MACULOPATHY RISKS IN MODERN VITREORETINAL SURGERY: RETINAL TOXICITY FOLLOWING MACULAR HOLE REPAIR SURGERY WITH BRILLIANT BLUE AND XENON LIGHT

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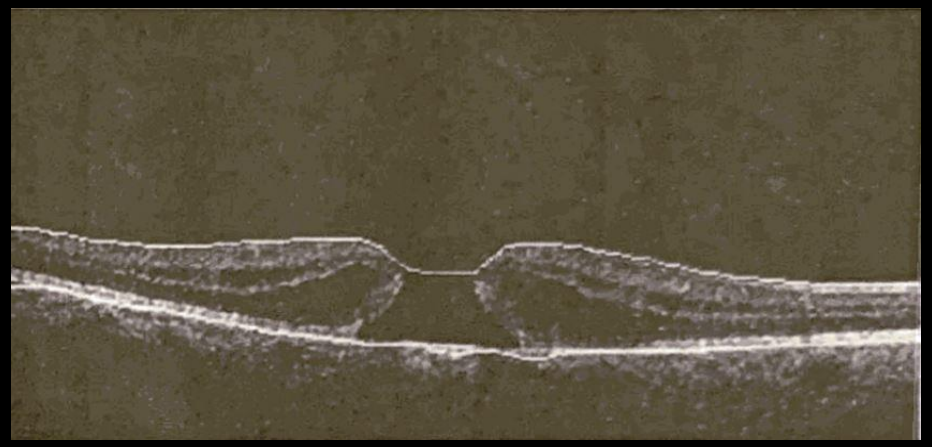
ABSTRACT

- This report aims to elucidate a rare case involving outer retinal injury subsequent to the utilization of Brilliant Blue (BB) dye and endoillumination during macular hole surgery.
- Enhancing visualization of translucent tissues in vitreoretinal surgery is crucial for precise surgical maneuvers, a feat made possible by endoillumination. However, this heightened clarity in macular surgery comes with a caveat: the risk of macular phototoxicity escalates if exposure surpasses a certain intensity or duration threshold. This potential complication, known as phototoxic outer retinopathy stemming from endoillumination, has been extensively documented over decades.
- Recent advancements in vitreoretinal surgical techniques have brought about new considerations regarding the risk of phototoxic maculopathy. Firstly, the introduction of smaller gauge instrumentation has resulted in reduced light pipe diameter and subsequently decreased illumination. Consequently, surgeons must compensate by elevating light intensity levels. Secondly, the increasing adoption of internal limiting membrane (ILM) peeling, aimed at thorough removal of epiretinal membranes and addressing tangential traction, raises concerns about potential iatrogenic retinal damage.

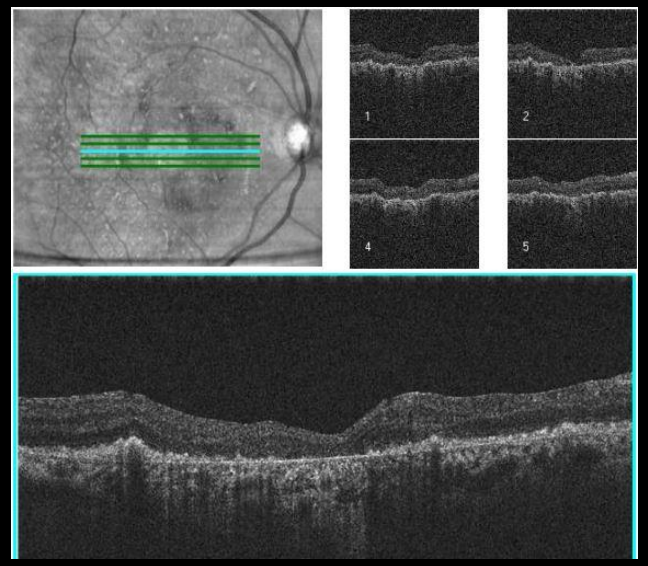
MATERIALS AND METHODS

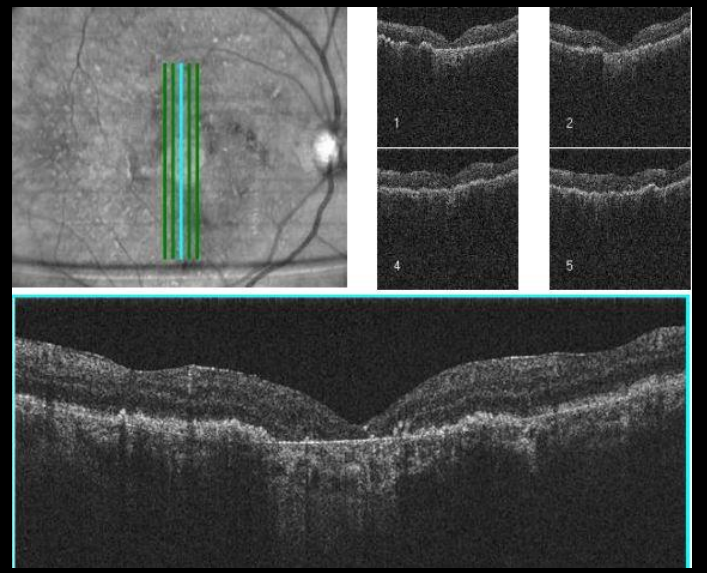
- The patient underwent phacoemulsification for cataract removal, followed by the implantation of an intraocular lens (IOL) and pars plana vitrectomy (PPV). Additionally, an internal limiting membrane (ILM) peeling was performed with brilliant blue, followed by the injection of C3F8 gas for retinal tamponade.
- Intraocular vital dyes have emerged as indispensable aids in identifying ocular tissues during vitreoretinal surgery, facilitating the complete and less traumatic removal of epiretinal membrane (ERM) and internal limiting membrane (ILM). While indocyanine green (ICG) has long been relied upon for this purpose, its association with retinal toxicity has spurred the search for alternatives. Brilliant Blue (BB) and Trypan Blue (TB) have gained popularity due to their specific affinities for ILM and ERM, respectively, coupled with their relatively safer profiles. Nonetheless, recent reports have raised concerns regarding retinal pigment epithelium (RPE) and photoreceptor damage following exposure to BB and TB during macular surgeries.



RESULTS

- One month post-surgery, the best-corrected visual acuity (BCVA) declined from 20/200 to 20/400. Literature presents several reports indicating the cumulative toxic impact of Brilliant Blue (BB) dye and endoilluminator light, leading to foveal thinning and damage to outer retinal layers and the retinal pigment epithelium (RPE), consequently resulting in diminished vision. The fundus photograph reveals speckled areas of both hyperfluorescence and hypofluorescent. Optical coherence tomography (OCT) revealed the absence of outer retinal layers and irregular thickening of the RPE accompanied by subretinal deposits.
- The presented symptoms strongly suggested acute retinal toxicity resulting from the combined exposure to Brilliant Blue (BB) and xenon endoillumination.





CONCLUSION

- To prevent immediate phototoxic harm to retinal pigment epithelial (RPE) cells and photoreceptors, intraoperative precautions should be taken. These include minimizing prolonged exposure to brilliant blue (BB) dye during internal limiting membrane (ILM) peeling and refraining from prolonged use of intense focal illumination near the macula.