PASCAL Laser for Retinal Disease Treatment

Despite the high volume of laser procedures performed, little has changed in laser design over the last 35 years — until now.

REVIEWED BY JULIA A. HALLER, MD

Shorter-pulsed patterned scanning laser photocoagulation (PASCAL; Optimedica Corp, Santa Clara, Calif) offers several potential advantages over conventional single spot laser, including increased uniformity and precision of spot placement (Figure 1) and reduced pain.

Speaking at the Cannes Retina Festival 24th Annual Meeting of the American Society of Retina Specialists (ASRS) & 6th Annual Meeting of the European Vitreoretinal Society Meeting (EVRS), held in Cannes, France, Julia A. Haller, MD, said that the PASCAL laser is based on the principal of applying more than one spot at a time. "The shorter pulse durations require less total energy to produce burns, there is less spreading, less choroidal heating and more uniform energy distribution. The burns are smaller and more homogeneous, with less inner retinal injury, and potentially, less field loss and better clinical outcomes." Dr. Haller is the Katharine Graham Professor of Ophthalmology at Wilmer Institute, The Johns Hopkins University School of Medicine, and she is also a member of RETINA TODAY'S editorial board.

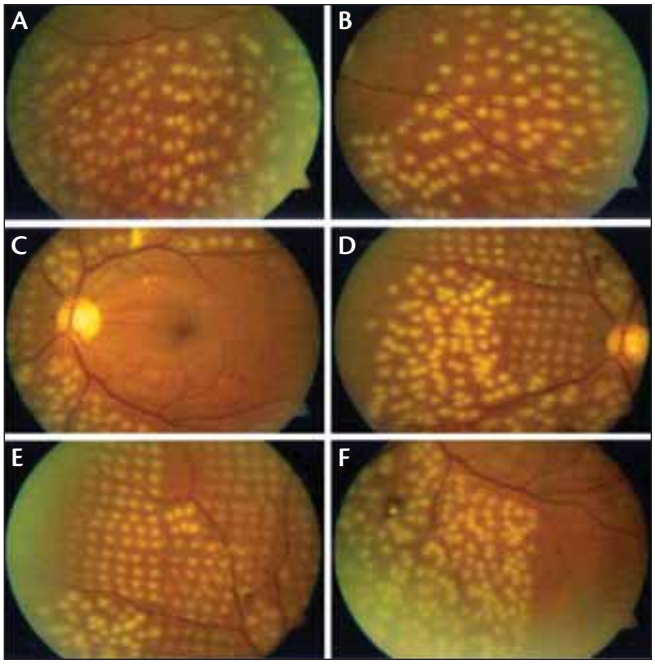

Figure 1. Compared with conventional, single-spot laser (A and B), PASCAL laser photocoagulation (D and E show both types of spots) offers increased uniformity and precision of spot placement.

SECOND-MOST COMMON EYE PROCEDURE

Laser photocoagulation remains the second-most common eye procedure after cataract extraction, Dr. Haller said, and yet little has changed in laser design over the last 35 years until recently. "There are different colors, different lasing sources and connecting cables, but otherwise we are still tied to the same single spot delivery system coupled to a slit lamp controlled by a joy stick."

The PASCAL laser uses a microprocessor-driven scanner that produces a variety of scalable patterns, viewable on a computer screen and selected by the physician. The laser

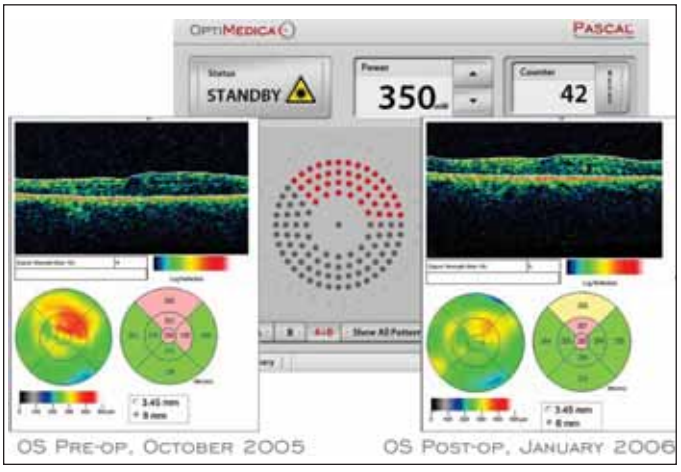

Figure 2. You may be able to treat patients earlier with tailored photocoagulation patterns using the PASCAL laser.

