LETTERS TO THE EDITOR

Waardenburg syndrome type 2 in a Turkish family: implications for the importance of the pattern of fundus pigmentation

EDITOR,—Waardenburg syndrome (WS) is a typical auditory pigmentary syndrome with affected individuals showing varying combinations of sensorineural hearing loss, patchy abnormal pigmentation of the eyes, hair and skin, and various defects of neural crest derived tissues.1

This syndrome is both clinically and genetically heterogeneous and is clinically classified into four types.2 Mutations of the PAX3 gene have been identified in WS type 1 and 3, while those of either the endothelin B receptor gene, the endothelin-3 gene or the sox10 gene have been identified in WS type 4.3,4 WS type 2 is a heterogeneous group, with about 10% of cases caused by mutations in MITF. But MITF mutations are obviously not the major cause of WS type 2 and for most cases the genetic basis is as yet unknown.

The diagnostic criteria for WS type 2 proposed by Liu et al include, in addition to congenital sensorineural hearing loss and pigmentary disturbances of the hair, pigmentary disturbances of the iris but not of the fundus.

In the two affected boys of the Turkish family presented here, the pattern of fundus pigmentation was one of the most striking clinical features, with dense hyperpigmented areas next to hypopigmented areas. We want to emphasise the importance of a thorough observation of the clinical phenotype and especially of the pattern of fundus pigmentation in WS type 2.

CASE REPORT

A Turkish family presented with two of three sons showing clinical symptoms of WS type 2. Firstly, the 5 year old boy, the youngest of the non-consanguineous couple, was referred for ophthalmological evaluation because of constant esotropia in the left eye. The child has worn hearing aids since the age of 16 months; the first reliable audiogram at age 3 years showed profound sensorineural hearing loss which had not changed over the past years. Best corrected visual acuity was 20/20 right eye and 20/400 left eye. Cycloplegic refraction showed anisohypermetropia (right eye +0.5D and left eye +5.5D), best corrected visual acuity was 20/20 right eye and 20/200 left eye.

Severe fundus pigmentary disturbances were found in the left (blue) eye, with extensive albinoid areas nasally and on the posterior pole, whereas the temporal region showed a homogeneous area of dense hyperpigmentation. In the right (dark brown) eye, the pigmentary disturbances were less extensive with a hyperpigmented peripapillary ring and pigmentary mottling especially in the nasal region (Fig 2, centre). Conventional audiological examinations showed bilateral sensorineural hearing loss with moderate impairment on the right and total deafness on the left side (Fig 2, bottom).

Ophthalmological and audiological evaluations made of the father, the eldest brother, and a son of the father's first marriage were within normal limits. The mother showed pigmentary mottling in the periphery of the fundus only. No other associated abnormalities (such as hair or skin hypopigmentation, medial eyebrow flare, broad and high nasal root, hypoplasia of alae nasi, or premature greying of hair) were found among the family members. To calculate the W index, a biometric index for dystopia canthorum, we used dystopia indices for WS as reported by Arias,

Figure 1 (Top) The 5 year old boy (III-5) with bilateral dark brown irides; corneal reflexes demonstrate left esotropia; there is no evidence of dystopia canthorum. (Centre) Left: right fundus with an area of hypopigmentation on the posterior pole as well as nasally; pigmentary mottling and spots of hyperpigmentation in the temporal periphery (arrows); (right) left fundus, albinoid in type with spots of hyperpigmentation nasally and around the whole fundus periphery (arrows). (Bottom) Audiogram: profound bilateral sensorineural hearing loss.
described elsewhere,

MITF

no abnormally migrating bands in the syndrome.

Given the classic symptoms of WS type 2 and that the individuals had dystopia canthorum. This was consistent with the clinical picture of WS type 2.

The genomic DNA samples, tested for PAX3 and MITF genes as described elsewhere, showed no abnormally migrating bands.

COMMENT

Given the classic symptoms of WS type 2 expressed in this Turkish family, we had the opportunity to make some interesting observations on the clinical findings in this syndrome.

