Scholars Journal of Medical Case Reports
Abbreviated Key Title: Sch J Med Case Rep
ISSN 2347-9507 (Print) | ISSN 2347-6559 (Online)
Journal homepage: https://saspublishers.com

OPEN ACCESS

Endocrinology

A Case of an Incredibly Giant Pituitary Adenoma in an Acromegalic Patient

Zahra Ismail[1*], Fatima-Ezzahra Mennani[1], Sana Rafi[1], Ghizlane El Mghari[1], Nawal El Ansari[1]

[1]Department of Endocrinology, Diabetology, Metabolic Diseases and Nutrition Mohammed VI University Hospital of Marrakesh, Morocco

DOI: 10.36347/sjmcr.2024.v12i04.020 | **Received:** 08.03.2024 | **Accepted:** 13.04.2024 | **Published:** 16.04.2024

***Corresponding author:** Zahra Ismail
Department of Endocrinology, Diabetology, Metabolic Diseases and Nutrition Mohammed VI University Hospital of Marrakesh, Morocco

Abstract **Case Report**

Acromegaly, characterized by excessive growth hormone secretion often due to pituitary adenomas, presents diagnostic and therapeutic challenges, particularly when associated with giant invasive tumors. We present a case of a 26-year-old male with progressive visual impairment, headaches, and systemic symptoms indicative of acromegaly. Physical examination revealed classic features of acromegaly along with neurological deficits. Diagnostic work-up confirmed the presence of a giant invasive pituitary adenoma, highlighting the importance of clinical, radiological, and biochemical evaluation in diagnosis. Despite surgical intervention, residual tumor remained, necessitating adjunctive medical therapy. Management involved a multidisciplinary approach, incorporating surgery, pharmacotherapy, and potentially radiotherapy. This case underscores the complexities of managing acromegaly with giant adenomas, emphasizing the importance of early recognition and individualized treatment strategies to optimize outcomes.

Keywords: Acromegaly, Growth hormone, Giant adenoma, Pituitary gland.

INTRODUCTION

Giant pituitary adenomas are tumors of the pituitary gland that exceed 4 cm in size. Approximately 5% of pituitary adenomas are estimated to become invasive, potentially growing to gigantic sizes. They can be functional, meaning they secrete hormones, or non-functional. When these tumors secrete growth hormone (GH), they can lead to a condition called acromegaly.

Acromegaly in adults is most commonly due to a pituitary adenoma (in almost 98% of cases). It is a rare disorder with an estimated incidence of 3 to 4 cases per million people and prevalence 33 case per million population [1].

The excess of GH causes the bones and tissues in the body to grow larger over time, leading to characteristic symptoms such as enlargement of the hands and feet, facial changes, joint pain, and other complications if left untreated. Simultaneously, the tumor's local expansion will affect adjacent structures, resulting in symptoms such as headache, visual field defect, and cranial nerve palsies. Less common manifestations vary based on the tumor's growth direction and extent like cognitive abnormalities, generalized seizure, or hemiparesis [2]. The mortality rate among individuals with acromegaly is 2 to 4 times greater compared to healthy individuals. Appropriate treatment would lead to normalizing serum IGF-1 and reducing GH levels that would decrease the morbidity and mortality rate. Treatment often involves a combination of surgery, medications (such as somatostatin analogs or growth hormone receptor antagonists), and radiation therapy. The choice of treatment depends on various factors, including the size and location of the tumor, the severity of symptoms, and the individual's overall health [3].

The aim of this paper is to describe an acromegalic case with an incredibly giant invasive adenoma.

CASE REPORT

A 26-year-old man was admitted to the hospital with a progressive decrease in visual acuity associated with headaches not relieved by painkillers, moderate asthenia, and shaking of the right superior arm. There was no hemiparesis or seizure, and there wasn't a prior history of head trauma. He had no medical records. He also experienced weakness, hyperhidrosis, oily skin,

snoring, a decrease in libido, and teeth loss. The symptoms were first noted about two years ago when the patient reported an increase in shoe size. He also felt that his face and voice began to change long before. He was 180 centimeters tall and weighed 104 kilograms, with a body mass index of 32.09 kg/m². On initial examination, his blood pressure was 131/79 mmHg, heart rate was 80 bpm, and respiratory rate was 18 cpm. The skin was oily and sweaty. He had gapped teeth with macroglossia and large lips, prominence and enlargement of the nose, mild prognathism, enlarged fingers and toes, and a grade 1 goiter. There was no gynecomastia.

