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Unmasking a Contralateral Pituitary Neuroendocrine Tumor After Resection of a Decoy Lesion: A Case Report

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ABSTRACT

Multiple pituitary adenomas (MPA) are a rare condition characterized by the presence of 2 or more histologically and/or radiologically distinct pituitary tumors in a single patient. Their diagnosis may be challenging, particularly when one lesion obscures another on preoperative imaging. It can potentially result in persistent hormonal hypersecretion after surgery. This case report presents a 57-year-old man with acromegaly who underwent transsphenoidal resection of a right-sided pituitary macroadenoma. Preoperative MRI demonstrated a lesion in the right and central part of the pituitary gland. Despite surgery, biochemical remission was not achieved - with persistently elevated IGF-1 levels. Histopathological examination did not demonstrate a GH-secreting adenoma. Follow-up MRI performed six months after surgery revealed a hypointense lesion in the left part of the pituitary gland located near the cavernous sinus, which had not been visible on the preoperative MRI. Due to persistent biochemical activity and the newly identified contralateral lesion, a second transsphenoidal surgery was performed. Histopathological examination confirmed a GH-positive pituitary neuroendocrine tumor. Three months after the second surgery IGF-1 levels had normalized, indicating biochemical remission. Follow-up MRI showed no residual or recurrent tumor. MPA represents a diagnostic and therapeutic challenge that requires a multidisciplinary approach involving: endocrinologists, radiologists and neurosurgeons to ensure accurate diagnosis and effective treatment. Persistent hormonal hypersecretion despite gross total resection should raise suspicion of an additional adenoma - particularly when the initial lesion is nonfunctioning. Careful preoperative and postoperative radiological assessment, together with endocrinological follow-up, is essential for identifying responsibility lesions and achieving biochemical remission.

Keywords: decoy lesion; multiple pituitary tumors; responsibility lesion; acromegaly; growth hormone–secreting pituitary adenoma; transsphenoidal surgery

1. INTRODUCTION

Multiple pituitary adenomas (MPA), or double pituitary adenomas, are the occurrence of 2 or more pituitary tumors simultaneously in one patient (Ogando-

Rivas et al., 2017). Tumors can be distinguished morphologically (on magnetic resonance imaging [MRI]/during surgery) and/or immunohistochemically (Iacovazzo et al., 2013). MPA is a rare condition – in clinical practice, its incidence is reported as approximately 1.5% of all pituitary adenomas, while in autopsy studies it reaches up to 10%. This may indicate that a large part of these tumors are undiagnosed due to a lack of clinical significance (Budan and Georgescu, 2016).

This case report presents a 57-year-old patient with acromegaly who underwent surgery for two independent, contralateral pituitary tumors.

2. CASE REPORT

A 57-year-old man was admitted to the neurosurgery department for surgical treatment of a pituitary microadenoma secreting growth hormone. The patient's medical history included a diagnosis of acromegaly (previously treated with lanreotide in an endocrinology clinic). Additionally, the patient had earlier been diagnosed with: hypertension, osteoporosis, hyperlipidemia, hypothyroidism (post-thyroidectomy due to papillary thyroid cancer), iatrogenic tetany, benign prostatic hyperplasia, chronic esophagitis, overweight (BMI 29.5 kg/m2) and Lyme disease.

On admission, the patient presented with characteristic phenotypic features of acromegaly (including: enlarged hands and feet, an enlarged nose and coarsening of facial features). He had no visual field disturbances or other neurological deficits. The patient had undergone his first transsphenoidal surgery for pituitary macroadenoma eight months earlier, without successful biochemical remission (IGF-1 300 ng/ml). The histopathological examination did not identify a secreting tumor.

An MRI of the pituitary gland performed before the first surgery (Figure 1) revealed a hypointense lesion (10x9x8 mm) in the right and central part of the pituitary gland, with the pituitary stalk displaced to the left, without compression of the optic chiasm. A follow-up postoperative MRI 6 months after the first surgery (Figure 2) revealed a hypointense mass in the left part of the pituitary gland along the left cavernous sinus (5x5x6 mm). This lesion was not visible on the MRI before the first surgery. A follow-up MRI showed no evidence of residual mass or local recurrence on the right side.