In the genomic DNA samples of this family members were living in the Turkey. Because of the fact that most of the other family members showed a conspicuous fundus picture with ipsilateral connections between iris, fundus, and perhaps, inner ear pigmentation. Therefore, one might suggest, that the clinical signs in WS type 2 could be a consequence of a failure in distribution of pigmented melanocytes in their final location. The genetic basis, as yet unknown, for most cases of WS type 2, might be found in a very late step of the pigmentation pathway.

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Depression and anxiety frequently accompany this disorder. An increased incidence of co-morbid obsessive-compulsive disorder (OCD) has been noted. The estimated lifetime prevalence is 1.5% for male and 3.4% for female college students. In very young patients, a more equal sex ratio is observed. On the whole, women show 5–10 times higher prevalence rates than men. The majority of the sufferers disguise their hair loss very well. Because of the secrecy and shame about their behaviour, many remain silent sufferers and treatment is often delayed. It is a chronic mental illness that imposes severe limitations on the patient's social, emotional, and occupational adjustment. The pathophysiology of trichotillomania is not well understood. Treatment options include: medications such as serotonin reuptake inhibitors with or without haloperidol, paroxetine, clomipramine, pimozide, risperidone in serotonin reuptake inhibitor refractory trichotillomania, venlafaxine; behaviour therapy habit reversal training and hypnotherapy.

Trichotillomania has been infrequently reported in the ophthalmic literature. Management can be difficult. Many of these patients are aware of their behaviour, but are unable to curtail it. Others may conceal or deny their habit. Psychiatric counselling may be of benefit if patients are willing to undergo it.

COMMENT
Trichotillomania is characterised by an irresistible urge to pull one's hair. Any body hair may be targeted. Scalp and eyelashes are most commonly affected. Onset is generally in childhood or adolescence, and a chronic course is typical. Depression and anxiety frequently accompany this disorder.
then occurred, with stromal oedema in the same distribution. This was controlled by reinstitution of topical prednisolone therapy. One year after onset, the patient continues to use topical prednisolone once a day and is asymptomatic. There is no stromal inflammation, but fine golden granules are still evident.

COMMENT

Two variants of gold induced keratopathy (corneal chrysiasis) have been described. The more common variant manifests as asymptomatic deposition of fine brown or purple granules in the central posterior corneal stroma, sparing the periphery. Other patterns include peripheral deposition with extension towards the central cornea, superficial and diffuse keratopathy. Corneal stromal granule deposition correlates with duration and dosage of therapy and occurs in most, if not all patients after a cumulative dose of 1 g has been reached. Corneal gold deposition by itself is not considered an indication to discontinue gold therapy.

The second variant of keratopathy is rare, presenting with inflammatory symptoms and signs. Examination reveals marginal interstitial keratitis that may ulcerate, with white, subepithelial limbal infiltration and deep, brush-like stromal vascularisation. Crescent-shaped marginal ulcers, 2–3 mm in length may be present. This variant is presumed to be an idiosyncratic reaction. It may be unilateral or bilateral, and is considered an indication to stop gold therapy. The underlying pathogenic mechanism, as well as the possible associations with other systemic gold toxicity, is unknown. However, it is notable that the keratitis in our case was responsive to topical corticosteroids and recurred after topical prednisolone therapy.

The diagnosis of gold keratopathy should be considered in patients with rheumatoid arthropathy who present with marginal interstitial keratitis. Assessment of possible systemic toxicity is warranted and cessation of therapy should be considered in such cases. Patients should be continuously followed, since stromal inflammation may recur even after cessation of gold therapy.

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Osteosarcoma with metastasis to orbit

EDITOR—Osteosarcoma is the most common primary malignancy of the bone. More than 90% of patients with this disease die with pulmonary metastases. Metastatic disease to the orbit from sarcomas is rare. An English language computer Medline search (from January 1966 to December 2000) for osteosarcoma metastatic to the orbit did not reveal any previous report. We describe perhaps the first case of osteosarcoma metastasising to the orbit.

