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# Pituitary abscess in an eight-year-old girl — diagnostic difficulties

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A pituitary abscess (PA) is an uncommon clinical entity that accounts for <1% of all cases of pituitary conditions, with 300 cases reported globally and only a few cases in children. The first case was described by Heslop in 1848 [1]. To reach a diagnosis in such cases is usually difficult. Clinical presentation varies greatly, which may be misleading in the initial stage and can delay proper treatment. Magnetic resonance imaging (MRI) findings should be differentiated from other sellar and suprasellar lesions. Treatment modalities include neurosurgical drainage, broad-spectrum antibiotics, and hormonal replacement. This case describes a rare pituitary lesion in a child with pituitary dysfunction and symptoms suggestive of meningitis.

An 8-year-old girl was admitted to the Department of Infectious Diseases in August 2021 due to suspected meningitis. On examination, symptoms such as headaches, fever, unremarkable neck stiffness, polyuria, and polydipsia were present. The patient did not show any cranial nerve, limb, or gait abnormalities. She had a medical history of nocturnal enuresis since March 2021, recurrent bacterial sinusitis, last one 2 months earlier. Laboratory evaluation was negative for leucocytosis 10.9 × $10^3/\mu$L with a neutrophil count of 7.83 × $10^3/\mu$L. C-reactive protein was 0.5 mg/dL and was within the norm. The endocrine panel revealed adrenal and thyrotropic deficiency (Supplementary File — Tab. 1). Based on serum and urine osmolality, lack of MRI neurohypophyseal bright signal, and clinical presentation, a diagnosis of diabetes insipidus was established. Cerebrospinal fluid (CSF) examination revealed high cytosis with a neutrophilic smear. Blood, urine, and CSF cultures were sterile. The infectious panel from CSF was also negative. MRI imaging showed a 23 × 16 × 19 mm cystic lesion in the sella. (Fig. 1A) The ophthalmological examination did not reveal any abnormalities. A pituitary abscess was suspected, considering the acute course of symptoms and MRI findings. Prompt broad-spectrum antibiotic therapy with ceftriaxone and metronidazole was initiated. The patient was started on hydrocortisone, L-thyroxine, and desmopressin to resolve symptoms and was transferred to the Department of Endocrinology of the Children's Memorial Health Institute. Markers in the serum, such as $\alpha$-fetoprotein (AFP), were within the norm, and the beta-subunit of human chorionic gonadotropin (beta-HCG) was negative. Antinuclear antibodies (ANA), anti-neutrophil antibodies (ANCA), and anti-thyroperoxidase antibodies (anti-TPO) were not present. QuantiFERON test was negative (Supplementary File — Tab. 1). Chest X-ray did not show any abnormalities. The patient was considered for neurosurgical intervention. However, it was not deemed necessary due to improvement on MRI imaging (Fig. 1B) and alleviation of symptoms. Antibiotics were continued for 6 weeks with excellent effect. MRI obtained at 3-month follow-up showed significant regression of the lesion (Fig. 1C). The repeated endocrine panel showed adequate hormonal substitution (Supplementary File — Tab. 1). The patient remains under endocrinological supervision and is scheduled for a tonsillectomy.

PA is divided into 2 types: primary and secondary. The primary subtype develops in a previously normal pituitary gland (accounting for 70% of causes, as in our pa-

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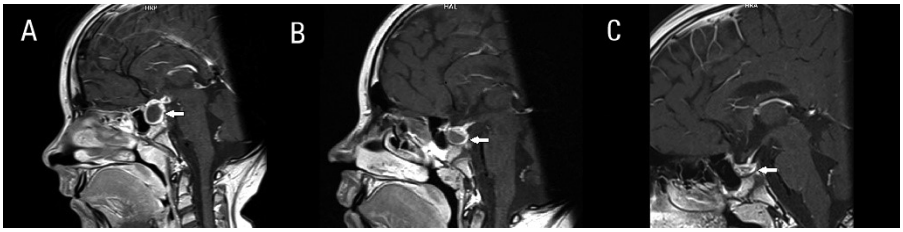


**Figure 1.** *Magnetic resonance imaging (MRI).* **A.** *Sagittal MRI imaging shows a cystic lesion in the sellar region the size of 23 × 16 × 19 mm with peripheral enhancement and pathologically changed pituitary stalk, pharyngeal tonsil hypertrophy, and mucosal oedema of the sinuses.* **B.** *MRI during treatment shows a significant reduction in the size of the lesion: 20 × 14 × 14 mm.* **C.** *Follow-up MRI shows further regression of the lesion*

tient), and secondary arises from pre-existing pituitary lesions such as craniopharyngioma, pituitary adenoma, or Rathke's cleft cyst [1, 2]. PA can be observed because of the haematogenous spread of an infection adjacent to the sellar region, such as sphenoid sinusitis or dental infection. In addition, there are possible risk factors for PA, such as previous surgical or irradiation interventions, sepsis, local infection, or diabetes mellitus [1, 2]. In PA, usually, gram-positive pathogens, including *Staphylococcus* or *Streptococcus* species, are detected. However, almost half of the obtained cultures have been reported to be sterile [1, 3]. Our patient had a good response to broad-spectrum antibiotics; therefore, neurosurgical intervention was not necessary.

The clinical manifestation of PA is nonspecific and includes headache, visual disturbance, neurological symptoms, hypopituitarism, and diabetes insipidus. Symptoms such as fever or meningismus are rare [1]. In our case, the patient presented with fever and neurological symptoms, which resolved during treatment. Sphenoid sinusitis revealed on MRI and history of three instances of sinusitis in the past strongly suggested that it was the source of infection.

MRI findings are nonspecific, including cystic lesions with isointensity or hypointensity on T1-weighted and isointensity or hyperintensity on T2-weighted imaging. After gadolinium injection, peripheral rim enhancement is noted. Diffusion-weighted imaging might be helpful because PA demonstrates a reduction in the apparent diffusion coefficient, whereas necrotic tumours have higher values [4]. In our patient, thickening of the pituitary stalk was also a notable finding. It prompted the inclusion of germinoma and hypophysitis in the differential diagnosis, especially because diabetes insipidus was also present. Follow-up MRI imaging showed a decrease in the lesion volume, which confirmed our initial diagnosis.

Transsphenoidal evacuation followed by antibiotic therapy for 4–6 weeks is usually recommended, although antibiotic treatment alone may be sufficient in some cases [2]. Empiric therapy consists of metronidazole and ceftriaxone with the possible inclusion of vancomycin. Hormonal deficiencies may resolve after treatment, but the risk of a recurrence exists, which warrants close follow-up.

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