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Vogt-Koyanagi-Harada Syndrome: A Case Study

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ABSTRACT

Vogt-Koyanagi-Harada (VKH) syndrome is considered to be a multisystem autoimmune and ethno-specific inflammatory disorder whose primary ocular manifestations consist of bilateral granulomatous panuveitis, choroiditis, and exudative retinal detachments. This case study involves a younger male patient of mixed ethnic background who presented with acute phase ocular findings without any prior history of VKH. Initial clinical presentation and follow-up was documented with fundus photography and Spectral Domain OCT. Topical and systemic medical treatment was conducted over the course of several months as he continued with oral corticosteroid and immunosuppressant therapy, as well as intermittent topical treatment for anterior uveitis. While prompt diagnosis and treatment of VKH frequently results in stable visual outcomes, long-term functional loss can be a potential risk in this disorder.

INTRODUCTION

Vogt-Koyanagi-Harada (VKH) syndrome presents systemically with a pattern suggestive of a T-cell-mediated autoimmune disorder directed against uveal, dermal, and meningeal melanocytes that is genetically influenced and is race dependent.[1] Somewhat biased toward females, VKH predominately affects individuals with darker skin pigmentation, such as Hispanics, Asians, Native Americans, Middle Easterners, and Asian Indians, but not blacks of sub-Saharan African descent.[2] Its chief systemic manifestations are dermatologic and neurologic, including alopecia, poliosis, vitiligo, CNS meningeal lesions, auditory, and ocular signs.[2] Other autoimmune conditions are known to be associated with the VKH syndrome, including hypothyroidism, diabetes, and autoimmune polyglandular syndrome type 1.[3] VKH accounts for 1% to 4% of uveitis cases in tertiary referral centers in the United States[4] and as many as 9.2% of cases in Japan.[5]

As a granulomatous inflammatory disorder, the precise mechanism that prompts the autoimmune attack is poorly understood. Some authors have speculated that cutaneous injury could elevate sensitization to melanocytic antigens,[6] others have postulated a systemic immune response to viral infection.[7]

The medical literature in fact support the contention that ocular signs and symptoms can be preceded by headache, aseptic meningitis, tinnitus, or symptoms resembling those of influenza.[8] The four clinical stages of VKH are outlined in Table I.

VKH typically presents in the anterior chamber as a granulomatous inflammatory process that can include keratic precipitates on the corneal endothelium.[9] The posterior segment is generally considered to be chiefly affected by a diffuse, sometimes severe, choroiditis in both eyes. Indocyanine green imaging classically demonstrates uneven filling of dye in the arterial phase with a generalized irregular hypofluorescence in the later venous phase. Sporadic signs of exudative retinal detachments secondary to the choroiditis are often detected, seen either as undulating subretinal fluid accumulations or as frank bullous detachments.[10]

The primary ocular pathogenesis in the VKH syndrome is thought to involve the choroid, with minimal involvement of the retinal vasculature. In fact, fluorescein

Table I The four clinical phases of VKH

Stage 1	**Prodromal:** tends to mimic signs and symptoms of a viral infection
Stage 2	**Uveitic:** bilateral uveitis, papillitis, and serous retinal detachment
Stage 3	**Convalescent:** retinal depigmentation
Stage 4	**Recurrent:** repeating patterns of uveitis and other ocular complications

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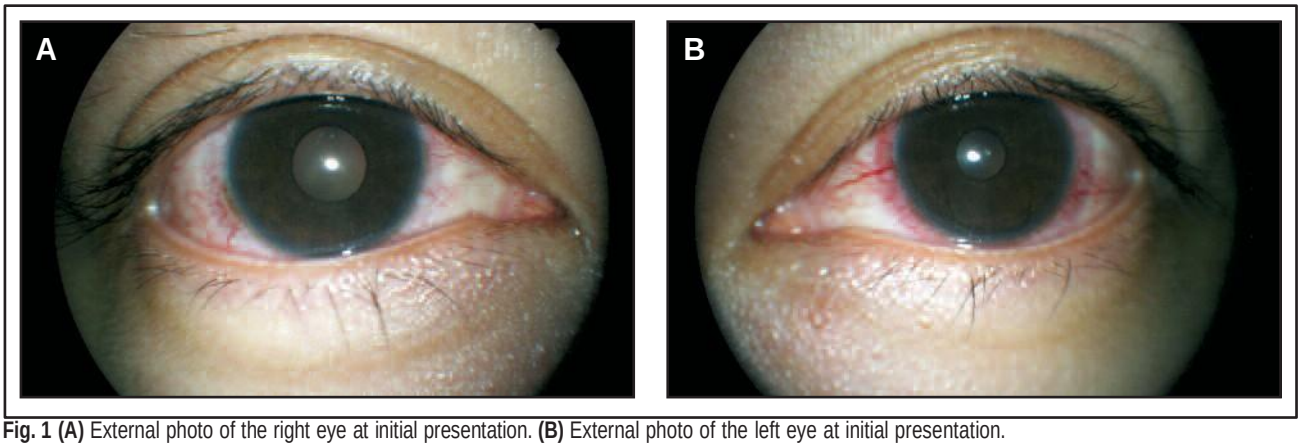

Fig. 1 (A) External photo of the right eye at initial presentation. **(B)** External photo of the left eye at initial presentation.

