



ATYPICAL NEUROLOGICAL AND METABOLIC PRESENTATIONS OF PITUITARY ADENOMAS: A CASE SERIES

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Abstract

Pituitary adenomas are common intracranial tumors with highly variable clinical presentations depending on tumor size, hormonal activity, and duration of disease. Although classical endocrine manifestations are well recognized, atypical neurological and metabolic presentations may lead to delayed diagnosis. We report a case series of three female patients with pituitary adenomas who presented with uncommon clinical features.

The first case involved a 17-year-old adolescent who presented with a first episode of generalized tonic-clonic seizure associated with headache and vomiting. Neuroimaging and hormonal evaluation revealed a prolactin-secreting pituitary macroadenoma. The second case was a 39-year-old woman referred with persistent vomiting, severe hyponatremia, anemia, and cerebellar ataxia. Detailed evaluation revealed panhypopituitarism secondary to a non-functioning pituitary microadenoma, with complete neurological recovery following hormone replacement therapy. The third case was a 47-year-old woman with long-standing diabetes mellitus who presented with diabetic keto acidosis in whom acromegalic features were noted on examination, leading to the diagnosis of a growth hormone-secreting pituitary macroadenoma.

This case series highlights the protean manifestations of pituitary adenomas, including seizures and reversible cerebellar ataxia, which are rarely the initial presenting features. Early recognition of subtle clinical clues and prompt endocrine evaluation are crucial for timely diagnosis and improved outcomes. Clinicians should maintain a high index of suspicion for pituitary pathology in patients with unexplained neurological symptoms, electrolyte abnormalities, or progressive somatic changes.

Keywords: Hypopituitarism; Hyponatremia; Secondary adrenal insufficiency; Cortisol deficiency; Pituitary adenoma

Introduction

Pituitary adenomas are benign tumors arising from the adenohypophysis and account for approximately 10–15% of all intracranial neoplasms¹. These tumors are classified based on size into microadenomas and macroadenomas and based on hormonal secretion into functional and non-functional adenomas². Functional adenomas, such as prolactinomas and growth hormone-secreting tumors, typically present with hormone excess syndromes, whereas non-functioning adenomas often manifest through hypopituitarism or mass effect³. Despite being histologically benign, pituitary adenomas can result in significant morbidity due to hormonal imbalance, compression of adjacent structures, and delayed diagnosis.

Despite their relatively high prevalence, pituitary adenomas may remain undiagnosed for prolonged periods due to non-specific or atypical clinical presentations. Many patients initially present to non-endocrine specialties, which may contribute to diagnostic delay. Neurological manifestations such as seizures and cerebellar ataxia are uncommon and are often secondary to metabolic derangements, electrolyte imbalance, or hormonal deficiencies rather than direct tumor invasion⁴. Such atypical presentations may obscure the underlying endocrine pathology and lead to misdiagnosis. Hyponatremia, particularly due to secondary adrenal insufficiency, is a well-recognized but frequently overlooked manifestation of hypopituitarism and may present with significant neurological symptoms⁵, sometimes mimicking primary neurological disorders.

Acromegaly is another example of delayed diagnosis, as its clinical features evolve gradually over years and are often mistaken for normal aging or common metabolic disorders such as diabetes mellitus and hypertension⁶. Subtle physical changes may go unnoticed by both patients and clinicians until complications develop. Delayed diagnosis is associated with increased cardiovascular morbidity and mortality, underscoring the importance of early recognition and intervention^{7,8}.

We present a case series of three patients with pituitary adenomas presenting with seizures, reversible cerebellar ataxia due to hyponatremia, and diabetic keto acidosis. This report aims to emphasize the importance of thorough clinical examination and comprehensive endocrine evaluation in patients with unexplained neurological or metabolic abnormalities, as early diagnosis and appropriate management can significantly improve clinical outcomes.