allows the operator to apply multiple spots almost simultaneously. To achieve this, pulse durations are reduced by nearly a log unit to about 10 milliseconds to 20 milliseconds compared with 100 milliseconds to 200 milliseconds with a traditional laser.

"You can apply multiple spots near-simultaneously with a single depression of the foot switch. The operator can select different arcs, circular grid patterns or sectors of grids for treatment, or use a rectangular array (ie, 4-by-4 or 5-by-5 spots)," she said.

In an initial trial, the investigators treated 10 eyes of patients with diabetes with both PASCAL and conventional laser. The results were compared in terms of efficacy, power requirement, procedure length, pain and adverse events. "The PASCAL burns were more precisely spaced and more uniform than the conventional single-spot burns, Dr. Haller said. "Higher power is required for the shorter burns [Table 1], and there was less subjective patient discomfort noted." On a scale of 0 to 5, with 5 being the most painful, standard laser was rated 2.82 by the patients and 0.61 for PASCAL.

As no adverse events were noted in this initial experience, the investigation was expanded to a five-center US study.

The surgeons have treated >1,200 patients for typical indications seen in a busy clinical practice, Dr. Haller said. These include proliferative diabetic retinopathy (PDR), PDR with vitreous hemorrhage, PDR with neovascularization of the iris, branch retinal vein occlusion (BRVO) with neovascularization and vitreous hemorrhage, diabetic macular edema, BRVO with macular edema, sickle cell disease with neovascularization/vitreous hemorrhage, Coats' disease, acute retinal tears and postoperative tears on scleral buckles (Figure 2).

"We found a rapid learning curve, accurate, uniform and precise burn placement, increased efficiency, increased patient comfort — particularly in panretinal photocoagulation and peripheral retinal burns — and decreased fatigue on the part of both the patient and the physician," Dr. Haller said.

Adverse events included occasional small pops in the periphery, particularly with short burn duration and large patterns, where some of the spots in the periphery were focused. There were no adverse long-term outcomes associated with the pops, however.

The PASCAL laser allowed multiple spot placement, short duration burns and more rapid and efficient delivery with less pain and comparable clinical outcomes in comparison with conventional laser, Dr. Haller concluded. "What remains to be seen is whether these short-term observations translate into long-term benefits and improved outcomes overall, and we look forward to reporting these to you, looking at a number of different parameters as time goes on," she said. ■

Julia A. Haller, MD, is the Katharine Graham Professor of Ophthalmology at Wilmer Institute, The Johns Hopkins University School of Medicine. She is also director of the Vitreoretinal Surgical Fellowship Training Program at Wilmer. Dr. Haller states that she is a shareholder in Optimedica. She may be reached at jhaller@jhmi.edu or 410-955-4714.

Haller JA for the PASCAL Study Group. Initial experience with a Patterned Scanning Laser for the treatment of retinal disease. Presented at the Cannes Retina Festival 24th Annual Meeting of the ASRS & 6th Annual Meeting of the EVRS. Sept. 9-13, 2006. Cannes, France.

TABLE 1. POWER REQUIREMENTS AND TIME COMPARISON, CONVENTIONAL LASER VERSUS PASCAL

	PRP (standard single spot)	PASCAL
Power requirements	441 milliWatts	562 milliWatts
Time (100 burns)	94 seconds	25 seconds
	Macular grid (standard single spot)	**PASCAL**
Power requirements	275 milliWatts	410 milliWatts
Time (100 burns)	780 seconds	111 seconds