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Case Reports

Trigeminal Amyloidoma in a Patient With Cardiac Amyloidosis

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Abstract

Trigeminal amyloidoma is a rare clinical phenomenon with scarce reports in the medical literature. This report presents a case of biopsy-proven trigeminal amyloidoma in a patient with cardiac amyloidosis. This case report sheds light on the differential diagnoses that may resemble trigeminal amyloidoma and strategies for workup and treatment.

Keywords: amyloidosis; cardiomyopathy; skull; biopsy

Case Report

Presentation and Physical Examination

A 73-year-old man was admitted for worsening frontal skull pressure. His symptoms began 6 weeks prior and became difficult to tolerate during the week leading up to his admission. He endorsed pounding frontal headaches with numbness and tingling in his bilateral eyes, cheeks, and occiput. He had been adherent with his immunosuppressant regimen for orthotopic heart transplantation, which included mycophenolate mofetil, prednisone, and tacrolimus. The patient presented to an outside institution, where an otolaryngology consultant diagnosed him with pansinusitis and trigeminal neuralgia. Sinus cultures were analyzed and were positive for *Pseudomonas* and *Achromobacter* species. The patient was subsequently started on intravenous antimicrobials with a projected duration of 6 weeks. Despite completion of antimicrobial therapy, he had worsening headache with accompanying right-sided facial pain and numbness.

Medical History

The patient had a medical history of wild-type transthyretin cardiac amyloidosis manifested through cardiomyopathy and neuropathy. He required an orthotopic heart transplant 4 years beore admission and continued to follow up with the transplant center.

Differential Diagnosis

The differential diagnoses for this patient's presentation included osteomyelitis, recurrent trigeminal neuralgia, infectious sinusitis, and trigeminal amyloidoma.

Technique

The patient presented to the Mayo Clinic with the aforementioned complaints. Initial maxillofacial computed tomography was performed and demonstrated findings consistent with potential osteomyelitis with possible dehiscence and no evidence of cerebrospinal fluid leak. Magnetic resonance imaging (MRI) of the brain showed enhancement

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of the central skull base at the clivus, the petrous pyramids bilaterally, the Meckel cave (trigeminal cavity), bilateral foramina, and the right foramen rotundum (Fig. 1). Endoscopic endonasal biopsy was performed, during which nasopharyngeal tissue appeared fibrotic and edematous, bony defects were noted in the clivus, and samples were collected from the left skull base. Biopsy results were positive for amyloid and produced a Congo red stain with apple-green birefringence (Fig. 2). Immunohistochemistry, electron microscopy, and mass spectrometry were not performed. The radiologic evaluation and biopsy results suggested that the entire syndrome was due to amyloid tissue invading the local trigeminal nerve, with no findings of osteomyelitis.

Key Points

- Trigeminal amyloidomas are extremely rare and complicated to treat.
- Studies have shown utility in computed tomography and MRI to characterize amyloid nodules and assess for nerve involvement, with biopsy being the most definitive diagnostic measure.
- Despite the lack of robust data on therapy for trigeminal amyloidomas, various interventions, including balloon decompression, surgical resection, steroids, and disease-modifying agents used in systemic amyloidosis, may be used.

