Lenticular burns following PASCAL photocoagulation

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A 64-year-old male with longstanding type-2 diabetes mellitus presented with progressive diminution of vision in both eyes for 2 months. Clinical examination revealed Grade-III nuclear sclerosis, proliferative diabetic retinopathy with partial vitreous hemorrhage in OU with BCVA 20/60 OD and 20/80 OS. Spectral-domain optical coherence tomography showed minimal macular thickening in OD and ERM with macular edema in OS. The patient was advised panretinal photocoagulation (PRP) in OU and anti-VEGF injection Ranibizumab on pro re nata basis following laser. PASCAL (Pattern Scan Laser) (Optomedica Corp., Santa Clara, CA, USA) photocoagulation with settings of 200-400 microns size, duration 20–30 ms, titrated power 500–1200 mW, 5 × 5 box grid was performed with Mainster 165 contact lens (Ocular 148 Instruments Inc., Bellevue, WA, USA) by an experienced surgeon. During the course of third sitting of laser, the patient felt discomfort with frequent squeezing of eyelids leading to loss of coupling of contact lens with the eye several times. Subsequent slit-lamp examination in the laser room revealed clusters of grayish-white, cylindrical anterior and midcortical laser burns paracentrally in OU. Anterior segment photographs were taken on Haag-Streit Photo-Slit Lamp BX 900 (Haag-Streit AG, Koeniz, Switzerland) [Fig. 1]. The patient was counseled about the complication and continued on NSAID eye drops for a month. Combined phacovitrectomy with gas injection was performed in OS for recurrent vitreous hemorrhage at 6.5 months. At last follow-up 8 months later, lenticular opacities were nonprogressive, vitreous hemorrhage had resolved with stable macula, and BCVA was 6/12 in OD post intravitreal Ranibizumab injection [Fig. 2].

Discussion

Photocoagulation burns of crystalline lens are a rare complication, which has been described using argon blue-green laser, krypton red laser, and following indirect laser photocoagulation. These lenticular burns are more commonly seen in the presence of dense sclerotic cataract, use of high-intensity long duration laser burns, and occasionally due to highly variable power output secondary to fractured fiber optic cord. The Pascal® (Pattern Scan Laser) photocoagulator is a 532 nm, frequency-doubled, neodymium-doped, yttrium aluminum garnet (Nd:YAG), solid-state laser that can deliver with a single foot-depression multiple laser spots in a predetermined pattern array produced by a scanner. Blumenkranz et al. reported that, with 6 × 6 or 7 × 7 array, the total treatment time may be reduced by several folds, in which a single treatment session may be reduced from approximately 25 min to mere 3–5 min using PASCAL. This is achieved by reducing pulse durations by nearly a log unit to about 10–20 ms compared with 100–200 ms with a traditional laser. It can deliver numerous patterns including squares, arcs, full and subset grids, the shapes and sizes of which are adjustable. Seymenoglu et al. reported retinal hemorrhage and choroidal rupture while using high-power settings in the peripheral retina. The exact focusing of the laser beam throughout the entire length of the large laser patterns (e.g., arc pattern) may be inhibited by the spherical curvature of the globe, and this may eventuate in variable laser burns, particularly in the far periphery. To alleviate such a complication, laser pattern size and/or length should be diminished with careful titration of laser power while working in retinal periphery.

In this case, lenticular burns were seen following third laser session probably due to multiple factors playing in tandem like use of large spot size, variable power use due to cataract and vitreous hemorrhage, procedure being performed on peripheral retina, compounded by loss of contact lens coupling leading to laser burns landing inside the crystalline lens. In addition, lack of immediate examination of the first eye before starting the session on the other eye led to the complication getting mirrored in both eyes. However, these burns if not in visual axis don’t affect patient’s vision and appear to remain stable as found before.

Thus, we conclude that in the presence of following risk factors one may get PASCAL photocoagulation burns inside lens like hazy media secondary to nuclear sclerosis and vitreous hemorrhage, use of high-intensity long duration laser burns, eye movement during session particularly while working in retinal periphery, higher lid tension leading to loss of coupling between contact lens and cornea and persistence with larger grid array (5 × 5) in the retinal periphery. In addition, regular service of the machine to rule out any damage to fiber-optic cord is equally important. High index of suspicion should be maintained in the event of patient feeling discomfort during the session and immediate slit-lamp examination should be done before commencing on the fellow eye. Typically 2 × 2 grid pattern should be used with carefully titrated power while doing PRP in the peripheral retina on PASCAL.

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This case report describes laser-induced lens burns using PASCAL laser system hitherto reported first time and underlines the importance of proper teaching of use of various settings of PASCAL laser system to prevent such a complication.

Declaration of patient consent
The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest
There are no conflicts of interest.

References
1. Bloom SM, Mahl CF, Schiller SB. Lenticular burns following argon panretinal photocoagulation. Br J Ophthalmol 1992;76:630-1.
2. Cartwright MJ, Blair CJ, Stratford TP. Krypton laser-induced lens opacity as a complication of panretinal photocoagulation. Ann Ophthalmol 1990;22:463-6.
3. Irvine WD, Smiddy WE, Nicholson DH. Corneal and iris burns with the laser indirect ophthalmoscope. Am J Ophthalmol 1990;110:311-3.
4. Blumenkranz MS, Yellachich D, Andersen DE, Wiltberger MW, Mordaunt D, Marcellino GR, et al. Semiautomated patterned scanning laser for retinal photocoagulation. Retina 2006;26:370-6.
5. Seymenoğlu RG, Ulaşoy MO, Başer EF. Safety and efficacy of panretinal photocoagulation in patients with high-risk proliferative diabetic retinopathy using pattern scan laser versus conventional YAG laser. Kaohsiung J Med Sci 2016;32:22-6.
6. Lakhanpal V, Schocket SS, Richards RD, Nirankari VS. Photocoagulation-induced lens opacity. Arch Ophthalmol 1982;100:1068-70.