CASE REPORT

Interesting case of base of skull mass infiltrating cavernous sinuses

Achintya Dinesh Singh,¹ Manish Soneja,² Saba Samad Memon,¹ Surabhi Vyas³

¹Department of Internal Medicine, All India Institute of Medical Sciences, New Delhi, India

²All India Institute of Medical Sciences, New Delhi, India

³Department of Radiodiagnosis, All India Institute of Medical Sciences, New Delhi, India

Correspondence to

Dr Manish Soneja, manishsoneja@gmail.com

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SUMMARY

A man aged 35 years presented with chronic headache and earache of 1-year duration. He had progressive vision loss and diplopia since last 9 months. He also had pain over the face and episodic profuse epistaxis. On examination, perception of light was absent in the right eye and hand movements were detected at 4 m distance in the left eye. Imaging revealed a lobulated mass in the nasopharynx extending into the bilateral cavernous sinuses and sphenoid sinus with bony erosions. Biopsy of the nasopharyngeal mass revealed pathological features which are characteristic of IgG4 disease. His serum IgG4 levels and acute inflammatory markers were also elevated. The patient was started on oral corticosteroid therapy. Fever, headache and earache resolved early and there was gradual improvement in the vision of the left eye. After 6 months, visual acuity in the left eye was 6/9, but right eye visual acuity had no change. Follow-up imaging revealed a significant reduction in the size of the mass.

BACKGROUND

Nasopharyngeal mass lesions with intracranial extensions usually portend a grave prognosis, nasopharyngeal carcinoma being the most common differential, other causes include metastasis to the Waldeyer's ring, tuberculosis, sarcoidosis, etc.¹ Isolated head, neck and brain involvement of IgG4-related disease is an uncommon entity. Despite disparate manifestations, its pathognomonic histopathological features and serum markers help in reliable diagnosis of the condition. Early suspicion and initiation of therapy significantly improves outcome of the disease.

CASE PRESENTATION

A man aged 35 years without any comorbidities or addictions presented with symptoms of holocranial headache of 1-year duration. It was associated with otalgia initially in the left ear but progressing to involve the other ear in about a month. He was diagnosed as having sinusitis at a local clinic and was advised antihistaminic medication for the same but without any response. About 2 months later, he developed double vision which disappeared when either eye was closed. He had an episode of profuse epistaxis few days later which necessitated nasal packing. About a month later, he noticed painless diminution of vision in his right eye progressing to involve both the eyes. Two months prior to presentation, he had moderate grade fever with nausea and projectile vomiting about one to two episodes per day.

There was no history of nocturnal awakenings due to headache, chemosis, weakness, changes in speech or seizures. There was no hearing difficulty, ear discharge or vertigo. There was no history of significant weight loss, tuberculosis contact or trauma in the past or any other organ involvement. His personal and family histories were unremarkable.

His general and systemic examinations were normal. ENT examination revealed a left-sided deviated nasal septum with no visible mass. Nasal endoscopy revealed a mucosa covered bulge in the nasopharynx. Perception of light was absent in the right eye, while he could count fingers at 4 m distance with the left eye with associated left lateral rectus palsy. The right eye had mydriasis with associated afferent pupillary defect and complete external ophthalmoplegia. Fundus examination revealed right-sided total disc pallor with left-sided mild temporal disc pallor.

INVESTIGATIONS

Laboratory investigations revealed leucocytosis with neutrophilic predominance (table 1). Rest of his haematological, renal, liver and thyroid function tests were normal. C reactive protein was 8 mg/L, ESR: 56 mm/hour. RF, ANA and ANCA were negative. Visual evoked response (VER) revealed no significant response in the right eye while the left eye had 9.5 μ V $\times$ 96 ms response.

MRI revealed a lobulated soft tissue mass in the nasopharynx and left sphenoid sinus (figure 1A, B). It was extending into both the cavernous sinuses (right more than left) and involved the pterygopalatine fossa and lateral pterygoid muscle. PET-CT scan revealed lytic lesions in the sphenoid bone with soft tissue component involving the nasopharynx, and lytic lesion in the left maxilla. Biopsy from the nasopharyngeal mass showed storiform fibrosis with dense lymphoplasmacytic infiltration (figure 2). His IgG level was 2139 mg/dL (normal: 960–1968), serum IgG4 was 2.44 g/L (0.03–2.00) and IgA was normal. He was diagnosed as IgG4-related disease (IgG4-RD) on the basis of serological and biopsy findings.