Abbreviations and Acronyms

MRI magnetic resonance imaging

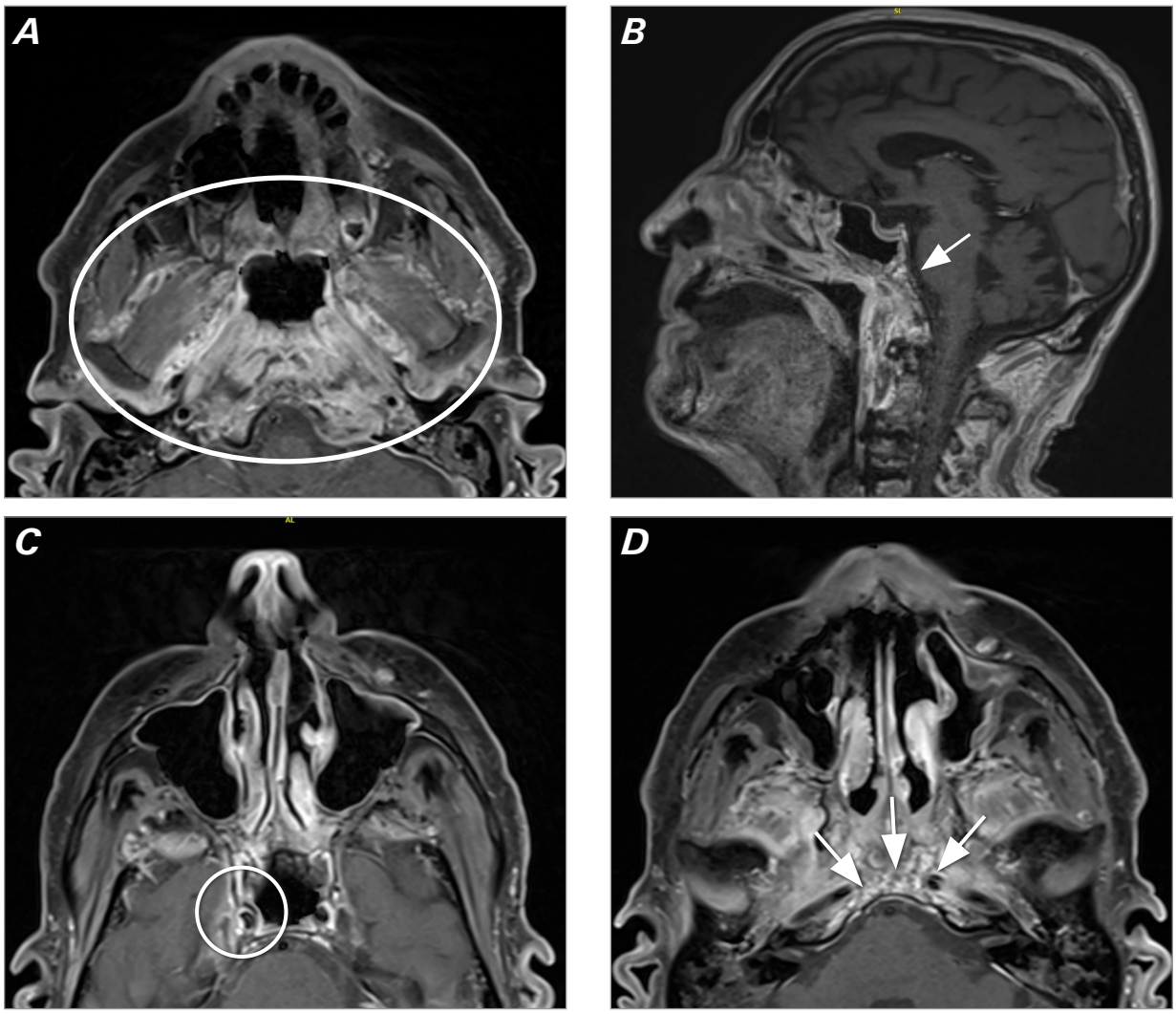
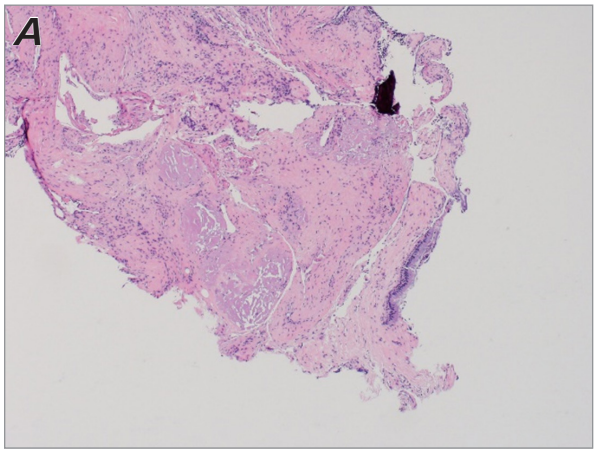
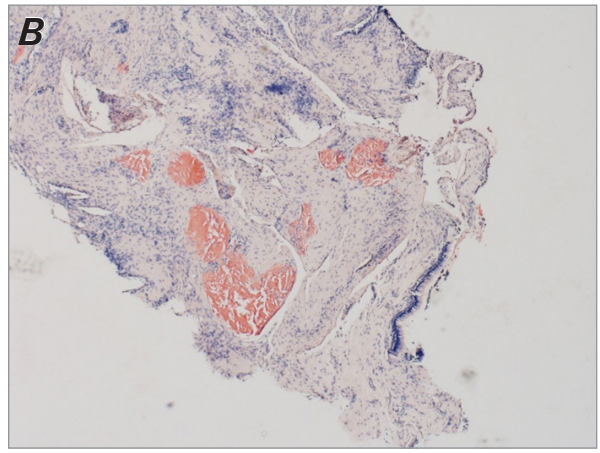


