Evaluation of Subfrontal, Pterional and Endoscopic Endonasal Approaches for Surgical Management of Suprasellar Pituitary Adenoma with Parasellar Extension

HELMY A. EL-DESSOUKY, M.D.; SHERIF G. AL-MEKAWI, M.D.; ALAA A. ABD EL-AZIZ, Ph.D.; OMAR M. EL-FALAKY, Ph.D.; MOHAMED ALAA EL-DIN MOHAMED, M.D. and MOHAMED ABD EL-HADY MOHAMED, M.Sc.

The Department of Neurosurgery, Faculty of Medicine, Cairo University

Abstract

Background: Several critical structure traverse suprasellar and parasellar regions including the circle of Willis, optic nerves and optic chiasm, hypothalamus, pituitary infundibulum, and the infundibular and suprachiasmatic recesses of the third ventricle. There are several pathological lesions in this area, pituitary adenomas and suprasellar meningiomas constitute the most common lesions.

Patients and Methods: Eighteen patients with suprasellar pituitary adenomas with parasellar extension were operated via subfrontal, pterional and endoscopic endonasal approaches, all had immediate post operative CT scan and followed-up clinically and radiologically for 6 months.

Results: Regarding presenting symptoms, intraoperative assessment of each approach, tumor excision radicality, post operative status, ICU and hospital stay.

Conclusion: Visual symptoms were found to be the most common affecting symptoms in all of these study patients followed by headache. The most common post operative complication was lid edema followed by CSF leak.

Radical excision performed in 8 patients via pterional approach, in 6 patients via subfrontal approach and in 3 patients via endoscopic endonasal approach.

Key Words: Adenoma – Subfrontal – Pterional.

Introduction

THE sella is located in the center of the cranial base. Access to the sella is limited from above by the optic nerve, optic chiasm and circle of Willis, laterally by the cavernous sinuses and internal carotid arteries and from behind by the brain stem and basilar artery [12].

Pituitary gland is a pea sized endocrine gland lies in the pituitary fossa which is important part of the sellar region at the base of the brain. It is composed of the adenohypophysis and neurohypophysis. The pars distalis, pars intermedia and pars tuberalis form the adenohypophysis. The neurohypophysis is made up of the pars nervosa, infundibular stalk and the infundibula proper. It helps control the release of hormones from other endocrine glands, such as the thyroid and adrenal glands. The pituitary also releases hormones that directly affect body tissues, such as bones [9].

Pituitary adenomas are benign epithelial tumors that arise from adenohypophysial cells and constitute the most common lesions in the hypothalamic/pituitary region, representing 10-20% of all intracranial tumors [11].

Patients and Methods

This is a study of eighteen patients operated upon in Cairo University Hospitals, which involves Kasr El-Aini Hospital, Abo El-Reish Hospital, and the New Teaching (French) Hospital between the periods of 4/2011 till 12/2012 with suprasellar pituitary adenoma with parasellar extension. These patients were operated by subfrontal approach, pterional approach and endoscopic endonasal approach. Patients were operated upon in Cairo University, which involves Kasr El-Aini Hospital, Abo El-Reish Hospital, and the New Teaching (French) Hospital. The aim of this work was to study the indications, clinical and radiological results of the different approaches in the treatment of suprasellar pituitary adenoma with parasellar extension, and comparing these results with those obtained by previous studies. The results will hopefully be
guidance to the advantages, disadvantages and limitations of each approach.

Results

In our study we operated eighteen patients with suprasellar pituitary adenoma and parasellar extension, the youngest patient operated upon was seventeen years of age while the oldest was fifty eight years, parasellar extension ranging from one cm to three cm, three cm in four patients, two cm in eight patients and one cm in six patients (Table 1), diminution of vision the most common presenting symptoms found in all patients. The extent of removal was total removal in six patient using subfrontal approach, in eight patients using pterional approach and subtotal removal in one patient using endoscopic endonasal approach (Table 2).

Table (1): Correlation between parasellar extension and pathology.

<table>
<thead>
<tr>
<th>Parasellar extension</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 cm</td>
<td>6</td>
</tr>
<tr>
<td>2 cm</td>
<td>8</td>
</tr>
<tr>
<td>3 cm</td>
<td>4</td>
</tr>
<tr>
<td>4 cm</td>
<td>0</td>
</tr>
</tbody>
</table>

Table (2): Correlation between radicality and approach in pituitary adenoma.

<table>
<thead>
<tr>
<th>Approach</th>
<th>Total</th>
<th>Subtotal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subfrontal</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Pterional</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Trans</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>
Discussion

The average age differs between litterateurs and our study, in our study the median age was 41.6 years with the oldest patient age was 58 years and youngest was 17 years. Kitthisak Kitthaweesin et al., in their study accounted 37.74 years as an average. Median age was 38 years in Nipat et al., study [8].

Visual symptoms were found to be the most common affecting symptoms in all of these study patients followed by headache in 16 patients (80%). Which were nearly similar in Junko et al., study 71.7% of the patient presented with visual symptoms and 12.8% of the patients had headache [7]. Also Bing Zhao et al., operated on 126 patients of pituitary adenoma 104 patients with a visual dysfunction [1].

We operated on 8 patients by pterional approach in this study and subfrontal approach in 6 patients. Landeiro et al., operated on 19 patients with suprasellar mass with a parasellar extension via subfrontal and extended subfrontal approaches [10].

In this series 16 patients had an excellent outcome, one patient had a good outcome, and one patient had a poor outcome.

Nearly the same in Landeiro et al., series. 19 patients had a sellar suprasellar lesion with parasellar extension which operated by subfrontal and extended subfrontal approach 14 patients had an excellent outcome, four patients had a good outcome, one patient had a poor outcome, and no mortality [10].

In Dehdashti et al., series 12 patients had a sellar suprasellar lesion with parasellar extension which operated by extended endoscopic endonasal approach seven (58.3%) patients had an excellent outcome, four (33.3%) patients had a good outcome, one (8.3%) patient had a poor outcome, and no mortality [4]. In González-Darder et al., series 31 patients were operated via extended pterional approach, 21 (67.7%) patients had an excellent outcome, ten (32.2%) patients with good and poor outcome (author didn’t specify) and no mortality in this study [6].

We operated on 18 cases of pituitary adenoma with parasellar extension which was one cm in six (33.3%) patients who had totally removed lesions, two cm in eight (44.4%) patients totally removed, and three cm parasellar extension in four (22.2%) patients three (16.6%) of them totally excised lesion and one (5.6%) patient had subtotal excision operated by endoscopic endonasal approach due to lack of proper instrumentation during surgery and fear of vascular injury.

Bing Zhao et al., operated on 126 patient with pituitary adenoma ranged in diameter between 1.54cm and 6.5cm via extended endoscopic endonasal approach. Gross-total resection was achieved in 78 (61.9%) patients, subtotal resection in 48 (38.1%) patients [11].

Conclusion:

Visual symptoms were found to be the most common affecting symptoms in all of these study
patients followed by headache. The most common post operative complication was lid edema followed by CSF leak.

Radical excision can be performed via endoscopic endonasal approach using the proper instruments.

Pterional approach advantages include minimal retraction and better exposure to the lesion for radical excision.

References


8- KITTHISAK KITTHAWEESIN and CHATCHAI PLOYPRASITH: Ocular Manifestations of Suprasellar Tumors, 2008.