DIFFERENTIAL DIAGNOSIS

Clinical features and imaging suggested the most likely possibility of nasopharyngeal carcinoma. Headache with otalgia and epistaxis are commonly associated with the condition. Associated visual symptoms were due to cavernous sinus infiltration or associated bilateral orbital apex syndrome. Other possible causes include

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Table 1 Pretreatment and post-treatment routine investigations

Date	27 December 2014 Pretreatment	12 November 2015 Post-treatment
Haemoglobin (g/dL)	15.2	14.7
Haematocrit (%)	45.8	47.3
TLC (/mm ³)	8800	14800
Platelets (/mm ³)	3.16 lakh	1.60 lakh
DLC	N64 L31 E2	N67 L24 M7
Urea (mg/dL)	26	25
Creatinine(mg/dL)	0.9	1.0
Calcium (mg/dL)	8.5	8.9
Phosphate (mg/dL)	3.8	4.2
Uric acid (mg/dL)	5.7	4.2
Sodium (mEq/L)	139	138
Potassium (mEq/L)	4.0	4.2
Bilirubin (mg/dL)	0.3	0.2
T. Protein (g/dL)	7.9	6.7
Albumin (g/dL)	4.4	4.7
Globulin (g/dL)	3.5	2.0
SGOT (IU/L)	22	16
SGPT (IU/L)	22	38
ALP (IU/L)	217	114
Prothrombin time (s)	12.1	11.2
ESR (mm/hour)	56	20

lymphoma involving the Waldeyer's ring, mucormycosis, metastasis from a distant primary and base of skull osteomyelitis. Rarer causes include Castleman's disease, midline destructive lesions like NK cell lymphoma, granulomatosis with polyangiitis, etc. Pathological findings with elevated serum immunoglobulin levels confirmed the diagnosis of IgG4-related disease.

TREATMENT

He was started on oral corticosteroids at 1 mg/kg body weight along with alendronate, calcium supplements and other supportive treatment. His general condition improved with resolution of fever, headache and earache within 1 week. He was discharged on tablet prednisolone 60 mg once daily for 6 weeks and advised for regular follow-up.

OUTCOME AND FOLLOW-UP

There was no recurrence of fever, headache, otalgia or epistaxis during the follow-up visits. Vision in his left eye showed gradual improvement in the first few weeks and then stabilised; his right eye did not show any improvement. Inflammatory markers were within normal range. After 8 weeks of prednisolone 60 mg, gradual steroid tapering was started. Visual acuity in his left eye was 6/9 at 6-month follow-up. Repeat MRI performed after 6 months revealed significant reduction in the mass with some residual mass at the base of the skull (figure 3). In view of the residual disease and the possibility of disease relapse after discontinuation of steroids, azathioprine was initiated and the dose was increased to 100 mg daily after monitoring for possible toxicities. Currently, he has been tapered off steroids and is doing well on azathioprine.

DISCUSSION

The presenting features of progressive headache, vision loss, nausea and vomiting suggested the likelihood of intracranial

Figure 1 Pretreatment MRI axial (A) and coronal (B) T2W images showing minimally hyperintense soft tissue mass in the nasopharynx (*), extending superiorly to involve the sphenoid sinuses and the cavernous sinuses. Arrows in (B) denote both cavernous sinuses with maintained flow voids of the intracavernous internal carotid arteries.

space-occupying lesion. Associated otalgia and diplopia hinted towards a possible aural and orbital invasion. Radiological findings further confirmed the possibility of nasopharyngeal malignancy infiltrating the base of skull or a primary intracranial malignancy with nasopharyngeal extension. Pathognomonic histopathological findings with elevated serum markers confirmed the diagnosis of IgG4-related disease (IgG4-RD).² Our case is an uncommon presentation of the ever-expanding conundrum of IgG4-RD.

