CASE REPORT

Thyroid malignancy presenting with visual loss: an unusual case of paraneoplastic retinopathy

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SUMMARY

Paraneoplastic retinopathy is a rare cause of painless vision loss, associated with an underlying (and often occult) systemic malignancy. Ocular examination findings are subtle, and the diagnosis is often made on the basis of electrophysiology findings. This report describes the case of a 48-year-old Caucasian man with paraneoplastic retinopathy presenting as visual disturbance, central scotomata and abnormal electrophysiology. He was subsequently diagnosed with papillary thyroid malignancy.

BACKGROUND

This case report represents a case of paraneoplastic retinopathy secondary to papillary thyroid cancer. To the best of our knowledge this is the only case report of its kind in the literature. This rare condition must not be overlooked in any case of painless visual loss with a normal fundal examination, as it may be the presenting feature of an underlying life-threatening condition. Abnormal electrophysiology may be the only positive finding on ophthalmic investigation.

CASE PRESENTATION

A 48-year-old man presented to the eye casualty of a tertiary referral hospital with a 2-year history of gradual bilateral vision loss, with more rapid decline in vision in the preceding 2 weeks. He had no systemic symptoms. His medical history was significant for a right leg deep venous thrombosis 1 year previously, as well as pernicious anaemia. His medications included hydroxocobalamin, rivaroxaban, aspirin and atorvastatin. On examination, Snellen visual acuity measured 6/18 on the right, and 6/60 on the left. Pupillary reactions and colour vision (tested with Ishihara plates) were normal. The anterior segment and fundal examination were unremarkable.

INVESTIGATIONS

There were bilateral central scotomata on Goldmann and Humphrey visual field testing. Fluorescein angiography was normal, as was macular ocular coherence tomography (OCT; [figure 1](#)). Blood testing, CT & MRI brain were performed. There were no abnormalities on full blood count, renal and liver profiles, inflammatory markers (C reactive protein, erythrocyte sedimentation rate) and antineutrophil cytoplasmic antibody was negative. MRI of brain and optic nerves was normal. Our facility did not have access to serum antiretinal antibody testing.

Electrophysiology, including electroretinogram (ERG), pattern ERG and pattern visual evoked potentials (VEP) was performed ([figure 2](#)). This

demonstrated normal rod responses, however pattern ERG responses were unrecordable, with unusual waveforms seen on pattern VEP. The photopic flash responses had low b wave amplitude: 10 μ V on the right, and 26 μ V on the left. Among the differential diagnosis were a late onset cone dystrophy or paraneoplastic retinopathy. The rapid rate of recent progression was suggestive of a paraneoplastic process.

A full body positron emission tomography scan revealed an area of abnormal fluorodeoxyglucose uptake in area adjacent to left lobe of thyroid which underwent ultrasound-guided fine-needle biopsy. The histology showed malignant papillary thyroid cancer.

DIFFERENTIAL DIAGNOSIS

The differential diagnosis included optic neuropathy (ischaemic, toxic, infectious, degenerative, paraneoplastic), retinopathy (inherited retinal disorder, paraneoplastic) and space occupying lesion in the visual pathway or compressing the optic chiasm.

TREATMENT

Subsequent to the histology findings, the patient had a total thyroidectomy. Adjacent lymph node sampling was negative for malignancy. Systemic immunosuppressive therapy was deferred as the patient demonstrated an improvement in visual symptoms postoperatively.

OUTCOME AND FOLLOW-UP

Four months post-thyroidectomy, vision improved to 6/9 on right, and 6/6 on left. Pattern ERG waveforms

Figure 1 Ocular coherence tomography of the macula of both right (above) and left macula (below). Normal retinal thickness is observed.

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Figure 2 Preoperative (left) and postoperative (right) pattern electroretinogram (PERG) for both eyes. The preoperative PERG is almost completely unrecordable. The postoperative PERG remains poorly defined in the right eye, with some recovery in the left eye.

showed improved definition in the right eye, however remained poorly defined in the left eye. There was an overall improvement in cone function, and the patient continues to be monitored.

DISCUSSION

Paraneoplastic retinopathy is an uncommon ophthalmic disorder resulting in progressive vision loss.¹ There are a number of subtypes, including melanoma-associated retinopathy (MAR) and cancer-associated retinopathy (CAR). Associations with small-cell and non-small cell lung cancer, gynecological and breast cancers, Hodgkin's lymphoma, pancreatic, prostate, bladder, laryngeal and colon cancers have all been described.² One case of a mixed thyroid adenoma/carcinoma-associated retinopathy has been published.³ Symptoms often precede the diagnosis of cancer. CAR has been characterised by the triad of painless and progressive visual loss, ring scotoma and loss of rod and/or cone function on electrophysiology.⁴ The type of visual loss varies, with some patients experiencing colour impairment, reduced acuity, central scotoma due to cone dysfunction or night blindness and reduced peripheral vision due to rod dysfunction.⁵ On examination, the fundus may have attenuation of arterioles, but is often normal.⁶ Serum antibodies in patients with CAR have been identified towards retinal proteins.^{2 7 8} These tests are mainly available in research facilities. Lack of an accepted gold standard for antiretinal antibodies detection alone makes their use in the diagnosis challenging.^{9 10} Postmortem examination of eyes with CAR have shown nearly complete loss of photoreceptor outer and inner segments and the outer nuclear layer in the retina.⁶

There are a number of ERG abnormalities associated with CAR, including dysfunction of both rods and cones, or cones alone.^{11 12} The ERG is classically severely attenuated under both photopic and scotopic conditions in CAR, with reduced or extinguished a and b waves.¹³ The pattern ERG was unrecordable in this case, pointing to significant central retinal dysfunction. There can be selective involvement of b waves in some cases, as in that presented here, indicative of inner retinal or bipolar cell dysfunction, but this is more typical in MAR. This patient had asymmetrical photopic b wave amplitudes.

Prognosis for vision is often poor. Surgical excision of the malignancy has resulted in a partial recovery of visual function in this case, however this is very uncommon. Recovery of retinal bipolar cell dysfunction after treatment of an associated ovarian malignancy has been described.¹⁴ Both systemic and local immunosuppressive therapy has been used with moderate effect.¹⁵

This case report represents a case of presumed CAR secondary to thyroid malignancy. To the best of our knowledge this is the only case report in the literature of CAR associated with papillary thyroid cancer. Three features of this case make for compelling evidence that papillary thyroid cancer was the aetiology of the CAR; the absence of an alternative diagnosis of malignancy in the 3-year follow-up, an improvement in symptoms on excision of the tumour and the classic abnormalities in electrophysiology. This patient presented with bilateral reduced visual acuity and central scotomata, in keeping with the subsequent electrophysiology findings of a cone dysfunction. Antiretinal antibody testing was not available at our centre. This condition carries significant morbidity, and thorough investigation for an otherwise occult malignancy must be performed.

Learning points

- ▶ Paraneoplastic retinopathy should be considered in all cases of unexplained painless visual loss, and it may precede the diagnosis of an occult malignancy.
- ▶ A normal fundal examination alone does not outrule this condition.
- ▶ Electrophysiology can be a key factor in diagnosis, and a high index of suspicion should be maintained in the presence of electroretinogram abnormalities.

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the patient's care, and both IF and PL contributed to drafting, and revising, the manuscript. All authors have given final approval for the manuscript to be published.

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