Scientific Research Publishing

Yangtze Medicine, 2026, 10(2), 44-49
https://www.scirp.org/journal/ym
ISSN Online: 2475-7349
ISSN Print: 2475-7330

Neurohypophysis Cyst: Not Always Straightforward

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How to cite this paper: Guerboub, A.A. (2026) Neurohypophysis Cyst: Not Always Straightforward. *Yangtze Medicine*, **10**, 44-49.
https://doi.org/10.4236/ym.2026.102005

Received: March 12, 2026
Accepted: April 19, 2026
Published: April 22, 2026

Abstract

Incidentaloma, a term frequently used in endocrinology to refer to the adrenal glands and thyroid, also applies to the pituitary gland. The management of pituitary incidentalomas is controversial. The incidental discovery of a pituitary cyst is relatively common and often warrants an endocrinological consultation. Some lesions can increase in size and lead to pituitary insufficiency or compression of the optic chiasm, while others remain stable and cause no tumor-like or hormonal symptoms. Our case concerns a 48-year-old woman followed in our department for a simple neurohypophysis cyst discovered incidentally. After two years of biological and radiological monitoring, her condition progressed with the gradual onset of asthenia, bradycardia, and hypotension, with a tendency toward hypoglycemia and the biological assessment revealed hyperprolactinemia with borderline low cortisol levels and a tendency towards hyperkalemia. A brain MRI revealed that the neurohypophysis cyst had doubled in size, increasing from 3.5 × 4 mm to 7 × 7.5 mm, while remaining well-defined, prompting the initiation of hormone replacement therapy with complete resolution of symptoms. When a cyst in the sellar region is discovered incidentally during a CT or MRI scan, the first challenge is to differentiate it from various pituitary cystic lesions: Rathke's pouch cyst, cystic craniopharyngioma, cystic adenoma, or simple neurohypophysis cyst, as this diagnosis significantly influences the treatment decision. Clinical and radiological monitoring can be considered when the lesion is small and non-secreting, thus relegating surgery to other indications.

Keywords

Incidentaloma, Neurohypophysis Cyst, COVID-19, MRI

1. Introduction

The term incidentaloma, widely used in adrenal and thyroid endocrinology, applies

equally to the pituitary gland. Indeed, with the frequent use of modern imaging techniques, pituitary abnormalities are increasingly being identified in asymptomatic patients or those being monitored for other conditions. Some lesions will remain stable on imaging and without biological repercussions, while others may increase in size, leading to endocrine or intracranial complications. Simple neurohypophysis cysts are found in 2% to 3% of the general population and are always asymptomatic.

2. Observation

This observation illustrates a case of a simple neurohypophysis cyst, discovered incidentally during a migraine assessment, which became symptomatic after 2 years of follow-up. The patient is a 48-year-old woman, mother of two children, with no particular medical history, who was followed up at our center for a simple cyst of the neurohypophysis gland.

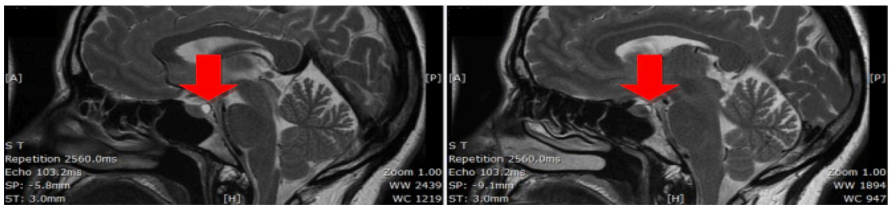

Figure 1. Magnetic resonance imaging at the time of diagnosis.