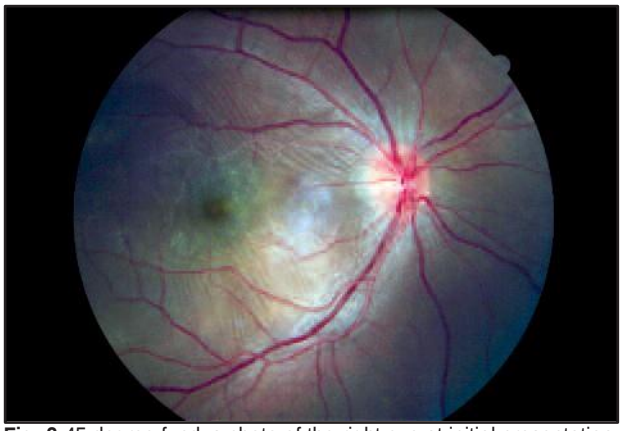

Fig. 2 45 degree fundus photo of the right eye at initial presentation. Multiple bands of retinal striae occupy regions superior and inferior to the macula. The optic nerve appears well-perfused with crisp neural rim borders nasally but a subtle blurring temporally. Retinal vasculature appears to be within normal limits apart from a superior arcade artery.

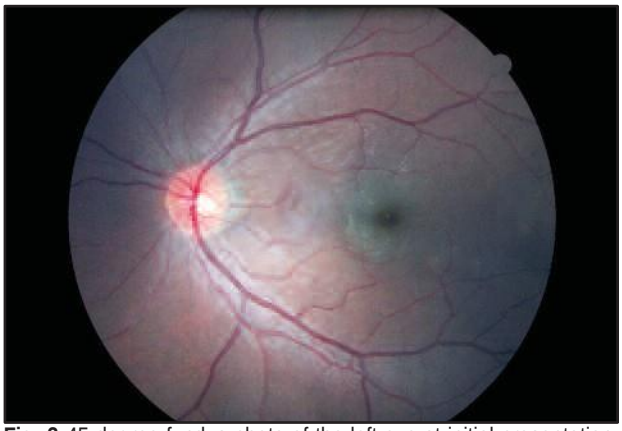

Fig. 3 45 degree fundus photo of the left eye at initial presentation. Retinal striae are almost absent, with good nerve head vascular perfusion and crisp borders. No changes were observed in the retinal vasculature.

angiographic studies have failed to reveal any anomalies of retinal vessels, at least when studied in the acute presenting phase. Relatively few patients are followed with retinal angiography over the long term for chronic disease. It is well known that the leading cause of decreased vision in retinal disease is cystoid macular edema, yet in VKH this is relatively uncommon. In fact, the precise way in which uveitis elicits fluid accumulation in retinal extracellular spaces remains poorly understood. Some compromise must necessarily take place in either the outer blood-retina barrier (tight junctions in the RPE cells) or in the inner blood-retina barrier (tight junctions in the retinal vascular endothelial cells). Finally, the choroid can potentially factor into longstanding, chronic VKH through neovascular invasion of the retina that can eventually lead to disciform scarring.[11]

Case Report

This 22-year-old male had an ethnic background consisting of both Japanese and Aboriginal Canadian heritage. He was unaware of any immediate family member with notable ocular or systemic medical conditions. His medical history was negative for any systemic conditions, medications, or illicit substances. Three days prior to the initial assessment, the patient had been experiencing progressively worsening signs of redness with symptoms of floaters and photophobia starting in his right eye. His vision started to deteriorate in the right eye and was described as “looking through an after image.” Soon thereafter, similar signs and symptoms emerged in the left eye. Vision was becoming blurry to the point that driving was difficult and reading printed material was a strain. He admitted to having slept in his

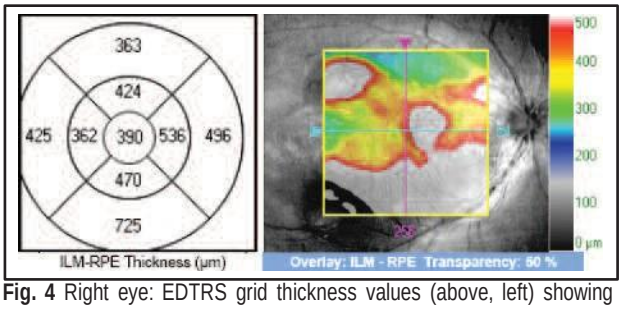

Fig. 4 Right eye: EDTRS grid thickness values (above, left) showing central subfield of 390 microns, and colour-grade thickness map (above, right) demonstrating regions of serous retinal detachment (shown as white). The outer inferior EDTRS subfield is 725 microns in thickness.

