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New Study Shows Giant Brain Tumors Can Be Safely and Effectively Removed Through Nasal Route

SANTA MONICA, Calif.- It's even worse than being told you have a brain tumor: having a tumor so large, it's in a category all its own. Giant pituitary adenoma is a so-called "benign" tumor that can cause visual loss and impair many of the body's most basic functions. But fortunately, even the largest of these giant tumors—which can grow to the size of an egg and invade nearby structures--can be treated effectively using a multimodality approach starting with minimally invasive surgery through the nose, according to a new study at the **John Wayne Cancer Institute** at Saint John's Health Center.

Pituitary adenomas are noncancerous tumors of the pituitary, the master gland that rules the endocrine system. Located in the skull base below the brain and behind the nasal cavity, the pituitary secretes powerful hormones that coordinate other glands, controlling such basic functions as growth and development, metabolism, the stress response, sexual function and water balance. Pituitary adenomas arise in about 1 in 1,000 individuals; about 10% are giant adenomas, 4 cm in diameter or larger.

As adenomas enlarge, they can cause pituitary gland failure by cutting off the flow of hormones. Headaches, visual loss and other symptoms may develop slowly over months or years, but can also happen rapidly over just a few hours if there is bleeding into the tumor, called "pituitary apoplexy." Giant adenomas often grow around the pituitary gland and skull base into areas where critical blood vessels and nerves travel, making complete surgical removal impossible.

Endonasal surgery allows doctors to remove many kinds of brain tumors through a nostril. Reaching the tumor through a natural opening eliminates the need for traditional open-skull surgery (craniotomy) and in experienced hands, creates less trauma, fewer complications and a shorter recovery time. "Patients prefer the idea of a minimally invasive procedure through a natural opening," said Daniel F. Kelly, MD, Director of Saint John's Brain Tumor Center, faculty member

at the **John Wayne Cancer Institute** at Saint John's, and senior author of the study.

The procedure is performed using an operating microscope and an endoscope (a surgical telescope) for highly magnified, high-definition panoramic views of the surgical site. Specialized instruments are passed through the nasal cavity into the skull base to remove the tumor. Like GPS for the brain, a computerized guidance system for surgical navigation completes the high-tech arsenal of modern endonasal skull base surgery.

The new study reviewed 10 years worth of cases involving 51 giant adenoma patients operated on by Dr. Kelly. Their symptoms included progressive visual loss, hormonal problems, tumor bleeding and/or headaches. Using a multimodality approach combining surgery with focused radiation therapy and/or medical therapy, tumors were effectively controlled in 96 percent of patients. Approximately 60 percent required only endonasal surgery, while about 40 percent received surgery plus one or more additional treatments to control residual tumor.

82 percent of 38 patients who had pre-operative visual loss regained some or all of their vision; no patients experienced new visual loss. Also, prior to surgery, 80 percent of the study group had suffered hormonal loss such as low sex hormones (hypogonadism), low thyroid (hypothyroidism) or growth hormone deficiency. Of these patients, nearly half had improved hormonal function after surgery, while only 15 percent showed a deterioration in hormonal function. Ultimately, 75 percent of the 51 patients still required hormone replacement therapy to compensate for the loss of normal pituitary function due to damage caused by the tumor.

"This study shows that endonasal surgery has evolved into a safe and effective treatment of these large and difficult tumors," Dr. Kelly said. "The vast majority of such tumors can now be removed or effectively debulked through this minimally invasive approach.

"This is particularly welcome because our patients are typically in the prime of life," Dr. Kelly continued. "To be struck with a deteriorating quality of life related to hormonal loss, headaches or severe visual impairment can be devastating. Fortunately, treating these tumors through a nostril and avoiding a craniotomy is the first step in getting these patients back to health.

"Many patients may need radiation or medical therapy, and long-term hormonal replacement therapy," Dr. Kelly noted. "But with properly coordinated care, most can look forward to an excellent quality of life."

Endonasal surgery is a highly specialized area of neurosurgery, and Dr. Kelly urged patients diagnosed with a pituitary adenoma or brain tumor to seek out a

center of excellence such as Saint John's Brain Tumor Center where a high volume of these surgeries are performed, and where patients receive a comprehensive treatment approach including close collaboration with endocrinologists and radiation oncologists.

For more information, visit www.brain-tumor.org.

Manoel Antonio de Paiva Neto, Alexander Vandergrift, Nasrin Fatemi, Alessandra A. Gorgulho, Antonio A. DeSalles, Pejman Cohan, Christina Wang, Ronald Swerdloff and Daniel F. Kelly. "Endonasal transsphenoidal surgery and multimodality treatment for giant pituitary adenomas." (Electronically published ahead of print: Clinical Endocrinology (Oxf). 2009 Jun 25.)