

Dexamethasone implants and neovascular glaucoma in central retinal vein occlusion

Albert Lula¹, Lavnish Joshi¹, Nigel Kirkpatrick², Sue Lightman¹, Victor Menezo¹, Ahmed Sallam², Simon Taylor^{1,3}

¹Royal Surrey County Hospital NHS Foundation Trust, Guildford; ²Gloucester Hospitals NHS Foundation Trust, Cheltenham; ³Faculty of Medicine, Imperial College London, London

Introduction

Dexamethasone intravitreal implants (Ozurdex) are a NICE-approved therapy for the treatment of macular oedema (MO) in patients with branch retinal vein occlusion (BRVO) and non-ischaemic central retinal vein occlusion (niCRVO), and have been reported to reduce the ischaemic complications of these conditions.^{1, 2, 3}

Interestingly, 2 important studies, such as GENEVA and SCORE study, have shown controversial results regarding the effect of intravitreal steroids on the reduction of retinal neovascularisation.^{4,5}

We present a case series of five patients who developed neovascular glaucoma (NVG), after being treated with dexamethasone implants for clinically-diagnosed niCRVO.

The purpose of this study was to report that neovascularisation is still a clinical problem in patients with niCRVO treated with Ozurdex implants, indicating that close observation for the development of NVG is still required in these patients.

Methods

This was a retrospective case series study of 25 patients with clinically-diagnosed niCRVO, treated with dexamethasone intravitreal implants and followed-up for 12 months.

The diagnosis of niCRVO was based on visual acuity (VA), clinical features and the absence of a relative afferent pupillary defect (RAPD). Patients were treated with dexamethasone implants if their VA was worse than 6/12 with central macular oedema.

NVG was diagnosed as neovascularisation of the angle (NVA) visible on gonioscopy and associated with raised intraocular pressure.

Results

5/25 patients developed NVG (20%), all within 8-12 weeks of their most recent dexamethasone implant. All five affected patients had initially presented with the clinical features of niCRVO and had visual acuities of 6/24 – 6/36 with no RAPD.

All had an improvement in visual acuity in response to treatment with dexamethasone intravitreal implant of 1-3 Snellen lines.

