Case Report

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Serendipitous Discovery of Pituitary Macroadenoma in a Patient with Hyponatremia: Endoscopic Management and Clinical Insights – A Case Report

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Abstract:

Although pituitary macroadenomas can present with a wide range of clinical manifestations, they may remain asymptomatic for a long time and be discovered incidentally, particularly when they are nonfunctioning pituitary neuroendocrine tumors (nfPitNETs). This case report describes a hypertensive, diabetic, and hypothyroid male who presented with constipation, vomiting, and severe hyponatremia, and was incidentally diagnosed with a pituitary macroadenoma on CT head. The tumor was subsequently removed via an endonasal endoscopic trans-sphenoidal approach, and histopathological examination confirmed it as a PitNET.

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Introduction:

Pituitary adenomas are common intracranial tumors, accounting for nearly 10-15% of all primary brain neoplasms.[1] Their presentation varies according to size, secretory function, and local compressive effects.[2] Functioning adenomas are often detected early due to hormonal syndromes, whereas nonfunctioning pituitary neuroendocrine tumors (nfPitNETs) may remain clinically silent and are frequently diagnosed incidentally on neuroimaging performed for unrelated conditions.[3]

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Macroadenomas, because of their size, can exert pressure on surrounding structures, particularly the optic chiasm and optic nerves, leading to visual field defects or decreased visual acuity. Nevertheless, some patients remain unaware of visual compromise despite demonstrable radiological evidence of compression.[4] Hyponatremia, though not a classic feature, may sometimes draw clinical attention, either as a manifestation of pituitary dysfunction or in the setting of associated comorbidities.[5]

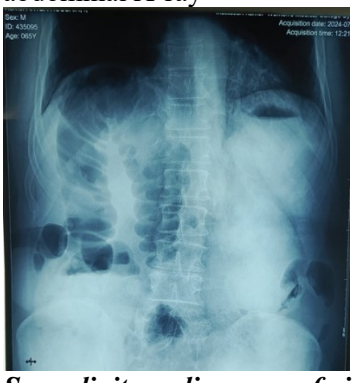
We describe the case of a hypertensive, diabetic, and hypothyroid male who presented with constipation, vomiting, and severe hyponatremia. Neuroimaging incidentally revealed a pituitary macroadenoma with optic nerve compression, despite the absence of gross visual complaints. The lesion was excised via an endonasal endoscopic trans-sphenoidal approach, and histopathology confirmed a PitNET. This case highlights the potential for significant anatomical involvement in the absence of overt clinical symptoms, emphasizing the need for careful evaluation of pituitary masses, particularly with regard to optic nerve involvement, even when patients do not report visual disturbances.

Case summary:

Presentation

A 65-year-old retired male with hypertension and diabetes mellitus for ten years, and hypothyroidism for two years, was admitted to the department of Medicine, Sylhet Women's Medical College, Bangladesh, with history of constipation and persistent vomiting. He had been compliant with regular medications for his chronic conditions. The patient reported a long-standing history of constipation, which had markedly worsened over the preceding week and was associated with moderate abdominal pain and intractable vomiting on admission. He denied any history of using medications known to cause constipation, as well as any history of fever, hematochezia, melena, or unintentional weight loss. However, he reported a history of reduced mobility, low dietary fiber intake, and mild depressive symptoms. Moreover, on query, he reported a gradual impairment of vision in both eyes over the past eight years. On examination, he was mildly restless with stable vital signs. Cardiovascular, respiratory, and neurological examinations were unremarkable, except for bilateral temporal visual field loss. The abdomen was soft and tympanitic with diffuse tenderness and sluggish bowel sounds. Random capillary glucose was 7.9 mmol/L. Abdominal X-ray showed gas-distended bowel loops (Figure 1), while ultrasound was unremarkable. Serum amylase, lipase and *troponin I* were normal. His gastrointestinal symptoms improved with conservative management.

