Pars plana vitrectomy for vitreoretinal complications of ocular toxoplasmosis

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PURPOSE. Ocular toxoplasmosis is associated with vitreoretinal complications that can potentially cause severe visual loss. The aim of this study is to report the preoperative, intraoperative, and postoperative outcomes of vitreous surgery in eyes with vitreoretinal complications secondary to ocular toxoplasmosis.

METHODS. This retrospective study included 15 eyes of 15 patients (8 men, 7 women; mean age at surgery, 37.2 years, range 18–57 years) who had undergone vitreoretinal surgery for vitreoretinal complications secondary to ocular toxoplasmosis. Visual acuity was compared between the last preoperative visit and the most recent follow-up visit. Intraoperative and postoperative complications were also analyzed.

RESULTS. Indications for surgery were retinal detachment in 8 eyes (53.3%), epiretinal membrane in 2 eyes (13.3%), persistent vitreous opacities in 2 eyes (13.3%), choroidal neovascularization in 1 eye (6.6%), vitreous hemorrhage secondary to vasoproliferative retinal tumor in 1 eye (6.6%), and hemorrhagic vasculitis with premacular hemorrhage in 1 eye (6.6%). At last examination, visual acuity improved in 11 eyes (73.3%) by 2 lines or more. Postoperative events that might be related to the surgery included 1 localized retinal detachment, 2 cataracts, and 1 glaucoma.

CONCLUSIONS. Pars plana vitrectomy for treatment of vitreoretinal complications secondary to ocular toxoplasmosis can be safely performed and may result in improved visual acuity. (Eur J Ophthalmol 2009; 19: 1039-43)

KEY WORDS. Pars plana vitrectomy, Toxoplasmosis

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PPV for complications of ocular toxoplasmosis

The patients were evaluated at Hospital Clinic and Instituto de Microcirugia Ocular of Barcelona, Spain, from 1999 through 2007. Institutional Review Board/Ethics Committee approval from both institutions was received. Patients presented a history of toxoplastic retinochoroiditis and one of the following vitreoretinal complications: rhegmatogenous retinal detachment (RRD), tractional retinal detachment, vitreous hemorrhage, premacular hemorrhage, epiretinal membrane, choroidal neovascularization (CNV), and persistent vitreous opacities. All eyes presented with inactive retinochoroiditis.

Vitrectomy was performed using 20-gauge vitrectomy systems. Three-port PPV was performed in all eyes using a standard approach and direct visualization of the vitrectomy instruments. In cases of RRD, scleral buckle and PPV with endophotocoagulation in retinal breaks was performed in all eyes and pars plana lensectomy and gas or silicone oil injection were used depending on number of breaks, vitreous opacities, and rate of inflammation. The surgical procedure in cases with epiretinal membrane was PPV and membrane peeling. In cases of CNV, surgical treatment consisted of PPV, dissection of the posterior hyaloid, retinotomy in the vicinity of the CNV, and extraction of the choroidal membrane with forceps and fluid-air exchange. Patient demographic data and clinical history were recorded at the initial visit. A complete ophthalmic history and examination were performed. The following information was obtained from the clinical chart: vitreoretinal complication type, follow-up period, preoperative and postoperative best-correct Snellen visual acuity, and complications related to PPV. The diagnosis of toxoplasmic retinochoroiditis was based on positive serologic test for *Toxoplasma gondii* (immunoglobulin G) and typical ocular lesion in the retina (i.e., focal necrotizing retinochoroiditis accompanied by scars). All patients with active lesions were previously treated with trimethoprim/sulfamethoxazole and oral prednisone at tapering doses for 30–40 days.

**RESULTS**

There were 15 eyes of 15 patients with vitreoretinal complications of ocular toxoplasmosis (8 male, 7 female). Mean age was 37.2 years (range, 18–57 years). Mean follow-up after vitreous surgery was 41.4 months (range, 16–115 months). The general characteristics of the 15 patients are summarized in Table I. *T. gondii* serologic analysis was available in all patients and immunoglobulin G was positive in all of them. Indications for vitreous surgery included retinal detachment in 8 eyes (53.3%), epiretinal membrane in 2 eyes (13.3%), persistent vitreous opacities in 2 eyes (13.3%), choroidal neovascularization in 1 eye (6.66%), vitreous hemorrhage in 1 eye (6.66%), and premacular hemorrhage in 1 eye (6.66%). Six eyes with retinal detachment had RRD (patients 8, 9, 11, 13, 14, and 15) and 2 eyes had RRD combined with tractional retinal detachment (TRD).