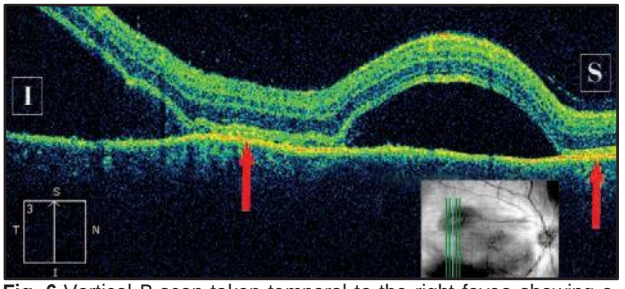

Fig. 6 Vertical B-scan taken temporal to the right fovea showing a large neurosensory detachment inferiorly (I) and a smaller detachment superiorly (S). The Cirrus SLO (scanning laser ophthalmoscope, inset) indicates scan registration with a teal line. Note that portions of the RPE continue to be attached to Bruch's membrane (red arrows).

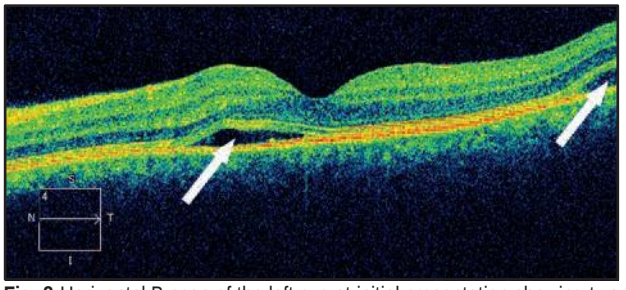

Fig. 8 Horizontal B-scan of the left eye at initial presentation showing two subtle neurosensory detachments (white arrows). Foveal contour is intact with an absence of overt cystoid macular edema.

contact lenses two weeks ago, and made an appointment for an eye exam thinking that his contact lenses were the source of the problem.

Clinical Assessment

This patient presented for assessment wearing sunglasses to alleviate his photophobia. Pinhole visual acuities were found to be OD 6/30 (20/100) and OS 6/24 (20/80). Extraocular muscle movements and pupil responses were unremarkable OU, as were applanation intraocular pressures. Slit lamp examination revealed bilateral

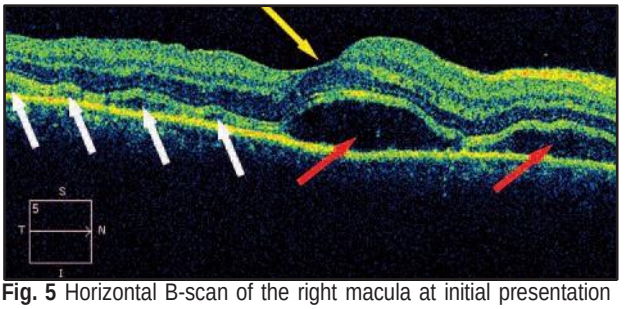

Fig. 5 Horizontal B-scan of the right macula at initial presentation showing fovea (yellow arrow), four small multilobular exudative detachments (white arrows) and two larger serous retinal detachments (red arrows). The neurosensory layers above the SRD show diffuse edema without any cystoid pockets of fluid.

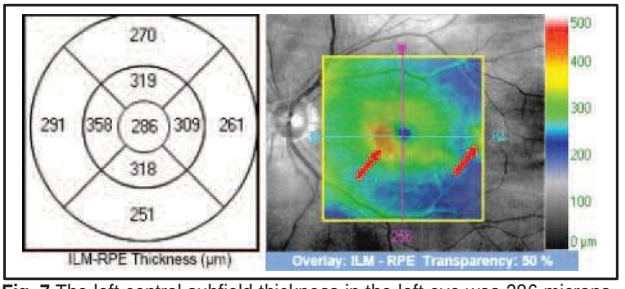

Fig. 7 The left central subfield thickness in the left eye was 286 microns with two subtle areas of serous neurosensory detachment (red arrows).

circumferential conjunctival hyperemia (Fig. 1A, B) and grade 2+ anterior uveitis.

