

Our Experience With the PASCAL Laser

Improved patient comfort, shorter treatments are possible with this semi-automated technology.

BY DANA M. DEUPREE, MD, FACS; AND MARK ERICKSON, CRA, COT

The PASCAL Photocoagulator (OptiMedica, Santa Clara, CA) is considered by many retina surgeons to be the first major innovation in laser photocoagulation since the retina laser photocoagulator was introduced in the 1970s. In our hands, this instrument greatly enhances the ability to safely treat multiple retina conditions in a far more patient-friendly and efficient manner. The PASCAL affords us the ability to select patterns that are conformable to the pathology being treated and allows alignment and rapid delivery of up to 56 spots in less than 1 second when treating diabetic retinopathy, choroidal neovascular membranes (CNVM), and retinal holes and tears.

The PASCAL laser is unique in that it rapidly delivers a predetermined pattern of multiple, precision laser spots (Figure 1). In our experience, this semi-automated technology allows much quicker, safer application and causes much less discomfort for the patient.

We have been using the precision PASCAL at our Palm Harbor, FL office since December 2008. The 25-minute laser treatments and the regimen of delivering multiple hundreds of individual shots to the retina are now a thing of the past at our private practice, The Macula Center. Lengthy treatments of hundreds of precisely positioned laser applications can be completed in 5 or 6 minutes using the PASCAL laser.

CASE REPORT

A 29-year-old man presented with uncontrolled type 1 diabetes with ocular complications. Both his retinas were strewn with untreated retinal neovascularization and disc neovascularization, scattered retinal hemorrhages, fibrovascular membranes, and lipid exudates (Figure 2). Vision in his right eye was 20/150. He was diagnosed with proliferative diabetic retinopathy.

The patient's fluorescein angiogram study demon-

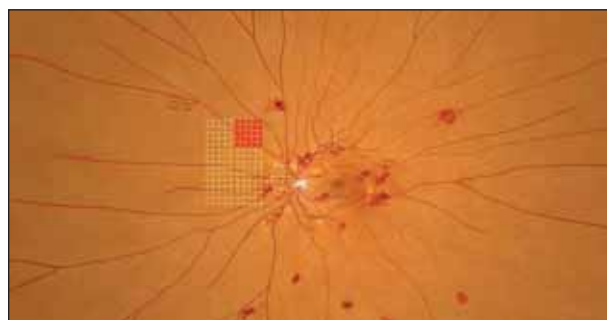


Figure 1. Illustration of the pattern laser burns made with the PASCAL laser.

strated extensive, active, leaking neovascularization throughout his retinas. There was marked capillary non-perfusion, macular and retinal edema.

Panretinal photocoagulation (PRP) was certainly indicated in both eyes and was performed using the PASCAL laser on the right eye the same day. The PRP procedure, which took about 6 minutes to perform, required no anesthetic block.

Approximately 1,700 laser spots were applied to the patient's right eye with the PASCAL's structured pattern-generation method. The patient was at the check-out desk making his follow-up appointment within 15 minutes of sitting down at the laser.

Traditionally, this procedure would have required a retro-bulbar block and about a 30-minute wait for the patient. From the patient's perspective, the PASCAL laser produces a safer, more comfortable, much quicker, more accurate treatment than the conventional single-spot photocoagulation method of PRP.

Figure 3, which is the 1-week postoperative fundus images of the PRP laser, shows the burns that were obtained using the 3x3 and 5x5 square array patterns with pulse duration set at 20 ms. The patient's visual acuity had improved from 20/150 to 20/40 at this visit.



Figure 2. Preoperative fundus image.



Figure 3. Postoperative fundus image.

DISCUSSION

Thanks to the fully integrated, ergonomically designed table and slit lamp, the feedback we get in terms of patient comfort has exceeded all of our expectations. The array of ergonomic features built in to the system, coupled with the locking hydraulic Surgistool (Stryker, Kalamazoo, MI) for the patient, means excellent patient positioning and reduced back and neck discomfort and far shorter treatment intervals. The integrated setup is also wheelchair-accessible—a plus in a vitreoretinal practice with lots of diabetic and elderly patients.

The surgeon's comfort is also improved. There are no more drawn out, back- and neck-straining, 25-minute laser marathons. We are typically finished and on to seeing the next patient within minutes.

In addition to the time-saving properties of the PASCAL method, the laser unit includes a slit lamp with excellent and precise optics. The furnished Leica (Wetzlar, Germany) optical system rivals my Visulas laser system (Carl Zeiss Meditec, Jena, Germany) and presents an excellent view of the central and peripheral retina.

The semi-automated nature of the PASCAL system does not mean that the surgeon's control is compromised.

Rather, the system has a biomicroscope's mechanical joystick, electronic micromanipulators, and LCD touch-screen control panel allowing the surgeon to maintain excellent control and ease of shaping the laser patterns to fit the area of treatment. The laser emission is ultimately controlled by the surgeon and the footswitch.

The PASCAL delivers 532-nm burn patterns in customized patterns that conform to even inter-spot spacing based on the size, shape, and location of the pathology or anatomy.

IMPROVED PATIENT COMFORT

Virtually all of our patients report having experienced less laser-burn discomfort during treatments. Early studies have indicated that the number of treatment sessions may be reduced in diabetic retinopathy patients.¹ Further, our experiences have shown that it is rare that more than one session for any patient age group or pathology is required.

There is a growing body of evidence suggesting that short-pulse-duration PASCAL burns have a different tissue effect than conventional laser.²

Shorter duration laser pulses result in less heat diffusion, which not only reduces heat in the choroid and patient pain, but also localizes the burns, resulting in less collateral damage. Unlike conventional laser burns, those made with the PASCAL do not spread over time;² early research indicates that light PASCAL treatments result in a quicker burn healing effect.²

We have successfully used the PASCAL laser with multiple built-in array patterns: square arrays with up to 25 spots on diabetic retinopathy cases; arcs and triple arc patterns for tears, detachments and lattice degeneration; macular grid and partial modified grid for retinal vein occlusion; and single-spot photocoagulation for CNVM.

In the current economic state, all equipment purchases should be critically evaluated. Although the PASCAL laser is expensive, it has reduced our workload of lasering by 70%, improving workflow and reducing surgeon fatigue. ■

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