Further work-up revealed a high level of IGF-1, increased prolactinemia, and corticotropic insufficiency. Fundoscopy revealed stage I papilledema, and the Goldman visual field test was impaired. The electrocardiogram was normal. The pituitary MRI showed features suggestive of a sellar, suprasellar, and bi-temporal tumoral process measuring 10 × 5 x 5.4 cm, locally advanced with encasement of vascular and nerve structures, extension into the nasopharynx, cavernous sinuses, and optic nerve canals. The diagnosis of acromegaly in a mixed pituitary giant adenoma was suggested based on clinical features, confirmed by IGF1 and high prolactin levels. Cervical ultrasound revealed a multinodular goiter, while the abdominal ultrasound was normal. Laboratory studies showed normal glucose and cholesterol levels.

Table 1: Hormonal profile of present case

Hormone	Level	Normal range
IGF-1	589.6 ng/ml	120 - 283
Prolactin	16597 ng/ml	4 - 15.2
Morning cortisol	4.49ug /dl	6.2 - 19.4
TSH	3,39 mUI/ L	0.27 – 4.2
Free T4	12.95pmol /l	12 – 22
Free T3	4,65 pmol /l	3.1 – 6.8
Testosterone	0,22 ng/ml	2.49 – 8.36
FSH	0.75 Mui /ml	10.9 – 13.9
LH	0.49 mui/ml	6.9 – 10.3

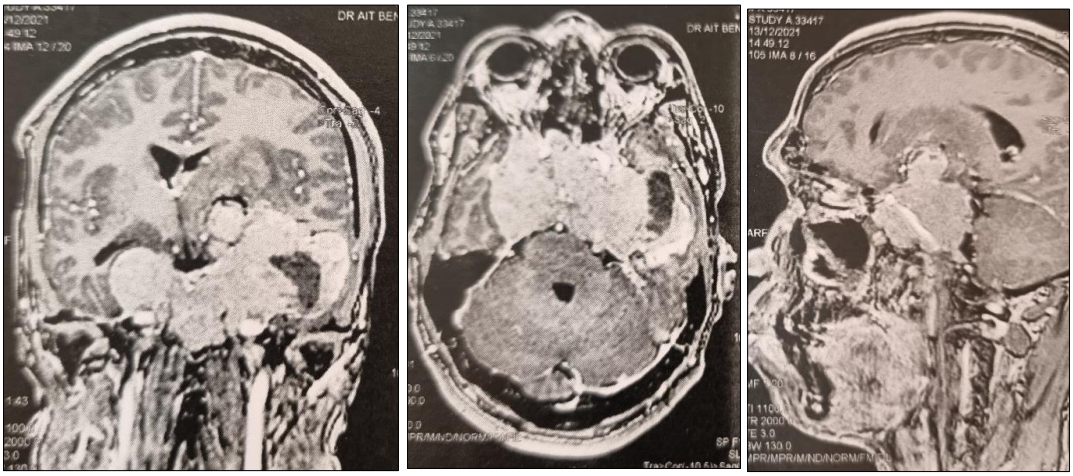

Figure 1: MRI imaging shows a giant pituitary adenoma in the sellar and suprasellar regions, with extension into the bi-temporal region, measuring 10 × 5 × 5.4 cm

Figure 2: The acrofacial dysmorphia

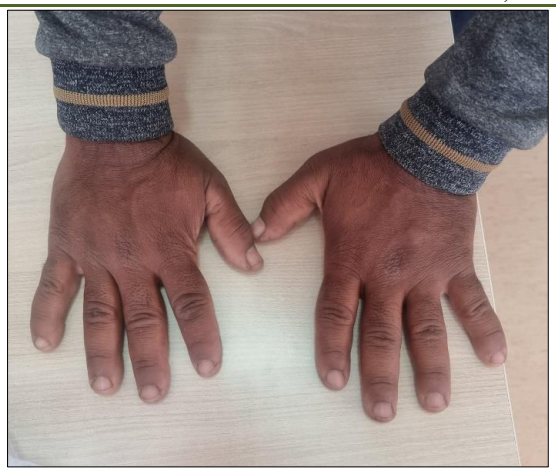

Figure 3: The enlargement of hands and fingers.

