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Letters to the Editor

Change in choroidal volume after dexamethasone intravitreal implant in eyes with diabetic macular oedema

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Editor,

Dexamethasone intravitreal implant 0.7 mg (DEX 0.7) is successfully used in the treatment of diabetic macular oedema (DME). Subfoveal choroidal thickness has been shown to significantly decrease after injection of DEX 0.7 in eyes with DME (Kim et al. 2016).

In this study, we aimed to investigate whether DEX 0.7 injection also had an effect on choroidal volume. Unlike subfoveal choroidal thickness, a decrease in choroidal volume suggests a global rather than a localized effect. Our second objective was to see whether an effect on the choroidal volume can be seen in the unaffected contralateral eye.

In this prospective study, we included 16 eyes from 12 patients with DME scheduled for intravitreal DEX 0.7 injection. Exclusion criteria were intravitreal injection with VEGF inhibitors and/or steroids in the study eye six months prior to study inclusion, systemic glucocorticoid treatment six months prior to study inclusion, presence of other retinal disorders in the study eye (excluding diabetic retinopathy) and no or poor view of the fundus.

We included seven fellow eyes (7 patients) as control eyes. Inclusion criteria for the fellow eye were presence of diabetic retinopathy (five eyes proliferative, two eyes severe nonproliferative). Exclusion criteria for fellow eyes were current treatment with intravitreal VEGF inhibitors and/or steroids and/or treatment six months prior to study inclusion, presence of other retinal disorders and no or poor view of the fundus. One untreated fellow eye had to be excluded due to poor image quality. All OCT images were performed using the Spectralis® OCT device (Spectralis, Heidelberg Engineering, Heidelberg, Germany).

Mean choroidal volume in the study eye was 6.44 mm^3 (±1.6), and mean subfoveal choroidal thickness was 257.5 μm (±72.3) at baseline. After injection of DEX 0.7, mean choroidal volume decreased significantly by 0.2 mm^3 (95%CI: −0.31 to −0.1, p = 0.001) after 1 month, by 0.35 mm^3 (95%CI: −0.56 to −0.15, p = 0.003) after 2 months and by 0.23 mm^3 (95% CI: −0.41 to −0.05, p = 0.016) after 3 months (see Fig. 1). Similarly, subfoveal choroidal thickness decreased significantly after one month (MD −9.33 μm, 95%CI: −14.1 to −4.6, p = 0.001), after two months (MD −11.1 μm, 95%CI: −17.3 to −4.8, p = 0.003) and after three months (MD −19.6 μm, 95%CI: −36.5 to −2.6, p = 0.027). For the fellow eye, mean choroidal volume at baseline was 4.88 mm^3 (±0.75), and mean subfoveal choroidal thickness was 190.6 μm (±34.2). No significant changes in mean choroidal volume and subfoveal choroidal thickness were observed during follow-up.

This is, to the best of our knowledge, the first study to show a significant decrease in choroidal volume after DEX 0.7 injection in eyes with DME. The decrease in choroidal volume observed in this study suggests a global effect on the choroid. Choroidal volume is known to increase among other reasons due to inflammation, vasodilation and intersitital oedema (Zhang et al. 2014). As glucocorticoids are known to be anti-inflammatory, enhance vascular reactivity to vasoconstrictors and are antiexudative, a decrease in choroidal

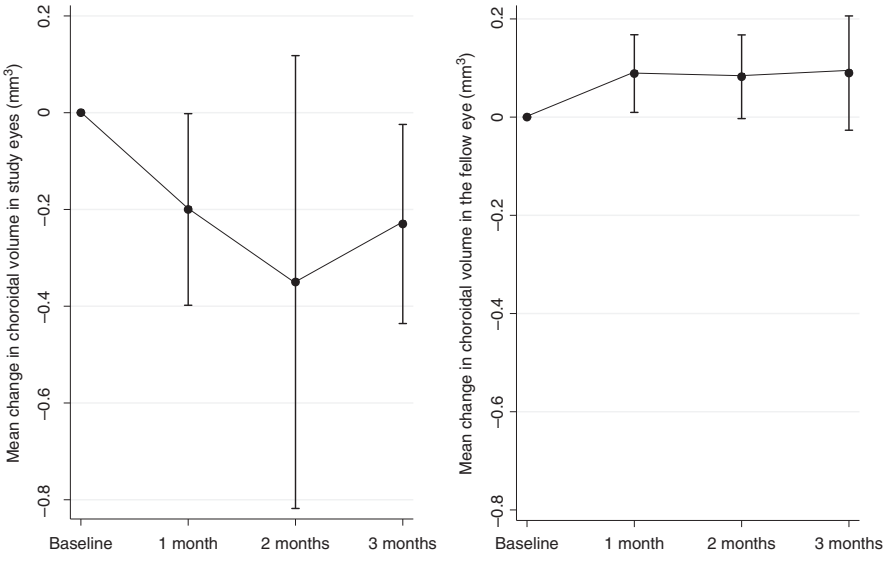

Fig. 1. Mean change in choroidal volume before and after DEX 0.7 injection. Mean change in choroidal volume before, one, two and three months after dexamethasone intravitreal implant injection in the study eyes and the fellow eyes.

