Grand Rounds

A 38-year-old man with bilateral foveal hemorrhages

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History

A 38-year-old man presented to the Eye Casualty department complaining of an episode of blurred vision affecting both eyes, particularly his left. The episode had occurred 4 weeks previously while climbing Mount Everest. It developed at an altitude of 6500 meters. The patient had at that point descended to base camp and received medical attention. He had no other complaints at that time. Specifically, he denied any lethargy, nausea, headache, confusion or breathing disturbance. His vision remained blurred, but he was permitted to continue his ascent to 7100 meters. He was referred to our department upon return from Kathmandu.

There was no significant past medical history; specifically, there was no history of diabetes or hypertension.

Examination

Visual acuities without correction were 6/18 (20/60) OD and 6/24 (20/80) OS with no improvement with pinhole.

The anterior segment examination was normal.

Dilated fundoscopic examination showed bilateral foveal preretinal hemorrhages and bilateral scattered nerve fiber layer hemorrhages. The foveal hemorrhages were beginning to organize at the time of presentation to our department.

Blood pressure, blood glucose and complete blood count were normal. Specifically, there was no evidence of anemia.

Figure 1. Right eye. Fundus photograph demonstrating foveal pre-retinal hemorrhage and scattered nerve fiber layer hemorrhages.

Ancillary Testing

Fluorescein angiography was carried out and the images are shown.

Treatment

This patient was observed over a period of several weeks. During this time all retinal hemorrhages resolved. Visual acuity returned to 6/6 OU (20/20) although the patient continued to complain of a subjective blur particularly affecting the left eye.

Differential Diagnosis

In this case the history points clearly to the diagnosis discussed below. However, on the basis of the fundus

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Figure 2. Left eye. Fundus photograph demonstrating organizing foveal pre-retinal hemorrhage and a nerve fiber layer hemorrhage in the inferior arcade.

Figure 3. Fluorescein angiogram right eye.

appearance alone, the differential diagnosis might include other retinopathies, in particular those listed below.

- Diabetic retinopathy - The patient in this case did not have diabetes.
- Hypertensive retinopathy - The patient in this case did not have hypertension.
- Central retinal vein occlusion - The fluorescein angiographic appearance shows no evidence of venous occlusion.
- Purtscher's retinopathy - Classically associated with chest trauma, this condition may also be seen in association with pregnancy, fat embolism and pancreatitis. None of these are relevant in this case.

Figure 4. Fluorescein angiogram left eye.

lism and pancreatitis. None of these are relevant in this case.

- Leukemic retinopathy - Leukemias, in particular myeloid leukemia, may be associated with retinopathy. Features of leukemic retinopathy include preretinal and intraretinal haemorrhages. Other features include Roth's spots, cotton wool spots, retinal venous tortuosity and neovascularization. There was no other evidence of leukemia in this case.
- Valsalva retinopathy - This will be discussed further in the Diagnosis and Discussion section.
- High-Altitude Retinopathy - This will be discussed further in the Diagnosis and Discussion section.

Diagnosis

A diagnosis of high-altitude retinopathy (HAR) was made in this case. HAR is an acquired vascular retinopathy that develops at high altitudes, typically above 16000 feet (approximately 4900m).¹ Its features include dilated retinal veins, intraretinal and preretinal hemorrhages and optic disc hyperemia. Often these hemorrhages spare the macula, although in this case both foveae were affected.

A number of factors are thought to contribute to the pathophysiology of the condition including increased retinal blood flow associated with reduced arterial oxygen pressures, reduced vascular competence² and inadequate autoregulation of the retinal circulation in hypoxic conditions.³ It has also been found to be more common in those with higher baseline intraocular pressures and

those who have used non-steroidal anti-inflammatory drugs.²

The Valsalva maneuver (forcible exhalation against a closed glottis) can be associated with a retinopathy characterized by rupture of perifoveal capillaries and unilateral or bilateral pre-macular hemorrhages. It has been suggested that this maneuver contributes to the pathophysiology of HAR but the intraretinal hemorrhage, retinal venous dilation and optic disc edema which may be seen in HAR are not features of Valsalva retinopathy.⁴

HAR has a benign course and usually is associated with good long-term visual outcomes. However, high altitude retinopathy is part of a spectrum of life threatening conditions which constitute altitude sickness. These conditions are acute mountain sickness (AMS), high-altitude retinopathy, high-altitude cerebral edema (HACE) and high-altitude pulmonary edema (HAPE). High-altitude

retinopathy is associated with HACE. The presence of retinopathy findings in climbers should alert physicians to the possibility of cerebral edema.¹

Treatment for HAR alone is rarely required but treatment of the systemic altitude sickness may include descent, administration of oxygen, steroids or diuretics.¹

References

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