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Case Report

Orbital apex schwannoma with a high titer of proteinase 3 antineutrophil cytoplasmic antibody☆

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ABSTRACT

Here, we present a very unusual case of orbital apex schwannoma with a high titer of proteinase 3 antineutrophil cytoplasmic antibody (PR3-ANCA). A 67-year-old man presented with a 3-month history of double vision. Radiological examinations revealed a mass lesion at the left orbital apex, and laboratory examination revealed a high titer of PR3-ANCA, of 49.1 U/mL (reference range<2.0). After the surgery, the lesion was histologically diagnosed as schwannoma, and the PR3-ANCA titer decreased to 8.4 U/m. Although making a correct diagnosis of orbital apex schwannoma may be difficult due to the need to differentiate from granulomatosis with polyangiitis when PR3-ANCA serum levels are elevated, careful examination of the radiological findings may aid the diagnosis.

Introduction

Proteinase 3 antineutrophil cytoplasmic antibody (PR3-ANCA) is a useful marker of granulomatosis with polyangiitis (GPA). However, PR3-ANCA has also been detected in patients with infectious diseases (eg, subacute bacterial endocarditis and tuberculosis), autoimmune diseases (eg, cryoglobulinemic vasculitis, ulcerative colitis, and anti-glomerular basement membrane antibody syndrome), and lymphoproliferative disorders [1]. However, schwannomas with elevated serum PR3-ANCA levels have not been previously reported. We report an exceptional case of orbital apex schwannoma with elevated serum levels of PR3-ANCA in a 67-year-old patient, and describe its multimodal imaging findings.

Case report

A 67-year-old man with a history of gout, presented with a 3-month history of double vision without orbital pain. Physical examination revealed adduction of the left eye and left

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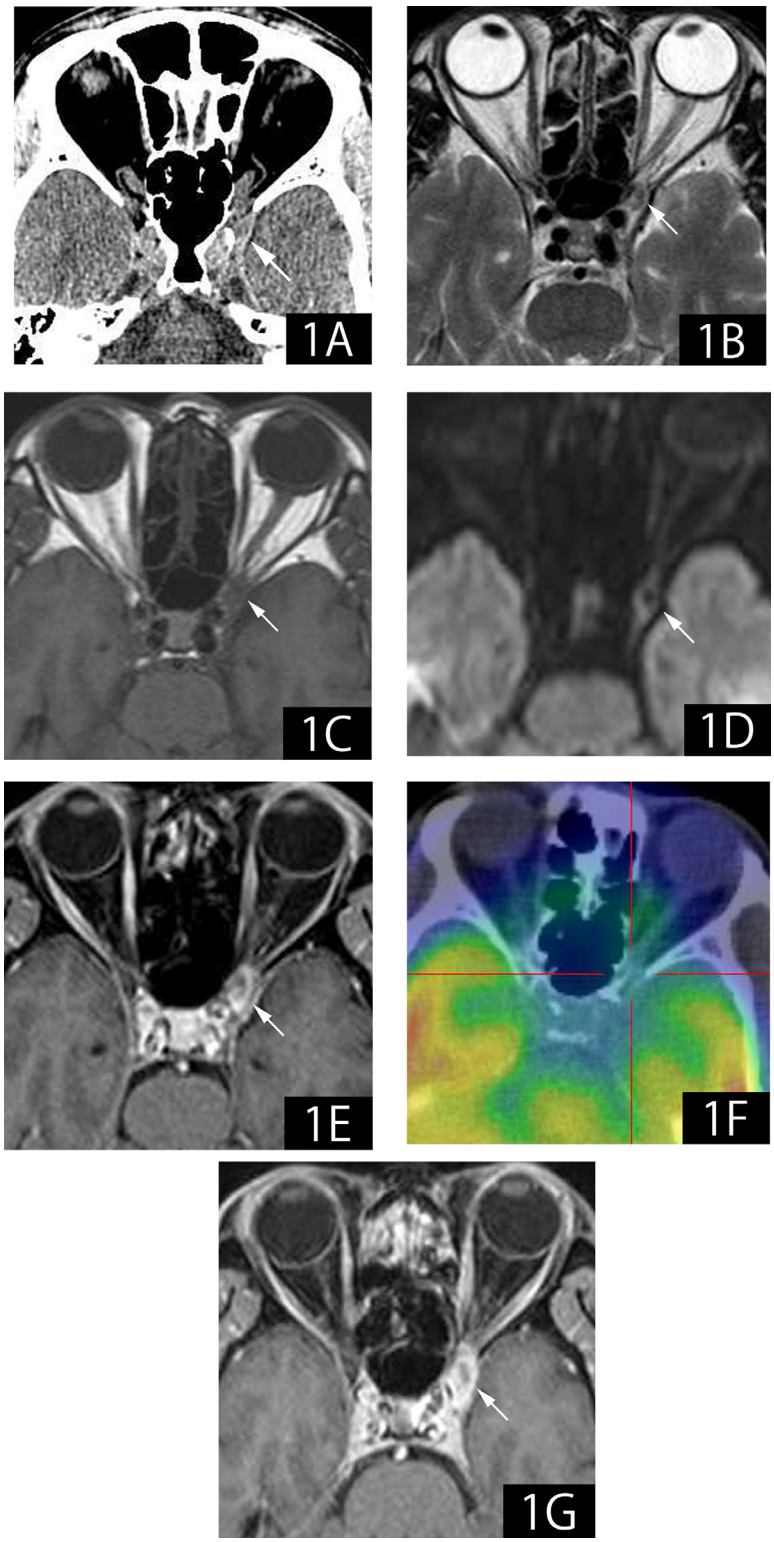