CASE REPORT

An 8 year old boy was referred from a district hospital for a swelling over the proximal right leg of 5 months’ duration. Lower extremity radiography showed a metaphyseal lesion in the proximal tibia with bone destruction and new bone formation. A clinical and radiological diagnosis of osteosarcoma was made. A plain chest radiograph did not reveal any abnormality. Histopathological examination of the tumour confirmed the diagnosis of osteosarcoma. An above knee amputation of the proximal tibia was performed.

One month later, the child developed proptosis of the right eye (Fig 1). An ophthalmic examination confirmed proptosis of the right eye. Vision, fundus, and eye movements were normal in both eyes. Ultrasound examination of the eye revealed a 12 mm × 18 mm lobulated, nodular, hypodense retrobulbar shadow on the temporal side, displacing the optic nerve medially. An area of necrosis was seen in the mass, but no calcification was present (Fig 2). Computed tomography of the orbit confirmed the findings of ultrasonography, demonstrating a soft tissue density mass in the right orbit displacing the eyeball. Fine needle aspiration cytology from the mass showed malignant spindle cells. A diagnosis of osteosarcoma with metastasis to right orbit was made. The patient was offered palliative chemotherapy but refused further treatment and was discharged from the hospital.

COMMENT

Osteosarcoma is the most common primary malignancy of bone. Most cases occur in children, adolescents, and young adults with a male predominance. The classic site of occurrence is the medulla of the metaphysis of the long bones, particularly the distal femur, proximal tibia, and proximal humerus. Metastases of osteosarcoma typically arise in the lungs. Recent studies indicate, however, that the incidence of non-pulmonary metastases is increasing.

Orbital metastases from malignant neoplasms are rare and can originate from anywhere in the body. In adults, the primary tumour is almost always a carcinoma, with breast and lung accounting for the vast majority of orbital metastases, followed in frequency by genitourinary and gastrointestinal primaries. In children with orbital metastases the primary tumours in descending order of frequency are neuroblastoma, Ewing’s sarcoma, and Wilm’s tumour.1,2,3 Found leukaemia and neuroblastoma as the commonest tumours producing orbital metastases. The two populations studied in these reports differed geographically (United States and India respectively). These tumours tend to involve the orbits and spare the globes in contradistinction to metastatic disease in adults.4 Metastatic osteosarcoma to the eye is very rare. Newman and DiLoreto4 reported a single case metastatic to the synovial pulping and Woodfin and Lees4 have reported single cases of osteosarcoma metastatic to the choroid. The lung was not involved as a metastatic site in our patient. The spread of tumour from the orbit, sparing the lung, may have possibly been through the Batson’s paravertebral system. Physicians should be aware that non-pulmonary metastases of osteogenic sarcoma may exist at unusual sites.

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Figure 1 Clinical photograph showing proptosis of right eye.

Figure 2 Ultrasound showing retrobulbar mass.
An unusual cause of oscillopsia

**Editor,—**Chronic maxillary atelectasis (CMA), also known as silent sinus syndrome (SSS), describes the same condition. Typically, the patient presents with acute enophthalmos and hypoglobus in the absence of previous trauma or surgery. Past sinus disease may be present and computed tomography (CT) scans demonstrate ipsilateral sinus con- traction, orbital floor resorption, and thinning with inferior prolapse into the maxillary sinus. We present a patient who noted oscillopsia while jogging 1 year after being diagnosed with SSS.

**CASE REPORT**

A 26 year old woman was referred with a 6 month history of painless gradual sinking of the left eye (Fig 1). She had suffered two episodes of mild sinusitis, one at the age of 12 and one at a year before presentation. Visual acuity was 6/6 in each eye and there was no evidence of optic neuropathy. There were 4 mm of left relative enophthalmos, no manifest deviation, and full extraocular movements. The height of the palpebral aperture was 1 mm less on the left. Orbital CT scans showed a unilaterally opaque maxillary an- trum and ethmoid sinus, a collapsed in- fundibulum, an imploding medial wall, and a concave demineralised orbital floor (Fig 2). Eighteen months after becoming symptomatic, the patient spontaneously remarked that she had vertical oscillopsia while jogging.

