

Operating microscope induced maculopathy

Abbreviations: OMIM, operating microscope-induced maculopathy; RPE, retinal pigment epithelium

Keywords: operating microscope, induced, photic maculopathy, retinal injury, toxicity, damage

Editorial

Operating microscope induced maculopathy (OMIM) is a type of photic toxic retinal damage in macular region.¹⁻³ OMIM may occur following anterior segment procedures such as extracapsular cataract extraction or phacoemulsification with intraocular lens implantation, penetrating keratoplasty and pterygium excision or vitrectomy.¹⁻⁷ OMIM is first described in 1977 as iatrogenic photic maculopathy from light exposure of operating microscopy.¹ Visible light (with 400-760 nm) can cause photic macular damage or maculopathy in various forms such as mechanical (photo-disruption), thermal (photocoagulation) and photo-biochemical (solar retinopathy and OMIM). It is considered that OMIM primarily results from photochemical reactions besides thermally enhanced phototoxic reactions from a microscopic illumination involving the outer segments of the photoreceptors and surface of the retinal pigment epithelium (RPE).¹⁻⁴ Some mechanisms protecting the retina from damaging effects of excessive light include ocular reflexes of blinking and aversion, pupillary constriction, absorption by the optical media of a majority of ultraviolet and infrared radiation, protection by xanthophyll pigments from blue light, protection from free radicals and other toxic products generated by the photochemical cascade by melanin. The usage of pupillary mydriatics and eyelid speculum is essential to perform the surgery. Thus, protection from OMIM by pupillary reflex and eyelid blinking is absent during the surgery.¹⁻⁴ Risk factors for OMIM include the illumination intensity of the operating microscope, the duration of exposure to its light, dilated pupilla, ocular immobility during surgery, emmetropia, associated vascular disease (diabetes mellitus), clear optic media, hypo-pigmentary fundus, the use of hydrochlorothiazide, vitamin A, photosensitizing agents or the supplemental oxygen and deficiency of ascorbic acid. However, surgical time is, the most important causative factor.¹⁻⁵ OMIM is clinically characterized by a small yellow spot at the fovea and by a central or para/peri-central scotoma and/or metamorphopsia or moderate visual loss occurring in one to four hours following light exposure and diminishing in a few weeks or months.¹⁻⁶ Ophthalmoscopically diagnosis of OMIM is difficult because of lesion's small size and normal foveal dense pigmentation.^{1-4,7,8} Spectral domain optical coherence tomography reveals a loss of the hyperreflective IS OS layer of the central fovea manifesting as an outer lamellar cystic lesion under the fovea as similar to solar maculopathy.⁹⁻¹¹ During the operation, to obtain the reduced surgical time and light intensity, and to avoid the use of local or general anesthesia but not topical, minimal utilization of coaxial illumination or the usage of oblique illumination in the light of the operating microscope, the usage of corneal covering with adequate built-in filters in the periods which surgical intervention disrupted and minimal use of supplemental oxygen in young patients can reduce OMIM risk. Topical anesthesia should be the choice for surgery at adequate cases because it provides the continuity of ocular movements and the distribution of the toxic effects of the light. During a vitrectomy, additionally, it is also recommended maintaining

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a prudent distance between the source of light and the retina and to frequently change its orientation.¹⁻⁵

Conclusion

In conclusion, any patient with clinically unexplained visual loss and central scotoma and which undergone any uncomplicated ocular surgery that operating microscope was used, should be evaluated for OMIM.

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Conflicts of interest

The author declares that there is no conflict of interest regarding the publication of this paper.

Authorship contributions

All author has contributed to the concept and design, data collection, literature Search in the work and writing of the manuscript.

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