Fig. 1 – Unenhanced CT showing a slightly low-density mass lesion (arrow) without calcifications at the left orbital apex (A). On MRI the lesion (arrow) was slightly hyperintense on T2-weighted image (B) and isointense on T1-weighted image (C). Diffusion-weighted image (D) shows a fusiform hyperintense mass (arrow) in continuity with the anterior and posterior hyperintense cord-like structures. Fat-suppressed contrast-enhanced T1 weighted image shows peripheral contrast enhancement (E). F18-fluorodeoxyglucose PET/CT showed no abnormal uptake (F). Two years later, the mass lesion (arrow) at the orbital apex slightly increased in size on fat-suppressed contrast-enhanced T1 weighted image (G). CT, computed tomography; MRI, magnetic resonance imaging; PET, positron emission tomography.

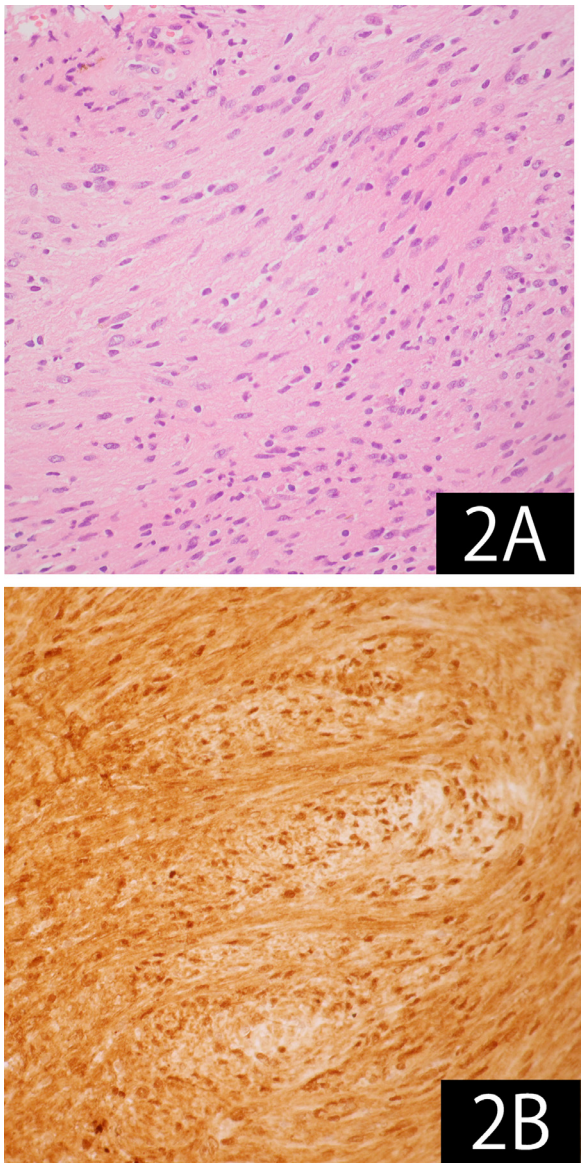

Fig. 2 – Hematoxylin and eosin staining shows the resected specimens are composed of whirling or wavy pattern of elongated spindle cells with nuclear palisading (A). Immunohistochemical staining shows positivity for the S100 protein (B).

abducens nerve palsy. Laboratory results revealed a high titer of PR3-ANCA, at 49.1 U/mL (reference range <2.0 U/mL).

An unenhanced computed tomography (CT) (Fig. 1A) revealed a slightly low-density mass lesion without calcifications at the apex of the left orbit. On magnetic resonance imaging (MRI) (Fig. 1B–E), the lesion was slightly hyperintense on T2-weighted images and isointense on T1-weighted images. Diffusion-weighted images revealed a fusiform hyperintense mass in continuity with the anterior and posterior hyperintense cord-like structures. There were no findings suggestive of hemorrhage. After administration of gadolinium, the lesion exhibited peripheral contrast enhancement. F18-fluorodeoxyglucose positron emission tomography (PET)/CT showed no abnormal uptake inside or outside the lesion (Fig. 1F). Contrast-enhanced CT of the chest and abdomen revealed no abnormal findings.