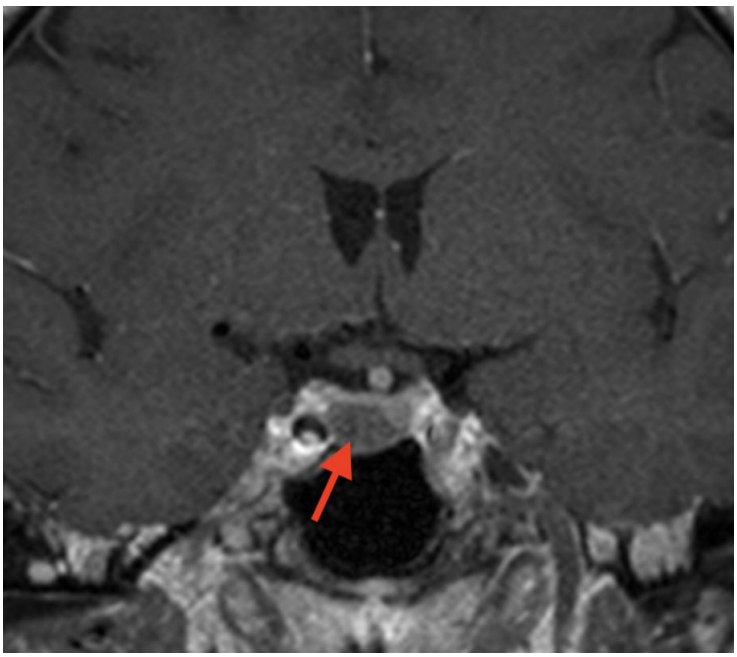

Figure 1. Preoperative MRI – right-sided pituitary adenoma (red arrow).

Due to the new lesion on pituitary MRI and the lack of biochemical remission after the first surgery, the patient underwent a second transsphenoidal surgery. The neuropathological diagnosis was pituitary neuroendocrine adenoma GH (+). Endocrine follow-up 3 months after the second surgery revealed IGF-1 levels within normal limits indicating biochemical remission. Postoperative MRI confirmed no residual tumor mass, or signs of recurrence.

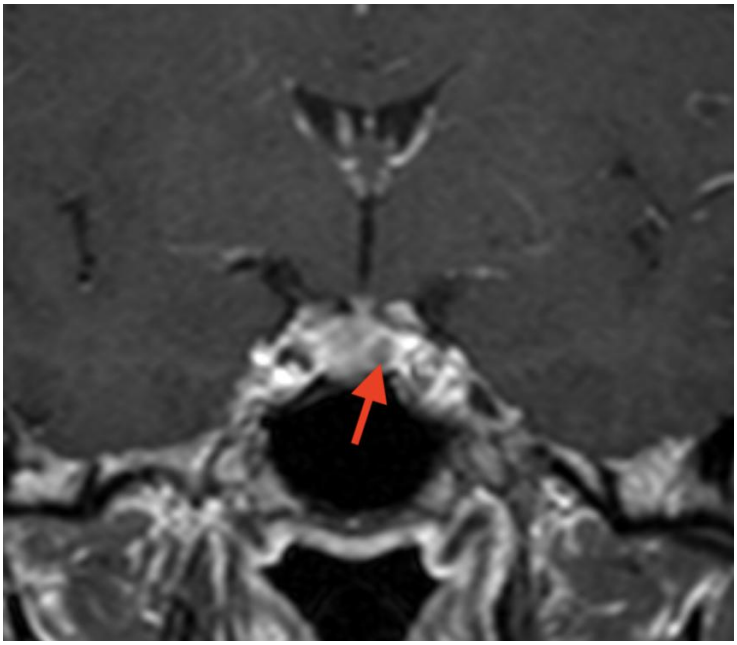

Figure 2. MRI 6 months after first surgery – pituitary adenoma on the left side (red arrow).

