

Why a fear of heights may be good for your eyes

A 49 year old male patient presents with a sudden painless loss of vision. He has worn glasses since in primary school and is highly myopic. He has not had an ocular examination in the last 10 years as he did not feel he needed one.

There is a strong family history of type 2 Diabetes; however a recent blood glucose work-up raised no concerns. He does suffer occasional headaches and feels lethargic despite leading a very active lifestyle, playing cricket and recently bungee jumped two weeks ago on holiday.

Examination shows reduced vision with right VA 6/12 and left VA 6/18. Pupil reactions are equal, consensual and direct with no relative afferent pupil defect (RAPD) present. Mobility is full and the patient reports no diplopia. Intraocular pressures are within normal range at 16 mmHg in both eyes.

External examination of the left eye reveals sub-conjunctival haemorrhages and chemosis bilaterally possible relating to trauma from sharply raised blood pressure from the bungee jump.

Internal examination of the eye reveals pre-retinal haemorrhage with scattered cotton-wool patches suggestive of retinal nerve fibre layer ischemia. The vitreous is cloudy with a frank vitreous haemorrhage.

It looks like the bungee jump has resulted in ocular trauma but there are other possibilities that need to be considered: Diabetic retinopathy, HIV manifestation and myopic degeneration.

Diabetic retinopathy.

If present, and allowed to progress, diabetic retinopathy will certainly lead to a retinal situation as described above. Retinal changes caused by diabetes may be initially viewed as micro-aneurysms. Increased permeability of the vessels allows for intra-retinal haemorrhages and oedema which may initially be seen as dot haemorrhages and small exudates. The result of these micro-vascular changes leads to retinal ischemia causing hypoxia. Cotton-wool patches are associated with hypoxia of the nerve fibre layer (NFL) (Kanski 2002).

Hypoxia of the retina has two main effects; firstly in the formation of

arteriovenous shunts, which may or may not be actual new vessels, referred to as intraretinal microvascular abnormalities (IRMA) and secondly via neovascularization, which is thought to be promoted by release of growth factors locally in the hypoxic retina. These new vessels are prone to leaking and can result in vitreous haemorrhages from straining and if a sudden elevation of blood pressure occurs, as might happen in a bungee jump.

However, as already noted the patient has not exhibited other signs or symptoms of diabetes so the cause being a longstanding diabetic disease process is not very likely.

HIV Manifestation:

HIV manifestations in the posterior pole of the eye match with some of the clinical findings of this case. HIV infection results in 3 out of 4 patients exhibiting ocular complications. (Robinson, Ross and Whitcup 1999). The most common posterior segment conditions are microangiopathy and cytomegalovirus retinitis.

Microangiopathy presents with characteristic signs of retinal

The patient has an active lifestyle, playing cricket and recently bungee jumped while on holiday



haemorrhages, cotton wool spots and microaneurysms and is the most commonly presenting lesion with HIV infection. In this case cotton wool spots and pre-retinal haemorrhage are observed but there are no microaneurysms present. Cytomegalovirus retinitis (CMVR) is the most common intraocular infection in HIV patients and generally occurs when CD4 T-cells counts are below 100 cells/uL. (Robinson, Ross and Whitcup 1999). This is an opportunistic infection due to immunosuppression and can lead to retinal necrosis and blindness.

This patient has no CMVR lesions, microaneurysms, or intraretinal haemorrhages. The absence of these signs would suggest HIV is not the cause of the situation with this patient.

Myopic degeneration.

Myopic degeneration typically appears in two distinct age groups of high myopes. It can manifest as myopic maculopathy in young adulthood with degenerative changes of the retina and choroid (Kanski 2002) or may be found in patient's aged 50 years and beyond (The Willis Eye manual 1999). Both groups suffer similar posterior pole changes due to pronounced elongation of the globe.