Based on the location of the lesion and the high titer of PR3-ANCA, the possibility of GPA was considered. However, the patient exhibited no vasculitis symptoms in the other target organs. After administration of steroids for 4 weeks, the left abducens nerve palsy gradually improved and serum PR3-ANCA levels decreased to 22.6 U/mL, but the mass did not shrink in radiological examinations.

Two years later, the patient complained of low visual acuity and discomfort in the left eye. Laboratory results showed that PR3-ANCA elevated to 28.2 U/mL. On MRI, the mass in the left orbital apex slightly increased in size (Fig. 1G). A surgical biopsy was subsequently performed. Intraoperative findings showed a mass in the inferior portion of the left optic nerve canal and the frontal portion of the left internal carotid artery. The tumor was then partially removed. Histological analysis of the specimen showed whirling or wavy patterns of elongated spindle cells with nuclear palisading. The tumor cells showed diffuse nuclear positivity for S100 protein (Fig. 2). Thus, the mass was diagnosed as a schwannoma. The biopsy showed no evidence of vasculitis. After surgery, the PR3-ANCA titer decreased to 8.4 U/mL. There were no apparent changes at the 6-month follow-up.

Discussion

Orbital schwannomas account for 1%-2% of all tumors that arise in the orbit [2]. Furthermore, schwannomas of the abducens nerve are extremely rare. Schwannomas of the abducens nerve can be located in the orbit, cavernous sinus, or prepontine region, similar to intrinsic brainstem tumors [3–5]. The originating nerve in this case could not be identified by intraoperative findings, but it was presumed to originate from the abducens nerve based on the symptoms. Intraorbital schwannomas on MRI usually appear hypointense on T1-weighted images and hyperintense on T2-weighted images. Enhanced T1-weighted images show homogeneous or heterogeneous enhancement, but peripheral enhancement is most prominent [2]. These MRI features were similar to our case, and the finding of peripheral enhancement could have led to the suspicion of schwannomas. In addition, schwannomas often show a fusiform mass in continuity with the neurovascular bundle. This feature was also observed in the diffusion-weighted images.

