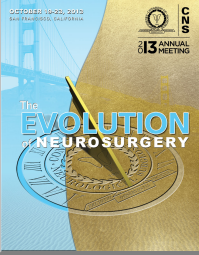


Impact of Selective Pituitary Gland Resection or Incision on Hormonal Function in Endonasal Tumor or Cyst Removal

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Introduction

The growth pattern of many pituitary adenomas and Rathke's Cleft Cysts (RCCs) often results in anterior distortion of the anterior pituitary gland thus obstructing direct surgical access from an endonasal transsphenoidal approach. In such cases we have found it useful to incise or partially resect a portion of the attenuated anterior pituitary gland in order to gain adequate access to the lesion while also minimizing traction on the remainder of the normal gland. In addition, gland incisions or partial resections are often necessary to remove small functional pituitary adenomas. Ultimately this technique can help ensure complete removal of a tumor that is otherwise difficult to visualize. While rates of new post-operative anterior or posterior pituitary failure range from as low as 0.4% in standard procedures to as high as 33% in cases requiring a hemihypophysectomy, it is our belief that the pituitary gland tolerates incisions or partial resections relatively well. Herein we investigate the frequency with which this technique has been performed in our practice while determining the associated risk of post-operative hypopituitarism.

Methods

All patients who underwent endoscopic-assisted or fully endoscopic transsphenoidal removal of a pituitary adenoma or RCC at our institution between July 2007 and January 2013 and had a pituitary gland incision or partial gland resection performed were identified. Each patient's routine pre- and post-operative hormonal testing (minimum 3 month post-surgical follow up) was then retrospectively evaluated in order to determine the overall impact on pituitary gland function. Patient's who underwent a total hypophysectomy were excluded

Results

Of 372 total operations over this period, an anterior pituitary gland incision or partial gland resection was performed in 93 cases (25%). In 64 of them a vertical or horizontal gland incision was made exclusively while the remaining 29 cases involved some degree of gland resection including 17 partial hemi-hypophysectomies and 12 resections of thinned/ attenuated anterior gland draped over a large macroadenoma. Diagnoses included 72 pituitary adenomas (18 endocrine-inactive, 32 Cushing's, 14 prolactinomas, 8 acromegaly) and 21 RCCs. Of 62 patients with complete endocrine follow-up data, new permanent hypopituitarism occurred in 4 patients (6.5%) with 4 other patients experiencing transient post-operative hyponatremia (Table 1). Overall gland improvement occurred in 13/22 patients (59%) with pre-operative hypopituitarism, including 9 with resolution of 1 axis or of stalk-effect hyperprolactinemia and 4 with resolution of 2 or more axes.

Conclusions

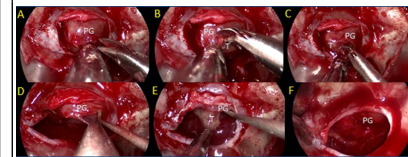
Incisions and partial resections of the pituitary gland appear to be generally well-tolerated and are rarely associated with new post-operative hypopituitarism. This technique which was performed in 25% of our cases, can therefore be utilized when necessary to gain better access to pituitary adenomas or RCCs. It minimizes traction on the normal pituitary gland during removal of large tumors or cysts and facilitates better visualization of microadenomas or small cystic lesions embedded within the anterior gland. Although a small subset (6.5%) of patients did develop new pituitary dysfunction, this deterioration may be more related to larger tumor or cyst size, infundibular lesion extension and/or multiple pre-operative hormonal axis deficiencies, and less so to the performance of a gland incision or partial resection.

Learning Objectives

By the conclusion of this session, participants should be able to:

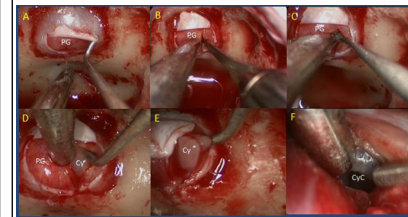
- 1) Describe the importance of performing a pituitary gland resection or incision during endonasal transsphenoidal removal of a pituitary adenoma or Rathke's Cleft Cyst and the associated low risk of post-operative gland dysfunction
- 2) Discuss in small groups the risk factors for post-operative hypopituitarism
- 3) Identify when a partial pituitary gland incision or resection is necessary during endonasal transsphenoidal surgery

Partial pituitary gland resection performed during tumor removal



Intraoperative photographs with 0- and 30-degree 4 mm endoscopes demonstrating: (A) Small attenuated portion of the anterior pituitary gland (PG) draped over a macroadenoma; (B) Partial resection of the attenuated anterior pituitary gland (PG) being performed revealing underlying soft tumor (T); (C), (D), (E) pseudocapsular dissection followed by complete tumor (T) removal with the remainder of the pituitary gland (PG) left intact; (F) final view of resection cavity

Pituitary gland incision facilitating cyst drainage

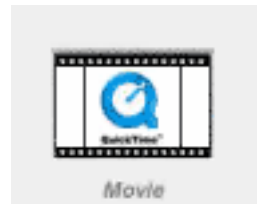


Intraoperative photographs with 0- and 30-degree 4 mm endoscopes demonstrating drainage of a suprasellar Rathke's cleft cyst requiring an incision into the normal anterior pituitary gland (PG): (A) anterior pituitary gland (PG) surface following dural opening; (B) vertical pituitary gland (PG) incision being performed using a straight feather blade; (C), (D) Dissection performed through the pituitary gland (PG) incision revealing characteristic Rathke's Cleft Cyst contents (Cyc); (E) Removal of cyst contents (Cyc); (F) Final view of cyst cavity (Cyc) with diaphragma sellae left intact

Table 1

Patient	Age	Pathology	Maximum Tumor Diameter (cm)	Gland Resection	Pre-Op Hormonal Deficit	New Post-Op Hormonal Deficit
1	59	Endocrine inactive pituitary adenoma	3.5	Yes (Small attenuated gland)	Hyperprolactinemia (stalk effect)	Diabetes insipidus, GH deficiency
2	47	Endocrine inactive pituitary adenoma	3.2	No	Hyperprolactinemia (stalk effect)	Diabetes insipidus
3	37	Rathke's Cleft Cyst	2.7	No	Hyperprolactinemia (stalk effect), hypothyroidism, hypocortisolism, hypogonadism	Diabetes insipidus
4	30	Rathke's Cleft Cyst w/ extension along infundibulum	1.2	No	None	Diabetes insipidus

Table 1 - Patients who developed permanent post-operative hypopituitarism following a pituitary gland incision or partial gland resection performed during an endonasal endoscopic tumor or cyst removal



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