IgG4-RD is a multisystemic fibrosclerosing condition initially described involving the pancreas, lacrimal glands and the retroperitoneum. Its ever-increasing spectrum currently includes a wide range of symptoms,³ some of which were previously considered idiopathic or entities like Ormond's disease, Mickulicz's disease etc.⁴

IgG4-RD can involve head and neck region. Orbital involvement as infiltration of the extraocular muscles and lacrimal glands are the most common manifestations in intracranial IgG4-RD.⁵ Increasing presentations as pachymeningitis as central nervous system manifestations have also been seen. IgG4-RD masquerading as an isolated nasopharyngeal mass with involvement of the cavernous sinuses is rarely reported.

Figure 2 H&E-stained sections show a lesion composed of fibroblasts arranged in a focal storiform pattern (A, $\times 400$), with a dense plasma infiltrate (B, $\times 400$). Stromal sclerosis and thin-walled vessels with endothelial swelling were also seen (arrows) (C, $\times 400$).

Radiologically, IgG4-related mass lesions, as in our case, present as homogeneously enhancing lesions which are isointense to hypointense on T1-weighted and T2-weighted images. There are features of bone remodelling as erosions or sclerosis, but frank destruction is less common.⁶ Symptoms include systemic manifestations and features due to local pressure and invasion as seen with vision loss in our case. The bilateral vision loss was most likely due to compressive optic neuropathy. This explains the response on the left side to steroid therapy; however, the right eye, which had shown total disc pallor and no response on VER prior to initiation of treatment, did not show any response.

Early suspicion of the condition with early institution of therapy can lead to near-complete remission. Time is the essence as advanced conditions may require additional debulking surgeries and immunosuppression with significant residual morbidity.⁷ Our case emphasises the importance of suspicion of this condition even in such unusual presentations. There was a delay in diagnosis as the patient was initially being treated as a case of chronic sinusitis. An earlier imaging and biopsy could have prevented the morbidity in the form of right-sided vision loss. The diagnosis of the condition obviated the morbidity associated with neurosurgery. It further supplements the role of biopsy in evaluation of the condition. The prompt response to corticosteroids corroborates the anecdotal evidences supporting the role of corticosteroids in treatment.⁸ Though the role of corticosteroids is well established, the duration of therapy is not

well defined. The role of adjuvant or steroid-sparing therapy is still undefined.

Patient's perspective

It all started as a simple headache. I used to have similar episodes in the past, but I never took them so seriously. When it extended to the face with associated ear ache, I suspected something is different and consulted our family physician. His assurance of the pain being due to allergy though gave some momentary relief but has scarred me for life. The diminution of vision has severely affected my work. On being informed that there was a mass inside my nose which was invading further deep, I and my family were distraught. The news of the condition being amenable to medicines and having a good cure rate brought us some hope. Since the start of therapy, my condition has improved. I can see more clearly with my left eye and the tightness of my eye is gone, but still I cannot see from the other eye. The only remorse being had they suspected such a lesion early may be I would have been saved from such handicap. I hope my visual improvement does not stop and I regain my vision back.

Learning points

- ▶ IgG4-related disease should be suspected as a cause of nasopharyngeal mass.
- ▶ Early suspicion and prompt management could have saved the visual loss of the patient.
- ▶ The mass lesions showed prompt response to oral corticosteroid therapy.
- ▶ Oral azathioprine is a steroid-sparing agent and is effective in maintaining remission in IgG4-RD.
- ▶ The duration of therapy and serological markers for nasopharyngeal IgG4-RD needs further research.

Figure 3 Post-treatment axial T2W MRI shows significant resolution of the sphenoid and cavernous sinus soft tissue. Arrows denote both cavernous sinuses.

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Contributors ADS (Resident doctor) was involved in directly managing the patient and writing the manuscript. MS was the faculty incharge of supervising the patient and also guided the writing of the manuscript. SSM was (Resident doctor) involved in case management, in assessing the follow-up progress of the patient and contributed in writing of the manuscript. SV was involved in the radiological diagnosis of the patient, procuring the images and write up on the radiological diagnosis.

Competing interests None declared.

Patient consent Obtained.

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