**COMMENT**

Oscillopsia is an illusion that the world is in motion; we believe that this is the first report in a patient with SSS. It occurs most frequently with disorders of the vestibular system, cerebellum, or brainstem. Our patient had no associated neurological signs or symptoms, and a normal head CT scan. A mechanical cause of oscillopsia caused by an instability of fixation is a rare but well documented finding.\(^1\)

In our patient we postulate that the oscillopsia during jogging arises from inadequate globe support caused by demineralisation and downward displacement of the orbital floor and Lockwood’s ligament, while the levator palpebrae superioris and Whitnall’s ligament remain in their normal position. Patients with SSS may also develop verti- cal diplopia,\(^2\) lid retraction,\(^3\) lagophthalmos,\(^4\) or blurred vision.\(^5\)

Spontaneous enophthalmos unrelated to trauma, surgery, local malignancy, or systemic disease is uncommon. The presence of diplo- pia may suggest an underlying neuro- ophthalmic disorder; however, hypoglobus and enophthalmos point to the orbital/ maxillary area as the primary site of pathology.\(^6\)

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COMMENT

Characteristic cytogenetic abnormalities are known to be associated with certain types of lymphoma. In addition to classic translocation of chromosome 8 and 14 in Burkitt’s lymphoma, other chromosome rearrangements are related to subsets of lymphoma. To our knowledge this is the first report of chromosome abnormalities in ocular lymphoma. We observed abnormalities frequently associated with non-Hodgkin’s lymphoma (NHL), including rearrangements of chromosome 1 and 6, which are found in both B and T cell NHL, as is a loss of the Y chromosome. Trisomy of chromosome 12 was also observed in this ocular lymphoma, and has been linked with small lymphocytic or chronic lymphocytic leukaemia. We observed abnormalities frequently associated with subsets of lymphoma. We observed abnormalities related to subsets of lymphoma. We observed abnormalities specifically related to the development of this eye lymphoma, it is apparent that certain alterations are characteristic of lymphoma in general, suggesting that similarities exist between development of ocular and other lymphomas.

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Grosstesque bilateral eyelid swelling as a symptom of Munchausen’s syndrome

EDITOR,—Eyelid swelling can be diffuse or solid, acute or chronic, isolated or part of a syndrome. The differential diagnosis of solid, chronic, and isolated eyelid swelling comprises tumours of multiple origin. We report a case of eyelid swelling which was caused by autotomylation as part of Munchausen’s syndrome.

CASE REPORT

A 44 year old white woman presented with bilateral lower eyelid swelling that had been present for 6 months, which made reading impossible (Fig 1). In the past she had undergone several parasal sinus operations and 3 years earlier she had been treated for a presessional orbital cellulitis and pansinusitis. For the past 4 years she had been bedridden because of fibromyalgia.

The swellings measured 7 × 5 × 2 cm and felt solid on palpation. Complete ocular, internal, otolaryngological, dermatological, parasitological, and psychological examination revealed no clues for the diagnosis. The swellings were surgically removed to the level of the orbital septum, the defects being covered with full thickness skin grafts. Histological examination showed chronic lymphoedema with lymphangiectasis, inflammation, and striking eosinophilia, but no conclusive diagnosis could be made at this time. During uneventful healing of the lower lids, the patient developed bilateral upper eyelid swelling. These swellings were removed as well and replaced by split skin grafts. Histology of the upper lids showed densely packed empty spaces, which almost obscured pre-existent structures such as the orbicularis muscle (Fig 2). In between a patchy infiltrate of lymphocytes, neutrophils, eosinophils, and many macrophages was seen. At high magnification (Fig 3), the empty spaces revealed a lining of macrophages as was demonstrated by positivity for the CD 68 antibody, a reaction pattern highly suggestive of a factitial process. The diagnosis of Munchausen’s syndrome was made.

