Original article

Clinical course of pars planitis in patients treated with selective photoocoagulation

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ARTICLE INFO

Article history:
Received 24 February 2011
Accepted 28 September 2012
Available online 18 October 2013

Keywords:
Pars planitis
Intermediate uveitis
Argon laser
Laser coagulation
Therapeutics

ABSTRACT

Introduction: Pars planitis is an intermediate uveitis with bilateral and asymmetric presentation. The etiology is unknown and pathogenesis is unclear. Treatment follows the algorithm of Foster, which includes selective photocoagulation. The mechanism of action of photocoagulation is still unknown.

Material and methods: An observational, longitudinal, ambispective cohort study was performed with the objective of evaluating the course of inflammation in patients with pars planitis treated with a selective argon laser.

Results: The study included 29 patients (10 female and 19 male) diagnosed with pars planitis and were treated with selective laser. The mean age of onset was 11.77 years. Eighteen (62.1%) patients were not immunosuppressed at the time of receiving the selective laser, and 11 (37.9%) were taking immunosuppressants. Indications for selective laser were; following the algorithm, 19 (65.55%), vitreous hemorrhage 7 (24.1%), vitrectomy 2 (6.98%), and neovascularization 1 (3.4%). The mean time for inflammation reduction was 5.9 months, and 17 patients (58.6%) had no relapse. Visual acuity showed improvement post-laser (OD P = .025 and OI P = .022). There was also an improvement in vitreous cells.

Conclusion: Selective laser was effective in 58.6% of patients.

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Pacientes con pars planitis tratados con fotocoagulación selectiva: curso clínico

RESUMEN

Introducción: La pars planitis es una uveitis intermedia, con una presentación bilateral y asímética. La etiología es desconocida y la patogenia no está clara. El tratamiento sigue el algoritmo de Foster, donde se incluye la fotocoagulación selectiva. El mecanismo de acción de la fotocoagulación es desconocido.

Materiales y métodos: Estudio observacional, longitudinal, cohorte ambispectiva. El objetivo fue evaluar el curso de la inflamación en pacientes con pars planitis tratados con láser argón selectivo.

* Please cite this article as: González Rubio-Medina E, Pedroza-Seres M. Pacientes con pars planitis tratados con fotocoagulación selectiva: curso clínico. Arch Soc Esp Oftalmol. 2013;88:298–301.

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Introduction

Pars planitis is defined as an intermediate uveitis which mainly affects patients in childhood and up to the fourth decade of life.\textsuperscript{1,2} Approximately 70–90% of cases are bilateral and asymmetric.\textsuperscript{1} The etiology of Pars planitis is unknown\textsuperscript{1} but it has been associated with the larger histocompatibility antigen (HLA–DR15).\textsuperscript{1,3} Pathgeny is likewise unclear. The dynamics of the damages are immunological mediated by CD4+ cooperating T lymphocytes as they are in the peripheral infiltrates of retinal vessels and in the snowbanks, suggesting that they respond against ocular antigens located in the vitreoretinal interface.\textsuperscript{2,4} T lymphocytes have been demonstrated as predominant cells (11–95%) in patients serum; CD8+ T lymphocytes express CD57, a marker of early cellular activation.\textsuperscript{5,6} In 1981, Cantrill et al. studied electroretinograms of 13 patients with Pars planitis, finding abnormalities in the B wave of the scotopic phase in several patients. This study suggests retinal etiology.\textsuperscript{6}

The treatment follows the algorithm indicated by Foster\textsuperscript{1,7} (Fig. 1).

