Post-laser regression of diabetic neovascularization: An optical coherence tomography angiography study

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A 57-year-old man with diabetes mellitus was referred to us for management of proliferative diabetic retinopathy.

Enface optical coherence tomography angiography (OCTA) montage images were acquired using Zeiss Plex Elite 9000 (CA, USA). Montage view (at level of superficial plexus) showed extensive capillary nonperfusion areas. A well-defined irregular vascular proliferation of fine convoluted exuberant vessels with terminal anastomosis was seen above the superior arcade [Fig. 1a], which corresponded and correlated well to the active neovascularization (NVE) seen on the fundus fluorescein angiography (FFA) (Heidelberg Engineering, Germany) [Fig. 1b]. The OCTA section through the vitreo-retinal interface showed proliferation of these vessels into the posterior hyaloid with the corresponding B scan showing a localized elevation of the posterior hyaloid due to the growth of NVE [Fig. 2a and b] and increased blood flow appreciated with flow function of OCTA [Fig. 3a]. There was no macular oedema on OCT B scan.

The patient underwent panretinal laser photocoagulation in three sittings, with focal laser to the NVE at time of the third sitting. Two months after completion of treatment, OCTA montage showed excellent regression and pruning of the neovascular network with some fine vessels persisting nasally and inferiorly [Fig. 4a]. This correlated well with fluorescein angiography findings [Fig. 4b].

Post-laser OCT B scan imaged through the area of NVE showed marked regression and decrease in the thickness of the overlying proliferation [Fig. 2c and d]. This thinning could partly has been a result of the focal laser to the NVE. A significant decrease in blood flow in this area corresponding to the thinning of the retinal layers was noticed, substantiating the decrease in neovascular activity [Fig. 3b, arrow head].

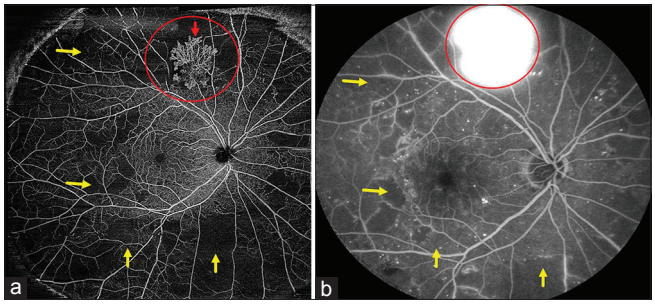

Figure 1: (a) Optical coherence tomography angiography superficial plexus (montage view) clearly shows neovascularisation (red circle) with anastomotic fine exuberant vessels at termini (red arrow). Capillary nonperfusion areas (yellow arrows) are sharply demarcated in all quadrants. (b) Fundus fluorescein angiography SLO image (late arteriovenous phase) shows leaking neovascularisation (red circle) and also the capillary nonperfusion areas (yellow arrows)

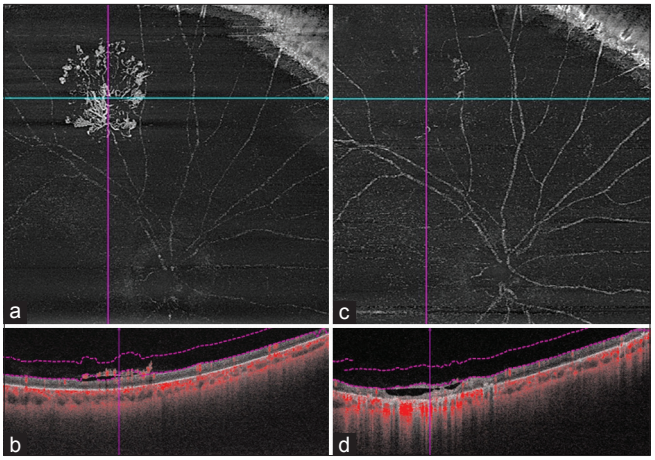

Figure 2: Optical coherence tomography angiography at vitreo-retinal interface. (a) Proliferation of neovascularisation into the posterior hyaloid with the corresponding B scan (b) showing localised elevation of posterior hyaloid. (c) Optical coherence tomography angiography post-laser at same segmentation, clearly illustrating regression of neovascularisation post-panretinal photocoagulation. (d) In the corresponding B scan, the decrease in the red dots seen in the raised tissue indicates decrease in blood flow through the tissue post-laser therapy suggestive of regressing neovascularization

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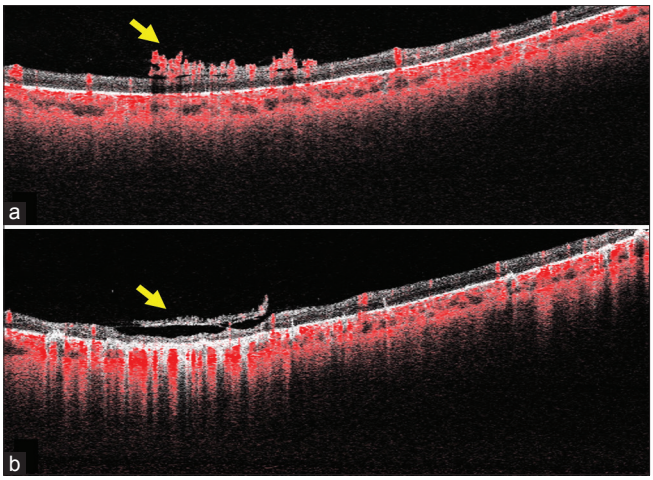

Figure 3: (a) B scan optical coherence tomography with flow function of optical coherence tomography angiography shows localized elevation of the posterior hyaloid due to the growth of neovascularisation (arrow) with increased blood flow (red dots). (b) Post-laser section through same area shows thinning of retinal layers with decrease in proliferative vascular thickness (arrow) and significantly decreased blood flow (much fewer red dots in elevated tissue post-laser therapy)

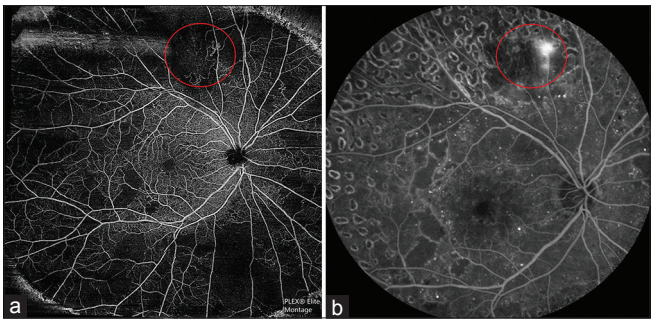

Figure 4: (a) Optical coherence tomography angiography superficial plexus montage view post-panretinal photocoagulation showing regression and pruning of neovascularisation (red circle). (b) Fundus fluorescein angiography SLO image (late arteriovenous phase) shows regression of neovascularisation (red circle) with adjacent panretinal photocoagulation scars

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.