COMMENT

The patient was confronted with these results and admitted having pin-pricked herself after putting fatty ointments on her eyelids. She thought this would help the “blisters” to disappear more rapidly. After an emotional conversation, she was able to get up and walk for the first time in 4 years. The repeated psychiatric evaluation resulted in a diagnosis of a factitious disorder with physical signs superimposed on a somatisation disorder. The complaints seemed to have a function in the maintenance of the balance of power in the matrimonial relationship. The patient refused psychiatric treatment.

Factitious disorders, such as the Munchausen’s syndrome, are under the patient’s voluntary control and are intended to get or maintain the role of patient. Self inflicted enucleation and corneal perforation are described ophthalmological representatives of these disorders and easy to recognise. The above described swellings are a less common case of Munchausen’s syndrome.

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and more difficult to prove example of an ocular factitious disorder, although the patient’s medical history might make the doctor suspicious. In summary, self inflicted disorders must be considered as a cause of eyelid swelling.

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**Angle closure glaucoma secondary to hemiretinal vein occlusion**

**EDITOR.—**Central retinal vein occlusion (CRVO) has been reported to cause shallowing of the anterior chamber with acute angle closure glaucoma.1,2 This is due to anterior displacement of the lens-iris diaphragm caused by either the transudation of fluid from retinal vessels into the vitreous cavity or swelling of the ciliary body due to spasms, oedema, or detachment which may cause relaxation of lens zonules with subsequent crowding and closure of the angle.3 We describe a patient who developed angle closure glaucoma without neovascularisation of the angle secondary to hemiretinal vein occlusion which responded to miotics and iridotomy suggesting a “pupillary block” mechanism. This is the first report of angle closure glaucoma following a hemiretinal vein occlusion.

**CASE REPORT**

A 63 year old African American man with controlled systemic hypertension noted reduced vision in his right eye for 1 month. Best corrected visual acuity was 20/200 right eye with +1.75 −0.75 × 85, and 20/25 left eye with +2.25 −1.00 × 95. Slit lamp examination was unremarkable, pupils were equally reactive without an afferent pupillary defect. Intraocular pressure (IOP) was 26 mm Hg right eye and 25 mm Hg left eye. Gonioscopy revealed grade 3 angles in both eyes. The superior half of the retinal right eye had dilated tortuous veins and multiple superficial haemorrhages. The right optic nerve was oedematous and haemorrhagic. Retinal examination was unremarkable left eye with a cup to disc ratio of 0.4 horizontally by 0.5 vertically. The patient was diagnosed with a hemiretinal vein occlusion right eye, elevated IOP in both eyes, and treated with betaxolol 0.25% twice daily in both eyes.

Two weeks later visual acuity was counting fingers right eye and unchanged left eye. IOP was 42 mm Hg right eye and 20 mm Hg left eye, on betaxolol. The patient was referred to our office.

On examination the anterior chambers were shallow right eye and deep left eye. IOP was 45 mm Hg right eye and 21 mm Hg left eye. The angle remained open (Fig 1). Pilocarpine 2% was instilled and a laser iridotomy performed right eye. The following day the IOP was 16 mm Hg right eye. Gonioscopy revealed grade 2 angle. Acetazolamide was discontinued, pilocarpine 4% four times daily without neovascularisation, 0.2% three times daily right eye, and Cosopt twice daily right eye.

The following day, the anterior chamber had deepened and the IOP was 24 mm Hg right eye and 22 mm Hg left eye. Gonioscopy revealed a closed angle. The patient was referred to our office for further evaluation. IOP decreased with miotics and high dose topical beta-blocker therapy followed by an increase in the IOP to 37 mm Hg. The patient was discharged on acetazolamide 250 mg by mouth four times daily, brimonidine 0.2% three times daily right eye, Cosopt twice daily right eye, and pilocarpine 2% four times daily right eye.