The history of the disease dates back to March 2022, following severe COVID-19 infection requiring hospitalization in an intensive care unit, with the onset of intermittent headaches after recovery from COVID infection that were resistant to symptomatic treatment. The patient consulted a neurologist who prescribed symptomatic treatment, but there was no improvement. A brain MRI revealed an oval-shaped lesion in the neurohypophysis gland, well-defined, with low T1 signal intensity, high T2 signal intensity, a regular wall, no enhancement after gadolinium injection, measuring 3.5 × 4 mm. This formation has homogeneous content and laminates the parenchyma of the neurohypophysis gland, which retains normal signal and kinetics (**Figure 1**). This morphological aspect supports a simple neurohypophysis cyst, ruling out all other differential diagnoses. Given the persistence of symptoms, the patient was referred to our department for treatment despite a complete hormonal assessment that proved to be normal particularly in terms of adrenal function: Prolactin at 12 ng/ml (2 - 25 ng/ml), TSHus at 0.96 mUI/ml (0.2 - 4.7 mUI/ml), Cortisol 8 a.m at 350 nmol/l (138 and 690 nmol/l), indicating simple biological monitoring every three months and radiological monitoring every year. The course of the disease was marked by the gradual onset in December 2024 of asthenia, bradycardia, and hypotension with a tendency toward hypoglycemia. The clinical examination revealed a weight of 66 kg, height of 162 cm, BMI of 25 kg/m^2, and waist circumference of 82 cm. Blood pressure was 105/55 mmHg with a heart rate of 54 beats per minute, confirmed by Holter ECG

and blood pressure monitoring. The rest of the examination was unremarkable. Hormone testing showed cortisol levels at 8 a.m. of 138 nmol/L, potassium levels of 4.9 mmol/L, sodium levels of 133 mmol/L, and hyperprolactinemia of 41 ng/ml, which is most likely a disconnection hyperprolactinemia secondary to the increase in the cyst volume. A complete ophthalmological examination, including a fundus examination and visual field test, came back without abnormalities.

A brain MRI revealed that the cyst in the neurohypophysis gland had doubled in size, measuring 7 × 7.5 mm (versus 3.5 × 4 mm). It remained well-defined, with low T1 signal intensity, high T2 signal intensity, and a regular wall, and did not enhance after gadolinium injection (Figure 2).

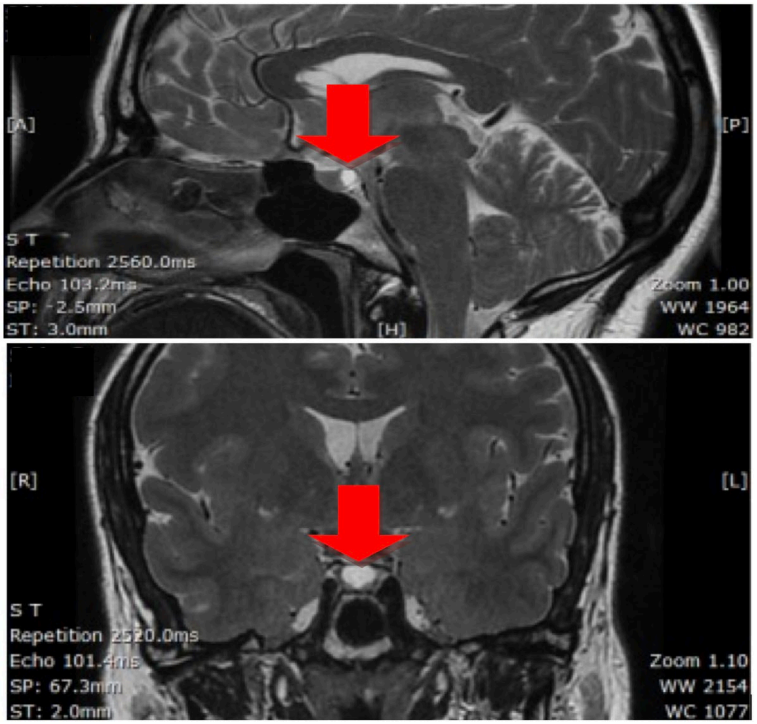

Figure 2. Magnetic resonance imaging after two years of diagnosis.

Given the signs suggestive of corticotropic insufficiency, emergency treatment with Hydrocortisone® 10 mg, two tablets in the morning at 8 a.m. and one tablet at 4 p.m. daily, was initiated as first-line therapy, resulting in marked improvement. After two months of treatment, there was a notable progress, with complete resolution of symptoms and a significant improvement in the patient's quality of life. The patient consented to her treatment and to the publication of her case.

3. Discussion

(1) The management of pituitary incidentalomas is controversial. Some lesions may increase in size, potentially leading to pituitary insufficiency or compressing the optic chiasm, while others will remain stable in size and will never produce any tumor or hormonal symptoms [1].