Dilated fundus examination of the right posterior pole revealed paramacular retinal striae with serous retinal detachment superiorly, supranasally, and inferiorly, all within a 1-3 disc diameter proximity to the fovea (Fig. 2). The right optic nerve head and retinal vasculature appeared to be unremarkable apart from a subtle blurring of the disc margin nasally. Low-grade vitreous haze was suggestive of posterior uveitis. Reduced signs were apparent in the left posterior pole, with only subtle retinal striae observed supranasally and just inferior to the fovea (Fig. 3). No abnormalities were demonstrated in either the optic nerve head or the retinal vasculature. There was an absence of overt vitreous haze in the left eye.

OCT Assessment

Cirrus Spectral Domain OCT (Zeiss, Dublin, CA) was used to assess the retinal architecture through dilated pupils. The 512X128 Macular Cube scan of the right eye laid out the primary areas of serous retinal detachment in the ILM-RPE thickness map. The central EDTRS subfield thickness was 390 microns (Fig. 4), over 75% thicker than normal. Small regions of detachment shown in white on the thickness map were seen supratemporal and

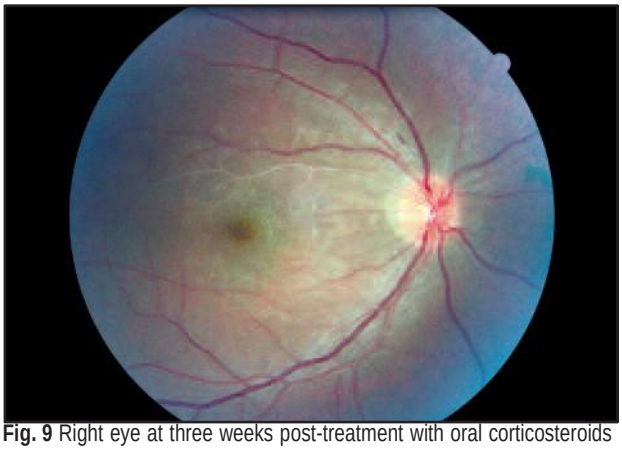

Fig. 9 Right eye at three weeks post-treatment with oral corticosteroids showing nearly complete resolution of the previous retinal striae. Note the absence of any retinal reflex from camera flash.

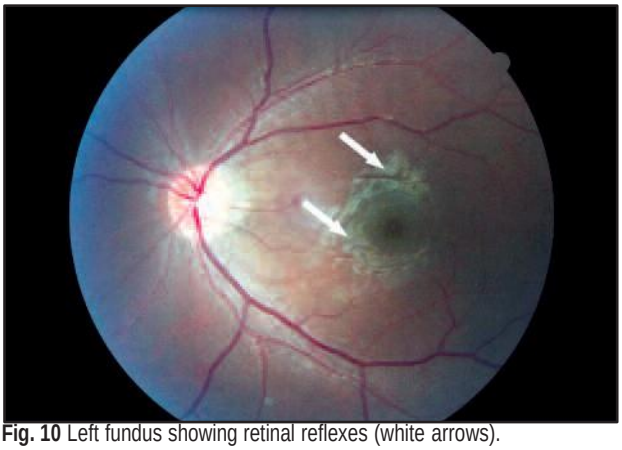

Fig. 10 Left fundus showing retinal reflexes (white arrows).

supranasal to the fovea. A much larger detachment was mapped out inferiorly, with an average EDTRS outer subfield thickness of 725 microns. Analysis of the foveal B-scan revealed the presence of a foveal contour (Fig. 5) with no sign of cystoid macular edema. Several small multilobular detachments could be discerned temporal to the fovea, with two larger detachments located subfoveally and nasally. Another vertical B-scan taken temporal to the fovea gave further clinical insight into the extent of the uveitic serous retinal changes (Fig. 6).

OCT assessment of the left eye was much less remarkable, with the 512X128 Macular Cube scan revealing only two subtle areas of retinal elevation (Fig. 7) within the 6 mm by 6 mm scan grid. The central subfield thickness was almost 100 microns less than in the right eye, measuring 286 microns. A horizontal B-scan through the left fovea demonstrated a fairly well-preserved foveal contour with an absence of intraretinal cystoid fluid and confirmation of the histological location of the serous detachments (Fig. 8).

Treatment and Follow-Up

The patient was started on topical atropine 1.0% b.i.d. OU and prednisolone acetate 1.0% for his anterior uveitis and referred to a retinal subspecialist, who prescribed oral prednisone 50 mg and azathioprine (Imuran®) 50 mg for the VKH choroiditis and conducted appropriate follow-up. The next available optometric follow up was in three weeks' time. Following upon treatment with oral medications, his best-corrected visual acuities (BCVAs) were now found to be: OD 6/18-3 (20/60-3) and OS 6/9 (20/30).