The patient began hydrocortisone replacement therapy. Transcranial surgery was performed, and anatomopathology and immunohistochemistry revealed a morphological appearance compatible with a pituitary adenoma with a 1% Ki67. Postoperative pituitary MRI revealed tumor residue, and the patient was put on a somatostatin analog and a dopaminergic agonist (cabergoline), with a surgical revision planned.

DISCUSSION

The diagnosis of acromegaly relies on clinical, radiological, and biochemical observations. The subtle clinical presentation commonly associated with acromegaly resulted in a postponement of diagnosis, with an average delay of around 10 years from the initial onset of symptoms [1]. The mean age at diagnosis is 40 to 45 years. A slightly higher frequency in men is reported in the literature [4].

Predominantly, the primary complaint leading to diagnosis was changes in the extremities (24%), followed by headaches (20%) [5]. The occurrence of a movement disorder in acromegalic patients is an unusual clinical characteristic. It is speculated that the mass effect of the adenoma, exerting direct or indirect pressure on other brain structures, may be the potential cause of this movement disorder.

The Gold Standard for diagnosing excess GH relies on the failure to suppress serum GH to a suitable level (usually < 1 ng/ml) following an oral glucose tolerance test. Random GH concentration measurement typically lacks diagnostic value due to its spontaneous fluctuations. A practical approach to confirming the diagnosis involves measuring serum IGF-1 concentration, which tends to remain relatively stable and can be assessed at any time [3].

Hyperprolactinemia is frequently observed, often due to co-secretion. The presence of hypopituitarism in pituitary macroadenoma is commonplace. Tumor-induced elevation in intrasellar pressure compromises blood flow to the normal pituitary tissue, leading to ischemia and infarction. Furthermore, heightened intrasellar pressure hampers the delivery of hypothalamic releasing and inhibiting factors, resulting in "stalk syndrome." [2]. In this case, we observed decreased levels of gonadotropins (FSH and LH), leading to impaired gonadal synthesis and secretion of sex steroid hormones. Additionally, the low cortisol level indicates corticotropic insufficiency.

Pituitary MRI with the administration of contrast material stands out as the most sensitive imaging study. When diagnosing somatotroph tumors, over 70% are identified as macroadenomas (tumor diameter >10 mm). In this instance, the patient presented with a giant invasive macroadenoma measuring 10 cm, extending into the suprasellar and temporal regions. Suprasellar extension is observed in 71–88% of cases with acromegaly and optic chiasm is compressed or deviated in 70–73% cases [6]. Roughly 5% of pituitary adenomas are estimated to become invasive, potentially growing to gigantic sizes exceeding 4 cm in diameter.

Dekkers *et al.*, in their meta-analysis, discovered a standardized mortality ratio (SMR) of 1.72 (95% CI 1.62–1.83), indicating a 72% higher mortality rate in the acromegaly population compared to the general population. The attributed causes of death include cardiovascular, respiratory, and malignant diseases [7].

The therapeutic objectives aim to alleviate symptoms, diminish tumor volume, prevent recurrence, and enhance long-term morbidity and mortality outcomes. These goals are pursued through three approaches to therapy: surgery, medical management, and radiotherapy.

The criteria for achieving remission or good control have become more stringent. It is now necessary for the concentration of GH to be reduced to less than 1 µg/l or 3 mIU/l, along with normalization of IGF-1 levels [7].

The complete surgical removal of GH-secreting tumors typically leads to hormonal control of acromegaly and improvement in soft tissue changes. However, in cases involving giant invasive macroadenomas, achieving complete surgical removal is often unlikely. Roughly, 40–60% of macroadenomas are expected to remain uncontrolled with surgery alone. Conventional treatment methods for giant invasive macroadenomas often result in high recurrence rates [8, 9]. In this case, the transcranial approach is preferred over the transsphenoidal approach due to the significant suprasellar extension of the tumor.

Given the suboptimal biochemical control achieved through surgery, patients with acromegaly often necessitate additional pharmacological intervention with somatostatin analogues. Dopaminergic agonists prove beneficial in cases of associated hyperprolactinemia or as adjunct therapy to somatostatin analogues when biochemical control is lacking and IGF-1 levels are up to 1.5 times greater than the normal range. Notably, according to a meta-analysis, cabergoline normalizes IGF-1 levels in 34% of patients, particularly those with moderately increased IGF-1 levels [10].