The following day, the anterior chamber had deepened and the IOP was 24 mm Hg right eye and 22 mm Hg left eye. Gonioscopy revealed a closed angle. Acetazolamide was discontinued, pilocarpine 4% four times daily without neovascularisation, 0.2% three times daily right eye, and Cosopt twice daily right eye were continued.

Two months later, the anterior chambers were deep and the angles were grade 3 in both eyes. IOP was 14 mm Hg right eye on pilocarpine 4% four times daily and Timoptic XE four times daily 0.5% IOP on subsequent visits remained below 20 mm Hg, and the angle remained open (Fig 2). Visual acuity did not improve.

**COMMENT**

Transient angle closure glaucoma, an infrequent sequela of CRVO, has not been reported following hemiretinal vein occlusion (HRVO). Angle closure may occur days to months following a CRVO. Neovascular glaucoma has been associated with CRVO, HRVO, and branch retinal vein occlusion (BRVO).1

The patient in this report developed angle closure glaucoma within a few weeks of the HRVO. He had a history of systemic hypertension. Elevated IOP was noted in both eyes on initial examination. Cycloplegic agents increased the IOP, suggesting the angle closure was not due to a ciliary block mechanism. Pilocarpine and a laser iridotomy reduced the IOP and opened the angle in this patient, suggesting a secondary pupillary block mechanism. At the time of diagnosis of angle closure glaucoma the contralateral eye had a deep anterior chamber angle, making a diagnosis of primary pupillary block angle closure glaucoma unlikely.

Previous reports of angle closure glaucoma secondary to central retinal vein occlusion suggest treatment with cycloplegic agents is beneficial in some patients.5 Miotic agents have been reported to be of benefit in cases of angle closure glaucoma following a CRVO.6 Determining the mechanism of angle closure in an individual patient following a retinal vascular occlusion will guide the ophthalmologist to the appropriate treatment options, mydriatic or miotic therapy. Uveal bi-omicromicroscopy may be of benefit in differentiating between a ciliary block mechanism and a pupillary block mechanism.6

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**Varicella zoster virus immune recovery stromal keratitis in a patient with AIDS**

**EDITOR.—**The advent of potent antiretroviral therapy has resulted in the recognition of the syndrome of immune recovery uveitis in patients with AIDS and a history of cytomegalovirus (CMV) retinitis.7 Although the pathogenesis of this disease is poorly understood, it is hypothesised to be a consequence of an improved immune response to viral antigen.
already present in the eye, with or without active viral replication. We describe a case of immune recovery varicella zoster virus (VZV) stromal keratitis in a patient with AIDS.

CASE REPORT
A 37 year old man with AIDS (CD4 = 180 cells x 10^9/L) developed right sided ophthalmic zoster and was treated with aciclovir (800 mg by mouth five times a day). Twelve days after onset of the rash, topical prednisolone acetate (one drop every 2 hours) was prescribed to treat multiple anterior stromal corneal infiltrates. The keratitis promptly resolved, and the corticosteroid drops were discontinued. The keratitis promptly resolved, and the patient’s immune recovery may be coincidental, the significant delay between his initial zosteriform eruption and the recurrence of his stromal disease, as well as the close temporal relation between the recurrence and the patient’s immune recovery, suggest that this is a case of immune recovery zoster keratitis in a patient with ophthalmic zoster.

Other examples of immune recovery disease in patients with AIDS include antiretroviral therapy related multiple anterior stromal keratoconjunctivitis. Although the recurrence of the keratitis with this patient’s immune recovery may be coincidental, the significant delay between his initial zosteriform eruption and the recurrence of his stromal disease, as well as the close temporal relation between the recurrence and the patient’s immune recovery, suggest that this is a case of immune recovery zoster keratitis in a patient with ophthalmic zoster.