SLE demonstrated white conjunctivae and no discernable anterior chamber activity, OU. Dilated funduscopy revealed an absence of vitreous haze and a much flatter retina in the right eye, with virtually a complete resolution of the previous retinal striae (Fig. 9). The left fundus also exhibited a resolution of the striae with the presence of retinal reflexes indicative of a drier retina (Fig. 10).

Cirrus OCT imaging of the right macula confirmed a significant improvement in the serous detachments, with the central subfield improving from 390 to 307 microns (Fig. 11). The outer inferior EDTRS subfield corresponding to the largest measured detachment improved from 725 to 306 microns. Histologically, the B-scan revealed an extensive but subtle residual neurosensory elevation (Fig. 12). The restoration of a normative foveal contour corresponded with the improvement in visual function, from 6/30 (20/100) to 6/18-3 (20/60-3). While the OS central subfield remained essentially static, the mid-nasal EDTRS subfield decreased from 358 to 320 microns, showing some resolution of the uveitic serous lesion (Fig. 13). A similar impression can be drawn from the macular B-scan (Fig. 14), where the functional improvement from 6/24 (20/80) to 6/9 (20/30) could be inferred from the structural improvement.

Two months after initial presentation, daily dosage of 50 mg oral prednisone and azathioprine were maintained. The gentleman felt encouraged by the improvement in his vision, especially in the left eye. BCVAs were found to be: OD 6/12+2 (20/40+2) and OS 6/7.5- (20/25-). Both eyes demonstrated a complete resolution of the serous retinal elevations, with fully normalized foveal contours and central subfield values within normal limits (Figs. 15, 16). Recent medical assessment by his family physician did not yet reveal any systemic VKH markers. At the six month follow-up after several months on treatment with

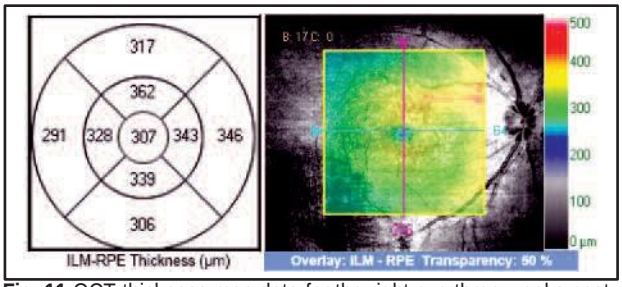

Fig. 11 OCT thickness map data for the right eye three weeks post-treatment. Note that the outer inferior EDTRS subfield (306 m) is less than half of the thickness at initial presentation (725 m).

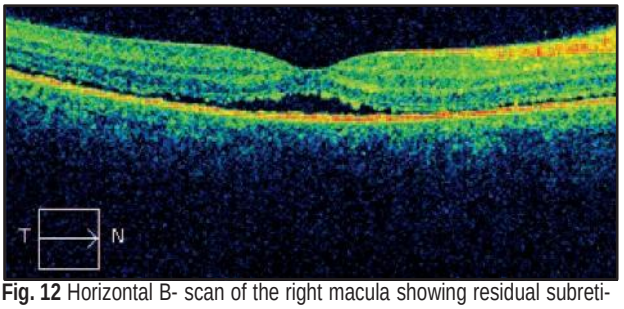

Fig. 12 Horizontal B- scan of the right macula showing residual subretinal space and normalized foveal contour.

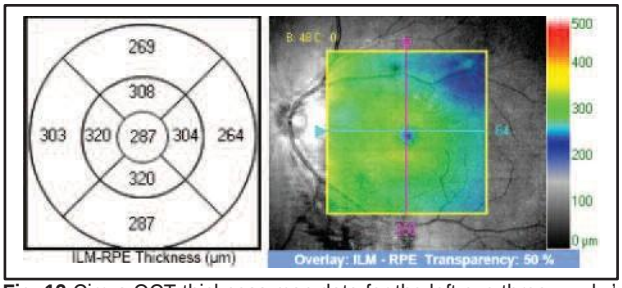

Fig. 13 Cirrus OCT thickness map data for the left eye three weeks' post-treatment.

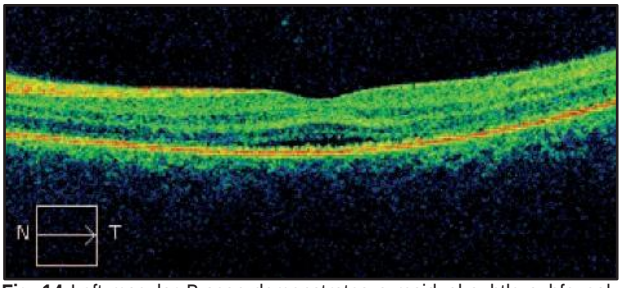

Fig. 14 Left macular B-scan demonstrates a residual subtle subfoveal neurosensory elevation.

