Pituitary Abscess Causing Hypopituitarism in a Patient With Acquired Immunodeficiency Syndrome

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A B S T R A C T

Background/Objective: Pituitary abscess is an uncommon infectious process, comprising <1% of pituitary pathology; however, it can be challenging to diagnose and treat.

Case Report: A 46-year-old woman with acquired immunodeficiency syndrome (AIDS) presented with headaches, nausea, and visual disturbances. Imaging revealed a sellar mass with peripheral wall enhancement. She was found to have panhypopituitarism. A diagnosis of pituitary abscess was made based on the patient’s presentation and imaging results. She was started on broad-spectrum antibiotics, corticosteroids, and thyroid hormone, with improvement of her symptoms and imaging results. Surgery was not performed given the patient’s immunocompromised state and improvement with medical therapy.

Discussion: Infection spread from neighboring structures is a common cause of pituitary abscess, and such infections can occur after surgery or head trauma. Pituitary abscesses can be difficult to distinguish from other lesions; however, rim enhancement is one of the classic findings. Pituitary dysfunction is common, with secondary adrenal insufficiency and diabetes insipidus being the most common hormonal deficiencies found. In addition to antibiotic therapy, the transsphenoidal debridement approach has been the most common route of treatment.

Conclusion: We present a case of pituitary abscess in a patient with AIDS, which likely developed after the patient sustained head trauma. Our patient presented with evidence of panhypopituitarism, requiring emergency treatment. Antibiotic therapy alone was used for treatment. She had to complete a 6-week course of a broad-spectrum antibiotic regimen because the culprit organism could not be identified. Given her posttreatment imaging studies, pituitary function recovery was unlikely because the pituitary gland was completely compromised.

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Introduction

Pituitary abscess is a rare infectious process caused by several organisms that can invade the pituitary gland.1 This process can be primary for an otherwise healthy patient or secondary, arising from an existing pituitary lesion such as an adenoma or a cyst.2 Organisms including bacteria, fungi, and mycobacteria have been previously reported to cause pituitary abscess.3 There are several case reports of pituitary abscess in the literature; however, its preoperative diagnosis continues to be a challenge given the rarity of the disease.4 Several routes of infection have been described, including hematogenous spread and retrograde infection due to sphenoid sinusitis.5 Transsphenoidal surgery has been described to be the safest route of treatment.6 We present a case of pituitary abscess following head trauma in a patient with AIDS, which was treated nonsurgically.

Case Report

A 46-year-old female patient presented to the emergency department with a 6-week history of headaches, posterior neck...
pain, nausea, loss of appetite, and blurry vision. Two weeks prior to the onset of these symptoms, the patient sustained head trauma from a domestic abuse incident but did not require hospitalization or surgical intervention. Her last menstrual cycle was 4 weeks prior to the head trauma incident, and the patient reported having normal menstrual cycles.

The patient's medical history included HIV/AIDS (with a CD4 count of 124 cells/μL), chronic hepatitis B infection, cocaine abuse, and a remote history of infectious endocarditis. She was found to have a low-grade fever (100.4 °F, tested orally), hypotension (76/51 mm Hg), a normal respiratory rate (17 breaths/min), and a tachycardic heart rate (126 beats/min). Her oxygen saturation was also normal at 96%.

Physical examination showed a cachectic patient in acute distress. Neurologic examination did not reveal any abnormalities. Cardiovascular examination was pertinent for tachycardia. The rest of her physical examination did not show any significant findings. A formal visual field examination could not be performed at the time of presentation.

Laboratory tests showed moderate hyponatremia; hypochloremia; an elevated creatinine level, consistent with acute kidney injury; and hypalbuminemia. Her complete blood count revealed anemia and leukopenia (Table). A pregnancy test yielded a negative result.

Contrast-enhanced magnetic resonance imaging (MRI) of the brain revealed a centrally necrotic mass, filling the sella and extending into the suprasellar cistern, with thick peripheral wall enhancement and a slight increase in size (Fig. 1A and B). There was no evidence of acute or chronic sinusitis on the initial computed tomography or MRI scan.

