

## CASE REPORT

# Idiopathic orbital inflammatory pseudotumor: case report and review of the literature

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### Abstract

Idiopathic orbital inflammatory pseudotumor is a chronic neoplasm-like inflammatory reaction, usually affecting the orbital tissues of both eyes and orbit. Isolated optic nerve involvement by the idiopathic inflammatory process is a rare finding and very few reports are available. Here a case of an isolated orbital nerve inflammatory pseudotumor presenting with gradually progressive unilateral loss of vision is described. It showed dramatic response to surgery and steroid treatment and its differential diagnoses are discussed.

**Keywords:** idiopathic orbit inflammatory pseudotumor, optic nerve.

### □ Introduction

Idiopathic inflammation of the orbit, or pseudotumor, is a non-granulomatous inflammatory process in the orbit or eye in which a local or systemic cause cannot be found [1]. It constitutes the third most common ophthalmic disorder after Grave's disease and lymphoproliferative disorders, and it has a reported incidence of between 4.7 and 6.3% [1]. Diagnosis is one of exclusion based on history of the case, examination, clinical course, radiological findings, biopsy and response to steroid therapy. Orbital pseudotumors, first described in 1905 by Birch-Hirschfeld, represent approximately 5–8% of all orbital masses [2]. They comprise a broad category of orbital inflammatory diseases with varying degree of involvement of orbital contents. Although the optic nerve may be affected as a part of the posterior segment process [3], isolated optic nerve involvement is extremely rare. In a review of 16 cases of orbital pseudotumor by Peyster RG *et al.*, isolated optic nerve involvement was discovered in just one [4]. The variegated histopathological appearance results from varying proportions of inflammatory component and resultant fibrosis [2]. A multitude of orbital structures may be involved in the inflammatory process which includes the globe, extraocular muscles, lachrymal glands and the optic nerve [2]. Diffuse enlargement of the optic nerve results from fibrocollagenous deposition over the affected nerve/sheath complex [5–7]. Idiopathic orbit inflammatory pseudotumor could be a part of other diseases: Tolosa Hunt syndrome, pituitary histiocytosis, idiopathic meningitis, carotido-cavernous fistula, Wegener granulomatosis, Erdheim–Chester disease [8, 9].

### □ Patient, Methods and Results

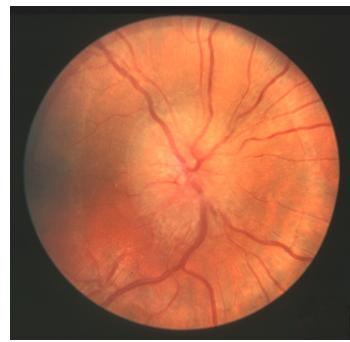
A 57-year-old woman presented with a one-year

history of progressive protrusion and decreased vision of the right eye (visual acuity, VA = 2/20) (Figure 1). There was no history of a blow or of other injuries to the orbit. She had intermittent attacks of retrobulbar pain and headache. Clinical examination revealed protrusion of the right eye, diminished visual acuity of the right eye with an ipsilateral afferent pupillary defect. The exophthalmos of the right part measured 26 mm. Motility of the right eye was absent. A central scotoma and poor color perception were also noted. Ophthalmoscopy exams revealed optic disk edema (Figure 2). Hematological investigations were non-contributory. Serum levels of antinuclear antibody were normal. Plain and contrast enhanced MRI of the orbit showed a diffuse, extra- and intraconal mass infiltrating the orbital fat and the enlargement of the right optic nerve sheath (Figures 3–5). The cavernous sinuses and the brain were normal. Idiopathic orbital inflammation was suspected and the patient was started on steroid therapy, six months before and six months after surgery (the surgical treatment was necessary due to a low response to cortisone therapy; the superior wall of the orbit was removed and a biopsy of the tumour was performed). One year follow-up exam revealed a gradual improvement in his vision (VA of the right eye = 5/20.), and the exophthalmos measured 19 mm (Figures 6 and 7).