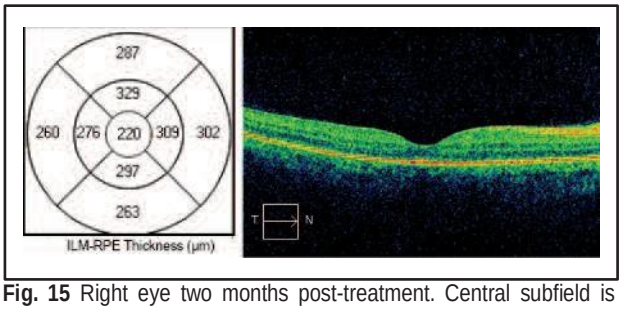

Fig. 15 Right eye two months post-treatment. Central subfield is normalized at 220 microns.

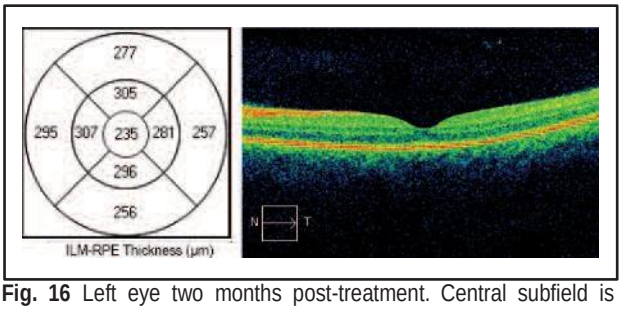

Fig. 16 Left eye two months post-treatment. Central subfield is normalized at 235 microns.

cyclosporin 100 mg b.i.d. in addition to azathioprine 50 mg b.i.d., the BCVAs were improved to: OD 6/6-2 (20/20-2) and OS 6/6-4 (20/20-4).

Discussion

VKH syndrome was first described by a Persian physician (Ali-ibn-Isa 940-1010A.D.) who reported poliosis in association with inflammation of the eyes.[12] Schenkl reported this association again in 1873, and in 1892 by Hutchinson. These disorders described in greater detail by Vogt, Koyanagi and Harada were combined by Babel in 1932, who suggested that these medical signs were manifestations of the same disease process. Since then, the uveomeningo-encephalitic disorder has come to be known as Vogt-Koyanagi-Harada syndrome.

The first attempt to establish diagnostic criteria for Vogt-Koyanagi-Harada disease occurred in 1978 at the annual meeting of the American Uveitis Society. The VKH patient must not have had any previous ocular trauma or surgery and must have at least one clinical finding from the following group of signs: 1) bilateral chronic iridocyclitis; 2) posterior uveitis, including exudative retinal detachment; 3) pigmentary posterior pole changes known as, 'sunset glow' fundus; 4) neurological symptoms of tinnitus, stiff neck, headache, or cerebrospinal fluid pleocytosis (elevated leukocyte count); and 5) dermatological signs such as vitiligo, poliosis, or alopecia[13] (Table II). Some researchers have tended to use the term, 'Harada's disease' to describe ocular findings of VKH with an absence of neurological

Table II Differential diagnosis of VKH
Sympathetic ophthalmia
Posterior scleritis
Uveal effusion syndrome
Sarcoidosis
Primary intraocular B-cell lymphoma

and cutaneous markers, as was observed in the case study of this paper. The use of this term, along with, 'incomplete' or 'atypical' VKH is gradually becoming discouraged as VKH becomes better defined and recognized in the medical literature. As integumentary changes are expected to be a latter-course sign of VKH, it was not unusual for this study's patient to initially present without them.

Ocular findings within 3 to 4 weeks from the acute stage of clinical presentation are of particular importance in VKH. A patient's visual acuity at one month's post-treatment has been shown to be a strong predictor of long-term VA following treatment. Eyes with VA better than 6/60 (20/200) at one month were shown to maintain at least 6/12 (20/40) acuity after three years.[14] In this study, VA at three weeks' post-treatment was: OD 6/18-3 (20/60-3) and OS 6/9 (20/30), implying a favorable long-term prognosis. Visual outcomes have improved over recent years with the combination of oral cortico-steroids and immunosuppressants such as azathioprine. By inhibiting purine formation and therefore DNA synthesis, azathioprine stalls the formation of fast-growing T-cells and B-cells that are implicated in auto-immune disorders.