COMMENT
VZV associated anterior stromal keratitis is thought to be due to immune recognition of residual viral antigen in the corneal stroma. The incidence of recurrent VZV stromal keratitis has not been well characterised, nor have factors which might precipitate recurrences. Recurrent keratitis related to immune system activation has been recognised following adenoviral infection. In that case, subepithelial opacities associated with a previous adenoviral follicular, keratoconjunctivitis recurred 9 months following the original infection in association with a severe upper respiratory infection. In this report, a patient with AIDS and a history of ophthalmic zoster had a recurrence of anterior corneal stromal infiltrates almost 3 years after the initial skin eruption. Recurrence of the keratitis was not associated with skin or corneal epithelial disease and occurred despite aciclovir prophylaxis. Although the recurrence of the keratitis with this patient’s immune recovery may be coincidental, the significant delay between his initial zosteriform eruption and the recurrence of his stromal disease, as well as the close temporal relation between the recurrence and the patient’s immune recovery, suggest that this is a case of immune recovery zoster keratitis in a patient with ophthalmic zoster.

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Dipetalonema reconditum in the human eye

EDITOR,—Human ocular invasion by non-human filarial parasites has been reported for more than 200 years. However, only just over a handful have actually been removed, described and identified in detail. Furthermore, the Dipetalonema species that have been described in three cases were thought to be from the body cavity of the natural hosts—the porcupine and the beaver.

Figure 1 Subconjunctival infestation with Dipetalonema reconditum (arrows). This report describes a case of Dipetalonema reconditum (usually associated with canine filariasis) in the human eye. It is noteworthy that this worm has morphological similarities to the canine heartworm Dirofilaria immitis, which in the past has been described in the human eye1 but not satisfactorily identified.2

CASE REPORT
A 62 year old white resident of suburban Victoria, Australia, presented with a red and irritated right eye of 2 weeks’ duration. This was exacerbated after a rural walking trip and did not improve with topical lubrication. He also noted mild diplopia on extreme right gaze. On examination, the visual acuity was 6/6 on the right eye and 6/4 in the left. There was mild limitation of right eye abduction. Localised bulbar conjunctival erythema and chemosis were noted inferio-temporally in the right eye near the insertion of the lateral rectus. Slit lamp biomicroscopy revealed a slithering, clear, thread-like mobile mass in the subconjunctival space of the inflamed area (Fig 1 and video report (see BJ Ophthalmic website)). Intraocular pressure and the rest of the ocular examination, including anterior and posterior segments, were unremarkable. Previous history included pyrexia of unknown origin (PUO) and lancinating headaches 5 months previously. Investigation results then of note included erythrocyte sedimentation rate (ESR) 96 mm in the first hour, C reactive protein (CRP) 411 mg/l, and trace proteinuria. He improved on intravenous ceftriaxone, metronidazole, and oral roxithromycin. He had also had another period of PUO and suffered with chronic Guardia infection.

The worm was removed following localised peritomy under topical local anaesthesia using lignocaine 2%, phenylephrine 10%, and phos- pholine iodide 12.5% (in an attempt to paralyse the worm). The specimen was removed alive and intact and sent in normal saline for identification. Laboratory examination revealed a worm measuring 32 mm in length with morphological features consistent with an unfertilised adult female D reconditum. Patient investigations including thick and thin blood film, full blood count, ESR, CRP electrolytes, liver function tests, and chest x ray were all within normal limits. His pet dogs were found to be serologically negative for Dipetalonema reconditum. He was treated with oral mebendazole, topical prednisolone acetate 1%, and chloramphenicol before the worm’s identification. Two weeks following removal of the worm the diplopia had resolved and residual fibrosis of the conjunctiva at the site of removal was noted.

COMMENT
Dipetalonema reconditum is a nematode that is commonly found to be endemic in dogs’ subcutaneous tissues. Worldwide distribution...
includes the United States, Italy, and Africa. Its infestation in dogs, the only definitive host, is not clinically significant, although they may manifest an elevated eosinophil and leucocyte count. This manifestation may result in false positives in test for circulating *Dirofilaria immitis* microfilariae, also known as the dog heartworm. The differentiation of these two worms is important as *Dirofilaria* is pathogenic to canines. Knott’s test is used to detect these microfilariae serologically. Identification of these two adult worms is by their staining patterns with acid phosphatase: *Dipetalonema* stains evenly while *Dirofilaria* concentrates the acid phosphatase in two regions.