(2) The prevalence of pituitary incidentalomas reported in the literature is difficult to interpret [2].

(3) In autopsy and neuroradiological series of pituitary incidentalomas, microadenomas are common, macroadenomas are rare, and cysts are exceptional [2] [3].

1) According to neuroradiological series, if the evaluation is performed by MRI, approximately 10% of the "normal" general population has a pituitary incidentaloma smaller than 10 mm, and only 1% has a lesion larger than 10 mm.

2) Simple cysts of the neurohypophysis gland are found in 2% to 3% of the general population and are almost always asymptomatic.

3) In autopsy studies, pituitary cystic lesions are found in 1% to 2% of cases:

a) 60% are Rathke's pouch cysts.

b) 5% are simple cysts of the neurohypophysis gland that rarely exceed 3 to 4 mm in length, which differentiates our case, measuring 7 × 7.5 mm [2]-[4].

(4) The main problem is diagnostic: how can we distinguish between the various types of pituitary cystic lesions?

1) When a cyst in the sellar region is found incidentally on a CT or MRI scan, it is necessary to differentiate between a cystic craniopharyngioma, a Rathke's pouch cyst, a cystic adenoma, or a simple cyst of the neurohypophysis [5] [6].

2) Therefore, the most difficult problem with cystic lesions is making a differential diagnosis.

3) On MRI, the appearance of craniopharyngioma varies depending on the proportion of solid or cystic features and the presence or absence of calcifications.

4) All patients with incidentally discovered pituitary cysts should therefore undergo a brain CT scan to check for calcifications, which, although non-specific, are highly suggestive of craniopharyngioma [5] [6].

5) Rathke's pouch cysts occur in adults. They generally remain small, intrasellar, and asymptomatic, but one-third may extend beyond the suprasellar region.

6) Rarely, they can become symptomatic, causing optic compression or pituitary gland dysfunction [6].

7) The third differential diagnosis is cystic or hemorrhagic adenoma, which is located in the anterior pituitary gland and enhances as a thick, irregular peripheral ring; the normal pituitary parenchyma is located above or around the lesion [2] [6].

8) The fourth lesion that could pose a diagnostic problem with cysts in the sellar region is the arachnoid cyst, which has a signal identical to that of cerebrospinal fluid and is generally located suprasellar [2] [3] [6].

9) Neurohypophysis cysts generally appear as purely cystic lesions on MRI. They are typically hypointense on T1-weighted sequences and hyperintense on T2-weighted sequences. This formation has homogeneous content and laminates the neurohypophysis parenchyma, which retains normal signal and kinetics [1] [4] [5].

10) Another common cause of incidentaloma is normal pituitary hypertrophy in young women. Careful examination of MRI images can distinguish it from pituitary tumors and infiltrating lesions, thereby avoiding unnecessary major surgery [1] [2].

(5) COVID-19 infection can cause rare but serious neuroendocrine complications, resulting either from the intense systemic inflammatory response (cytokine storm) linked to SARS-CoV-2, causing hypophysitis, or from the direct invasion by the virus of the hypothalamic-pituitary system via "Angiotensin-Converting Enzyme 2" receptors, affecting the production of hormones, particularly from the neurohypophysis (ADH/Vasopressin) [7]. Case studies suggest a possible association between COVID-19 infection and pituitary disorders, including the discovery of cysts in patients with post-COVID corticotropic insufficiency. These cysts may be stable but require hormonal monitoring, as the infection can reveal pre-existing abnormalities or cause cystic lesions [8].

(6) For treatment, simple monitoring is scheduled, based on imaging and hormonal assessment, especially for the very rare cases of cysts that increase in size, as in our patient [1] [2].

4. Conclusions

The incidental discovery of a pituitary cyst is fairly common and often warrants consultation with an endocrinologist.

Distinguishing between a simple cyst and a mixed solid-cystic mass, determining its location, and assessing its potential endocrine and intracranial impact are the main issues that significantly influence the treatment decision. Monitoring may be recommended when the lesion is small, non-secreting, and easy to monitor, thereby relegating surgery to other indications.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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