

Wegener's Granulomatosis with Extension to the Cavernous Sinus

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Background: Wegener's granulomatosis (WG) is an uncommon inflammatory disease which rarely is reported to invade the cavernous sinus.

Objective: To report a case of cavernous sinus syndrome in a patient with longstanding pansinusitis who was found to have Wegener's granulomatosis.

Patient: A 59-year-old African American woman presented with a 10-day history of increasing nasal congestion with loss of taste and a 5-day history of increasing right frontal head pain with visual blurring of the right eye. On exam, she was noted to have diminished visual acuity, an afferent pupillary defect, and mild proptosis on the right, along with a palsy of the right sixth cranial nerve. She had a contrast-enhancing inflammatory process of the sinuses, the right pterygopalatine fossa, and the cavernous sinus by computed tomographic (CT) and magnetic resonance (MRI) scans.

Results: Biopsy revealed a necrotizing granulomatous process compatible with Wegener's granulomatosis. She was switched from empiric anti-bacterial, anti-tuberculous, and anti-fungal therapy to prednisone and methotrexate.

Conclusions: Cavernous sinus involvement in Wegener's granulomatosis is rare, but such a disease process needs to be considered in the differential diagnosis of cavernous sinus syndrome as this will influence the choice of therapy.

TARGET AUDIENCE	CME INFORMATION	CREDIT
<p>This CME article is intended for primary care physicians and physician extenders, internists, neurologists, rheumatologists, ENT specialists, radiologists, and pathologists.</p>	<p>The LSMS Educational and Research Foundation designates this educational activity for a maximum of one (1) <i>AMA PRA Category 1 Credit</i>TM. Physicians should only claim credit commensurate with the extent of their participation in the activity.</p>	
<p>EDUCATIONAL OBJECTIVES</p> <p>After reading this article, the healthcare provider should be able to define a cavernous sinus syndrome; provide some insight into an atypical presentation of Wegener's granulomatosis; review the manifestations of pathological processes involving the cavernous sinus; review some of the radiological manifestations of Wegener's granulomatosis; and discuss some of the potential clinical manifestations of Wegener's granulomatosis. Estimated time to complete this activity is one (1) hour.</p>	<p>DISCLOSURE</p> <p>Dr. Fadil has nothing to disclose. Dr. Gonzalez-Toledo has nothing to disclose. Dr. Kelley has nothing to disclose. Dr. Henley has nothing to disclose.</p>	
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CASE REPORT

A 59-year-old African American woman with the past medical illness of chronic pansinusitis was admitted with a 10-day history of nasal congestion and altered sense of gustation, as well as a 5-day history of right-sided headache with blurry vision. On examination, she had a mild fever and was found to have decreased visual acuity, an afferent pupillary defect, mild proptosis, and sixth nerve palsy in the right eye.

A computed tomographic scan showed pansinusitis extending to the orbits and the cavernous sinuses. The

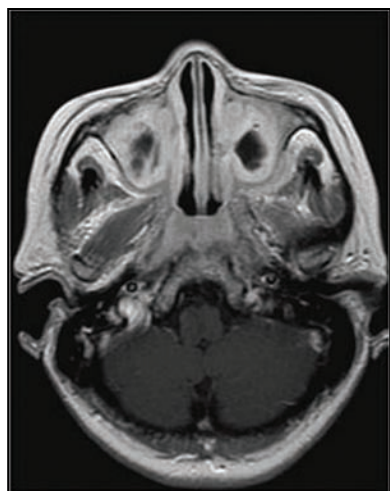


Figure 1. Axial T1 weighted sequence magnetic resonance image of the brain with gadolinium contrast demonstrating extensive pansinusitis.

magnetic resonance scan with gadolinium contrast confirmed the pansinusitis with involvement of the pterygopalatine fossa (Figure 1) and intracranial extension to the cavernous sinuses (Figure 2). A computed tomographic (CT) scan of the chest did not reveal any infiltrate, mass, or lymphadenopathy. The complete blood count and metabolic panel, including renal function tests, were normal. There was no eosinophilia.

