[2]Department of Dermatology, the Second Affiliated Hospital, Fujian Medical University, Quanzhou, Fujian, China
E-mail: gaoyingying@gmail.com

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Sir,

Laser barrage anterior to ridge in threshold ROP-caveat

We read with interest the study by Ells *et al*.[1] The authors have succinctly highlighted the role of laser posterior to the neovascular ridge in severe retinopathy of prematurity (ROP) in a select group of patients.

Ells *et al*[1] have themselves highlighted some of the limitations in their study. In addition, we feel, they could have nuanced the study findings.

Confluent laser treatment to larger avascular retina in Zone II ROP is likely to be more beneficial than secondary treatment to a small strip of vascular posterior retina while allowing skip areas in the avascular retina.[2] We reckon that posterior laser to vascular retina should be considered as a last resort after treatment to avascular retina has been completed. This, especially, should be the case with the temporal retina in Zone II, where the macula shows temporal traction and accurate laser posterior to ridge is fraught with the risk of macular laser/foveal laser in an awake infant. In this regard, the 'safer zones' for such laser would be nasal, superior, and inferior. This could be a practical point of consideration for clinicians treating ROP.

Also it would be an overstatement to infer that laser treatment posterior to ridge results in rapid regression of ROP as the authors conclude. We have not seen this in the present study findings, and the progression of two eyes to retinal detachment belies the claim.

We agree with the authors that posterior retinal laser is a safe option of ROP treatment and it may have a role in reducing the chances of retinal detachment, but that remains to be proven with controlled trials.

Conflict of interest

The authors declare no conflict of interest.

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M Uparkar[1] and S Kaul[2]

[1]Vitreo-Retina Services—Vasan Eye Care Hospital, Navi-Mumbai, Maharashtra, India
[2]Pediatric Ophthalmology and Strabismology Services—Vasan Eye Care Hospital, Navi-Mumbai, Maharashtra, India
E-mail: uparkar@gmail.com

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Sir,

Response to Dr Uparkar and Dr Kaul

We thank Drs Uparkar and Kaul for their correspondence[1] with regard to our paper on laser photocoagulation, posterior to the neovascular ridge in infants with severe subgroup of Type I retinopathy of prematurity.[2]

In addressing the suggestion that confluent secondary laser treatment be applied anterior to the ridge, we wish to confirm that all of these infants did receive laser to the avascular anterior retina and to all skip areas in addition to laser posterior to the ridge.

We agree with Drs Uparkar and Kaul that posterior laser should be considered with great caution; however, all of our infant eyes represented a very severe form of Type I ROP and were treated under general anesthesia where there was maximum control of laser application within the temporal arcades. Minimal temporal arcade traction was permitted in our treated eyes, as we commonly observe this feature in eyes with severe Type I ROP prior to treatment; however, a minimum distance of 3000 μm (two disc diameters) between the fovea and temporal ridge was required in order to minimize potential complications of posterior laser.

Two eyes in this 3-year series progressed to 4A retinal detachment and required further intervention, however 89% of eyes did not go on to stage 4 retinal detachment and experienced regression within 1 week, which we consider to be a rapid regression of very severe disease after laser treatment. Lepore and colleagues[3] report fluorescein angiography cases with avascular loops, which exist posterior to the ridge, and hypothesize that these ischemic posterior retina areas may contribute significantly to the production of VEGF. We also hypothesize that additional laser to these posterior ischemic retina areas may facilitate regression of neovascularization in this subgroup of infants with very severe zone II, stage 3 ROP.

We describe clear morphological criteria for consideration of posterior laser in a group of premature infant eyes with very severe Type I ROP, which may halt progression of the disease and minimize visual loss from cicatricial macular changes or avoid advancement to stage 4 or 5 ROP warranting vitreoretinal surgery.

Conflict of interest

The authors declare no conflict of interest.

References

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AL Ells[1,2], GA Gole[3], P Lloyd Hildebrand[4], A Ingram[1], CM Wilson[5,6] and R Geoff Williams[2,7]

[1]Ells Retina Centre, Calgary, Alberta, Canada
[2]University of Calgary, Calgary, Alberta, Canada
[3]Discipline of Paediatrics and Child Health, University of Queensland, Royal Children's Hospital, Brisbane, Queensland, Australia
[4]Department of Ophthalmology, University of Oklahoma, Oklahoma City, Oklahoma, USA
[5]Department of Optometry and Visual Science, City University, London, UK
[6]Department of Ophthalmology, St Mary's Hospital, London, UK
[7]Calgary Retina Consultants, Calgary, Alberta, Canada
E-mail: annaells@mac.com

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Sir,

Human histopathology of PASCAL laser burns

We present the first human histopathological and immunohistochemical correlation after laser injury with semi-automated pattern scanning retinal photocoagulation (PASCAL).

