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## Transsphenoidal Extracapsular Resection of Pituitary Adenoma

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### ABSTRACT

**Aim of the work:** The current work aimed was for the evaluation of extra-capsular resection of hypophysis adenoma for complete total resection and preservation of hypophysis function.

**Patients and Methods:** This was descriptive prospective study that assessed and evaluated patients who has been diagnosed as hypophysis adenoma and undergoing trans-sphenoidal surgery as for preoperative, intraoperative and postoperative evaluation away from exclusion criteria. The study was carried out at Neurosurgery Dep. of Al-Azhar University Hospital "Al-Hussein" and "Bab El-Shaeria. It was carried out on 30 patients.

**Result:** operative time ranged 90 – 210 minutes, meanwhile hospital stay ranged 3 – 7 days. 83.3% of them had Soft suckable tumour. 40% of them had Partial resection. 16.7% of them had distinct pseudo capsular identification. 6.66 % of them have En bloc capsulectomy and 13.3% had fragmented capsulectomy.

**Conclusion:** The trans-sphenoidal pseudo capsule-built extra-capsular resection method delivers more effective and safer treatment than the traditional intra-capsular method, with a elevated tumour removals and remission rates, and lesser recurrence rates, being difficult to achieve except certain circumstance like a small tumour and longer operative time to clearly dissect the tumour from the gland.

**Keywords:** Extra-capsular Resection; Hypophysis Adenoma; Hypophysis Function; Trans-sphenoidal.

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### INTRODUCTION

For several decades, the trans-sphenoidal method has considered to be the first-line way for treating sellar lesions involving hypophysis adenomas excluding prolactinomas responding to dopamine agonist. <sup>1, 2</sup> Because of the existence of the pseudo-capsule surrounding hypophysis adenomas, trans-sphenoidal resection operation for hypophysis adenomas was sorted into intra-capsular and extra-capsular methods built on the location of dissection regarding the pseudo-capsule. <sup>3, 4</sup> In the pseudo-capsule-built extra-capsular resection method, as well termed intensive resection of the micro-surgical pseudo-capsule <sup>3, 4</sup> or the technique of utilizing the pseudo-capsule as an operative capsule. <sup>5</sup> resection is performed beside the interface amid the exterior surface of the pseudo-capsule and the ordinary hypophysis body, with repetitive interior de-compression of the hypophysis adenoma. Eventually the adenoma and the pseudo-capsule are entirely resected by preserving hypophysis functions as possible.

There are numerous benefits to by means of the extra-capsular method compared to an intra-capsular

one. First, the extra-capsular method aids to recognize consistently small tumours with positive or negative MRI results, and differentiate them from the frontal hypophysis gland so as to reduce the risk of mistaken elimination of part of ordinary gland and avoiding inappropriate more explorations. It as well permits comprehensive tumour elimination and prevents hormonal deficiency, as the pseudo-capsule holds a slightly dissimilar color and constancy in comparison with other portions of adeno-hypophysis underneath an operative microscope <sup>5, 6</sup> Second, this method offers an extra layer of compressed ordinary adenohypophysis tissues as a protecting coating to avoid entry into the sub-arachnoid cavity and post-operative cerebrospinal fluids leak. <sup>6</sup> Ultimately, this method can assist to detect any breach of the hypophysis capsule at the accurate location of entry into the dura mater or the back lobe by invasive tumours to straight following treatment. <sup>5, 7</sup> Most significantly, it can possibly increase the post-operative remissions rates and decrease complications. <sup>3,4,5,8</sup> But, some drawbacks of the additional capsular method comprise the next: This method theoretically rises the possible for post-operative CSF leak and hypo-pituitarism. Post-

operative CSF leak rates with the conservative intra-capsular method are in general 1.5– 12.7%.<sup>9, 10</sup> but rates can be more for the extra-capsular method. Regarding the post-operative hypo-pituitarism, the method of extra-capsular adenoma elimination can cause elimination of a small percentage of ordinary hypophysis tissues, since the pseudo-capsule is a layer of compressed ordinary frontal lobe, easily causing hypo-pituitarism.

This study aimed for the evaluation of extra-capsular resection of hypophysis adenoma for complete total resection and preservation of hypophysis function.

## PATIENTS AND METHODS

This was descriptive prospective study that assessed and evaluated patients who has been diagnosed as hypophysis adenoma and undergoing trans-sphenoidal surgery as for preoperative, intraoperative and postoperative evaluation away from exclusion criteria. The study was carried out at Neuro-surgery Dep. of Al-Azhar University Hospital "Al-Hussein" and "Bab El-Shaeria. It was carried out on 30 patients. Our Inclusion criteria were Patients underwent trans-sphenoidal surgery for hypophysis adenomas or Patient with first time surgery and Patients with no contraindications for the surgery. Their **Exclusion criteria** were Patients with side extensions (invasion) to the cavernous Sinus because of complications in accomplishing full resection or Patients with recurred tumour (prior Hypophysis surgery) and Patients with history of radiotherapy.