**TABLE I - PATIENT DATA**

<table>
<thead>
<tr>
<th>Patient no.</th>
<th>Sex</th>
<th>Age, yr</th>
<th>Vitreoretinal complication</th>
<th>Preop VA</th>
<th>Postop VA</th>
<th>Surgical treatment</th>
<th>PPV-related complications</th>
<th>Follow-up period, mo</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M</td>
<td>18</td>
<td>EM</td>
<td>20/400</td>
<td>20/40</td>
<td>PPV + membrane peeling</td>
<td>None</td>
<td>32</td>
</tr>
<tr>
<td>2</td>
<td>F</td>
<td>36</td>
<td>CNV</td>
<td>20/200</td>
<td>20/40</td>
<td>PPV + submacular surgery</td>
<td>None</td>
<td>72</td>
</tr>
<tr>
<td>3</td>
<td>F</td>
<td>57</td>
<td>RRD + TRD</td>
<td>20/400</td>
<td>20/200</td>
<td>SB + PPV + silicone oil</td>
<td>None</td>
<td>48</td>
</tr>
<tr>
<td>4</td>
<td>F</td>
<td>20</td>
<td>RRD + TRD</td>
<td>20/400</td>
<td>20/200</td>
<td>SB + PPV + delamination + gas</td>
<td>PPV</td>
<td>110</td>
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<tr>
<td>5</td>
<td>F</td>
<td>67</td>
<td>PVO</td>
<td>20/200</td>
<td>20/40</td>
<td>PPV</td>
<td>None</td>
<td>115</td>
</tr>
<tr>
<td>6</td>
<td>F</td>
<td>33</td>
<td>EM</td>
<td>20/100</td>
<td>20/30</td>
<td>PPV + membrane peeling</td>
<td>None</td>
<td>10</td>
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<tr>
<td>7</td>
<td>F</td>
<td>57</td>
<td>PVO</td>
<td>HM</td>
<td>20/80</td>
<td>PPV + lensectomy</td>
<td>EM</td>
<td>12</td>
</tr>
<tr>
<td>8</td>
<td>M</td>
<td>42</td>
<td>RRD</td>
<td>HM</td>
<td>20/80</td>
<td>SB + PPV + lensectomy + silicone oil</td>
<td>None</td>
<td>28</td>
</tr>
<tr>
<td>9</td>
<td>M</td>
<td>53</td>
<td>RRD</td>
<td>LP</td>
<td>20/200</td>
<td>SB + PPV + gas</td>
<td>None</td>
<td>12</td>
</tr>
<tr>
<td>10</td>
<td>M</td>
<td>22</td>
<td>VH + VPT</td>
<td>CF 1 m</td>
<td>20/80</td>
<td>PPV + endolaser + cryocoagulation</td>
<td>Cataract</td>
<td>30</td>
</tr>
<tr>
<td>11</td>
<td>M</td>
<td>26</td>
<td>RRD</td>
<td>HM</td>
<td>20/80</td>
<td>SB + PPV + gas</td>
<td>None</td>
<td>16</td>
</tr>
<tr>
<td>12</td>
<td>F</td>
<td>19</td>
<td>VH + premacular hemorrhage</td>
<td>20/200</td>
<td>20/60</td>
<td>PPV + endolaser</td>
<td>RRD</td>
<td>16</td>
</tr>
<tr>
<td>13</td>
<td>M</td>
<td>33</td>
<td>RRD</td>
<td>HM</td>
<td>20/80</td>
<td>SB + PPV + lensectomy + silicone oil</td>
<td>Glaucoma</td>
<td>48</td>
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<tr>
<td>14</td>
<td>M</td>
<td>50</td>
<td>RRD</td>
<td>20/100</td>
<td>20/40</td>
<td>SB + PPV + gas</td>
<td>None</td>
<td>24</td>
</tr>
<tr>
<td>15</td>
<td>M</td>
<td>26</td>
<td>RRD</td>
<td>20/200</td>
<td>20/200</td>
<td>SB + PPV + gas</td>
<td>None</td>
<td>48</td>
</tr>
</tbody>
</table>

VA = visual acuity; PPV = pars plana vitrectomy; EM = epiretinal membrane; CNV = choroidal neovascularization; RRD = rhegmatogenous retinal detachment; TRD = tractional retinal detachment; SB = scleral buckling; PVO = persistent vitreous opacities; HM = hand motions; LP = light perception; VH = vitreous hemorrhage; VPT = vasoproliferative tumor; CF = counting fingers.
ments probably has to do with severe inflammation of the vitreous, which may lead to liquefaction and traction causing not only tractional but also rhegmatogenous retinal detachment, specifically in patients where additional risk factors such as myopic retinal degenerations are present. It is noteworthy that in our patients there were no attacks of active toxoplasmosis preceding the manifestation of retinal detachment as described in previous case reports, although vitreous cells were present in all of our patients. All 8 eyes with RD required PPV and scleral buckle and gas or silicone oil injection with good anatomic result. Vi-

DISCUSSION

The most common vitreoretinal complication associated with toxoplasmosis that required vitreous surgery observed in our series was retinal detachment. Occasional case reports on retinal detachment in patients with ocular toxoplasmosis have been reported. One study of 150 consecutive patients attending a Dutch ophthalmology department reported a frequency of 6% for retinal detachment and an additional 5% for retinal breaks (4). The majority of retinal detachments observed in individuals with ocular toxoplasmosis are rhegmatogenous or tractional in nature (5, 6). The pathogenesis of such types of retinal detachments probably has to do with severe inflammation of the vitreous, which may lead to liquefaction and traction causing not only tractional but also rhegmatogenous retinal detachment, specifically in patients where additional risk factors such as myopic retinal degenerations are present. It is noteworthy that in our patients there were no attacks of active toxoplasmosis preceding the manifestation of retinal detachment as described in previous case reports, although vitreous cells were present in all of our patients. All 8 eyes with RD required PPV and scleral buckle and gas or silicone oil injection with good anatomic result. Vi-