The degenerative changes in the retina and choroid lead to alteration of the retina pigment epithelium (RPE) and exhibit well circumscribed area of choroidal atrophy, presence of "myopic crescent", subretinal haemorrhages, and choroidal sclerosis, which can lead to severe loss of central vision if macular involvement occurs. The presence of these signs defines the presence of myopic degeneration (Vongphanit, Mitchell, Wang 2002). Other signs, which may occur in highly myopic eyes, include tilted disc, posterior staphylomas, macular holes, peripheral chorioretinal degeneration. Retinal holes and retinal detachments may develop.

Although this patient is approaching 50, it is unlikely that his current condition is due to myopic degeneration. There are no signs of chorioretinal atrophy no observations of a myopic crescent. There is moderate, rather than severe, visual loss which suggests there is no involvement of the macula. The presence of signs such as pre-retinal haemorrhage, cotton wool spots, sub-conjunctival haemorrhage and chemosis do not fit into the clinical picture of myopic degeneration.

Ocular Trauma.

The remaining condition to consider is, of course, ocular trauma which is the most likely scenario for this patient. Several reports of injury due to bungee jumping have been recorded (Curtis & Collin 1999), including: dot and blot haemorrhages, sub-hyaloid, pre-retinal, sub inner limiting membrane, and into the vitreous. In some patients' haemorrhages have been accompanied by macula oedema, demonstrated by fluorescein angiography, and cotton wool patches. There are numerous reports of sub-conjunctival haemorrhages and chemosis.

The mechanism of how the damage occurs is uncertain and several factors may be involved. It is possible that a sudden rise in intrathoracic pressure and intravenous pressure might cause haemorrhages to occur in the eyes. Gravitational forces may be an important factor as the increase in intravascular pressure (particularly venous) may be caused by the reversal of direction of acceleration and negative G-forces. Curtis and Collins (1999) have suggested this may cause spontaneous rupture of superficial capillaries leading to haemorrhagic detachment of the inner limiting membrane at the fovea. In previous reports of vision loss following a bungee jump the degree of loss has varied from

slight (6/9) to severe (6/60). Delays in presentation are also common and Collins and Collins (1999) report delays up to 6 days after the event.

With this case the signs of sub-conjunctival chemosis and haemorrhage with cotton wool patches and pre-retinal haemorrhage would fit with previously described instances of ocular trauma from bungee jumping. The clouding of the vitreous and presence of a frank vitreous haemorrhage in the left eye may well be the cause of the slight to moderate visual loss. The possibility of macula oedema can not be overlooked and a fluorescein angiography may be useful in detecting its presence, hopefully the left haemorrhage would not obscure the results.

Management

Management of this patient would mainly involve checking for possible macular oedema and then monitoring the resolution of the vitreous haemorrhage and the macula oedema if present.

If macula oedema is found and exhibits prolonged persistence laser treatment may be considered. Spontaneous resolution normally results in excellent visual recovery. The anterior conjunctival changes should be monitored and again spontaneous resolution should occur with out direct intervention. Artificial tear supplements may be used to improve any mild ocular irritation.

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Vision and lighting key issues for older people

Vision and visual impairment have a significant impact on older adults' daily function and safety within their homes and communities. Despite this many older people do not recognise vision problems and do not see the impact that failing vision has on their daily lives.

All too often health care providers, caregivers, and elders themselves assume that loss of visual function is a normal part of growing old. There is widespread belief that nothing can be done to improve the quality of life of older people with irreversible vision loss¹.

Vision impairment, including decreased visual acuity, loss of visual field, and low contrast sensitivity, has been linked to disability,² falls,³ difficulty in mobility,⁴ restriction in activities of daily living,⁵ social isolation,⁶ loss of independence,^{5,7} depression,⁵ suicide,⁷ and mortality.⁸

In a recent study¹ looking at home environmental factors it was found that older people tended to live with lighting conditions that were significantly below recommended levels. Their homes were also likely to have poor contrast, especially in bathrooms where bathtubs, sinks, grab rails and floor are often several different shades of white, and spots of glare create blindspots.

Suggested strategies for assisting older people to remain in their own homes included improving lighting, clearing walkways, ensuring adequate contrast of furniture and adequate contrast in the bathroom.

Light intensity is only one aspect to consider and qualitative factors such as placement of light source, good contrast conditions, and absence of glare are all important for vision.

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