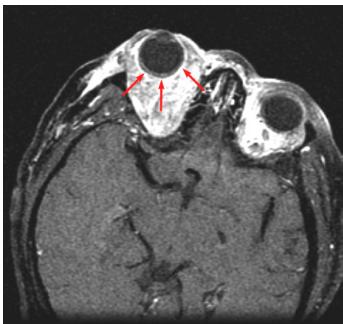
The histopathological examination of the biopsy showed a dense fibrous proliferation, with collagen deposition, infiltrating the muscles (Figure 8). Numerous inflammatory cells were observed, consisting mainly of lymphocytes, diffusely disposed (Figure 9) or arranged in follicles with germinal centers. Plasma cells, macrophages and scattered neutrophils were also observed. A granulomatous inflammatory reaction was present in some areas, with epithelioid cells and giant multinucleated cells (Figure 10).



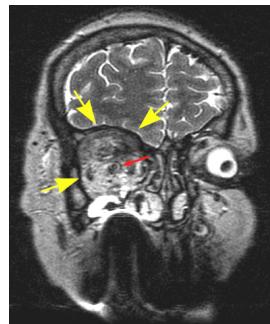
**Figure 1 – Patient photo on admission: important proptosis, chemosis, loss of motility of the right eye.**



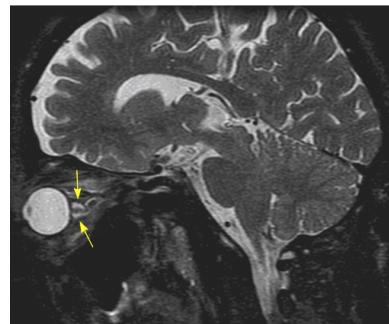
**Figure 2 – Ophthalmoscopic aspect of the right eye: the optic disk is swollen (papillitis).**



**Figure 3 – Plain and contrast enhanced MRI of the orbit showed diffuse orbital mass, high signal intensity of orbital fat, protraction of the right eyeball and thickening of the sclera (cerebral axial section, T1).**



**Figure 4 – Plain and contrast enhanced MRI of the orbit showed diffuse orbital mass and enlargement of the right optic nerve sheath (cerebral coronal section, T1).**



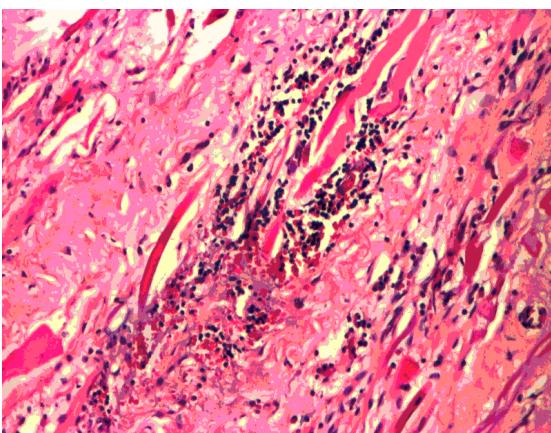
**Figure 5 – Plain and contrast enhanced MRI of the orbit showed diffuse orbital mass and enlargement of the right optic nerve sheath (cerebral sagittal coronal section, T2).**



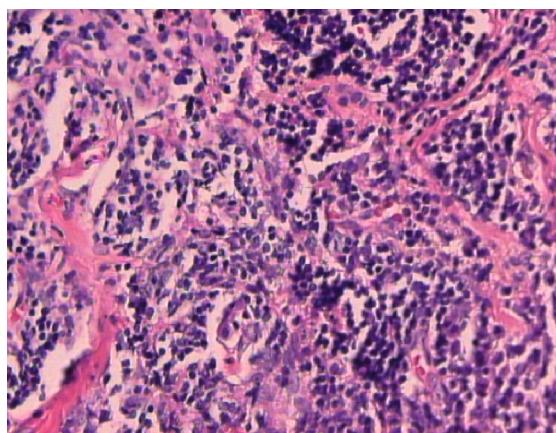
**Figure 6 – Patient photo at ten days after surgery.**