Fig 1. T1-weighted brain magnetic resonance images demonstrating **A**) edematous changes involving the masticator space of the pterygoid muscles bilaterally (oval); **B**) oropharyngeal invasion of amyloidoma (arrow); **C**) enhancement of the bilateral Meckel caves through which the trigeminal nerves traverse, with the right Meckel cave enhancing more than the left (circle); and **D**) enhancement of the clivus and skull base (arrows), suggesting invasion of amyloidoma into bony structures.





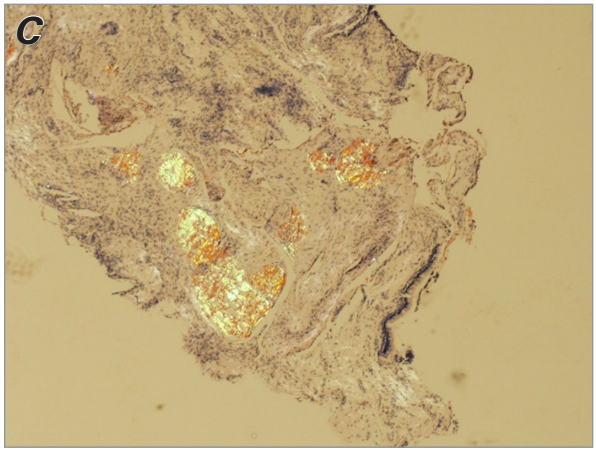


Fig 2. A) Hematoxylin-eosin stain of sphenoid sinus tissue magnified to 100×. **B**) Light microscopy image of Congo red-stained sphenoid sinus tissue magnified to 100×. **C**) Polarization microscopy image of Congo red-stained sphenoid sinus tissue magnified to 100×.

The conclusion of the patient's clinical syndrome was explained by infiltrating cerebral amyloidosis eroding through the skull bone and into the trigeminal nerve, which caused his symptoms. Pharmacologic therapy for pain was initiated with minimal success, so the patient underwent right-sided balloon decompression of the trigeminal nerve by a neurosurgeon. The procedure was well tolerated, and the patient had improved pain symptoms afterward.

Latest Follow-Up

The patient was eventually discharged and started on tafamidis therapy for management of systemic amyloidosis and cerebral amyloidoma with involvement of the trigeminal nerve. He continues to follow up with in the Multidisciplinary Amyloidosis Clinic. The patient has not had any symptoms or indications of amyloidosis recurrence in the heart since his transplant. He had stable left ventricular systolic function with a left ventricular ejection fraction of 63% on the most recent transthoracic echocardiogram.