3. DISCUSSION

Endocrine aspect

This case report presents a patient with acromegaly and MPA – one tumor was functioning (growth hormone [GH]-secreting), and the other was a nonfunctioning pituitary adenoma (NFPA). MPA should be differentiated from plurihormonal pituitary adenomas, in which a single tumor produces two or more pituitary hormones. In case of MPA – one (or more) of the lesions may be hormonally active, resulting in hormone hypersecretion and associated with endocrine dysfunction (Budan and Georgescu, 2016). In a literature review of 24 publications - identified 35 patients (70 lesions) with MPA. Acromegaly (37%) and Cushing's disease (31%) were the most common disorders related to functioning adenomas in the analyzed population (Han et al., 2026). A similar correlation was described by Budan and Georgescu in a group of 63 patients with MPA - Cushing's syndrome and acromegaly accounted for 38% and 34,9% respectively (Budan and Georgescu, 2016). While one tumor may be functioning, the other may be functioning or NFPA. In an analysis of approximately 60 patients with MPA, Iacovazzo et al., (2013) reported that the most common patterns of hormone expression were: adrenocorticotropic hormone (ACTH) + prolactin (PRL), GH + NFPA (as in this case) and GH + PRL.

Neurosurgical aspect

Han et al. propose the division of MPA into "responsibility lesions" and "decoy lesions" (Han et al., 2026). Decoy lesions are defined as larger tumors for which surgical removal does not result in biochemical remission. They can obscure smaller adenomas (responsibility lesions) that are functioning and explain the patient's endocrinopathies. Unfortunately, the occurrence of these tumors simultaneously may result in the need for repeated neurosurgical intervention if the treatment is ineffective after the first surgery.

The macroadenoma removed in the first operation in this patient corresponds to a decoy lesion because no biochemical remission was observed after its resection. Following the first surgery, a contralateral responsibility lesion was observed on follow-up MRI. Biochemical remission was achieved only after resection of this adenoma.

Radiological aspect

The presence of two or more pituitary tumors increases the risk of failure of surgical treatment and biochemical remission in secreting tumors (Demirci et al., 2024). For this reason, patients' preoperative MRIs should be carefully analyzed. Preoperative diagnosis of MPA may be difficult. 3-T MRI is recommended over 1,5-T MRI because it has a higher detection rate for double lesions (Demirci et al., 2024; Zhang et al., 2024).

In the described case, a second tumor appeared on a follow-up MRI 6 months after the first surgery; it had not been visible on MRI before the first operation. Saeger et al., (2018) indicate that the appearance of a second lesion after previous pituitary tumor surgery can be theoretically explained in four ways: regrowth from a residual mass, recurrence due to hormone secretion, a tumor that was undetected before the first surgery, or a tumor that arose de novo. In the presented case, the most likely scenario is that the second, functioning tumor was initially obscured by the larger, nonfunctioning tumor and therefore remained undetected on preoperative MRI. Following resection of the larger adenoma, as a result of tissue decompression, the second lesion became visible on follow-up MRI.

4. CONCLUSION

Taken together, the possibility of MPA should be considered, particularly in patients with functioning tumors. Persistent hormonal hypersecretion despite gross total resection of the primary adenoma should prompt clinicians to consider the presence of an additional lesion. To achieve biochemical remission - identification and complete resection of the second tumor may be crucial. Therefore, comprehensive endocrinological and radiological follow-up is essential in patients undergoing neurosurgical treatment for pituitary tumors.

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Authors' Contributions

Author has read and agreed to the published version of the manuscript.

Informed consent

Written & Oral informed consent was obtained from participant included in the study.

Ethical approval

Not applicable. This article does not contain any studies with human participants or animals performed by any of the authors.

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Conflict of interest

The author declare that he has no conflicts of interest, competing financial interest or personal relationship that could have influenced the work reported in this paper.

Data and materials availability

All data associated with this study will be available based on reasonable requests to the corresponding author.

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