The first step is regional injected corticosteroids (triamcinolone 40 mg, a series of 6 peribulbar injections). Three peribulbar injections were applied at two-week intervals. If there was no response, a nonsteroid anti-inflammatory (NSAID) was added orally (naproxene 500 mg every 12 h) after the third injection and topical NSAID in the presence of EMQ. Retinal cryopexy or argon laser selective photocoagulation was applied at the pars plana level if the inflammation persisted despite systemic NSAIDs. Immunosuppressants were included together with steroids at the beginning of the treatment. These are recommended if the above failed to control the inflammatory condition. First-line immunosuppressants are cyclosporine A, methotrexate, mycophenolate mofetil and the second line immunosuppressant is azathioprine. If the uveitis is resistant to the above options, biological agents can be added or depending on the circumstances of the patients pars plana vitrectomy can be performed.\textsuperscript{1,7}

The action mechanism of cryotherapy and selective photocoagulation is unknown although it is proposed that the core is inducing the regression of neovascularization\textsuperscript{8} of the vitreous base by diminishing angiogenic factors secondary to peripheral retina ischemia and accordingly stabilizing the inflammation.\textsuperscript{1}

Cryotherapy is applied in patients who have not responded to treatment with drugs or exhibit recurring inflammation. Vision improvement and diminished vitreitis have been reported.\textsuperscript{8,10,11} Cryotherapy complications involve the necessity of surgery due to retina detachment development, the formation of cataracts and exacerbation of macular edema.\textsuperscript{3} Selective photocoagulation has demonstrated its efficiency for treating neovascularization associated to intermediate uveitis.\textsuperscript{10} It produces neovascularization regression, inflammation stabilization, EMQ reduction and visual acuity improvement. The advantages of selective photocoagulation are its ease of application which reduces morbidity as compared to cryotherapy as well as reducing the use of corticosteroids.\textsuperscript{1}

\begin{figure}
\centering
\includegraphics[width=\textwidth]{treatment_algorithm.png}
\caption{Treatment algorithm.}
\end{figure}
When compared to cryotherapy, selective photocoagulation does not create large atrophy areas and, as it is placed in 3 rows posterior to the vitreous exudation and organization base, it could create a barrier against the possible formation of detachment\textsuperscript{10,12} (Fig. 2).

The objective was to assess the course of inflammation measuring vitreous cellularity in patients with Pars planitis treated with selective laser.

**Subjects, material and methods**

The study included patients with Pars planitis diagnostic as defined by the SUN Working Group criteria\textsuperscript{16} treated with selective argon laser photocoagulation in 3–4 rows posteriorly to snowbanks in lower quadrants, with subsequent examinations and a minimum follow-up of 6 months up to 10 years. The presence of inflammatory cells in the vitreous was quantified as follows: 0: No cell in the vitreous, 0.5+ (1–10), 1+ (10–20), 2+ (20–30), 3+ (30–100).\textsuperscript{13} The study excluded patients with associated disease and those who failed to comply with follow-up or treatment. The protocol was approved by the ethics committee of the hospital in accordance with the Helsinki declaration, and every patient was requested to sign an informed consent letter in order to carry out the procedure.

The study is observational, longitudinal and with ambispective cohort.

**Statistics**

The statistics used were descriptive, i.e., mean, percentages and the T for student test. Statistical analysis was carried out with the Microsoft Office Excel 2007 computer application.

**Results**

The study included 29 patients with pars planitis diagnostic treated with selective laser. Of these, 10 patients were female and 19 male. The mean onset age was of 11.37 years with a range of 6–24 years.

Due to the fact that some patients were already multi-treated, some were managed with the algorithm described above. Prior treatment in patients was periorcular (average RE 4.87 and LE 5.09); oral NSAID was utilized in 15 patients (51.7%) (9 with naproxene and 5 with indometacin). At the time of receiving the selective laser, 18 patients (62.1%) were not being administered immunosuppressants and 11 (37.9%) were administered immunosuppressants. In these patients the objective of the selective laser was to diminish immunosuppressants and control inflammation.

The patients treated with the described algorithm were 9, with 20 being treated without said algorithm. Laser indications are described in Table 1.

Both eyes were treated with laser in 9 patients (31%), in 6 patients (20.7%) the RE and in 14 patients (48.3%) the LE. The average time of inflammation reduction was of 5.9 months (1–11 months); 18 patients (62.1%) exhibited diminished inflammation in said period and 17 patients did not exhibit relapses (in the follow-up period of 8 months to 8 years).