Figure 1: Gas distended bowel loops on abdominal X-ray



Serendipitous discovery of pituitary macroadenoma

While the patient's symptoms improved following bowel movement, he suffered a fall upon standing on the day of admission, resulting in a head injury. Initial blood tests revealed severe hyponatremia (108 mmol/L), with normal potassium, chloride, and bicarbonate levels. A CT scan of head performed to rule out skull or brain injury incidentally detected a sellar mass (2 cm X 1.8 cm X 1.7 cm) with suprasellar extension, suggestive of a pituitary macroadenoma (Figure 2). This was subsequently confirmed by brain MRI (Figure 3), which demonstrated a pituitary macroadenoma compressing the optic chiasm. Perimetry further confirmed bilateral peripheral visual field loss (Figure 4). However, anterior pituitary hormone levels were within normal limits (Table 1).

Table 1: Hormone assay of the patient

	Hormone levels	*Patient's value*	*Reference range*
1	Serum GH (ng/ml)	0.41	0.45-10
2	Serum prolactin (ng/mL)	4.42	2.5-17
3	Serum TSH (µIU/L)	2.09	0.27-4.20
4	Serum FT3 (pg/ml)	4.12	1.21-4.20
5	Serum FT4 (ng/dl)	0.85	0.89-1.76
6	Serum ACTH (pg/ml)	31.54	05-46
7	Serum FSH (mIU/ml)	5.65	1.4-18.1
8	Serum LH (mIU/ml)	5.77	1.3-8.0
9	Serum testosterone (ng/ml)	6.17	1.66-8.11

Figure 2: a) Incidental finding on non-contrast CT head, and after I/V contrast- b) horizontal view c) sagittal view

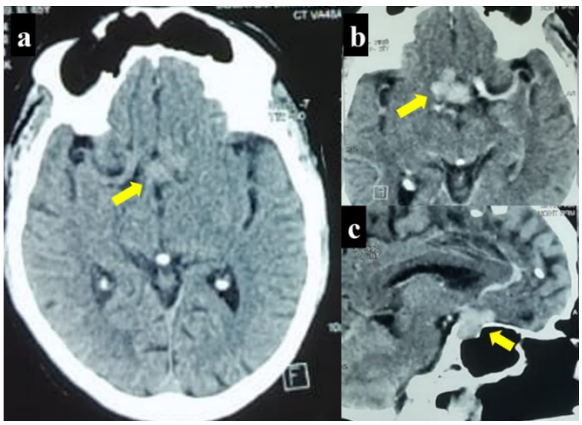


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Figure 3: MRI of brain showing macro adenoma- a) sagittal view b) coronal view

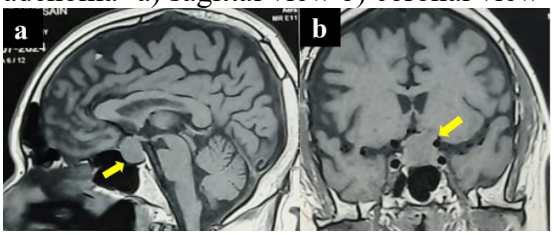
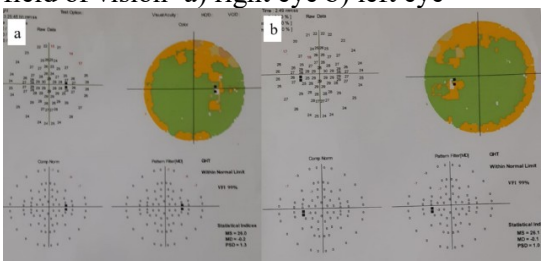


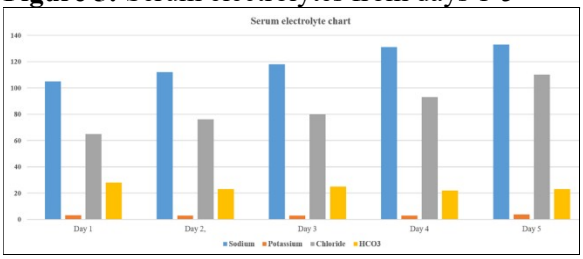
Figure 4: Perimetry showing loss of peripheral field of vision- a) right eye b) left eye



Management of hyponatremia

His hyponatremia was further evaluated with urinary and plasma osmolality, which confirmed hypovolemic hyponatremia. He was treated with a slow intravenous infusion of 500 mL of 3% NaCl at a rate of 1 mL/kg/hr under close monitoring. This was followed by an infusion of normal saline (0.9% NaCl) until his serum sodium levels returned to normal (Figure 5). Subsequently, the patient was transferred to a neurosurgical facility in Dhaka for operative management of the pituitary tumor.