volume after DEX 0.7 seems plausible (Yang & Zhang 2004). Choroidal volume did not change in the fellow eye during the follow-up, again suggesting that the decrease in the study eye is a direct consequence of the DEX 0.7 injection.

In addition, this study confirmed the findings of Kim et al. (2016) that subfoveal choroidal thickness significantly decreases after DEX 0.7 injection in eyes with DME.

In conclusion, choroidal volume decreased significantly in eyes with DME after DEX 0.7 injection, while choroidal volume in the fellow eyes remained unchanged.

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Increased risk of neovascular age-related macular degeneration in patients with herpes zoster ophthalmicus: a retrospective cohort study

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Editor,

Herpes zoster is identified as a reactivation of latent varicella zoster virus (VZV) within a single dorsal root or cranial sensory ganglion (Oxman 2009). When the latent VZV reactivates in the ophthalmic branch of the trigeminal nerve, herpes zoster ophthalmicus (HZO) occurs (Vrcek et al. 2017). Of those patients with HZO, about 70% may develop ocular complications (Weinberg 2007). This cohort study aimed to explore the relationship between HZO and the subsequent risk of neovascular AMD using a population-based data set in Taiwan.

Medical records for this cohort study were retrieved from the Taiwan Longitudinal Health Insurance Database 2005 (LHID2005) (TMU-JIRB N201705073). For the study cohort, we initially identified 1668 patients who had received a first-time principal diagnosis of HZO (ICD-9-CM codes 053.2) during an ambulatory care visit between 2001 and 2010. The date a patient received their first HZO diagnosis was identified as the index date. We then excluded 499 patients who were aged less than 40 years. In addition, we excluded 21 patients who had a medical history of dry AMD (ICD-9-CM code 362.51) or neovascular AMD (ICD-9-CM codes 362.52) prior to the index date. Finally, 1148 patients with HZO were recruited in the study cohort.

The matched comparison cohort (n = 5740) (five comparison subjects per HZO patient) was selected from the remaining beneficiaries of the LHID2005. The comparison cohort was identified by matching HZO patients in terms of propensity score. The matching variables included patients' sex, age, monthly income, urbanization level, geographical region, hypertension, coronary heart disease, hyperlipidaemia, tobacco use disorder and diabetes. The date of a comparison patient's first use of ambulatory care during that matched year was defined as the index date. Additionally, we ensured that none of the selected comparison subjects had been diagnosed with neovascular AMD before the index date. Each patient was individually tracked for a 3-year period starting from their index date to define those who were subsequently diagnosed with neovascular AMD.

Table 1 shows that among all sampled patients, the incidence rate of neovascular AMD per 1000 person-years within the 3-year follow-up period was 2.31 (95% CI: 1.69–3.08). In addition, the findings indicated that incidence rates of neovascular AMD per 1000 person-years within the 3-year follow-up period were 6.82 (95% CI: 4.27–10.32) for HZO patients and 1.44 (95% CI: 0.92–2.13) for comparison subjects. The stratified Cox proportional analysis (stratified by propensity score) revealed that the hazard ratio of neovascular AMD during the 3-year follow-up period was 4.62 (95% CI: 2.59–8.24) for HZO patients compared to comparison subjects.

This population-based cohort study found that HZO patients were 4.62 times more likely to suffer from neovascular AMD compared to those patients without HZO. Even though the actual pathogenesis of the association between HZO and neovascular

Table 1. Hazard ratio (HR) and 95% confidence intervals (CIs) for neovascular age-related macular degeneration (AMD) among sampled patients during the 3-year follow-up period

Presence of a neovascular AMD diagnosis	Total sample, N = 6888	Patients with herpes zoster ophthalmicus, n = 1148	Comparison patients, n = 5740
Three-year follow-up period			
Incidence rate per 1000 person-years (95% CI)	2.31 (1.69–3.08)	6.82 (4.27–10.32)	1.44 (0.92–2.13)
HR (95% CI)	–	4.62*** (2.59–8.24)	1.00

*** $p < 0.001$.