Results

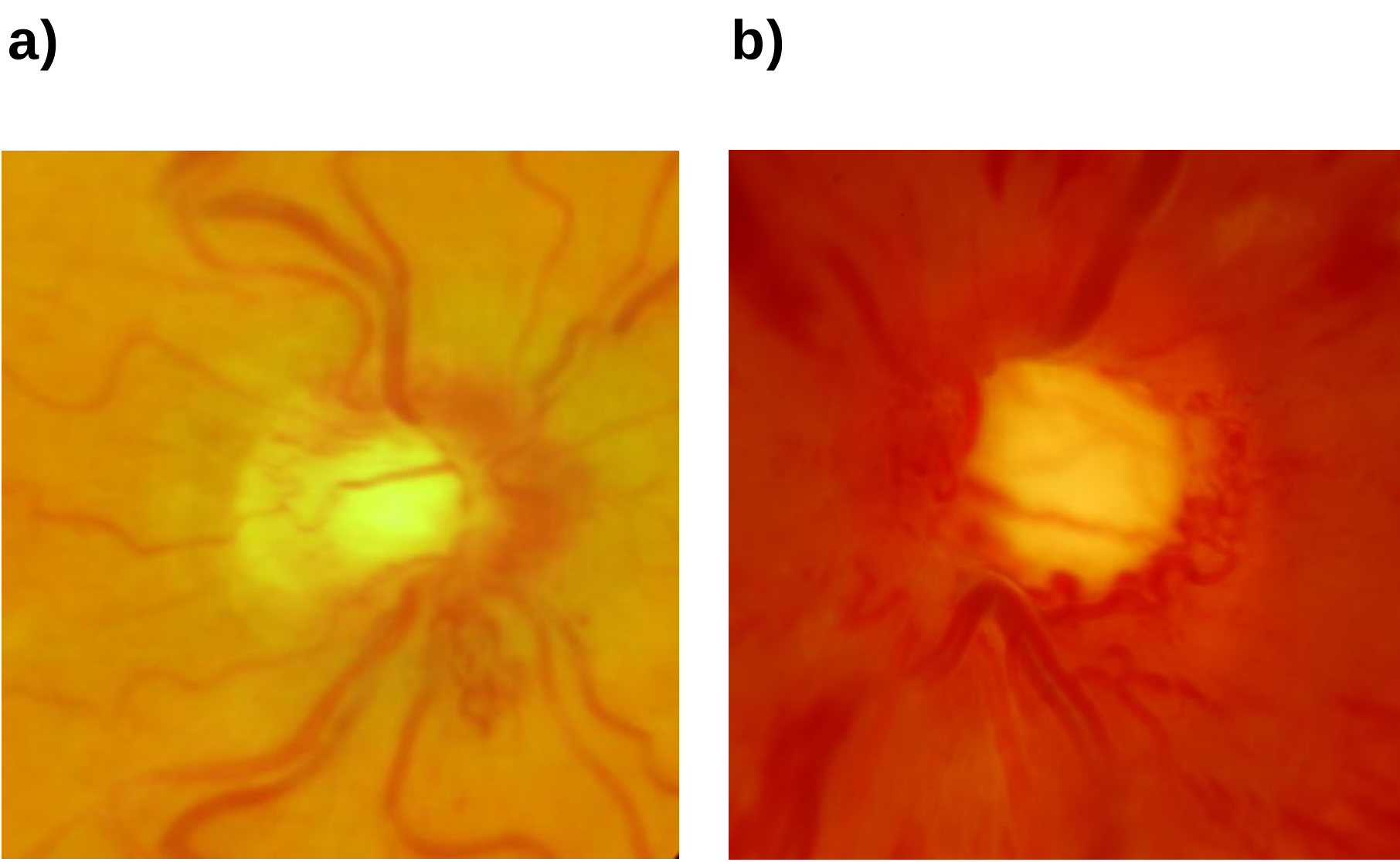


Figure 1: **a)** Extensive neovascularisation of the disc is visible; this patient also had neovascularisation of the iris and angle; **b)** Extensive neovascularisation of the disc is visible in association with some larger, dilated vessels which could easily be mistaken for disc collaterals.

- **Patient 1** was diagnosed with steroid-induced raised intraocular pressure at 8 weeks following his dexamethasone implant, but was then diagnosed with neovascularisation of the disc (NVD), neovascularisation of the iris (NVI) and NVG 2 weeks later (**Figure 1.a**)
- **Patient 2** responded to an initial dexamethasone implant, but relapsed at 16 weeks and received a further implant. He was diagnosed with steroid-induced ocular hypertension 9 weeks after the second implant and went on to develop NVG two weeks later, i.e. 26 weeks from baseline.
- **Patient 3** and **patient 4** developed NVD, NVI and NVG at week 8.
- **Patient 5** was diagnosed with steroid-induced ocular hypertension at week 9 and developed NVI and NVG at week 12 (**Figure 1.b**)

Table 1: Summary of the above findings

Patients	Steroid-induced raised IOP	Neovascular Glaucoma
Patient 1	8 - Weeks	10 - Weeks
Patient 2*	9 - Weeks	11 - Weeks
Patient 3	-	8 - Weeks
Patient 4	-	8 - Weeks
Patient 5	9 - Weeks	12 - Weeks

Note: * After the latest Dexamethasone implant

Results

All patients were successfully managed with a combination of anti-hypertensive agents, intravitreal bevacizumab injections and panretinal argon laser photocoagulation. No patients received further dexamethasone intravitreal implants.

Conclusions

All five of our patients developed NVG within 8-12 weeks of their most recent dexamethasone implant, at which time it would be expected to be exerting its full effect. Thus our case series, whilst small, suggests that the dexamethasone implant does not prevent the development of NVG.

In addition, three patients were diagnosed with NVG following an earlier diagnosis of steroid-induced ocular hypertension, suggesting that it may be easy to overlook early NVG, particularly in a situation where 15% of patients are expected to develop steroid-induced ocular hypertension.¹

One of the assumptions that has supported the adoption of the dexamethasone implant in the UK is that treated patients may require less frequent follow-up than patients managed with ranibizumab or observation.³ On the contrary, our study suggests that frequent and careful observation is still required to guard against NVG, and that patients with ocular hypertension should be assessed carefully for the presence of subtle iris and angle neovascularisation.

References

- Haller JA, Bandello F, Belfort R, Jr., et al. Randomized, Sham-Controlled Trial of Dexamethasone Intravitreal Implant in Patients with Macular Edema Due to Retinal Vein Occlusion. *Ophthalmology*. Apr 22 2010.
- Haller JA, Bandello F, Belfort R, Jr., et al. Dexamethasone Intravitreal Implant in Patients with Macular Edema Related to Branch or Central Retinal Vein Occlusion Twelve-Month Study Results. *Ophthalmology*. Jul 15 2011.
- National Institute for Health and Clinical Excellence. Dexamethasone intravitreal implant for the treatment of macular oedema secondary to retinal vein occlusion. 2011; <http://guidance.nice.org.uk/nicemedia/live/13037/54692/54692.pdf>.
- Chan CK, Ip MS, Vanveldhuisen PC, et al. SCORE Study report #11: incidences of neovascular events in eyes with retinal vein occlusion. *Ophthalmology*. Jul 2011;118(7):1364-1372.
- Hayreh SS. Management of central retinal vein occlusion. *Ophthalmologica*. May-Jun 2003;217(3):167-188.