NAVIGATED LASER (NAVILAS) THERAPY FOR CHOROIDAL NEOVASCULAR AND HYPERPERMEABILITY PATHOLOGIES

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Purpose: To report the utility of navigated laser (NAVILAS) in the treatment of leaking areas in central serous chorioretinopathy and a feeder vessel in choroidal neovascular membrane.

Methods: Two patients with choroidal lesions were treated with NAVILAS. The first patient had central serous chorioretinopathy with visible leaking angiographic spots, and the second had choroidal neovascular membrane with a well-defined feeder vessel on angiography. Both patients underwent NAVILAS treatment.

Results: Both patients were successfully treated with resolution of clinical symptoms after a single session of NAVILAS. In addition, complete resolution of the subretinal fluid and leakage, and the subretinal blood and feeder vessel, were noted in the central serous chorioretinopathy and feeder vessel cases, respectively.

Conclusion: NAVILAS may be of utility in targeting choroidal vascular pathologies with laser.

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NAVILAS (OD-OS GmbH, Teltow, Germany) is a new novel navigated laser technology that gives several advantages when compared with conventional laser. Its retinal navigation function is a superior property that increases the accuracy of treatment and improves the clinical outcomes.¹,² NAVILAS gives advanced computerized images and a targeted laser delivery system that permits laser treatment without the need for a slit lamp or a contact lens. Although NAVILAS has been predominantly applied in the treatment of retinal pathology such as diabetic macular edema, it has not been investigated to the same degree in the treatment of choroidal lesions. Some choroidal pathologies have feeder blood vessels or choroidal hyperpermeability foci that may require precise photocoagulation. We believe that the main advantage of the NAVILAS system is in the management of such choroidal conditions because the causative foci in such diseases are difficult to visualize clinically. Therefore, treating them focally using traditional slit-lamp biomicroscopy-based laser systems has been hindered by the need for accurate localization of the lesions by comparing fundus landmarks during biomicroscopy and treatment with angiographic landmarks. This may have to be repeated frequently during treatment, may be tedious, and is not always possible particularly with overlying pathology such as the case in feeder vessel therapy in choroidal neovascularization. Here, we report two cases of choroidal pathology that have been successfully treated using the NAVILAS system.

Case Reports

Case 1

A 39-year-old woman presented with a 1-year history of decreased vision in both eyes and a documented diagnosis of central serous chorioretinopathy with active disease in the right eye...
and “resolving” subretinal fluid in the left eye. Her best-corrected visual acuity (BCVA) was 20/50 in both eyes. Spectral domain optical coherence tomography and fundus fluorescein angiography were performed. Fundus fluorescein angiography of the right eye disclosed four leaking spots inferonasal to the fovea that were treated with four targeted NAVILAS spots on fundus fluorescein angiography images. The parameters used included a spot size of 100 μm, power of 100 mW, and pulse duration of 80 milliseconds.

After 1 month, optical coherence tomography showed that complete resolution of subretinal fluid and fundus fluorescein angiography disclosed the absence of leakage in the treated areas. Three months later, the patient’s BCVA was 20/30 with complete resolution of the subretinal fluid (Figure 1). The vision remained stable 6 months later with no recurrence of subretinal fluid.

**Case 2**

A 42-year-old woman presented with sudden decrease of vision in her right eye with BCVA of 20/125. Examination disclosed extensive subretinal hemorrhage in the macular area with a peripapillary subretinal whitish lesion. Fluorescein angiography and indocyanine green angiography showed a peripapillary choroidal neovascular membrane (CNVM) with a feeder vessel that has three branches. Because the neovascular lesion was ≤50% CNVM and consisted predominantly of blood, the value of antivascular endothelial growth factor injections was not certain. Therefore, we decided to treat the lesion with laser therapy targeting the feeder vessels.

The indocyanine green image was imported into the NAVILAS unit, and overlay with a NAVILAS-obtained fundus image was performed. The feeder vessel and its 3 branches were focally targeted with the NAVILAS using 6 focal laser spots with an average power of 300 mW, pulse duration of 30 milliseconds, and spot size of 100 μm.

After 1 month, BCVA was 20/100 with significant resolution of the submacular blood and remaining dehemoglobinized blood in the perifoveal area. A repeat indocyanine green showed complete closure of the feeder vessel and its branches. Three months later, BCVA was 20/70 with complete resolution of the blood and closed feeder vessel (Figure 2). After 6 months of follow-up, the subretinal blood and exudation resolved completely with no recurrence, and BCVA was 20/60.

**Discussion**

Choroidal lesions, particularly feeder vessels of CNVM, are usually difficult to localize during slit-lamp examination and slit-lamp biomicroscopy-based laser therapy. Treating physicians would need to depend on angiography to localize the abnormal leaking areas and then target them with laser, based on the best guess
estimate, to their location in the fundus while delivering the laser treatment using slit-lamp biomicroscopy-based laser systems. This practice has been shown to carry a significant failure risk, and the reported success rate has been only in the range of 40% of treated lesions.\(^5\,^6\) Navigated laser systems, however, allow for precise localization of and targeted laser delivery to the lesions by avoiding the use of a slit-lamp biomicroscopy-based delivery system. Rather, the lesions are localized and marked on angiography images, and then the laser is accurately delivered to the localized lesions in the patient’s fundus using navigation software coupled with a tracking devise. This allows for accurate targeted treatment without the need for a contact lens in contrast to traditional laser systems.

Although the NAVILAS system is equipped with safety zones that when activated and coupled with the tracking system do not allow laser delivery to vital structures such as the optic nerve head and the fovea, it is quite conceivable that the laser may be inadvertently delivered to such structures should this safety system fail. Although such lack of control of laser delivery by the operator could potentially represent a serious safety limitation of the NAVILAS, no such complications have been reported so far in association with the use of NAVILAS.\(^1\,^2\)

Navigated laser has shown good success rate for the treatment of retinal vascular diseases such as diabetic macular edema with excellent outcomes.\(^2\) However, we believe that its use may be even more beneficial in choroidal vascular diseases that are usually more difficult to localize and treat using traditional laser systems. Its successful use has been reported in the case of central serous chorioretinopathy.\(^2\) However, to our knowledge, navigated laser has not been previously reported in the case of feeder vessel therapy in CNVM.
Herein, we report such an application for navigated laser that may have the potential of improving outcomes of laser therapy for some forms of CNVM with or without the concomitant use of antivascular endothelial growth factor agents. Larger studies will be necessary to further elucidate the potential use of navigated laser systems in the treatment of choroidal vascular diseases.

**Key words:** choroidal neovascular membrane, central serous chorioretinopathy, feeder vessel, laser, NAVILAS.

**References**