Case Series Presentation

Case1

A 17-year-old female presented with a first episode of generalized tonic-clonic seizure lasting approximately two minutes, which occurred while she was sitting at home. The episode was associated with tongue bite, post-ictal confusion, two episodes of vomiting, and headache for two days prior to presentation. There was no history of fever, head trauma, visual disturbances, limb weakness, or prior seizures. She had no known medical comorbidities and was not on any long-term medications. Menstrual history was appropriate for age, and there were no clinical features suggestive of endocrine dysfunction at presentation. She was conscious, oriented, afebrile, and hemodynamically stable. General physical and systemic examinations, including a detailed neurological assessment, were unremarkable. Initial laboratory investigations, including capillary blood glucose and serum electrolytes, were within normal limits. In view of new-onset seizure, magnetic resonance imaging of the brain was performed, which revealed a pituitary lesion suggestive of an adenoma. Subsequent hormonal evaluation showed elevated serum prolactin levels, with normal thyroid function tests. Based on the combined clinical, biochemical, and radiological findings, a diagnosis of prolactin-secreting pituitary adenoma was established. The patient was initiated on dopamine agonist therapy. The patient underwent successful endoscopic endonasal transsphenoidal resection of the pituitary macroadenoma, following which there was significant clinical improvement and a favorable postoperative outcome without complications.

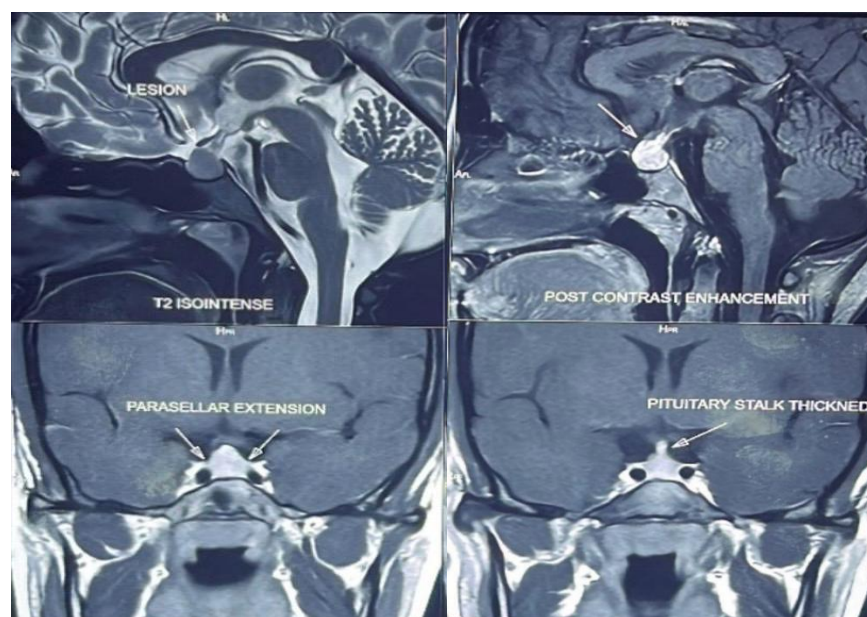


Figure 1: Contrast-enhanced MRI series of sellar-suprasellar pituitary macroadenoma. Multiplanar post-contrast T1-weighted images (sagittal, coronal, axial views) demonstrate a well-defined, homogeneously enhancing sellar mass with suprasellar extension (white arrows), abutting the optic chiasm superiorly (*) and causing pituitary stalk thickening (dashed arrow). Labeled annotations highlight "Suprasellar Extension," "Pituitary Stalk," and "Post Contrast" enhancement pattern confirming sellar epicenter without cavernous sinus invasion. These findings are characteristic of a pituitary macroadenoma

Case

2

A 39-year-old unmarried woman with no known comorbidities was referred with complaints of persistent vomiting for ten days, progressive easy fatigability, loss of appetite, and unsteadiness of gait for one month. She had been evaluated at a private hospital and was found to have severe hyponatremia and anemia. There was no history of seizures, visual disturbances, head injury, fever, or bleeding manifestations.