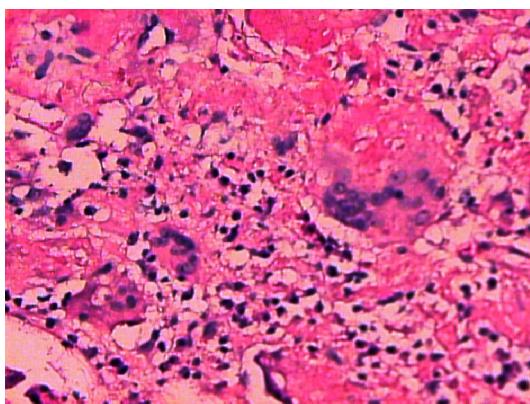
**Figure 7 – Patient photo at three month after surgery (mydriasis of the right eye due to topical drugs, Nilephrine 5%).**



**Figure 8 – Histological aspects of the orbital tumoral mass showing dense fibrosis infiltrating the muscle, with collagen deposition and a scant inflammatory infiltrate with mononuclears (HE stain,  $\times 100$ ).**



**Figure 9 – Area showing a diffuse mixed inflammatory infiltrate, consisting of lymphocytes, plasma cells and macrophages (HE stain,  $\times 200$ ).**



**Figure 10 – A granulomatous focus with many giant multinucleated cells and epithelioid cells (HE stain,  $\times 200$ ).**

## Discussion

Although classically described as a triad of pain, ophthalmoparesis and proptosis [5], the symptoms are more often non-specific, simulating many intraorbital tumors [5], the symptoms are more often non-specific, simulating many intraorbital tumors [6]; thus, they are not sufficient by themselves to make a diagnosis. Imaging findings are helpful and reflect the heterogeneity of the inflammatory process. The most common imaging features (in decreasing order of frequency) include infiltration of retro-orbital fat, proptosis, extraocular muscle enlargement and enhancement, orbital apex inflammation and optic nerve thickening [2]. In the perineuritic form of the disease, computer tomography (CT) and magnetic resonance imaging (MRI) show edematous enlargement of the optic nerve with a variable degree of contrast enhancement. Differentiation of the pure, perineuritic form from other entities presents significant diagnostic difficulty. Broadly, the causes of optic nerve/sheath complex enlargement may be divided into neoplastic and non-neoplastic conditions [7]. Neoplastic causes of optic nerve/sheath enlargement include optic gliomas, meningiomas, neurofibromas, hemangioblastomas, metastases, leukemias and lymphomas. Optic neuritis, pseudotumours, granulomatous optic neuropathies (most commonly sarcoidosis), dysthyroid orbitopathies, traumatic hematomas and optic nerve drusen constitute the non-neoplastic causes.

Optic neuritis is an acutely manifesting condition, usually idiopathic and often associated with multiple sclerosis [4]. Although its rapid improvement with steroid therapy may simulate a pseudotumor, the acuteness of onset and dramatic clinical presentation resolve the issue. Grave's disease can also cause enlargement of the optic nerve, but by the time enlargement of optic nerve sheath complex has occurred, the disease is quite advanced and marked muscle enlargement can be identified on CT [4]. Some other less common differentials such as optic nerve drusen have longstanding features including pseudopapilloedema and calcification at the junction of the optic nerve and globe. In our case the tumors were excluded based on absence of the optic canal enlargement (optic glioma and meningioma) [1], hyperostosis

and calcification (meningioma) [7–9], and systemic neoplasms. In contrast, the symptoms of orbital pain and headache seem to suggest an inflammatory etiology [10–14]. The absence of systemic symptoms and serologic markers and the characteristic natural history make the diagnosis of systemic vasculitis less likely [15, 16]. Finally, the surgery of the orbit followed by a dramatic response to a therapeutic trial of steroids clinched the diagnosis in favor of inflammatory pseudotumor [17–20].

## Conclusions

The diagnosis of optic nerve pseudotumor is thus one of exclusion; is noted in 5–10% of the orbital diseases. Consider idiopathic orbital inflammatory pseudotumor in cases of painful ophthalmoplegia; the disease is typically unilateral and may be recurrent. Typical presentation includes acute onset of orbital pain, swelling, chemosis and proptosis.

The differential diagnosis includes orbital cellulitis, thyroid ophthalmopathy, sarcoidosis, lymphoid tumor, lymphangioma and metastatic carcinoma. Biopsy is rarely indicated and should be reserved for highly doubtful and steroid-non-responsive cases. Orbital magnetic resonance imaging is the single most important diagnostic test. Serologic studies are necessary to exclude a systemic cause. Diagnosis is based on exclusion supported by clinical, serological, histological, and radiological findings.

