Reporte de Caso

Endoscopic Endonasal Transsphenoid Approach for Resection of Suprasellar Hemorrhagic Mass after Gamma Knife Radiosurgery: Case Report

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ABSTRACT:

Pituitary adenomas are common benign tumors that are rarely malignant and may or may not produce hormones. Current treatment options include medical therapy (if hormone producing), microscopic or endoscopic surgical resection, gamma knife radiosurgery, radiation therapy, and observation. We describe the recurrence of a non-functioning pituitary adenoma after Gamma Knife Radiotherapy treatment, which followed an Endoscopic Endonasal approach for resection. The endonasal approach is a minimally invasive surgical treatment for pituitary adenoma that can be both safe and effective, and could be considered the first-choice therapy as it gives a chance for complete resection.

Keyword: Pituitary adenomas, radiosurgery, endoscopic endonasal

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INTRODUCTION

Pituitary adenomas are common benign tumors that are rarely malignant and may or may not produce hormones. Those that do not generate hormones are considered non-functioning. Here we describe the recurrence of a non-functioning pituitary adenoma after Gamma Knife Radiotherapy treatment, which followed an Endoscopic Endonasal Transsphenoidal approach for resection. Furthermore, follows a review of the specified literature.

Case presentation: An 82-year-old male presented at an outside facility with an unrelated syncopal episode. Incidental discovery at the time of the workup revealed a 1.6 cm x 2.2 cm sellar mass, which expanded the sella and eroded the dorsum with extension into the suprasellar cistern and equivocal displacement of the optic chiasm. The cavernous sinuses and orbits were unremarkable. Further assessment concluded that it was a non-secreting pituitary adenoma.

All treatment options were then carefully reviewed and considered with both the patient and his family. A full review of the risks, benefits, and alternatives were discussed for options of observation, gamma knife radiosurgery, and endoscopic transsphenoidal resection of the macroadenoma. The family in consideration with the patient’s age subsequently chose radiotherapy. The patient underwent gamma knife radiosurgery with stereotactic localization. A 14Gy was delivered to the 50% isodose line with a region measuring 2.6cc giving complete coverage but maintaining dose to the brain stem to less than 6Gy; less than 4Gy to the optic nerve and optic chiasm; and less than 50 cGy to the bilateral lens.

Three months later the patient presented acutely with complaints of headache, nausea/vomiting, altered mental status, and diplopia. Physical examination revealed bitemporal hemianopia and CNIII palsy. Laboratory and imaging workup revealed panhypopituitarism. MRI studies discovered a 1.7cm x 1.9 cm contrast enhancing suprasellar hemorrhagic mass impinging on...
the optic chiasm with extension into the cavernous sinuses R>L.

Figure 2a: Pre-Operative T1 Weighted MRI (Sagittal View); Figure 2b: Pre-Operative T2 Weighted MRI (Coronal View); showing a suprasellar mass with heterogeneous density compatible with a hemorrhagic pituitary adenoma.

Treatment options were discussed and the patient chose to undergo surgery for resection of the macroadenoma. The patient successively underwent Endoscopic Endonasal Transphenoid Resection of the Pituitary Adenoma.

Figure 3: Intraoperative Photograph demonstrating the pituitary adenoma in the Sella Turcica prior to resection.

Post-operatively, the patient had no major complications or focal motor or sensory neurological deficits. Patient noticed immediate improvement in his peripheral vision with marked resolution of CN III palsy several days post-op. Patient had no complications, clear rhinorrhea, or infection. Patient was placed on hormone replacement therapy (with Hydrocortisone, Synthroid, Vasopressin) secondary to panhypopituitarism from pituitary apoplexy.

Final pathology showed markedly necrotic neoplasm suggestive of necrotic pituitary adenoma.

Figure 4: Pathological Section of the Pituitary Adenoma showing extensively necrotic neoplasm with few areas of viable tumor characterized by clusters of monomorphic cells consistent with pituitary adenoma.
Discussion: With pituitary adenomas composing a wide variation of subtypes many factors go into the consideration when determining a treatment plan. Multifactorial elements include tumor size, location, hormone production, neoadjuvant, radiation, or surgical treatment history, patient’s health, applicable comorbidities, and inevitably the patient’s preferences. Treatment options that are widely available include medical therapy (if hormone producing), microscopic or endoscopic surgical resection, gamma knife radiosurgery, radiation therapy, or observation depending on the tumor and clinical status of the patient [1]. Here we focus on Gamma Knife Radiotherapy and Endoscopic Endonasal techniques.