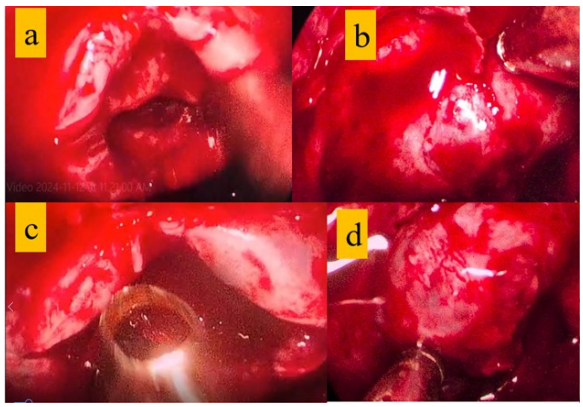
Figure 5: Serum electrolytes from days 1-5



Endonasal endoscopic trans-sphenoidal removal of the pituitary macroadenoma:

Under general anesthesia, the patient was positioned supine with slight head flexion. The nasal cavity was prepared with antiseptic and antibiotic solutions. After topical decongestion and local infiltration, a posterior septectomy was performed and the middle turbinate was lateralized to create a surgical corridor. The sphenoid ostium was identified and the anterior sphenoid wall was opened and widened using Kerrison rongeurs. Intrasphenoidal septations were removed to expose the sellar floor. The sellar bone was carefully drilled to expose the dura, which was then opened to visualize the pituitary tumor. Tumor debulking was performed using a long pituitary rongeur and ring curette, with endoscopic inspection confirming gross total resection (Figure 6). Reconstruction involved placement of a fat graft within the sellar cavity and application of fibrin sealant (Tisseel) to prevent CSF leakage. A nasal pack was placed and kept for 48 hours. The surgery was uneventful, and the patient had an uncomplicated postoperative recovery. The removed tissue was sent for histopathological examination, which revealed a neoplasm composed of nests of monotonous cells having ovoid nuclei with 'salt and pepper' like chromatin and moderate eosinophilic cytoplasm; some tumor cells formed pseudo rosettes around vascular channels; no mitosis was seen. These features suggested a pituitary neuroendocrine tumor (Pit-NET).

Figure 6: Steps of operative procedure and post-operative state



a. Incision over sellar coverings to get access to the pituitary
b. Exposure of the pituitary tumor after opening the dura mater
c. Removal of the pituitary tumor in piecemeal by ring curette
d. Diaphragma sella after removal of the sellar floor

Follow-up after removal of the pituitary macroadenoma:

The first follow-up CT scan of the head (Figure 7), performed 48 hours after tumor removal, revealed a bony defect in the sellar floor, postsurgical pneumocephalus, and soft tissue density consistent with postoperative packing. No acute intracranial hemorrhage or large residual mass was detected. However, a small lobulated enhancing soft tissue lesion was noted in the left paranasal region, suggestive of mild residual tumor compressing the optic chiasma. The patient remained clinically stable throughout the postoperative period and at subsequent follow-up visits. *The second follow-up* MRI of the brain (Figure 8a), obtained 4 months after surgery, demonstrated residual tumor tissue in the sellar-suprasellar region. Compared with the earlier imaging, the optic chiasma appeared relatively decompressed. *The third follow-up* MRI (Figure 8b), performed 9 months postoperatively, showed no evidence of residual or recurrent tumor extending into the suprasellar region. The optic chiasm appeared decompressed without visible upward displacement, and the pituitary stalk was not thickened. Surrounding brain structures, including the brainstem and ventricles, appeared normal. Follow-up pituitary hormone assays were also within normal limits. There was significant clinical improvement of visual field defect after one year.

