Endoscopic Transsphenoidal Removal of Pituitary Tumors and Skull Base Lesions

**Case Illustration:**
This 63-year-old male presented with worsening visual function and bitemporal hemianopsia. MRI demonstrated a large invasive pituitary macroadenoma with significant suprasellar extension compressing the optic chiasm with invasion into the sphenoid sinus and bony clivus (Figs. A and B). The patient also had giant incidental arachnoid cyst in the left hemisphere which was asymptomatic. Endocrinological laboratory workup was consistent with a nonfunctioning pituitary adenoma. The patient underwent a purely endoscopic endonasal transsphenoidal removal of his pituitary tumor using stereotactic image-guided neuro-navigation. Complete tumor removal was achieved with preservation of the pituitary gland and decompression of the optic nerves and chiasm (Figs. C and D). There was no intra-operative cerebrospinal fluid leak, and the sellar skull base defect was repaired with a fat graft and a nasoseptal flap. Postoperatively, the patient’s vision improved immediately in the recovery room and he was discharged in 3 days without requiring any hormone replacements.

**Discussion:**
It has been nearly 100 years since the inception of removing pituitary tumors through the nose using the transsphenoidal approach. The surgical technique has undergone an evolution over the last century with the advent of microsurgery, image-guidance and intraoperative MRI. The incorporation of the endoscope to transnasal surgery has added further minimally invasive options for the resection of a variety of skull base lesions, including pituitary tumors. The endoscope provides excellent illumination and wide panoramic visualization from the anterior skull base to the craniocervical junction. This approach, often referred as the endoscopic endonasal approach, is performed through both nostrils without any incisions in the face or under the lips, and without any retractors in the nose. The major advantages of this approach include the avoidance of a craniotomy and brain retraction, resulting in faster recovery and shorter hospital stays.

A purely endoscopic approach for pituitary adenomas has allowed us to achieve excellent tumor removal rates and favorable remission rates in functioning pituitary tumors (including acromegaly, Cushing’s disease, and prolactinoma) with very low complication rates. The endoscopic endonasal approach also provides a promising minimally invasive alternative to traditional trancranial approaches for skull base lesions including meningiomas, craniopharyngiomas, clivus chordomas, sinonasal malignancies and craniocervical junction lesions.

James K. Liu, MD

Dr. James Liu is Director of the Skull Base and Pituitary Center and has authored more than 80 papers and book chapters on pituitary tumors and skull base surgery. He collaborates with Dr. Jean Anderson Eloy (ENT surgeon), Director of Rhinology and Endoscopic Sinus Surgery. Together they perform the Endoscopic Endonasal Approach using a combined team approach to achieve the best results.

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**Endovascular Treatment of Complex Intracranial Aneurysms**

Intracranial aneurysms have a yearly risk of rupture and previously ruptured aneurysms have a very high risk of re-rupture without treatment. Over the past decade the treatment of intracranial aneurysms has been rapidly evolving from surgical clipping to less invasive endovascular options. During endovascular embolization a microcatheter is placed within an aneurysm through a transarterial approach and novel embolic materials are then delivered. The embolic materials most commonly employed are platinum coils that are highly thrombogenic and promote occlusion and eventual fibrosis of the aneurysm.

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Initially, only aneurysms with a favorable neck-to-dome ratio less than 2 (ie, aneurysms where the neck of the aneurysm could support the coils without allowing them to herniate into the parent vessel) could be safely treated. However, more recent developments in intracranial stenting have greatly expanded the types of aneurysms that can be treated. The two stents currently approved by the FDA are the Neuroform (Boston Scientific) and Enterprise (Codman). These self-expanding stents are made of a novel material called nitinol that, once cut and shaped, will always retain its intended form, even after being loaded into a microcatheter. The stent is placed across the neck of a wide aneurysm and provides essential scaffolding that holds the coils within the aneurysm. These stents have also been shown to provide some degree of flow-diversion that is thought to aid in the thrombosis of treated aneurysms.

Intracranial stents are classified by the FDA as HDE (Humanitarian Device Exemption) meaning that only a limited number can be placed yearly and only a select few institutions are approved to use them. UMDNJ-New Jersey Medical School and the Department of Neurological Surgery is one of the few regional centers where approval for this novel therapy has been granted.

By: Chirag D. Gandhi, MD and Charles J. Prestigiacomo, MD

Drs. Gandhi and Prestigiacomo specialize in Cerebrovascular and Endovascular Neurosurgery. They provide comprehensive care to a wide variety of Neurologic conditions and support the Stroke Centers at University Hospital and Jersey City Medical Center.

Meet Dr Robert F. Heary

Dr. Robert Heary is one of the leading spine surgeons in the United States and regularly voted one of the Best Doctors in America. He sits on the editorial boards of major medical publications and has authored over 70 peer-reviewed articles, 100 abstracts, and 35 book chapters.

Born in New Jersey, Dr. Heary attended University of Pittsburgh School of Medicine and completed his residency in Neurological Surgery at UMDNJ-New Jersey Medical School. He then spent a year at Thomas Jefferson University’s renowned Spine Fellowship before returning to Newark. He has been active in numerous professional societies and scientific journal boards.

Currently Dr Heary serves as the Director of the Spine Center at the University Hospital in Newark, NJ. In addition to his expertise in Neurological Spine Surgery, Dr. Heary has an additional focus in the treatment of Peripheral Nerves.

As of late, Dr. Heary has focused some of his time on the Tim Reynolds Family Spinal Cord Injury Center. As the Scientific Co-Director, Dr. Heary is leading a research team in looking into the mechanics of how spinal cords are injured and how they heal. He is working to improve outcomes following spinal cord injury.

Dr. Heary can be reached for consultations and questions at 973-972-2334.

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