Discussion

Amyloidomas are localized deposits of misfolded, insoluble amyloid fibrils.[1,2] Solid amyloidomas are exceptionally rare; in fact, fewer than 40 solid amyloidomas have been documented in the past century.[2] Cases have reported amyloidoma findings in the Meckel cave, gasserian ganglion, cerebellopontine angle, pituitary gland, and other parts of the skull.[1] Skull base involvement is extremely rare and has been noted in only a few case reports.[2] Amyloidomas, especially when located at the skull base, have the potential to spread perineurally into the trigeminal nerve and subsequently cause neuropathy. Trigeminal anesthesia, facial numbness, and ear pain have been described in case reports of patients with trigeminal nerve involvement or compression from the amyloidoma.[1,3] Other studies have reported jaw claudication, headache, and visual disturbance symptoms resulting from temporal artery involvement of cerebral amyloidoma.[4]

Diagnosis of trigeminal amyloidomas is challenging because of their varied presentation. Differential diagnoses often include neoplasms of the brain, including schwannomas, lymphomas, gliomas, and metastases. Biopsy with pathology remains the gold standard for diagnosing amyloidomas, but numerous imaging modalities have been used in the investigation of undifferentiated masses resembling amyloidomas. Plain radiographic findings typically show destructive lytic lesions with

regions of calcification.[2] Computed tomography often enhances visualization with the use of contrast to reveal a mass that varies in appearance from hypodense to patchy.[4,5] Very few investigators have reported MRI characteristics of cerebral amyloidomas, with details of heterogenous-appearing masses visualized best with gadolinium contrast enhancement.[2,6] T1-weighted MRI can reveal hypointense lesions, whereas T2-weighted MRI can show both high- and low-intensity lesions.[3,5] Imaging findings may be suggestive of amyloidosis, but biopsy and histopathology demonstrating Congo red-positive material with apple-green birefringence is considered diagnostic, as was the case in this patient.[1,5] Given the nonspecific imaging findings and the difficult locations that amyloidomas can occupy, many case reports have adopted conservative approaches in diagnostic workup, even to the point of avoiding biopsies given interventional limitations. In fact, studies have reported significant issues in differentiating amyloidomas from nerves, with the risk of causing nerve damage and complications, such as worsening anesthesia or motor dysfunction, with diagnostic interventions.[3,5] Currently, there is no consensus on the optimal management of trigeminal amyloidomas, but modalities include biopsy with clinical monitoring, surgical decompression and/or resection, and radiation therapy.[5,6]

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References

1. Hashmi H, Dhanoa J, Manapuram S. Trigeminal amyloidoma: case report and review of literature. *Cureus.* 2018;10(12):e3795. doi:10.7759/cureus.3795
2. Simoens WA, Hauwe L, Hedent EV, et al. Amyloidoma of the skull base. *AJNR Am J Neuroradiol.* 2000;21(8):1559-1562.
3. Gottfried ON, Chin S, Davidson HC, Couldwell WT. Trigeminal amyloidoma: case report and review of the literature. *Skull Base.* 2007;17(5):317-324. doi:10.1055/s-2007-986430
4. Churchill CH, Abril A, Krishna M, Callman ML, Ginsburg WW. Jaw claudication in primary amyloidosis: unusual presentation of a rare disease. *J Rheumatol.* 2003;30(10):2283-2286.
5. Swanson A, Giannini C, Link M, et al. Trigeminal amyloidoma: a report of two cases and review of the literature. *J Neurol Surg B Skull Base.* 2020;81(6):620-626. doi:10.1055/s-0039-1693111
6. Ogilvia J, Zhao R, Camelo-Piragua S, et al. Magnetic resonance imaging of a temporal lobe cerebral amyloidoma. *Radiol Case Rep.* 2022;17(8):2820-2823. doi:10.1016/j.radcr.2022.05.038