Case report

A 66-year-old male with a history of type 2 diabetes, coronary artery disease, congestive heart failure, and chronic kidney disease was admitted for abdominal pain and hypoxia. The patient had a history of proliferative diabetic retinopathy (PDR) and vitreous hemorrhage, for which he underwent conventional panretinal photocoagulation (PRP) 2 years prior in the left eye. Five months prior the patient had PDR with subhyaloid hemorrhage of the right eye and underwent PASCAL (Topcon, Santa Clara, CA) PRP with 912 spots, 200 micron, 20 ms pulse duration, and power from 400 to 850 mW. The patient underwent PASCAL PRP fill-in with 595 spots 4 months later in the right eye with visual acuities of 20/30 OD and 20/150 OS.

The patient had necrotizing Nocardia pneumonia, expired, and underwent autopsy. Gross examination of the right retina showed well-aligned 3×3 laser grids. H&E sections of the right eye PASCAL lesions showed outer nuclear layer (ONL) loss, but with a preserved inner nuclear layer (INL; Figure 1). An acellular matrix and pigmented cells fill the ONL defect. PAS stain shows an irregular ONL with a break in the ELM (Figure 2). Immunohistochemistry with GFAP demonstrates staining of short vertical segments that extend from the INL to ONL, likely representing activated Müller cell

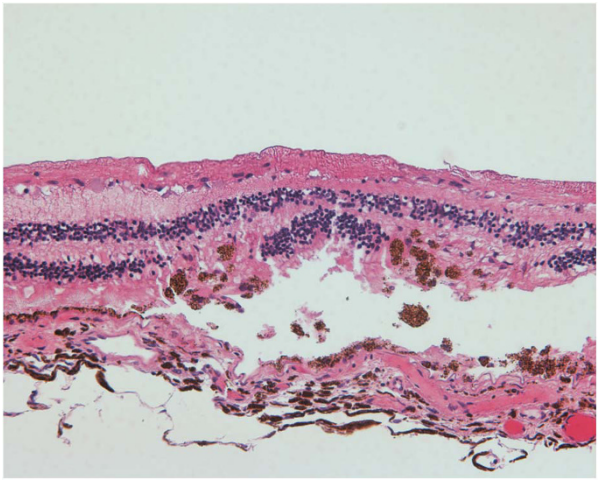

Figure 1 Hematoxylin and eosin (H&E) $\times 10$ magnification section of PASCAL laser shows regions of outer nuclear layer loss filled with an acellular matrix and migrating pigmented cells within the outer retinal layers. There is disorganization of the choriocapillaris layer and areas of retinal pigment epithelial (RPE) atrophy and hyperplasia adjacent to these regions. The inner nuclear layer, ganglion cell layer, and nerve fiber layer appear preserved.

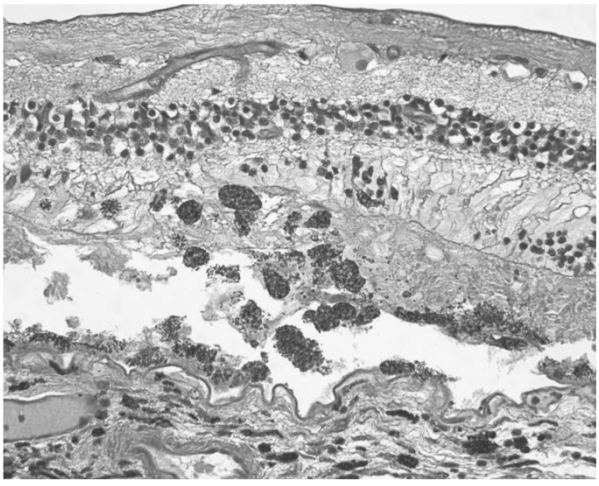

Figure 2 Periodic acid-Schiff (PAS) stain shows an irregular outer nuclear layer with a break in the external limiting membrane (ELM) with the migration of pigmented cells anterior to the ELM.