*Dipetalonema reconditum* microfilariae averages about 250–270 µm in length and 4.4–5.3 µm in width with a rounded curved body, a distinguishing cephalic hook, and a blunt anterior end. Adult males average 13 mm in length and females 17–32 mm.

*Dipetalonema* has an indirect life cycle with development of infective larvae that are carried by fleas (genus *Ctenocephalides*, *Pulex*), ticks (*Rhipicephalus sanguineus*), and lice (*Linognathus*). Dogs are infected when bitten by an infected flea, tick, or louse. The larval life stage is known as the *paratenic* or *intermediate* host, such as bats. Adult microfilariae are ingested by a mosquito when it bites an *intermediate* host. The microfilariae develop in the intestinal tubules of the mosquito and pass to its saliva when it bites the definitive host. The adult worms reach the subcutaneous tissues by way of the blood as a first stage larva. The larval life stage of *Linognathus* (ticks (*Rhipicephalus sanguineus*)) and lice (*Linognathus*) is ingested when the mosquito is feeding.

Following ingestion, the microfilariae are released into the bloodstream of the definitive host, usually a dog, and mature into adult worms over a period of several weeks. The adult worms typically migrate to the pericardial cavity, subcutaneous tissues, and anterior chamber of the eye.

**Dipetalonema reconditum** has been documented in the United States, Italy, and Africa. In the United States, the highest prevalence of *Dipetalonema* infections in dogs was found in the southeastern states, with the highest prevalence in Alabama (32.3% of dogs tested), followed by Georgia (16.5%) and Florida (10.9%). In Italy, the highest prevalence of *Dipetalonema* infections was found in the region of Lombardy (27.8% of dogs tested), followed by the region of Piedmont (18.3%) and the region of Veneto (14.2%). In Africa, the highest prevalence of *Dipetalonema* infections was found in the region of Togo (25.5% of dogs tested), followed by the region of Benin (19.8%) and the region of Nigeria (13.1%).

**Intervention:** The treatment for *Dipetalonema* infection is typically not necessary, as the worms are usually asymptomatic. In cases of clinical signs, such as ocular inflammation, treatment may be considered. Ivermectin and milbemycin are the recommended treatments for *Dipetalonema*. Other control measures include flea, louse, and tick control. Hitherto, there has not been any documented public health significance. The incidence of *Dipetalonema* infection has significantly decreased since the introduction of the heartworm prevention programme as part of the heartworm prevention programme as part of the public health programme in the United States.

**Conclusion:** *Dipetalonema reconditum* is a rare infection in dogs, and its clinical significance remains unclear. However, the recognition of this infection is important for the effective management of canine heartworm disease.
pterygia is interesting because this protein is known to be related to differentiation when expressed in other epithelial tissues—for example, skin. In view of the recent report that Hsp27 transient expression seems essential for preventing embryonic stem cells from undergoing apoptosis. Furthermore, Tan et al recently proposed that pterygium may be related to faulty apoptosis. The role of Hsp27 in pterygium remains to be elucidated since Hsp27 is expressed in basal epithelial cells of normal conjunctiva, where the cells are mainly differentiating stem cells and in all layers of epithelium in pterygia. Further studies would provide valuable information regarding the possible role of Hsp27, and the involvement of heat shock proteins generally in the pathogenesis of pterygium.

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Figure 1 (A) Normal conjunctiva: Hsp27 cytoplasmic immunoreactivity in basal and subbasal layers of epithelium (×400). (B) Pterygium: Hsp27 positive cells in all layers of epithelium. Cells of subepithelial connective tissue are Hsp27 negative while vessels are Hsp27 positive (arrows) (×400).