Although PR3-ANCA is a proven marker of GPA, ANCA-positive paraneoplastic vasculitis is rare. In a few cases of malignant diseases, high serum levels of PR3-ANCA have been reported in lung cancer, renal cancer, hepatocellular carcinoma, and lymphoproliferative disorders [1,6–9]. Malignancy may have been the trigger for the generation of antibodies or development of vasculitis itself; however, the mechanisms remain unclear. Schwannomas with high serum levels of PR3-ANCA are an exceptional case.

PR3-ANCA was strongly suspected to be related to the clinical course of the patient, yet the exact pathophysiology remains unclear. One reason for the lack of reported cases of

schwannomas with high PR3-ANCA serum levels in the past may be that the measurement of serum PR3-ANCA levels is usually performed to rule out the possibility of GPA rather than schwannomas. This case was an exception since orbital apex lesions have a diverse set of differential diagnosis, including GPA, so serum PR3-ANCA was measured.

Conclusion

Our case suggests an association between schwannomas and elevated PR3-ANCA serum levels. Achieving the correct diagnosis of orbital apex schwannoma may be difficult, since elevated serum PR3-ANCA is a proven marker of GPA. However, careful examination of the radiological findings may aid in proper diagnosis.

Patient consent

A written informed consent was obtained from the patient.

REFERENCES

[1] Hamidou MA, El Kouri D, Audrain M, Grolleau JY. Systemic antineutrophil cytoplasmic antibody vasculitis associated with lymphoid neoplasia. Ann Rheum Dis 2001;60:293–5. doi:10.1136/ard.60.3.293.

[2] Wang Y, Xiao LH. Orbital schwannomas: Findings from magnetic resonance imaging in 62 cases. Eye (Lond) 2008;22:1034–9. doi:10.1038/sj.eye.6702832.

[3] Erlich SA, Tymianski M, Kiehl TR. Cellular schwannoma of the abducens nerve: case report and review of the literature. Clin Neurol Neurosurg 2009;111:467–71. doi:10.1016/j.clineuro.2009.01.001.

[4] Mascarenhas L, Magalhaes Z, Honavar M, Romao H, Resende M, Pereira JR, et al. Schwannoma of the abducens nerve in the cavernous sinus. Acta Neurochir (Wien) 2004;146:389–92 discussion 391. doi:10.1007/s00701-003-0197-9.

[5] Vachata P, Sames M. Abducens nerve schwannoma mimicking intrinsic brainstem tumor. Acta Neurochir (Wien) 2009;151:1281–7. doi:10.1007/s00701-009-0302-9.

[6] Baschinsky DY, Baker PB, Niemann TH, Wilmer WA. Pauci-immune ANCA-positive crescentic glomerulonephritis associated with metastatic adenocarcinoma of the lung. Am J Kidney Dis 2000;36:E24. doi:10.1053/ajkd.2000.17727.

[7] Tatsis E, Reinhold-Keller E, Steindorf K, Feller AC, Gross WL. Wegener's granulomatosis associated with renal cell carcinoma. Arthritis Rheum 1999;42:751–6. doi:10.1002/1529-0131(199904)42:4⟨751::AID-ANR19⟩3.0.CO;2-D.

[8] Walcher J, Witter T, Rupprecht HD. Hepatocellular carcinoma presenting with paraneoplastic demyelinating polyneuropathy and PR3-antineutrophil cytoplasmic antibody. J Clin Gastroenterol 2002;35:364–5. doi:10.1097/00004836-200210000-00021.

[9] Shinkawa Y, Hatachi S, Yagita M. Intravascular large B-cell lymphoma with a high titer of proteinase-3-anti-neutrophil cytoplasmic antibody mimicking granulomatosis with polyangiitis. Mod Rheumatol 2019;29:195–7. doi:10.1080/14397595.2016.1205798.