The patient was admitted to the neurointensive care unit for strict monitoring and was started on aggressive intravenous fluid resuscitation and empiric, broad-spectrum antibiotics, including vancomycin, cefepime, and metronidazole, in addition to the antifungal agent fluconazole. Hormonal analysis revealed central hypothyroidism, secondary adrenal insufficiency, a low insulin-like growth factor-1 level, and a low prolactin level (Table). A pregnancy test yielded a negative result.

A computed tomography scan showed a hypoenhancing and hypodense mass within the sella, measuring 1.4 × 0.8 × 0.7 cm, with suprasellar extension, superior deviation of the infundibulum, and superior displacement of the optic chiasm (Fig. 1A and B). Contrast-enhanced magnetic resonance imaging (MRI) of the brain revealed a centrally necrotic mass, filling the sella and extending into the suprasellar cistern, with thick peripheral wall enhancement and a slight increase in size (Fig. 1A and B). There was no evidence of acute or chronic sinusitis on the initial computed tomography or MRI scan.

Ten days after antibiotic therapy was started, repeat contrast-enhanced MRI of the brain showed an interval decrease in the size of the mass and thickening of the peripheral wall (Fig. 2A and B). During this 10-day interval, the patient was still on the same broad-spectrum antibiotic regimen.

Based on evaluations by the endocrinology, infectious disease, radiology, and neurosurgery teams, the patient was diagnosed with pituitary abscess. Her blood cultures did not reveal a specific organism. Because lumbar puncture was performed after the initiation of antibiotic therapy, it was not useful. Given her AIDS status and the improvement of her clinical status and imaging results while she was on the antibiotics, the neurosurgery team recommended no surgical intervention. The patient received a 6-week regimen of vancomycin, cefepime, and metronidazole. Repeat MRI, 11 months after treatment, showed evidence of pituitary destruction, including loss of gland volume and loss of tissue enhancement (Fig. 2C and D).

The patient continued to have persistent, central hypothyroidism, requiring oral levothyroxine, and secondary adrenal insufficiency, requiring a physiologic dose of oral hydrocortisone, indefinitely. Her menstrual cycles never returned, and laboratory tests continued to show secondary hypogonadism. The patient self-discontinued desmopressin after hospital discharge and reported no polyuria or polydipsia. Therefore, desmopressin was discontinued. Subsequent laboratory tests showed normal sodium levels and serum osmolality.

Discussion

Despite >200 cases of pituitary abscess reported in the past, this condition continues to comprise <1% of all pituitary lesions, thus contributing to the difficulty of correct diagnosis and delay in initiation of antibiotics. In a case series of 33 patients analyzed by Liu et al in 2011, only 15 patients were correctly diagnosed with pituitary abscess prior to surgery, whereas the majority of the remaining patients were diagnosed with pituitary adenoma or craniopharyngioma based on imaging.

To improve diagnostic knowledge of this rare process, the imaging findings of 51 patients were analyzed. The classic MRI findings included T1 hypointensity or isointensity of the pituitary gland, T2 hyperintensity or isointensity, peripheral rim enhancement after gadolinium injection, and at least 1 sign of invasion to surrounding structures such as the pituitary stalk and the meninges. These findings were similar to those observed on our patient's MRI scan, which also showed peripheral enhancement and extension into the suprasellar cistern.

As for clinical presentation, generalized, bitemporal headache was the major presenting complaint in 24 patients with pituitary abscess studied by Vates et al in 2001. Fever was present in only 8 patients, and the triad of elevated white blood cell count, fever, and meningismus was present in only 6 patients. In our patient, a low-grade fever was present; however, leukopenia could have resulted from the long-standing HIV infection. We believe that life-threatening hypotension in our patient could have resulted from...
After Discharge, diabetes insipidus was found in 70% of cases.7 Pituitary abscess at their institution. Adrenocorticotropic hormone dysfunction were present in >80% of patients at their initial encounter with health care providers. They studied 66 cases of pituitary abscess at their institution. Adrenocorticotropic hormone deficiency was the most common postoperative deficiency, followed by thyroid-stimulating hormone deficiency. Secondary hypogonadism was the least common condition.8 In another study, diabetes insipidus was found in 70% of cases.7

The route of infection can also vary. However, multiple reports have shown acute or chronic sphenoid sinusitis to be a culprit, in addition to posttranssphenoidal surgery and hematologic seeding. Furthermore, the presence of a previous pituitary lesion seems to have an impact on the formation of an abscess. Of the reported lesions, pituitary adenoma, craniopharyngioma, and Rathke cleft cyst were the most common.1,5,7 Our patient had not undergone any previous cranial imaging to determine the presence of untreated sinusitis or previous pituitary lesions. We believe that her immunocompromised state increased her chances of developing pituitary abscess after the head trauma incident, although the exact mechanism remains unclear. Although head trauma is a well-established cause of pituitary dysfunction,2 it does not seem to be a common cause of pituitary abscess formation.

