CASE REPORT

Rubeosis iridis in patients with diabetes: not forgetting oculoischaemic syndrome as a differential

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Accepted 26 October 2014

SUMMARY

This case illustrates an oculoischaemic syndrome presenting with iris neovascularisation in a patient with established diabetic retinopathy. It highlights the importance of considering the differential diagnosis of rubeosis in all patients, including those with an underlying vascular pathology. Moreover, it urges clinicians to consider the sequelae of a compromised vascular system, such as the iatrogenic central retinal artery occlusion as a result of intravitreal injections. Early diagnosis not only informs correct ophthalmic treatment, but is crucial in preventing ischaemic stroke and, therefore, reducing the risk of systemic morbidity and mortality.

BACKGROUND

Oculoischaemic syndrome is a rare condition caused by reduced ocular perfusion. The risk factors include age of 50–80 years, male gender, hypertension, diabetes, vascular stroke, coronary disease and haemodialysis.¹ It can present with deterioration of visual acuity and ocular pain. The clinical manifestations are variable, including neovascular glaucoma, poorly reactive pupil, rubeosis iridis and uveitis, as well as dilated veins, narrowed arteries, cotton wool spots, a cherry red spot and mid-peripheral intraretinal haemorrhages,^{2 3} many of which are frequently found in diabetic retinopathy. The significant overlap of clinical signs poses a diagnostic challenge, especially in patients with established diabetic retinopathy. High index of suspicion in these cases is required as timely diagnosis is essential to prevent ocular and systemic morbidity and mortality and involves investigations and treatments quite different from proliferative diabetic retinopathy.

CASE PRESENTATION, INVESTIGATIONS AND DIFFERENTIAL DIAGNOSIS

A 42-year-old man with type 1 diabetes with a history of right pseudophakia, hypercholesterolaemia and established diabetic retinopathy previously treated with pan-retinal photocoagulation was noted to have macular oedema and new onset neovascularisation of the iris in the right eye (figure 1) at a routine follow-up appointment. This was attributed to his diabetic retinopathy and was treated with intravitreal ranibizumab injection, as indicated by the significant diabetic macular oedema.

One week after the treatment, the patient presented with worsening vision. His right visual acuity was reduced to hand movements from 6/12. Examination found new sectoral disc swelling,

macular pallor and a central cherry red spot (figure 2).

The findings were consistent with central retinal artery occlusion, precipitated by transient increased intraocular pressure following intravitreal injection. This was an unusual complication of an intravitreal injection in a young patient and seemingly without multiple cardiovascular risk factors. Thus, he underwent carotid artery Doppler ultrasound, which revealed complete occlusion of the right extracranial internal carotid artery. Retrograde flow from the right ophthalmic artery back into the circle of Willis was demonstrated on Doppler ultrasound, and this direction of blood flow suggests diversion, or 'steal', of oxygenated blood from the eye to the brain.

TREATMENT

Patient was started on dual antiplatelet therapy and aggressive management of risk factors. He is not yet being considered for carotid endarterectomy given the established intracranial collaterals from presumed long-standing stenosis.

OUTCOME AND FOLLOW-UP

Since the diagnosis of oculoischaemic syndrome, the patient has developed poorly controlled neovascular glaucoma in the right eye which was managed with a tube shunt. The patient remains under close surveillance and joint care of ophthalmology, neurology, diabetes team, cardiology and vascular surgery given the extent of his vascular disease.

To cite: Nistrata-Ortiz M, Li J-PO, Davies N. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2014-207236

Figure 1 Rubeosis iridis of the right eye. When first noted, the rubeosis was located in iris root.

Figure 2 Right fundus with sectoral disc swelling, macular pallor and a central cherry red spot. Scarring from previous pan-retinal photocoagulation visible.

