Vitrectomy + 360° cyclopelexy with transscleral 810 nm laser application: a novel surgical technique for hypotonic maculopathy

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To the Editor:

Traumatic cyclodialysis is always a challenging condition. Evidence is based on single case reports or small case series. Treatment is indicated in the presence of persistent ocular hypotony or disturbance of the posterior segment anatomy due to deformation of the globe caused by extremely low IOP. The first step in the management of a traumatic cyclodialysis should always include a conservative approach with cycloplegic drops and topical, periocular or oral corticosteroids. More invasive options should be reserved for refractory cases and for eyes with risk of irreversible visual loss.

Many treatment options have been reported, ranging from internal or external laser cyclophotocoagulation [1–3], transscleral diathermy [1], cryotherapy [4] to surgical therapy and vitreoretinal procedures, such as suture-based techniques [5], vitrectomy, endotamponades or scleral buckling. All of the aforementioned approaches share the same purpose of closing the cyclodialysis cleft, reattach the ciliary body to the sclera and to normalize the IOP. Even when favourable results have been reported using any of these techniques, the evidence is insufficient to establish superiority over each other or an adequate management algorithm and choosing the right option must be based on the size, extension and location of the cleft as well as the duration of the ocular hypotony.

We report four cases of 360° traumatic cyclodialysis with favourable results after vitrectomy + transscleral laser cyclophotocoagulation + supine positioning (Table 1). We

highlight the role of the transscleral laser cyclopelexy in achieving such early favourable results, with good anatomic and visual results (Fig. 1).

Amini and Razeghinejad first described the use of transscleral laser to close a sectorial small cyclodialysis in a post-traumatic patient and one post-trabeculectomy patient by applying laser burns over the cleft with the following parameters: 2500 MW of power with a 2 s exposure time in two consecutive rows around the cornea.

We aimed for a controlled thermal laser burn to induce cyclopelexy with a laser power of 700–1000 MW with an exposure time of 2 s. By performing a pars plana vitrectomy and while the vitreous cavity was completely filled with air, we achieved a rise of the IOP and a transient apposition of the ciliary body to the sclera facilitating transscleral laser application. After this, air-SF6 or air-silicon oil exchange was performed and supine positioning of the head was indicated following the same principles of pneumatic retinopexy. The combination of these techniques had never been reported elsewhere.

Transscleral cryotherapy combined with pars plana vitrectomy has been successfully used to treat traumatic cyclodialysis but it is frequently accompanied by post-operative complications. Comparing our combined treatment with this cryotherapy technique, we believe that transscleral laser application is a better option than the latter because of possible standardization in laser parameters, faster effects, less inflammation, no hypertensive spikes and a greater cyclopelexy adherence. In conclusion, pars plana vitrectomy + application of 360° transscleral diode laser technique can be useful to treat patients with 360° cyclodialysis in the presence of hypotonic maculopathy secondary to ocular trauma.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Table 1 Clinical characteristics.

No.	Gender	Age (years)	Initial IOP (mmHg)	Initial BCVA (logMAR)	Trauma mechanism	Time since trauma	Final IOP (mmHg)	Final BCVA (logMAR)
1	M	37	2	1.0	Metallic nail	1 month	15	0.1
2	M	42	4	2.8	Belt buckle	1 month	22	1.84
3	M	45	4	1.3	Rope	3 months	10	0.39
4	M	43	4	1	Firework	5 months	18	1

Fig. 1 Anterior and posterior segment photographs of the right eye of patient #1 at 1 week after referral.

Resolution of the anterior segment hyphema (a). Fundus image showing temporal subretinal blood (b) and macular folds (c). Anterior and posterior segment photographs at 1 month after surgery. Resolution of the iridodialysis (d). Fundus image without macular folds (e).

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