VKH over the long term will manifest a bilaterality in flare-ups of both anterior uveitis and choroiditis. Independent from these unpredictable events, the posterior pole over time will demonstrate pigmentary changes that can be unique to VKH. Generalized RPE clumping, as an example of a less specific sign, was observed in this case study some three months after initial presentation (Fig. 17). The Sugiura sign, or 'sunset glow fundus,' is unique to VKH,[15] and is a form of depigmentation that presents as a kind of 'ocular vitiligo.' It is expected to emerge after several years subsequent to initial diagnosis. Another generalized pigmentary finding is nummular hypopigmented choroidal scars that are erroneously referred to as Dalen-Fuchs nodules.

Despite the implementation of new treatment protocols, slightly more than half of the patients who present with acute phase signs of VKH still proceed to develop chronic disease.[16] Whereas acute phase patients may manifest systemic findings of auditory and CNS anomalies, chronic or recurrent phase findings of vitiligo (patchy skin hypopigmentation) and poliosis (hypo-pigmentation of hair, eyebrows, and eyelashes) are more typical. One study uncovered a connection between the

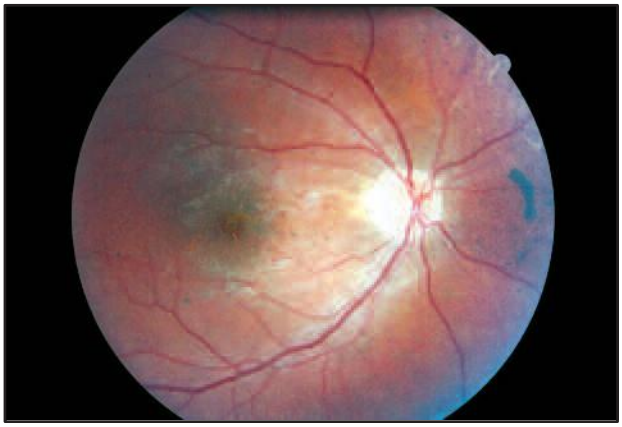

Fig. 17 Diffuse pigmentary clumping changes emerging in the right eye three months after initial presentation.

emergence of vitiligo and visual field loss secondary to chorioretinal degeneration.[14] Due to the necessity of systemic corticosteroid use, VKH patients also face the possibility of visual field loss as a comorbidity secondary to glaucoma. Recurrent panuveitic events over the long term constantly predispose the VKH patient to reduced acuity due to macular edema. VKH in fact can be a relentless autoimmune condition in over half of affected individuals with eventual vision loss due to subretinal fibrosis, choroidal neovascular membranes, epiretinal membrane, pigmentary degeneration, and chorioretinal atrophy.[17] The recent emergence of effective VEGF blockade therapy has helped reduce vision loss as a complication of choroidal neovascular membrane formation, and the judicious use of immunomodulatory drugs such as azathioprine has been shown to preserve vision in relentless VKH cases.

A commonly accepted treatment protocol for acute phase VKH or for a patient naïve to the condition is high-dose oral corticosteroids followed by a slow tapering over a 3 to 6 month period. Immunosuppressive medications are sometimes used as adjunct therapies, or if the patient demonstrates intolerance or resistance to oral steroids. The goal in acute treatment is to gain control of the regions of inflammation and minimize complications. Long-term treatment strategy focuses on intermittent control of flare-ups, with almost no data in the literature detailing how VKH responds over extended time lines. Whether therapy involves topical, oral, or intravenous corticosteroids, cyclosporine, antimetabolites, and alkylating agents, the most efficacious treatment with the least long-term risk of complications is yet unknown.[2]

Conclusion

Vogt-Koyanagi-Harada syndrome is a multisystem autoimmune disorder that challenges health care

providers on virtually every continent to provide an accurate assessment of signs and symptoms, thereby enabling prompt topical and systemic treatment. Although the clinical picture of VKH is well established, little is known about its pathogenesis. At the point of acute onset presentation, slit lamp examination to uncover anterior chamber findings is essential, and Optical Coherence Tomography can demonstrate a powerful clinical utility by harmonizing retinal architecture findings with functional visual acuity. As vision improves in response to therapy, there is a corresponding quantifiable change in the retinal tissues.

The optometrist and ophthalmologist is well-advised to educate his or her patient concerning the long-term probability of repeated flare-ups of iritis and/or choroiditis. The patient in this study had been seen on repeated occasions following initial diagnosis, and is likely expected to present in the future with complaints of bilateral red eyes and photophobia over the long term. Clinically, there is evidence supporting the concept of ongoing choroidal inflammation even after high-dose corticosteroid therapy followed by apparent ocular quiescence. This implies that initial therapy may not be sufficient to completely eradicate choroidal inflammation in a significant percentage of patients. Adequate optometric management of the VKH patient over time necessitates timely communication with both the family doctor and retinal subspecialist as the disease moves forward. O