## References

- [1] Weber AL, Jakobiec FA, Sabates NR, *Pseudotumor of the orbit*, Neuroimaging Clin N Am, 1996, 6(1):73–92.
- [2] Mafee MF, Schatz CJ, The orbit. In: Som PM, Bergeron RT, Curtin HD, Reede DL (eds), *Head and neck imaging*, 2<sup>nd</sup> edition, Mosby-Year Book, St. Louis, 1991, 783–788.
- [3] Mombaerts I, Goldschmeding R, Schlingemann RO, Koornneef L, *What is orbital pseudotumor?* Surv Ophthalmol, 1998, 41(1):66–78.
- [4] Peyster RG, Hoover ED, Hershey BL, Haskin ME, *High-resolution CT of lesions of the optic nerve*, AJR Am J Roentgenol, 1983, 140(5):869–874.
- [5] Rootman J, McCarthy M, White V, Harris G, Kennerdell J, *Idiopathic sclerosing inflammation of the orbit. A distinct clinicopathologic entity*, Ophthalmology, 1994, 101(3):570–584.
- [6] Swamy BN, McCluskey P, Nemet A, Crouch R, Martin P, Benger R, Ghabriel R, Wakefield D, *Idiopathic orbital inflammatory syndrome: clinical features and treatment outcomes*, Br J Ophthalmol, 2007, 91(12):1667–1670.
- [7] Yuen SJ, Rubin PA, *Idiopathic orbital inflammation: distribution, clinical features, and treatment outcome*, Arch Ophthalmol, 2003, 121(4):491–499.
- [8] Lutt JR, Lim LL, Phal PM, Rosenbaum JT, *Orbital inflammatory disease*, Semin Arthritis Rheum, 2008, 37(4):207–222.
- [9] GordonLK, *Orbital inflammatory disease: a diagnostic and therapeutic challenge*, Eye (Lond), 2006, 20(10):1196–1206.
- [10] Chaudry IA, Shamsi FA, Arat YO, Riley FC, *Orbital pseudotumor: distinct diagnostic features and management*, Middle East Afr J Ophthalmol, 2008, 15(1):17–27.
- [11] Nugent RA, Rootman J, Robertson WD, Lapointe JS, Harrison PB, *Acute orbital pseudotumors: classification and CT features*, AJR Am J Roentgenol, 1981, 137(5):957–962.
- [12] Atlas SW, Galeta SL, Orbit and visual system. In: Atlas SW (ed), *Magnetic resonance imaging of the brain and spine*, 2<sup>nd</sup> edition, Lippincott-Raven Publishers, Philadelphia, 1996, 1007–1092.

- [13] Edwards MK, Zuel DW, Gilmore RL, Muller J, *Invasive orbital pseudotumor – CT demonstration of extension beyond orbit*, Neuroradiology, 1982, 23(4):215–217.
- [14] Dutton JJ, Anderson RL, *Idiopathic inflammatory periorbital neuritis simulating optic nerve sheath meningioma*, Am J Ophthalmol, 1985, 100(3):424–430.
- [15] Rothfus WE, Curtin HD, Slomovits TL, Kennerdell JS, *Optic nerve/sheath enlargement. A differential approach based on high-resolution CT morphology*, Radiology, 1984, 150(2):409–415.
- [16] Rush JA, Kennerdell JS, Martinez AJ, *Primary idiopathic inflammation of the optic nerve*, Am J Ophthalmol, 1982, 93(3):312–316.
- [17] Borruat FX, Vuilleumier P, Ducrey N, Fankhauser H, Janzer RC, Regli F, *Idiopathic orbital inflammation (orbital inflammatory pseudotumour): an unusual cause of transient ischaemic attack*, J Neurol Neurosurg Psychiatry, 1995, 58(1):88–90.
- [18] Friberg TR, Stewart T, *Ocular involvement in systemic idiopathic fibrosis*, Retina, 1983, 3(1):34–39.
- [19] Curtin HD, *Pseudotumor*, Radiol Clin North Am, 1987, 25(3):583–599.
- [20] Lewis PM, *Inflammatory pseudotumor of the orbit: report of a case*, Trans Am Ophthalmol Soc, 1937, 35:328–335.

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