In cases where there is no response to somatostatin analogues, combining them with a GH receptor antagonist is recommended. However, it's crucial to conduct appropriate monitoring with testing due to the risk of tumor growth, even if there's adequate biochemical response and symptom improvement [8, 10].

The use of radiotherapy as a third-line treatment should be considered, but the risk of hypopituitarism should also be taken into account. Hypopituitarism is observed in more than 50% of patients receiving radiation therapy. Other limitation of radiotherapy is delay effectiveness. The conventional fractionated radiation therapy may take 10 to 20 years to be fully effective [1, 11].

CONCLUSION

This article emphasizes the challenges of managing acromegaly with a giant tumor, particularly the unsatisfactory outcomes of transcranial surgery. It's crucial to recognize that diagnosis often occurs late, and surgery is typically the initial treatment. However, due to poor biochemical control in such giant and invasive tumors, pharmacological treatment with somatostatin analogues becomes necessary. In cases of residual tumor and inadequate control with somatostatin analogues, combining them with GH antagonists is recommended. Radiotherapy is considered a last resort. These findings highlight the crucial significance of early diagnosis.

REFERENCES

1. Ben-Shlomo, A., & Melmed, S. (2008). Acromegaly. *Endocrinology and metabolism clinics of North America*, *37*(1), 101-122. doi: 10.1016/j.ecl.2007.10.002. PMID: 18226732; PMCID: PMC2697616.
2. Blevins, L. S., Shore, D., Weinstein, J., & Isaacs, S. (1999). Clinical presentation of pituitary tumors. *Pituitary Disorder: Comprehensive Management. Baltimore, Lippincott Williams & Wilkins*, 145-161.
3. Cook, D. M., Ezzat, S., Katznelson, L., Kleinberg, D. L., Laws, E. R., Nippoldt, T. B., ... & Vance, M. L. (2004). American Association of Clinical Endocrinologists medical guidelines for clinical practice for the diagnosis and treatment of Acromegaly. *Endocrine Practice*, *10*(3), 213-225. doi: 10.4158/EP.10.3.213.
4. Mestrón, A., Webb, S. M., Astorga, R., Benito, P., Catalá, M., Gaztambide, S., ... & all the REA participants. (2004). Epidemiology, clinical characteristics, outcome, morbidity and mortality in acromegaly based on the Spanish Acromegaly Registry (Registro Espanol de Acromegalia, REA). *European Journal of Endocrinology*, *151*(4), 439-446.
5. Nachtigall, L., Delgado, A., Swearingen, B., Lee, H., Zerikly, R., & Klibanski, A. (2008). Extensive clinical experience: changing patterns in diagnosis and therapy of acromegaly over two decades. *The Journal of Clinical Endocrinology & Metabolism*, *93*(6), 2035-2041.
6. Melmed, S. (2006). Acromegaly. *N Engl J Med*, *355*, 2558-73.
7. Dekkers, O. M., Biermasz, N. R., Pereira, A. M., Romijn, J. A., & Vandenbroucke, J. P. (2008). Mortality in acromegaly: a metaanalysis. *The Journal of Clinical Endocrinology & Metabolism*, *93*(1), 61-67.
8. Melmed, S., Colao, A., Barkan, A., Molitch, M., Grossman, A. B., Kleinberg, D., ... & Giustina, A. (2009). Guidelines for acromegaly management: an update. *Journal of Clinical Endocrinology and metabolism*, *94*(5), 1509-1517.
9. Racine, M. S., & Barkan, A. L. (2002). Medical management of growth hormone-secreting pituitary adenomas. *Pituitary*, *5*, 67-76.
10. García, W. R., Cortes, H. T., & Romero, A. F. (2019). Pituitary gigantism: a case series from Hospital de San José (Bogotá, Colombia). *Archives of endocrinology and metabolism*, *63*, 385-393.
11. Melmed, S., Colao, A., Barkan, A., Molitch, M., Grossman, A. B., Kleinberg, D., ... & Giustina, A. (2009). Guidelines for acromegaly management: an update. *Journal of Clinical Endocrinology and metabolism*, *94*(5), 1509-1517.