(patients 3 and 4). In patients with TRD, the breaks were not anatomically associated with the TRD. Scleral buckling with PPV was performed in 6 eyes, gas injection in 5 eyes, silicone oil injection in 3 eyes, and pars plana lensectomy in 2 eyes. Three of the 8 eyes were pseudophakic. In 2 of the 8 eyes, retinal breaks were located in the direct proximity of toxoplasmic lesions. Final visual acuity of 20/200 or less occurred in 4 patients: 3 due to large macular toxoplasmic scar (patients 3, 4, and 15) and 1 due to previous branch retinal arterial occlusion (patient 9). At the last examination, visual acuity improved in 11 eyes (73.3%) by 2 lines or more. Retina was attached in all eyes and postoperative events that might be related to the surgery included 1 localized retinal detachment, 2 cataracts, and 1 glaucoma.

Fig. 1 - Patient 12. Left eye fundus examination showed vitreous inflammation and a whitish retinochoroidal lesion inferiorly to optic nerve.

Fig. 2 - Patient 12. Ophthalmoscopy disclosed a dense premacular subhyaloid hemorrhage.

Fig. 3 - Patient 12. Left eye posterior examination after pars plana vitrectomy disclosed a total regression of the retinal hemorrhages and a white chorioretinal scar.
PPV for complications of ocular toxoplasmosis

sual acuity less than 20/200 in 2 eyes was caused by large toxoplasmic scar in the macular areas.
Vitreous hemorrhage appeared in 2 patients: 1 with retinal vasculitis and secondary premacular hemorrhage (patient 12) and the other with vasoproliferative retinal tumor producing an overlying exudative retinal detachment (patient 10). Retinal vasculitis is common in patients with ocular toxoplasmosis and typically occurs in the same quadrant as the retinochoroiditis but also can occur remote from site of infection (7). In rare cases, the vasculitis may be occlusive, resulting in retinal infarction and consequent visual field defects or retinal ischemia with secondary neovascularization (8, 9). Ocular occlusive vasculitis can be observed in other in infectious diseases: syphilis, acute retinal necrosis, and tuberculosis. Our case demonstrates the importance of including toxoplasmosis in the differential diagnosis of unilateral hemorrhagic retinochoroiditis. Subhyaloid hemorrhage in the macula may occur in Valsalva retinopathy or in retinal vascular diseases (10) but associated with toxoplastic retinochoroiditis has not been described. We found surgical removal of premacular blood to be advantageous; PPV and the removal of subhyaloid blood resulted in good outcome in terms of visual acuity (Figs. 1–3). Another patient (patient 10) presented vitreous hemorrhage and exudative detachment associated with toxoplasmosis scar. This type of retinal detachment has been described in earlier reports in cases in which the exudative reaction was severe, taking the form of a vasoproliferative retinal tumor producing an overlying exudative retinal detachment, recurrent retinal detachment, or cystoid macular edema (11-13). Treatment in our patient included cryocoagulation and endolaser photocoagulation combined with PPV. Postoperatively, a slightly elevated grayish-white mass persisted peripheral to an atrophic zone.
Epiretinal membrane formation is uncommon in ocular toxoplasmosis (14). Epiretinal membranes secondary to chronic uveitis have been suggested to carry a poorer prognosis after vitrectomy surgery (15, 16). Visual improvement seen in our two patients is due to the effect of epiretinal membrane stripping confirmed by OCT through relief of foveal traction (Figs. 4 and 5). Epiretinal membranes due to ocular toxoplasmosis tend to have a good visual prognosis in our series, restoring vision with PPV and membrane peeling without postoperative complications.
Vitreous involvement occurs in diffuse toxoplasmic retinochoroiditis cases and is responsible for severe sequelae. Vitreous haze with longstanding vitreous opacity in those cases after antimicrobial treatment can cause visual loss. We performed PPV in those cases with good visual results and postoperative visual acuity improved in the 2 patients.
CNV secondary to ocular toxoplasmosis is a rare event that may be responsible for central visual loss and usually occurs as a late complication of retinochoroiditis (17).
Disruption of Bruch’s membrane caused by necrotizing chorioretinitis promotes the development of choroidal neovascular membranes, which may develop adjacent to the retinal scar or at a distant location with feeder vessels originating from the scar. Submacular surgery may represent an option in treatment (18). Visual acuity improvement has been produced in one of our patients. Other options that include PDT and intravitreal injections of anti-VEGF drugs are less invasive and good visual results have been published (19-21).

Although this study is limited by its retrospective nature and by relatively small number of patients, it suggests a visual beneficial outcome for patients with vitreoretinal complications associated with ocular toxoplasmosis. Modern vitreoretinal surgery proved to be an efficient method to treat some complications of ocular toxoplasmosis.

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REFERENCES