On admission, she was conscious, oriented, and hemodynamically stable, with pallor but no signs of dehydration. Neurological examination revealed truncal ataxia, horizontal nystagmus, and impaired tandem walking, while tone, power, and reflexes were preserved in all four limbs. Initial management included cautious correction of hyponatremia with hypertonic saline and supportive measures. Although serum sodium levels improved partially, neurological symptoms persisted, prompting further evaluation.

A detailed endocrine history revealed long-standing menstrual irregularities progressing to secondary amenorrhea, along with absence of axillary and pubic hair and underdeveloped breast tissue. Magnetic resonance imaging of the brain demonstrated a pituitary microadenoma measuring approximately 0.8 × 1 cm (Figure 2). Comprehensive hormonal assays revealed deficiencies of multiple anterior pituitary hormones, confirming the diagnosis of panhypopituitarism. The severe hyponatremia was attributed to secondary adrenal insufficiency. Hormone replacement therapy with glucocorticoids and levothyroxine was initiated, following which serum sodium levels normalized gradually. The patient showed marked clinical improvement, with complete resolution of cerebellar signs, improved gait stability, and enhanced general well-being.

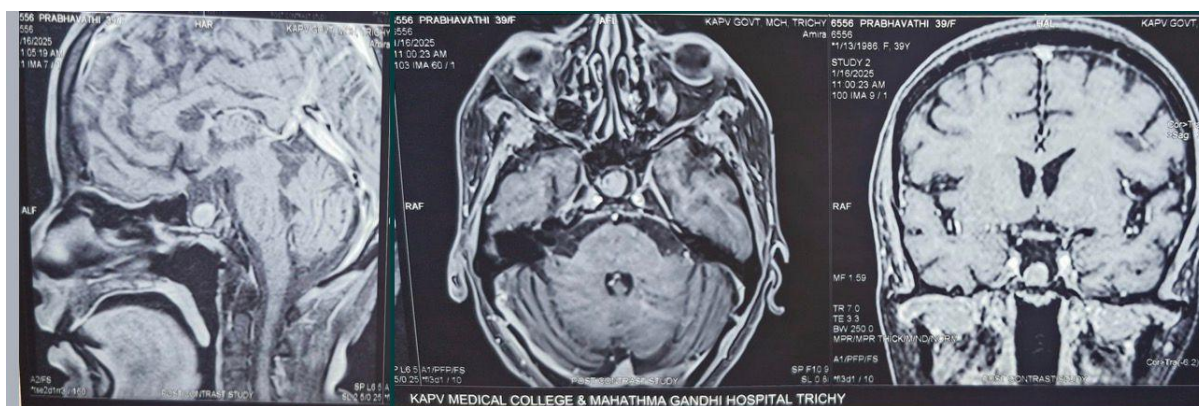


Figure 2: Contrast-enhanced MRI shows well defined rounded hypo enhancing lesion measuring 0.8cm x 1cm in pituitary gland

Case

3

A 47-year-old woman, a known case of type 2 diabetes mellitus for five years, presented with complaints of vomiting, abdominal pain, breathlessness and altered sensorium for 1 day. There was no history of seizures, vomiting, visual disturbances, or focal neurological deficits. Her past history was significant for bilateral double-J stenting for pyelonephritis one year earlier and poor glycemic control.

