**Nocardia farcinica** pituitary abscess in an immunocompetent patient: illustrative case

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**BACKGROUND** Pituitary abscess is a rare clinical entity, typically precipitated by *Staphylococcus*, *Pseudomonas*, or *Aspergillus* infection. Although *Nocardia* species–associated central nervous system abscesses have been documented in immunocompromised patients, no case of *Nocardia* pituitary abscesses has been previously reported.

**OBSERVATIONS** A 44-year-old man presented with hemoptysis and was found to have a cavitary right lung nodule, which was presumed histoplasmosis, prompting antifungal treatment. Several months later, he developed panhypopituitarism. Magnetic resonance imaging identified a pituitary mass, which subsequently underwent transsphenoidal endoscopic biopsy. Infectious workup was negative, and the patient was discharged on intravenous ertapenem therapy. Over several months, he developed progressive headaches, and updated imaging confirmed interval enlargement of the mass with new cavernous sinus invasion. He underwent repeat endoscopic biopsy, which yielded positive cultures for *Nocardia farcinica* and prompted successful treatment with trimethoprim-sulfamethoxazole and linezolid.

**LESSONS** The current study highlights a previously unreported clinical entity, the first pituitary abscess attributable to *Nocardia* sp. or *N. farcinica*, which arose in a young, immunocompetent individual. Although rare, atypical infections represent an important component in the differential diagnosis for sellar mass lesions.

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**KEYWORDS** pituitary; pituitary abscess; *Nocardia farcinica*; skull base

Pituitary abscesses are rare, accounting for 1% of pituitary lesions, and may be challenging to differentiate from pituitary adenomas using clinical or radiographic criteria.1 The most common presenting symptoms are headaches, vision disturbances, and endocrine abnormalities.1 Systemic signs of infection are uncommon, particularly in immunocompetent patients, and pituitary cultures from endoscopic endonasal biopsies are frequently negative.2 Where positive, cultures predominantly isolate *Staphylococcus* genus, with *Pseudomonas* and *Aspergillus* also reported in association with pituitary abscesses.1,2

*Nocardia* is a genus of aerobic actinomycetes that are most commonly observed as opportunistic pathogens causing localized or disseminated infections in immunocompromised hosts.3 *Nocardia* rarely infects the central nervous system (CNS), accounting for <2% of all intracranial abscesses.4 Within the *Nocardia* genus, *N. farcinica* is the most likely to manifest with intracranial abscesses formation.5 *N. farcinica* is noteworthy for easy dissemination and propensity for antibiotic resistance, resulting in high case fatality rates.6 Given their contrasting antimicrobial susceptibilities, distinguishing *N. farcinica* from *N. asteroides* is clinically salient, particularly in the setting of CNS infection, because *N. farcinica* is frequently resistant to common agents used in this setting, such as third-generation cephalosporins.7,8

Rare *N. farcinica* CNS abscesses have been reported, almost exclusively among immunocompromised or elderly patients.5,9–11 No prior case of *Nocardia* pituitary abscesses has been documented, neither in an immunocompromised nor an immunocompetent patient. We present the index case of *N. farcinica* pituitary abscess, which arose in a young, healthy host and was subject to a challenging course before the correct diagnosis was established and curative treatment was initiated.
Illustrative Case

A healthy 44-year-old male landscaper in the midwestern United States presented with isolated hemoptysis. He was found to have a cavitation right pulmonary nodule, and bronchoalveolar lavage demonstrated an elevated histoplasmosis yeast complement fixation titer of 1:16. The patient was diagnosed with presumed histoplasmosis; however, a repeat titer 6 months later was negative. After initial diagnosis, the patient did not follow up and denied taking antifungal therapy. No further testing was conducted to assess for disease dissemination. Five months later, he developed severe headaches, fatigue, weakness, chills, and marked unintentional weight loss. Laboratory studies confirmed new panhypopituitarism (serum cortisol, 1.9 mcg/dL; serum testosterone, <7.0 ng/dL; thyroid-stimulating hormone, 0.2 mIU/L; insulin-like growth factor 1, 48 ng/mL), central diabetes insipidus, and cerebrospinal fluid (CSF) lymphocytosis; magnetic resonance imaging (MRI) of the brain revealed a 1.8-cm sellar mass with suprasellar extension and upward displacement of the optic chiasm. The lesion was T1-hypointense and well-circumscribed and had a comparable enhancement pattern to normal gland (Fig. 1A and B). On neurological examination, he had new bitemporal superior quadrantanopsia.

Hormone replacement therapy was initiated, and the patient underwent endoscopic transsphenoidal exploration and biopsy. Intraoperatively, the mass appeared purulent. Tissue specimens were obtained, and empirical broad-spectrum antibiotics were initiated, including cefepime and vancomycin. Comprehensive infectious testing of the serum, CSF, and biopsy specimen produced negative results, including explicit testing for Nocardia. Pathology revealed fibrinopurulent exudate and chronic inflammation, consistent with an infectious process (Fig. 2). Following completion of the workup, the patient was discharged home on intravenous ertapenem therapy. He subsequently developed progressive headache over several months, prompting updated MRI, which confirmed enlargement of the pituitary mass with new cavernous sinus and third ventricular involvement (Fig. 1C). CSF analysis identified worsening lymphocytosis, but comprehensive infectious workup remained unrevealing, including positron emission tomography–computed tomography imaging. In light of the clinical and radiographic disease progression, the patient was received repeat transsphenoidal resection of the sellar mass. Tissue cultures from this second resection specimen were positive for N. farcinica, susceptible to amikacin, minocycline, linezolid, and trimethoprim-sulfamethoxazole. A 2-month treatment protocol was initiated with trimethoprim-sulfamethoxazole and linezolid, during which time the headaches and visual deficits improved in tandem with radiographic resolution of residual disease (Fig. 1D). Pituitary deficits persisted in follow-up, while all test results for possible immunocompromise, including CD4 count and human immunodeficiency virus testing, remained negative.