## RESULTS

Patients (n=30)		
	N	%
Total resection	6	20
Subtotal resection	12	40
Partial resection	12	40

**Table 1:** Extent of resection of the studied patients

Patients (n=30)		
	N	%
No	4	13.3
Distinct	5	16.7
Incompletely developed	9	30
Infiltrated	12	40

**Table 2:** Pseudo-capsule identification of the studied patients

Patients (n=30)		
	N	%
En bloc capsulectomy	2	6.66
Fragmented capsulectomy	4	13.3

**Table 3:** Extra-capsular resection of the studied patients

	Improved	Not Improved
Visual defects (n=18)	16 (88.9%)	2 (11.1%)
Headache (n=20)	16 (80%)	4 (20%)
Acromegalic features (n=4)	3 (75%)	1 (25%)
Amenorrhea / galactorrhea (n=3)	3 (100%)	0
Impotence (n=3)	2 (66.7%)	1 (33.3%)
Cushing's disease (n=5)	5 (100%)	0

**Table 4:** Follow up data of the studied patients according to improvement status).

## DISCUSSION

Trans-sphenoidal extra-capsular resection methods have been developed as a new modification in the 20<sup>th</sup> century. The method built on the existence of a histologic pseudo capsule around a hypophysis tumour.<sup>6</sup>

The extra-capsular approach has the benefits of anatomic orientation, elimination of a security boundary, decreased risk of opening the arachnoid coating with consequent CSF flow, recognition of breaches in the pseudo-capsule as mark of invasion and dependable identifications of micro-adenomas.<sup>12</sup>

In the preset study, The majority of the patients aged 21 - 60 years and regarding sex, 18 (60%) of patients were males and 12 (40%) were females.

However, Skulsampaapol & Hansasuta,<sup>11</sup> demonstrated that the ages mean of cases was 50.4 years old (13.9) with 50% males.

The current study showed that regarding tumour type, CNPT was the most prevalent type by 33% followed by GH (27%). The majority of the patients (33.3%) were grade II, 30% of the cases were grade III and 26.7% of the patients were grade I. As regard Tumour type - Hormonal activity, 26.7% of them were Nonfunctioning. As regard manifestations, 66.7% of them had headache and 60% of them had Visual field defects.

Our results were supported by study of Qu et al.,<sup>12</sup> as they reported that the primary manifestations are endocrine disturbance, progressive visual diseases and headache. Among them, 30 cases (21%) in the studied groups suffered menstruation variations. Lactorrhea happened in 26 females (18%). 95 cases (67%) suffered reduced visual acuity, and visual field imperfections happened in 86 (60.5%). Headache happened in 106 cases (74.69%), and 24 (16.91%) had pre-operative panhypopituitarism or a significant disorder in one or more axes.

In the study in our hands, operative time ranged 90 – 210 minutes, meanwhile hospital stay ranged 3 – 7 days. 83.3% of them had Soft suckable tumour. 40% of them had Partial resection. 16.7% of them had distinct pseudo capsular identification. 6.66 % of them have En bloc capsulectomy and 13.3% had fragmented capsulectomy.

The results of En bloc capsulectomy and fragmented capsulectomy (Extra-capsular resection ) were

relatively low because extra-capsular resection is time consuming and for better extra-capsular dissection it may cause hypophysis gland compression resulting in more postoperative complications.

Moreover, there are strict criteria for better extra-capsular resection such as it is performed for microadenomas with well-defined, fibrous and non suckable.

Also some non-functioning hypophysis adenomas are presenting very late with macroadenomas so become non applicable for extra-capsular resection.

Our results were in line with Li et al.,<sup>13</sup> they reported that soft texture was found in 98 (84.5%) adenomas, and the tough texture was present in 18 (15.5%) adenomas.

For the association between the pseudo capsule and tumour dimensions, Kawamata et al.,<sup>4</sup> revealed that micro-surgical pseudo-capsules in smaller tumours tended to display integrity and enclose the whole tumour, while most pseudo capsules in larger tumours may be irregular or disturbed so as not to encapsulate the whole tumour.

In the same way, Lee et al.,<sup>3</sup> as well revealed that non-completeness of the pseudo capsule has been exhibited by greater adenomas, as aggressive resections of the micro-surgical pseudo capsule was more commonly accomplished in bigger tumours than in the slighter ones.

On the other hand, Qu et al.,<sup>12</sup> confirmed that the extra-capsular resection technique didn't rise the risk of complications as compared to the intra-capsular one.

The current work revealed that the most prevalent complication was diabetes insipidus followed by Hyponatremia and the least prevalent complication was intrasellar hematoma and pneumocephalus. Amenorrhea / galactorrhea and Cushing's disease were completely improved while the rest were significantly improved.

The report by Li et al.,<sup>13</sup> reveals a remarkably elevated occurrence of post-op diabetes insipidus (DI) (73.0%), given that the regularly observed rates in the current study besides many others is to the tune of 18.0% for temporal and 2.0% for lasting DI.<sup>14</sup> This elevated rate of DI can be due to a more than normal handling of the stalk/neuro-hypophysis throughout extra-capsular resections.

### CONCLUSION

The trans-sphenoidal pseudo capsule-built extra-capsular resection method delivers a more effective and more-safe substitute than the traditionally intra-capsular one, with more tumour elimination and remission rates, and lesser recurrence rates, being difficult to achieve except certain circumstance like a small tumour and longer operative time to clearly dissect the tumour from the gland.

Conflict of interest : none

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