ENDOSCOPIC TRANSSPHENOIDAL APPROACH TO PITUITARY MACROADENOMA

CASE REPORT

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Abstract:

Pituitary adenomas are benign tumors of pituitary gland, divided into three types, 1. Benign adenoma, 2. Invasive adenoma, 3. Carcinoma. These tumors represent 10-25% of all intracranial tumors. Adenomas more than 10 mm are called Macro Adenoma, Less than 10 mm are called as Micro Adenoma. 36 year old male presented with history of headache, disturbed sleep and increase in size of both hands and feet. MRI brain with contrast taken and was diagnosed to have pituitary macro adenoma. He was treated by Endoscopic transsphenoidal excision of pituitary macroadenoma.

Keyword:
Pituitary Macroadenoma, Endoscopic, Transsphenoidal.

INTRODUCTION:

The cause of Pituitary Macroadenoma is unknown. Most favored theory attributes monoclonal neoplastic transformation of pituitary cells is the cause of tumor initiation and growth of the tumor. Pituitary adenomas may present as increase in levels of prolactin, Growth hormone, adrenocorticotrophic hormone, thyroid stimulating hormone, gonadotrophic hormone.

CASE REPORT:

36 Year old from Thiruvannamalai presented to ENT Department with history of Headache for 5 years which was severe in the morning, relieved spontaneously after 2-3 hours. History of disturbed sleep for 6 months and patient had increased in size and length both hands and feet. No History of vomiting, visual disturbance, Vertigo. On examination general condition fair, Systemic examination normal. On local examination thickening and increase in size of both hands and feet. Visual acuity both side 6/6. Hormonal studies revealed IGF I – 1191 ng/ml (71-341 ng/ml), Prolactin – 9.81 ng/ml (2-18 ng/ml), other pituitary hormone level was normal.

CT and MRI Brain with contrast given it showed well circumscribed lesion measuring 2.2 X 3 cm tumor occupying the sellar region. Under general anesthesia patient in supine position, infiltration given in septal wall on either side or modified Killians incision made over the left side of septum, Mucoperichondrium and periosteal flaps elevated. Deviated parts of the septum removed.

After lateralizing the middle turbinate infiltration given over the axilla and the body of the middle turbinate, posterior end of the septum removed. Sphenopalatine artery coagulated. Sphenoid sinus opened, posterior Bony wall of sphenoid sinus drilled, sella was found to bulge. Dural adhesions removed. Pituitary stalk identified, tumor identified and removed in Toto. Defect closed by using hadad flap, Surgicel and tissue glue. Complete hemostasis achieved. Nasal packing kept. After surgery on the 5th post-operative day patient headache got reduced, on 16th post-operative day hormonal level IGF I, Prolactin levels became normal and on 17th Post – operative day CT and MRI was taken it shows no residual mass.
Pituitary adenomas are most common sellar/parasellar mass. Patient with pituitary macroadenoma may be asymptomatic or may present with complaints due to hormonal imbalance or mass effect. These are benign tumors of epithelial origin arising from anterior lobe of pituitary gland. They are broadly divided into functional and non-functional adenomas. Functional adenomas are 1. Prolactinoma, 2. Growth hormone secreting adenoma, 3. ACTH secreting adenoma, 4. Thyroid stimulating hormone adenoma, 5. Gonadotrophinoma. Non-functional adenomas are more common than functional adenomas, they represents either by being large enough to compress adjacent structures by causing pituitary hormone deficiency. Incidental lesions found on imaging for other indication, hence the name incidentaloma. Tumor size is important, when considering treatment. Microadenoma less than 10mm, Macroadenoma is more than 10mm, Mesoadenoma intermediate size between 10mm and 2cm. Hardy & Somma(1) graded tumor on a scale of 0-4, where 1 & 2 are adenoma confined to fossa. 3 has localized invasion and destruction of the sella, 4 has more extensive invasion and expansion beyond the sella. Acromegaly has been recognized as an entity for a very long time, it was clinically described by pierre marie[ 2] in 1886. Massalongo [3] was first to suggest that pituitary gland may be the cause for the disease. In 1908 Hochenegg[5] performed first transphenoidal operation for acromegaly. The increased cause of death in acromegaly patients is due to cardiovascular disease. Acromegaly is found in general population at a rate of 50 -70% cases per million with an incidence of 3-4 cases per million per year [6-8]. Patient typically present with disease between ages of 40 to 50. Vast majority of patients presenting with acromegaly have an underlying pituitary tumor, rarely the disease can be caused by growth hormone releasing hormone elevation secondary to hypothalamic dis function[9]. Very early the disease can also be caused by ectopic release of GHRH by carcinoid/pancreatic islets tumor. Mortality is significantly increased in patient with un treated/un cured acromegaly. Excess growth hormone presence with acromegaly as a result of somatotropinoma (Often macroadenoma).