DISCUSSION

Oculoischaemic syndrome can be difficult to diagnose in the presence of diabetic retinopathy due to significant overlap of clinical signs. This is consistent with Terelak-Borys *et al*⁴ study where diabetic retinopathy and central retinal vein occlusion (CRVO) were reported as the main differential diagnoses of oculoischaemic syndrome. Furthermore, central retinal vein occlusion is more prevalent in patients with diabetes in comparison with people without diabetes and people with type 1 diabetes are at a higher risk of developing retinal neovascularisation as a result of CRVO.⁵

Rubeosis iridis occurs in ischaemia and can be present in ocular ischaemia as well as in diabetic retinopathy. The pattern of distribution of iris neovascularisation may vary. Characteristically it is found around the pupil margin in diabetes mellitus and at the angle and iris root in oculoischaemic syndrome. Owing to the overlap of clinical symptoms, the diagnosis of oculoischaemic syndrome requires a high index of suspicion and vigilance to differential diagnoses despite an established disease process. Features suggestive of an alternative underlying cause for rubeosis in a patient with diabetic retinopathy include good sugar control, mild diabetic retinopathy changes and marked asymmetry of pathology between the eyes, as was in this case. This is consistent with the report of Oller *et al*,⁶ who described a case of oculoischaemic syndrome and subsequent rubeosis iridis due to a high-grade carotid stenosis and highlighted the importance of vascular imaging in these patients.

Incorrect diagnosis of the underlying pathology can not only lead to delayed treatment of oculoischaemic syndrome, but also to potentially harmful interventions. We highlight the risk of central retinal artery occlusion following intravitreal injections^{7 8} in patients with compromised perfusion. In such cases the artery can become occluded even with a small increase in the intraocular pressure from the injection. Thus, in patients with concurrent ocular ischaemia and macular disease amenable to intravitreal injections, careful deliberation should take place and measures taken to minimise artery occlusions.

Furthermore, early diagnosis of ocular ischaemia not only informs correct ophthalmic management, but may also be life-saving in preventing ischaemic stroke. The average stroke rate has been reported to be significantly higher in patients with ocular ischaemic syndrome (4% per year) compared to controls (0.49% per year).⁴ Therefore, early diagnosis and management of risk factors is crucial to prevent systemic morbidity and mortality.

Lastly, this case outlines an ophthalmic presentation of a common systemic disease. It is essential that clinicians are aware of the oculoischaemic syndrome and its presentations as it requires a multidisciplinary treatment approach, including neurology, cardiology, endocrinology and vascular surgery.

Learning points

- ▶ Rubeosis iridis can be present in microvascular disease, as seen in diabetes, or macrovascular disease, as seen in carotid artery stenosis.
- ▶ It is essential to always consider differential causes of rubeosis even in patients with diabetic retinopathy.
- ▶ Clinicians should be vigilant of the diagnosis of the oculoischaemic syndrome even in patients with an established disease process.
- ▶ Misdiagnosis of the underlying cause of rubeosis can lead to harmful complications of incorrectly applied treatment—we highlight the risk of central retinal artery occlusion following intravitreal injections in patients with compromised perfusion.
- ▶ Early diagnosis of the oculoischaemic syndrome not only informs correct ophthalmic management but also is crucial in preventing ischaemic stroke.

Acknowledgements The authors would like to thank the patient for consenting to use his case for education and learning. The authors would like to thank the Ophthalmology clinic staff at Chelsea and Westminster Hospital.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

- 1 Zemba M, Avram CI, Ochinciuc U, *et al*. Ocular ischemic syndrome—a case report. *Oftalmologia* 2013;57:17–22.
- 2 Bennett LW. Ocular ischemic syndrome as initial manifestation of bilateral carotid occlusive disease. *J Am Optom Assoc* 1997;68:250–60.
- 3 Dhooze M, de Laey JJ. The ocular ischemic syndrome. *Bull Soc Belge Ophtalmol* 1989;231:1–13.
- 4 Terelak-Borys B, Skonieczna K, Grabska-Liberek I. Ocular ischemic syndrome—a systematic review. *Med Sci Monit* 2012;18:138–44.
- 5 Santiago JG, Walia S, Sun JK, *et al*. Influence of diabetes and diabetes type on anatomic and visual outcomes following central retinal vein occlusion. *Eye* 2014;28:259–68.
- 6 Oller M, Esteban C, Pérez P, *et al*. Rubeosis iridis as a sign of underlying carotid stenosis. *J Vasc Surg* 2012;56:1724–6.
- 7 Battaglia Parodi M, Iacono P, Cascavilla ML, *et al*. Sequential anterior ischemic optic neuropathy and central retinal artery and vein occlusion after ranibizumab for diabetic macular edema. *Eur J Ophthalmol* 2010;20:1076–8.
- 8 von Hanno T, Kinge B, Fossen K. Retinal artery occlusion following intravitreal anti-VEGF therapy. *Acta Ophthalmol* 2010;88:263–6.

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