Figure 7: Post-operative evaluation with CT scan head- a) bony window, b) coronal view, c) sagittal view

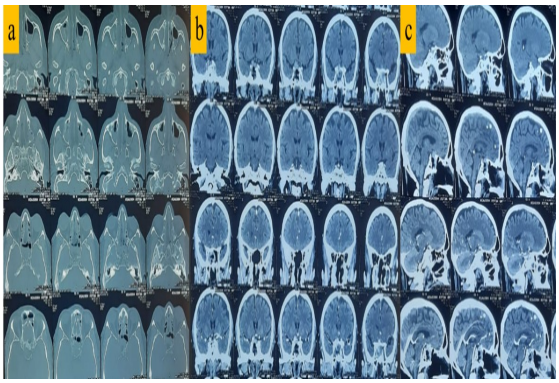
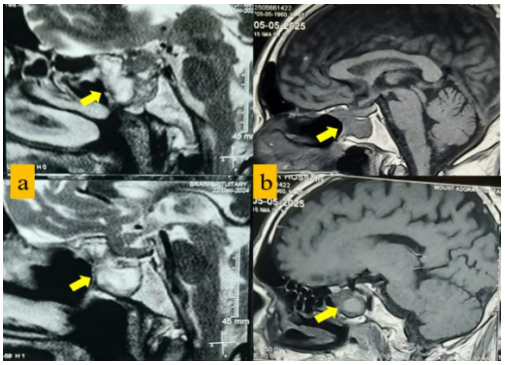


Figure 8: Post-operative evaluation with MRI of brain- a) after 4 months and, b) after 9 months



Discussion

Pituitary macroadenomas can present with a wide range of clinical manifestations, but they remain asymptomatic, particularly when they are non-functioning tumors.[1,6] A substantial proportion of patients with non-functioning pituitary neuroendocrine tumors (nfPitNETs) are asymptomatic, and when symptoms do occur, they are typically due to the tumor's mass effect, including headaches, visual field defects, or hypopituitarism.[3] The rate of asymptomatic cases varies across studies; one study reported that about 47% of patients with non-functioning pituitary adenomas were incidentally diagnosed, whereas 53% were symptomatic.[7]

In the present case, severe hyponatremia was the primary clinical issue that prompted medical attention. The mechanisms of hyponatremia in nonfunctioning pituitary macroadenomas are multifactorial and may include secondary adrenal insufficiency, central hypothyroidism, and, less commonly, syndrome of inappropriate antidiuretic hormone secretion (SIADH).[8,9] The index patient had primary hypothyroidism, constipation, vomiting, and gas-distended bowel loops on abdominal radiography, all of which may have contributed to hyponatremia through gastrointestinal losses.

Nonfunctioning pituitary neuroendocrine tumors (nfPitNETs) can lead to hypopituitarism;[10] however, in this case, the patient demonstrated normal levels of anterior pituitary hormones. He had a prior diagnosis of hypothyroidism, which was likely attributable to primary thyroid gland failure, as indicated by normal thyroid-stimulating hormone (TSH) levels with thyroxine replacements.

The presence of compression over the optic chiasm was an indication for surgical removal of the tumor. An endonasal endoscopic approach was preferred due to its minimally invasive nature, superior illumination, and wider visualization of the operative field less chances of complications.[11] This method represents an important addition to the surgical repertoire and should be considered in the management of patients with complex cranial base pathologies.[12,13]

A follow-up CT scan of the head performed 48 hours after surgery revealed a small residual tumor, which is not an uncommon finding. This appearance may result from the application of fibrin sealant and fat grafts in the sellar cavity after tumor removal, mimicking residual tumor. Such changes usually resolve within weeks to months after the procedure.[14,15] In this case, an MRI of the brain obtained 9 months postoperatively showed no residual soft tissue mass and significant decompression of the optic chiasm.

Conclusion

Nonfunctioning pituitary neuroendocrine tumors (nfPitNETs) can remain clinically silent for prolonged periods and are often discovered incidentally or during evaluation for unrelated medical conditions. Although functionally inert, they may cause significant morbidity by exerting mass effect on adjacent structures such as the optic chiasma or cavernous sinuses. Endoscopic endonasal resection provides a safe and effective approach for the management of these tumors.

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