The patient was initially empirically treated with antituberculous, antibacterial, and antifungal agents. She then underwent nasal endoscopy with debridement. Microscopic examination of debrided tissue revealed necrotizing and non-necrotizing granulomatous inflammation (Figure 3) with involvement of some of the blood vessels (Figure 4) consistent with Wegener's granulomatosis, even though there were no circulating antineutrophil cytoplasm antibodies (c-ANCA's) present in the serum. No microbial agent could be detected. The antibiotics were discontinued, and the patient was treated with prednisone and methotrexate. At a

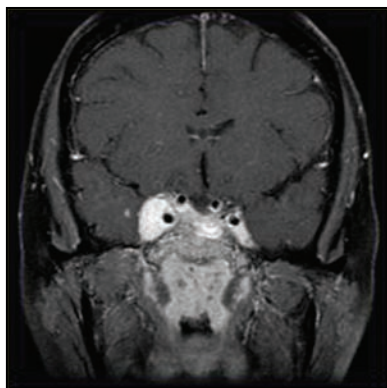


Figure 2. Coronal T1 weighted sequence magnetic resonance image of the brain with gadolinium contrast showing bilateral cavernous sinus involvement.

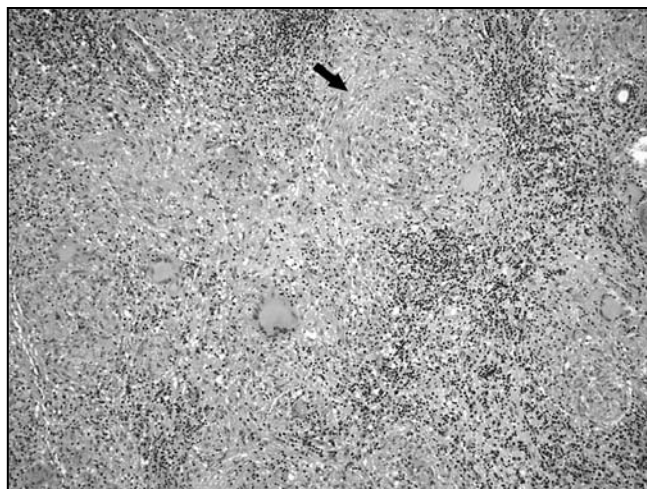


Figure 3. Photomicrograph of middle turbinate showing diffuse granulomatous inflammation. There are multiple poorly formed centrally necrotic granulomas containing giant cells (arrow). (Hematoxylin and eosin stain, original magnification x 100)

follow-up visit a month later, the patient had improved tremendously, and her visual symptoms and signs had subsided.

DISCUSSION

Wegener's granulomatosis is a systemic vasculitis of the small and medium-sized arteries and veins. It is a relatively rare disease of unknown etiology. It is usually associated with the presence of c-ANCA's which are considered a useful serological marker for the disease.¹ However, ANCA-negative cases have been reported.² As many as 10 percent of patients with active, generalized Wegener's granulomatosis and 40 percent of patients with limited forms of the disease (such as the one limited to the upper airways) are ANCA-negative.^{3,4} Histologically, it is characterized by granulomatous inflammation, necrosis, and vasculitis. It primarily affects the head and neck, the lungs, and the kidneys, although it may involve virtually any organ.⁵

Intracranial involvement may occur through three mechanisms. The most common one is by direct extension from the paranasal sinuses, orbits, or mastoid cells as probably happened in this case. The second mechanism is by direct targeting of the cerebral vessels by the vasculitic process. The third mechanism is by formation of granulomas within the brain parenchyma.⁶ Extension to the cavernous sinus has rarely been described.^{7,8} When this occurs, other inflammatory processes involving the cavernous sinus need to be considered. Of particular importance is Tolosa-Hunt syndrome which not only is similarly responsive to steroids, but also can apparently be triggered by Wegener's granulomatosis.^{9,10} Unlike our patient's presentation, however, it is typically a unilateral disease. Our case illustrates the need to consider Wegener's



Figure 4. Photomicrograph of middle turbinate. There is vasculitis with destruction of the black elastic lamina. Granulomatous inflammation of the vessel wall is also evident (arrow). Verhoeff-van Gieson elastic stain, original magnification x 100

granulomatosis in the differential diagnosis of unexplained cavernous sinus syndrome as there is a potential impact on the choice of effective therapy.

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Choose the one answer that is most correct for each question.

1. A cavernous sinus syndrome may include all the following except:
 - a. Paralysis of the oculomotor nerve.
 - b. Paralysis of the fourth cranial nerve.
 - c. A Horner's syndrome.
 - d. Paralysis of the sixth cranial nerve.
 - e. Involvement of the mandibular branch of the trigeminal nerve.
2. Causes of cavernous sinus syndrome include:
 - a. Local tumor invasion.
 - b. Supraclinoid carotid artery aneurysm.
 - c. Tolosa-Hunt syndrome.
 - d. Wegener's granulomatosis.
 - e. All of the above.
3. True/False:
Wegener's granulomatosis is a vasculitis of the large-sized arteries and veins.
4. True/False:
Wegener's granulomatosis is usually associated with circulating antineutrophil cytoplasm antibodies.