Vital examination showed elevated blood sugars. General examination revealed coarse facial features, enlarged nasal cartilage, thickened lips, exaggerated nasolabial folds, prominent supraorbital ridges, macroglossia with dental impressions, and acral enlargement. Skin tags and acanthosis nigricans were also noted. These findings raised strong clinical suspicion of acromegaly. Biochemical evaluation showed elevated insulin-like growth factor-1 levels, and growth hormone failed to suppress following oral glucose tolerance testing. Magnetic resonance imaging of the brain revealed a pituitary macroadenoma, confirming the diagnosis of acromegaly due to a growth hormone-secreting pituitary adenoma. The patient was initially managed for diabetic ketoacidosis and started on octreotide. Later the patient underwent successful endoscopic endonasal transsphenoidal resection of the pituitary macroadenoma, following which there was significant clinical improvement and a favorable postoperative outcome without complications. Reassessment of GH levels was done in immediate post operative period and was normal. Patient is now currently continued on Inj. Octreotide and Inj Human Insulin and currently under follow up.



Figure 3 Sagittal MRI brain demonstrating a sellar-based pituitary macroadenoma with suprasellar extension and optic chiasmal elevation, along with a lateral radiograph of the left foot showing increased heel pad thickness consistent with acromegaly.

Discussion

Pituitary adenomas demonstrate wide clinical heterogeneity, with presentation influenced by hormonal activity, tumor size, and duration of disease. Although endocrine manifestations are classical, atypical neurological and metabolic presentations often delay diagnosis. The present case series illustrates three uncommon presentations and compares them with previously published literature, highlighting important diagnostic considerations.

Seizures are rarely the initial presenting symptom of pituitary adenomas and are most often reported in association with macroadenomas producing significant mass effect or with secondary metabolic disturbances⁹. Mindermann and Wilson, in their analysis of neurological manifestations of pituitary tumors, reported seizures predominantly in patients with large or invasive adenomas⁴. In the case of prolactinomas, seizures are rare and typically occur when the tumor burden is substantial or when complications such as electrolyte imbalances are present, according to Hong et al.¹⁰ in contrast, the first case in our series involved an adolescent with a prolactinoma presenting solely with a first-onset generalized seizure, without evidence of mass effect or metabolic derangement. This divergence from previously reported patterns underscores the need to include pituitary evaluation in unexplained new-onset seizures, particularly when initial investigations are unrevealing.

Hyponatremia is a well-documented but frequently overlooked complication of hypopituitarism, most commonly due to secondary adrenal insufficiency¹¹. Thompson and Garrahy have described that inadequate glucocorticoid levels impair renal free-water excretion through inappropriate antidiuretic hormone activity, resulting in dilutional hyponatremia³. While neurological manifestations such as confusion and seizures are commonly described, cerebellar ataxia remains a rare presentation. Isolated case reports have documented reversible cerebellar dysfunction secondary to severe hyponatremia¹². The second case in our series aligns with these rare observations and further emphasizes that early identification of endocrine causes can result in complete neurological recovery, distinguishing such cases from primary cerebellar disorders.

Acromegaly is notorious for delayed diagnosis, with several studies reporting an average diagnostic delay of 5–10 years due to its insidious onset and overlap with common metabolic conditions¹³. Lavrentaki et al. highlighted that many patients are diagnosed incidentally during evaluation for unrelated complaints⁸. In concordance with these findings, the third case in our series was identified during evaluation for diabetic ketoacidosis, where recognition of subtle but characteristic physical features prompted further endocrine evaluation. This case also underscores the importance of evaluating the underlying etiology in patients with long-standing or poorly controlled diabetes, as secondary causes such as acromegaly may remain unrecognized if clinical suspicion is low. Consistent with previous studies, early identification remains critical, as prolonged exposure to excess growth hormone is associated with increased cardiovascular morbidity, metabolic complications, and reduced life expectancy¹⁴.

Conclusion

When compared with existing literature, this case series reinforces the concept that pituitary adenomas may initially present with non-specific or atypical symptoms rather than overt endocrine syndromes. Similar conclusions have been drawn in prior observational studies emphasizing delayed diagnosis as a major contributor to disease-related morbidity¹⁵. Our findings support the need for a high index of clinical suspicion and highlight the importance of a multidisciplinary approach involving internists, endocrinologists, radiologists, and neurosurgeons to ensure timely diagnosis and optimal management.

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