The statistically significant differences in pre- and post-laser visual acuities of every eye (with the T for student test of 2 paired samples) are described in Table 2.

Clinical improvement of vitreous cellularity was observed without finding statistically significant differences (Table 3).

In 21 patients (72.4%) it was not necessary to reapply selective laser, in 6 patients (20.7%) it was reapplied due to inflammation relapse, in one patient (3.4%) due to vitreous hemorrhage and in another patient (3.4%) due to recurring vitreous hemorrhage.

Complications secondary to selective laser were described in one patient with the formation of epiretinal membrane.

**Discussion**

Previous studies carried out by Park, Pulido and Romero proposed that selective laser stabilizes the hematoretinal area associated to intraocular inflammation reduction as well as diminishing angiogenic factors and creating a barrier against the development of retina detachment.\textsuperscript{8,10,15} Pulido et al. reported that selective laser diminished inflammation and applied it as part of the treatment.\textsuperscript{7} Romero and Park found diminished inflammation and disease deactivation in patients treated with laser and cryotherapy.\textsuperscript{11,14}

Cases treated in other studies had the objective of diminishing the chronic use of corticosteroids, treating

<table>
<thead>
<tr>
<th>Table 1 - Laser indications.</th>
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<tr>
<td>Selective laser No. (%)</td>
</tr>
<tr>
<td>19 (65.55%)</td>
</tr>
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</table>
neovascularization, controlling intraocular inflammation and as last treatment option. In the instant study, selective laser demonstrated to be a useful therapeutic option for the cases described above in addition to corticosteroid hyper-reaction and to diminish the dosage of immunosuppressants.

In the present study visual acuity exhibited significant improvements with treatment, which was not reported in previous studies.

In the population of our study, the average time to observe inflammation reduction was of 5.9 months, which indicates that selective laser results are not immediate. Compared with the report by Cesarz and Flickinger for patients treated with cryotherapy, the mean time for diminishing inflammatory activity was 15 months.

Patients who underwent vitrectomy and selective laser exhibited improved inflammation control during follow-up. The only complication in one patient (3.4%) was the formation of epiretinal membrane. This percentage differs from the 23–46% reported by Pulido.

Even though this study presents a limited number of patients, the authors propose that due to satisfactory control of inflammation with selective laser photocoagulation, more prospective studies will be needed for confirmation purposes.

Selective laser is part of the treatment algorithm for patients with Pars planitis and proved to be effective in 58.6% of patients, expanding the stability period to avoid consequences of the medical or surgical treatment.

**Conflict of interests**

No conflict of interests has been declared by the authors.

**REFERENCES**


**Table 2 – Pre- and post-laser visual acuities.**

<table>
<thead>
<tr>
<th></th>
<th>Pre-laser logMAR CV</th>
<th>Post-laser logMAR CV</th>
<th>P &lt; 0.05</th>
</tr>
</thead>
<tbody>
<tr>
<td>RE</td>
<td>0.49</td>
<td>0.37</td>
<td>P = 0.025</td>
</tr>
<tr>
<td>LE</td>
<td>0.65</td>
<td>0.33</td>
<td>P = 0.022</td>
</tr>
</tbody>
</table>

**Table 3 – Pre- and post-laser vitreous cellularity.**

<table>
<thead>
<tr>
<th></th>
<th>Baseline old patients (range)</th>
<th>Baseline recent patients (range)</th>
<th>Baseline old patients (range)</th>
<th>Baseline recent patients (range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RE</td>
<td>5 (1 ± 2+)</td>
<td>13 (0.5 ± 2+)</td>
<td>11 (0.5 ± 2+)</td>
<td>6 (0.5 ± 2+)</td>
</tr>
<tr>
<td>LE</td>
<td>5 (0.5 ± 2+)</td>
<td>15 (0.5 ± 3+)</td>
<td>17 (0.5 ± 2+)</td>
<td>3 (1)</td>
</tr>
</tbody>
</table>