REFERENCES

1. Moorthy RS, Inomata H, Rao NA, et al. Vogt-Koyanagi-Harada syndrome. Surv Ophthalmol 1995; 39(4): 265-292.
2. Read, RW, Holland, GN, Rao, NA, et al. Revised diagnostic criteria for Vogt-Koyanagi-Harada disease: report of an international committee on nomenclature. Am J Ophthalmol 2001; 647-652.
3. Jaggarao N, Voth D, Jacobsen J. The Vogt-Koyanagi-Harada syndrome: Association with hypothyroidism and diabetes mellitus. Postgrad Med J 1989; 65: 587-588.
4. McCannel CA, Holland GN, Helm CJ, et al. Causes of uveitis in the general practice of ophthalmology. UCLA Community-Based Uveitis Study Group. Am J Ophthalmol 1996; 121: 35-46.
5. Shimizu K. Harada's, Behcet's, Vogt-Koyanagi syndromes—are they clinical entities? Trans Am Acad Ophthalmol Otolaryngol 1973; 77: OP281-OP290.
6. Rathinam SR, Namperumalsamy P, Nozik RA, Cunningham ET. Vogt-Koyanagi-Harada syndrome after cutaneous injury. Ophthalmology 1999; 106: 635-638.
7. Bassili SS, Peyman GA, Gebhardt BM, et al. Detection of Epstein-Barr virus DNA by polymerase chain reaction in the vitreous from a patient with Vogt-Koyanagi-Harada syndrome. Retina 1996; 16: 160-161.
8. Beniz J, Forster DJ, Lean JS , Smith RE, Rao NA. Variations in clinical features of the Vogt-Koyanagi-Harada syndrome. Retina 1991; 11: 275-280.
9. Nussenblatt RB, Palestine AG. The Vogt-Koyanagi-Harada syndrome (uveomeningitic syndrome). In: Ryan SJ, ed. Retina, 2nd ed. St Louis: Mosby, 1994: 1737-1743.
10. Oshima Y, Harino S, Hara Y. Indocyanine green angiographic findings in Vogt-Koyanagi-Harada disease. Am J Ophthalmol. 1996; 122: 58-66.
11. Vasconcelos-Sanos DV, Sohn EH, Sadda S, et al. Retinal pigment epithelial changes in chronic Vogt-Koyanagi-Harada disease. Retina 2010; 30(1): 33-41.
12. Pattison EM. Arch Neurol 1965; 12: 197-205.
13. Snyder DA, Tessler HH. Vogt-Koyanagi-Harada syndrome. Am J Ophthalmol 1980; 90: 69-75.
14. Soon-Phaik C, Aliza J, Bacsal K. Prognostic Factors of Vogt-Koyanagi-Harada Disease in Singapore. Am J Ophthalmol 2009; 147: 154-161.
15. Inomata H, Rao NA. Depigmented atrophic lesions in sunset glow fundi of Vogt-Koyanagi-Harada disease. Am J Ophthalmol 2001; 131: 607-614.
16. Chee SP, Jap A, Bacsal K. Spectrum of Vogt-Koyanagi-Harada disease in Singapore. Int Ophthalmol 2007; 27: 137-142.
17. Bykhovskaya I, Thorne JE, Kempen JH, Dunn JP, Jabs DA. Vogt-Koyanagi-Harada disease: clinical outcomes. Am J Ophthalmol 2005; 140(4): 674-678.

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En ligne : Accéder le questionnaire en ligne en cliquant ci-dessous à l'endroit indiqué. Complétez le test à l'écran, puis cliquez sur le bouton «SUBMIT» à la fin du quiz pour le soumettre à la notation. Si vous rencontrez un problème pour soumettre le test en ligne, soumettez le questionnaire par courriel ou par courrier ordinaire. Vous serez facturé via PayPal pour 25,00 $ plus taxes après avoir reçu votre certificat de crédit UFC.

Par courriel : Accéder le questionnaire en ligne en cliquant ci-dessous à l'endroit indiqué. Inscrivez vos réponses au questionnaire de test (comme suit : 1-a. 2-c, 3-d… etc.) et incluez également votre nom, votre adresse postale et votre numéro de licence professionnelle, et envoyez-les a info@optomed.ca . Vous serez facturé via PayPal pour 25.00$ plus taxes après avoir reçu votre certificat de crédit UFC.

Par courrier ordinaire : Accéder le questionnaire en ligne en cliquant ci-dessous à l'endroit indiqué. Inscrivez vos réponses au questionnaire de test (comme suit : 1-a. 2-c, 3-d… etc.) plus votre nom, votre adresse postale et votre numéro de licence professionnelle, et postez-les à Optomed Québec 421- 5885 Marc Chagall, Montreal QC H4W 0C1. Vous serez facturé via PayPal pour 25.00$ plus taxes après avoir reçu votre certificat de crédit UFC.

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