Discussion

Observations

We report the index case of a pituitary abscess attributable to Nocardia sp. (N. farcinica). In addition to a unique clinical history, the present case is noteworthy for the patient’s young, healthy clinical status without evidence for immunocompromise and the difficulties encountered clinically in attempting to establish a definitive diagnosis. Taken together, these features emphasize the importance of atypical infectious processes in the differential diagnosis for sellar mass lesions.

Nocardia intracranial abscesses are rare; where observed, they appear to arise via hematogenous spread from a primary pulmonary source. Abscess formation in nocardiosis is particularly rare in patients with an immune deficiency; however, scattered case reports have documented other unusual instances of Nocardia CNS abscesses.
in healthy individuals. As with many CNS mass lesions, Nocardia abscesses within the cerebral cortex prototypically present with signs or symptoms of raised intracranial pressure, including headache, nausea, vomiting, or altered mental status. CNS nocardiosis appears to present synchronously with pulmonary disease; correspondingly, Nocardia sp. is an important consideration among individuals presenting with simultaneous nonneoplastic lung and brain lesions.

Although our patient initially presented with an infectious pulmonary lesion that, in retrospect, was almost certainly attributable to Nocardia sp., his case does not fully adhere to this prototypical pattern. Most likely, this is due to the sellar rather than cerebral location of the intracranial mass lesion, which is more accommodating in terms of the lesion size that may be tolerated before symptoms develop, and the fact that the pattern of signs and symptoms will more likely involve the hypophyseal axis, visual system, or both rather than simple intracranial hypertension.

Several other features of the present case are unusual and potentially insightful. The radiographic findings were clearly abnormal but not consistent with typical features of pituitary abscess, adenoma, or other more common sellar pathologies. The infectious workup was also confounding throughout most of the patient’s course, with many tests remaining equivocal even after the diagnosis was established, and infection was considered a less likely item on the differential until frank purulence was encountered intraoperatively. Although negative cultures are common in pituitary abscess across essentially all reported bacterial and fungal species, the intersection of a rare infection with an immunocompetent host likely explains the near-complete lack of definitive findings.

Yet another key point is with respect to treatment: following the initial transsphenoidal resection, routine broad-spectrum agents were considered most reasonable, absent any microbiological data to guide decision-making. As the present case demonstrates, disease recurrence after debulking is a potentially morbid outcome, influenced by a range of factors such as antibiotic resistance, poor abscess penetration, and rapid disease spread into other anatomical compartments. This emphasizes the need for close follow-up and consideration for repeat imaging or neurosurgical exploration if an appropriate treatment response is not observed. Single-agent treatment with etampenem failed to provide adequate disease control in the present case, indicating that multagent strategies may be warranted for cases in which atypical organisms are suspected. Fortunately, following repeat transsphenoidal resection, microbiology data confirmed both the organism and antibiotic sensitivities, allowing initiation of definitive N. farcinica treatment with trimethoprim-sulfamethoxazole and linezolid combination therapy. Finally, although many patients with more routine Nocardia cerebral abscesses recover without residual deficit, our patient had persistent pituitary dysfunction after treatment. This dysfunction reflects the sensitivity of the hypothalamic-pituitary axis to injury and is more aligned with the broader literature regarding mass lesions involving the sella.

Lessons

We report the index case of N. farcinica, which arose in a healthy, young, immunocompetent individual. His clinical course was challenging, particularly from a diagnostic perspective, with equivocal radiographic and laboratory findings delaying the ultimate diagnosis and definitive treatment. Although the present case is highly unusual, it emphasizes several important, generalizable lessons; most importantly, the importance of maintaining a degree of suspicion for atypical infections when more common diagnoses for a pituitary lesion have been excluded, including among immunocompetent patients. Above all, we emphasize the highly variable range of diagnoses that may arise in and around the sella and recommend consideration for neurosurgical exploration as a means to potentially diagnose and treat symptomatic lesions that otherwise confound clinical investigation.

References


Disclosures

The authors report no conflict of interest concerning the materials or methods used in this study or the findings specified in this paper.

Author Contributions

Conception and design: Meyer, Carlstrom, Graffeo. Acquisition of data: Meyer, Scheitler, Carlstrom, Graffeo. Analysis and interpretation of data: Meyer, Scheitler, Graffeo. Drafting the article: Scheitler, Bauman. Critically revising the article: all authors. Reviewed submitted version of manuscript: Meyer, Bauman, Carlstrom, Graffeo. Administrative/technical/material support: Carlstrom. Study supervision: Carlstrom, Graffeo.

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