Radiotherapy has its benefits in that it is a reliable way of gaining local control for radiographically progressing pituitary adenomas [2]. Gamma Knife also has better long-term effects as compared with external beam radiation therapy. This is due to the fact that it allows radiation to be largely confined to the target with minimal radiation reaches the surrounding brain [2]. However, the minimum distance required between the irradiated target and the optic pathway should be 2 mm for secreting adenomas. In cases of non-secreting adenomas this distance is even lower [3]. This is an important consideration to make as a contributing factor in the recurrence of pituitary macroadenoma seen in this case.

The most common reported complication after radiosurgery is delayed hypopituitarism followed by cranial neuropathies [1]. Direct complications include radiation necrosis, which is a radiation-induced damage to the tissues. In addition, complications specific to certain diseases and their locations do occur. For the treatment of pituitary adenomas, specific radiotherapy complications include pituitary failure. The most common precipitating factors for pituitary apoplexy include pituitary stimulation, surgery (e.g. coronary artery surgery), and coagulopathy [4]. A risk of inducing neoplasia from irradiation of normal tissue or tumor also exists [5]. This could be another potential causative factor in the recurrence of pituitary macroadenoma.

The endoscopic endonasal technique brings advantages to not only to the surgeon but to the patient as well. Patient’s treated with the endoscopic endonasal approach have been reported to have less nasal traumatism, no nasal packing, less post-op pain, quick recovery, and shorter hospital stay [6,7]. This is minimally invasive in comparison to the other available surgical approaches of pituitary macroadenoma, which include neuroendoscopy and craniotomy. Benefits of endoscopic endonasal technique to the surgeon include an enhanced visualization of the surgical field of the relevant anatomy, enlarged working angle with a panoramic view, and smoothing of interdisciplinary cooperation. From the peer-reviewed literature over the last 15 years, the endoscopic endonasal technique has provided an increase in the opportunities, knowledge, and medical activity from these surgeries [6,7,8]. Lastly, advantages can also be seen at the level of the facility with shorter post-op hospital stay allowing for an increase in the number of cases [7].

A retrospective study performed on 32
patients with pituitary adenomas examined efficacy, safety, and outcomes of the endoscopic endonasal transsphenoidal approach [9]. Total-subtotal tumor resection was achieved in 75% of the microadenomas (<10mm) and 45% and macroadenomas (>10mm). Complications to the Transsphenoidal approach do exist, which include CSF leak, requiring sellar repair. Other complications include residual mass, blindness, bleeding, infection, and the possibility of developing panhypopituitarism. Post-op complications in the above study included CSF leak (3 patients) and transient diabetes insipidus (2 patients) [9]. The endoscopic endonasal approach has been reported to have similar outcomes as compared to major microsurgical series in regards to removal of the mass, relief of clinical symptoms, cure of the underlying disease, and complication rate. However, patient compliance is by far better in endoscopic endonasal cases [8]. Overall, endoscopic transsphenoidal surgery is an effective and safe treatment for most patients with pituitary adenoma and could be considered the first-choice therapy in these patients [9].

**Conclusion:** Gamma knife Radiotherapy can be a suitable primary approach for patients with pituitary macroadenoma. It is a safe and effective treatment option especially for patients with advanced age or comorbidity. However, a certain probability exists for treatment failure, as seen with gamma knife technique in this case report. Attention should be paid to the late adverse radiation effects such as hypopituitarism, optic neuropathy, and radiation-induced neoplasms, which cannot be excluded [10]. Considering all surgical methods available for the resection of pituitary macroadenoma, the endoscopic endonasal approach is minimally invasive compared to the neuroendoscopic and craniotomy approaches. Overall, treatment of macroadenomas is complex because they are more likely to have greater involvement such as suprasellar involvement and cavernous sinus extensions [9]. All treatments should not be considered without their risk. However, with advances in both technology and surgical technique using the endonasal approach for pituitary adenoma can be both safe and effective, while also giving the patient the chance of complete resolution of the macroadenoma.

**REFERENCES**


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