Growth hormone secreting pituitary adenomas make up approximately 15% of surgical cases of pituitary lesions. In children pre-adolescent excess growth hormone leads to abnormally increased height and gigantism and Organomegaly. Once ephiphysveal plates have closed, the manifestations are that of acromegaly. Clinical features are patient may notice in increase of shoe size and ring size, prominent supra orbital ridges, coarsening of facial features, MacroGLOSSia, Prominent eyebrows, Prognathism, Increased space between teeth, Low voice, Hyper tension, Thickened skin, Hepatomegaly, Impaired glucose tolerance, Osteoarthritis, Cardiomyopathy, Coronary artery disease, Carpal tunnel syndrome, Colonic cancer, Myopathy, Increased heel pad thickness. Retrospective data from New Zealand showed a significant increase in death rate from cardiovascular complication. Reduction of IGF-1 to the normal range produced a mortality equivalent to that of a general population. Other studies have found that mortality approximated that of general population when GH approached 2.5ug/lit[10] or 5ug/lit[11]. Most recent studies confirmed that lower GH is associated with better long term morbidity and reduced mortality rate. Orme et al performed a large retro specitive review of 1362 patients with acromegaly and found a higher than expected rate of colonic cancer in patients with acromegaly. Histology of adenoma shows monotonous sheets or spongier or papillary patterns. The nuclei may be cytologically pleomorphic with mitotic figures and a stippled chromatin appearance. GH secreting tumors are divided into sparsely and densely granulated. Densely granulated resembled the well differentiated somatotroph cells of normal anterior pituitary, while sparsely granulated cells bear little resemblance to the normal GH secreting cells. Recent studies have suggested that the Ki-67 labeling index may predict clinical outcome in the postsurgical management of acromegaly patient with a lower index correlating with a higher remission rate[12]. Familial cancer syndromes associated with Pituitary adenoma formation are MEN – 1, Carney complex and isolated familial acromegaly.Differential diagnosis are Craniopharyngiomas, Germinomas, Granulomatous disease, Histiocytosis-X, Lymphocytic hypophysitis. Metastatic tumors, Tumors of clivus. Investigations -Growth hormone is under control of hypothalamic hormone GHRH. In 1960 the advent radioimmunoassays allowed for measurement of GH levels & following that similar test were developed to measure IGF-1 levels [13]. In normal individual GH ranges from less than 0.1 – 0.2ug/lit interspersed periods with levels as high as 20-30ug/lit. More effective and popular is measurement of GH levels after an oral glucose load. In normal individual GH level will drop significantly following injection of 75 – 100 grams of glucose. In 1980 levels of less than 10ug/lit of GH on random assay were considered normal and less than 2ug/lit after oral glucose was also considered to be normal. Recent data have a cut off value of random level at 2.5ug/lit and the cut off for a normal suppression test at 1ug/lit. Up to 50% of patients with GH nadirs of less than 1ug/lit have elevated IGF-1. CT & MRI brain with contrast are useful in deducting macro adenomas, MRI with gadolinium is also being used.

TREATMENT:
The goal of treatment are to control of GH and IGF-1 levels are less than 1ug/lit after and oral glucose load and IGF-1 levels are normal. Transsphenoidal micro surgery is the preferred treatment for acromegaly though cranietomy is indicated as a primary surgical intervention. Endoscopic resection when compared to microscopic resection gives a beneficial access for complete removal of tumor. Rates of cure of acromegaly by transsphenoidal surgery as defined by GH less than 5ug/lit ranged from 53[14] to 81[15] %. According to shimon et al although patient with pre-operative GH levels of less than 20ug/lit are 20-50ug/ lit had cure rate of 90% are 79% respectively, those with more than 50ug/lit had a cure rate of only 16%. It is common that acromegaly will require multi-modality therapy [16]. Some acromegaly patients have visual disturbance which is due to nerve compression, but these symptoms improved after transsphenoidal surgery. Elderly patients undergoing transsphenoidal surgery may experience improvement in their cardiac function and glucose tolerance and hyper tension.

Complication of surgery are CSF rhinorrhea, meningitis transient diabetes insipidus, permanent diabetes insipidus requiring vaso pressin, sinusits, Epistaxis, Hypopituitarism.Dopamine agonist orally active drug bind to dopamine D2 receptor and prevent GH secretion. Bromocriptine has poor success rate, Cabergoline is a new agent. IGF-1 normalization seen in 35% of patients. Side effects are nausea, vomiting, dizziness, mood disturbance, cardiac valve dis function. Somatostatin receptor analogues inhibit the release of GH, other peptide hormone and nerve transmitters. Synthetic
analogue were developed to overcome the half-life of natural somatostatin of 1 to 3 min. Hence Octreotide is commonly used, newer long acting drug lanreotide is also commonly prescribed and it is given in injection form. Newman et al found that 73% of patients taking octreotide as primary therapy had normalization of IGF-1 by 3 years. Early tumor shrinkage after 3 months of octreotide. GH receptor antagonists pegvisomant is one of the newest option for treatment. Given by daily subcutaneous injections and it acts as a competitive antagonist at the receptor site. Maximal response is seen within 2 weeks of treatment. Some studies have shown that quality of life in acromegaly patients may be improved with combined therapy of somatostatin analogue treatment and Pegvisomant. Radiotherapy is effective in treating uncured acromegaly patients. Most patients presenting to radiotherapy would have undergone microsurgery or medical treatment. Because of pan hypopituitarism and gradual effect. It is not given as first line treatments hence given were surgery has failed. Now stereotactic radiosurgery is effective in treating uncured acromegaly patients. Most patients presenting to radiotherapy would have undergone microsurgery or medical treatment. Because of pan hypopituitarism and gradual effect. It is not given as first line treatments hence given were surgery has failed. Now stereotactic radiosurgery is widely used, which has high precision single session treatment delivered via gamma knife, proton accelerator, cyber knife or linear accelerator to the target organ. Maximum dose of 40 Gy is given. The major side effects of radiotherapy are radiation induced optic neuropathy hypopituitarism and damage to remaining pituitary gland.

CONCLUSION:
The current treatment paradigm for acromegaly involves a multidisciplinary approach. Treatment success correlates with pretreatment GH levels. Surgery offers the best possible opportunity for cure.

REFERENCES.
