



LETTER TO THE EDITOR

Optical coherence tomography (OCT) findings in obstructive sleep apnea



We have read the article by Mentek et al., however, we believe some discussion would be of benefit [1]. The authors describe vascular disorders of the retina and optic nerve in patients affected by obstructive sleep apnea (OSA). When reviewing results of eye tests in this disease it is necessary to mention that OSA itself presents alterations in particular ophthalmic examinations.

Most current literature confirms the usefulness of optical coherence tomography (OCT) in neurodegenerative diseases, and in OSA [2]. The authors present that the analyzed studies agree that OSA patients with no signs of optic neuropathy, notably glaucoma, often demonstrate a significant decrease in retinal nerve fibre layer in OCT.

Furthermore, individuals affected by OSA manifest OCT changes of the macular region as well. In the study by Casas et al. patients with severe OSA had significantly lower temporal inner macular thickness than those with mild-moderate OSA [3]. Xin and associates revealed that not only macular thickness, but also subfoveal choroidal thickness is lower in OSA patients than in control [4]. Although not excluding patients with hypertension could be a confounding factor of the aforementioned study, these differences were confirmed by Bahyan et al. in patients without systemic diseases [5]. Long-term structural changes of the retina and choroid in patients with OSA is presumably related to intermittent hypoxia influencing retinal and choroidal blood supply. Interestingly, OCT-angiography, which is a new and powerful imaging modality, presents decreased vessel densities in the peripapillary and parafoveal areas in OSA patients [6]. Patients affected by OSA have also reduced retinal sensitivity measured in standard automated perimetry [7].

When pointing out future directions retinal oximetry ought to be mentioned. Retinal oximetry is a quick non-invasive eye fundus imaging modality that evaluates saturation of retinal arterioles and venules based on spectrophotometry. It has already confirmed its value in diabetic retinopathy, central retinal vein occlusion, retinitis pigmentosa, glaucoma and Alzheimer's disease [8]. Current research is focused on neurodegenerative diseases, and retinal oximetry cameras are currently available commercially.

Funding

Dr. Kanclerz reports non-financial support from Visim, Poland. Dr. Grzybowski reports grants, personal fees and non-financial support from Bayer; grants, non-financial support from Novartis; non-financial support from Alcon, personal fees and non-financial support from Valeant, grants and non-financial support from

Allergan, grants and non-financial support from Pfizer, grants, and financial support from Santen.

Conflicts of interest

No conflicting relationship exists for any author.

References

- [1] Mentek M, Aptel F, Godin-Ribuot D, Tamisier R, Pepin J-L, Chiquet C. Diseases of the retina and the optic nerve associated with obstructive sleep apnea. *Sleep Med Rev* 2018;38:113–30.
- [2] Grzybowski A, Ascaso FJ, Mateo J, Cabezón L, Casas P. Other neurological disorders: migraine, neurosarcoidosis, schizophrenia, obstructive sleep apnea-hypopnea syndrome (OSAHS). In: *OCT in central nervous system diseases*; 2016. p. 167–83.
- [3] Casas P, Ascaso FJ, Vicente E, Tejero-Garcés G, Adiego MI, Cristóbal JA. Retinal and optic nerve evaluation by optical coherence tomography in adults with obstructive sleep apnea-hypopnea syndrome (OSAHS). *Graefes Arch Clin Exp Ophthalmol* 2013;251(6):1625–34.
- [4] Xin C, Wang J, Zhang W, Wang L, Peng X. Retinal and choroidal thickness evaluation by SD-OCT in adults with obstructive sleep apnea-hypopnea syndrome (OSAS). *Eye* 2014;28(4):415–21.
- [5] Bayhan HA, Aslan Bayhan S, İntepe YS, Muhafiz E, Gürdal C. Evaluation of the macular choroidal thickness using spectral optical coherence tomography in patients with obstructive sleep apnoea syndrome. *Clin Exp Ophthalmol* 2015;43(2):139–44.
- [6] Yu J, Xiao K, Huang J, Sun X, Jiang C. Reduced retinal vessel density in obstructive sleep apnea syndrome patients: an optical coherence tomography angiography study. *Invest Ophthalmol Vis Sci* 2017;58(9):3506–12.
- [7] Ferrandez B, Ferreras A, Calvo P, Abadia B, Fogagnolo P, Wang Y, et al. Retinal sensitivity is reduced in patients with obstructive sleep apnea. *Invest Ophthalmol Vis Sci* 2014;55(11):7119–25.
- [8] Stefánsson E, Ólafsdóttir OB, Einarssdóttir AB, Elíasdóttir TS, Eysteinnsson T, Vehmeijer W, et al. Retinal oximetry discovers novel biomarkers in retinal and brain diseases. *Invest Ophthalmol Vis Sci* 2017;58(6):BIO227–33.

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1 July 2018
Available online 29 August 2018