvement in visual symptoms in 96.4% of cases.²⁶

Dehdashti and colleagues reported their outcomes in 200 consecutive patients with removal of pituitary adenomas using the purely endoscopic, endonasal technique. They reported gross total resection in 91% of cases overall. This improved to 96 – 98% if tumors that invaded the cavernous sinus were excluded. Visual improvement occurred in 89% of patients.²⁷

As discussed in literature, after end nasal endoscopic surgery According to Cappabianca et al. the gross tumor removal rate was 62%.¹⁰

On the other hand a recent Meta-analysis also reported, among patients who underwent endoscopic surgery and were followed for periods ranging from 3 months to 6 months the reported rate of visual field improvement 92% of patients and gross tumor removal rate was 89%.¹¹ In a local study there was improvement in visual field was noted in 74% of cases.¹²

Ammirati et al, recently reported a meta-analysis concluding that endoscopic removal of pituitary adenoma, in the short term, does not seem to confer any advantages over the microscopic technique and the incidence of vascular complications was higher with endoscopic than with microscopic removal of pituitary adenomas.²⁸

Rotenberg et al, concluded that the two approaches had similar outcomes (GTR, hormonal abnormality resolution) but that the endoscopic approach was associated with fewer complications as well as a shorter hospital stay and length of operation.²⁹

Mirian Cabral Moreira de Castro and co reported that the endoscopic transsphenoidal approach to sellar tumors proved to be safe when the majority of the tumors were non-secreting. The most frequent complication was CSF leakage.³⁰

Recent studies have shown endoscopic techniques to be associated with similar or reduced rates of complications compared with microsurgical techniques.^{14,31,32}

CONCLUSION

In this study, gross removal of tumor as well as visual

field improvement was found in maximum number of patients and it is concluded that endoscopic assisted microsurgery for pituitary tumors is a better technique for such surgeries.

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