Several microorganisms have been cultured from pituitary abscesses, including but not limited to Staphylococcus species, Pseudomonas species, Acinetobacter species, Clostridium species, Escherichia coli, Toxoplasma, and Aspergillus.5,6,9 Given our patient’s immunocompromised state and the blood cultures not revealing a specific organism, the safest treatment option was to administer broad-spectrum antibiotics that target major organisms that have been cultured from previous pituitary abscesses.

Early surgical drainage has been the standard of care for the majority of reported cases, in addition to broad-spectrum antibiotics during the perioperative period and up to 6 weeks afterward. Among the 66 patients who were analyzed in 1 cohort study, transsphenoidal surgery was used in the vast majority of the patients. However, the transcranial approach, being the more aggressive route, has been used in cases in which the abscess is suprasellar or in patients with contraindications to the transsphenoidal approach.6 Zhu et al10 reported a case of pituitary abscess in a patient, who refused surgical treatment and was treated medically with antibiotic therapy and hormone replacement. The difference between the reported patient and our patient is recovery of pituitary hormonal production in their patient. It is unclear whether our patient’s immunocompromised status contributed to the lack of pituitary recovery.

### Table

| Laboratory Parameter | Patient’s value (at presentation) | Patient’s value (after discharge) | Normal value |
|----------------------|----------------------------------|-----------------------------------|--------------|
| Leukocyte count      | 2.49 x 10^9/L                    | 3.23 x 10^9/L                    | 4.5-10 x 10^9/L |
| Hemoglobin (g/dL)    | 7.6                              | 9.5                               | 12.0-16.0    |
| Sodium (mEq/L)       | 128                              | 143                               | 135-145      |
| Chloride (mEq/L)     | 95                               | 108                               | 101-110      |
| Creatinine (mg/dL)   | 1.23                             | 0.71                              | 0.51-0.95    |
| Albumin (g/dL)       | 2.8                              | 3.4                               | 3.8-4.9      |
| TSH (mIU/L)          | 0.03                             | 0.36                              | 13.8-42      |
| Free T4 (ng/dL)      | 0.3                              | 0.79                              | 0.8-1.7      |
| Free T3 (pg/mL)      | 1.4                              | 1.2                               | 2.0-4.4      |
| Morning cortisol (µg/dL) | 5.0                          | 6.3a                              | 4.0-6.29     |
| ACTH (pg/mL)         | <1.5                             | <1.5                              | 1.5-62.9     |
| Prolactin (ng/mL)    | 2.9                              | 3.5                               | 14.3-23.3    |
| IGF-1 (ng/mL)        | 18                               | 20                                | 57-195       |
| FSH (mIU/mL)         | 1.3                              | 2.8                               | 3.5-12.5     |
| LH (mIU/mL)          | 0.6                              | 1.6                               | 2.4-12.6b    |
| Estradiol (pg/mL)    | 12.0                             | 15.3                              | 12.5-166.0   |

Abbreviations: ACTH = adrenocorticotropic hormone; IGF-1 = insulin-like growth factor 1; FSH = follicle-stimulating hormone; LH = luteinizing hormone; T3 = triiodothyronine; T4 = thyroxine; TSH = thyroid-stimulating hormone.

a Measured at around 8 am.

b Measured at the same time as cortisol.

c Measured at the same time as cortisol.

d Follicular phase.
In our patient, surgery was contraindicated given her immunocompromised state. However, a full course of antibiotics was enough to treat her pituitary abscess. She had to complete a full course of a broad-spectrum antibiotic regimen because we could not culture a specific organism, and her clinical condition improved while she was on this regimen. Her endocrinopathies appear to be permanent, and she continues to need treatment for secondary hypothyroidism and secondary adrenal insufficiency. Diabetes insipidus was resolved.

Disclosure

The authors have no multiplicity of interest to disclose.

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