Comparison of Long-term Efficacy and Recurrence rate between Oral spironolactone and Photodynamic therapy for the treatment of Nonresolving Central Serous Chorioretinopathy

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Introduction

CSC (central serous chorioretinopathy) is disease characterized by subretinal fluid accumulation in the macular, and it mainly affects the working population. Persistent or nonresolving CSC can lead to irreversible retinal pigment epithelium (RPE) damage or vision deterioration. Therefore, effective and safe treatment for persistent or nonresolving CSC is very important.

Photodynamic therapy (PDT) with verteporfin has been suggested as a treatable option for nonresolving CSC, it might be caused by chorioscapular hypoperfusion and choroidal vascular remodelling. PDT has been shown to be effective in reducing SRF and improving visual acuity in persistent CSC. Half-dose PDT has a long-term efficacy and lower recurrence rates in chronic CSC.

An animal model of CSC showed that there is a strong relationship between the macular pigment, (MR) and choroidal vessels. MR is expressed in the choroid and the activation of MRs can prevent choroidal vasodilation and leakage. Therefore, antagonist of MRs can be involved in the pathogenesis of CSC in the choroid.

Several reports have shown that MR antagonist (spironolactone, eplerenone) can be effective in nonresolving CSC. However, these reports are the results for the short-term clinical outcome of MR antagonist, and there is no study comparing MR antagonists and PDT for the long-term efficacy and recurrence rate in the treatment of nonresolving CSC.

Purpose

To evaluate and compare the morphological and functional changes with nonresolving CSC using spectral domain optical coherence tomography (OCT) parameters, including central macular thickness (CMT), subretinal fluid height (SRFH), and subfoveal choroidal thickness (SFT).

Method

Retrospective chart review of patients
50 eyes of 50 patients of CSC
Oral SPRL (25 mg) Vs Half-dose PDT (24 patients)
Two center study: Jeju National University Hospital, Chungbuk National University Hospital between January 2013 and June 2016

Inclusion criteria
1. A visual symptoms for more than 3 months
2. Persistent SRF for at least 3 months
3. Cystoid macular oedema involving the fovea on OCT

Exclusion criteria
1. Previous photodynamic therapy, anti-vascular endothelial growth factor intravitreal injection
2. Diabetic retinopathy, choroidal neovascularization or polypoidal choroidal vasculopathy
3. History of other macular diseases
4. myopia (>6 dioptries), hyperopia (>5D)

Treatments
Oral SPRL: 25mg twice daily until complete resolution of the subfoveal fluid accumulation.
Half-dose PDT: Verteporfin was infused at the normal dose (3 mg/ml) over 10 minutes, followed by laser irradiation at 15 minutes after the start of infusion. The total light energy was 50 J/cm², with an intensity of 600 mW for 83 seconds.

Measurements
1. BCVA (best corrected visual acuity):
Snellen visual acuity were converted to logarithm of the minimum angle of resolution units
2. CMT, SRFH, SFT: SD-OCT
3. Follow-up examinations were performed at 1, 2, 3, 6, and 12 months
4. Blood pressure, serum potassium, creatinine were checked every 3 months during oral SPRL treatment

The primary outcome:
the changes in CMT, SRFH, SFT thickness from baseline to the apex of the serous retinal detachment.
Secondary outcome: the changes in BCVA
Patients were asked about potential side effects at every follow-up visit.

Results

All included patients: 50 eyes of 50 patients with nonresolving CSC
The baseline characteristics of the SPRL and half-dose PDT groups are summarized in Table 1.

Table 1. Summary of patient demographics and history

<table>
<thead>
<tr>
<th>Spironolactone (n=24)</th>
<th>Half-dose PDT (n=24)</th>
<th>p</th>
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<tbody>
<tr>
<td>Age (years)</td>
<td>46.32 ± 1.39</td>
<td>50.89 ± 2.712</td>
</tr>
<tr>
<td>Sex (Male:Female)</td>
<td>20:6</td>
<td>19:5</td>
</tr>
<tr>
<td>Previous use of corticosteroids, n (%)</td>
<td>0 (0)</td>
<td>1 (4)</td>
</tr>
<tr>
<td>History of smoking, n (%)</td>
<td>16 (64)</td>
<td>8 (33.3)</td>
</tr>
<tr>
<td>Underlying disease, n (%)</td>
<td>1 (4)</td>
<td>2 (8.3)</td>
</tr>
<tr>
<td>Diabetes</td>
<td>7 (29.2)</td>
<td>4 (16.7)</td>
</tr>
</tbody>
</table>

Central macular thickness
- The mean CMT in spironolactone group is shown in figure 1.
- The mean CMT in both groups significantly decreased with baseline in all follow-up periods. However, there was no significant difference in CMT between two groups at any period.

Subretinal fluid height
- The mean SRFH in spironolactone group is compared with initial presentation.
- The SPRL group decreased until 1 month and showed a tendency to recover. Consequently, there was significant difference compared with baseline only at 1 month.
- Unlike the SPRL group, the mean SFT in PDT group significantly decreased with baseline at 1, 2, 3, and 12 months. In the comparison between the two groups, there were significant differences in SFTC between two groups at 2, 3, 6, and 12 months.

Conclusion

Our results suggest that oral SPRL had a positive effect in the reduction of SRF and recovery of visual acuity, and had a long-term efficacy in the nonresolving CSC. However, oral spironolactone showed more recurrences comparing PDT.

Subfoveal choroidal thickness
- The SPRL group decreased until 1 month and showed a tendency to recover. Consequently, there was significant difference compared with baseline only at 1 month.
- Unlike the SPRL group, the mean SFT in PDT group significantly decreased with baseline at 1, 2, 3, and 12 months. In the comparison between the two groups, there were significant differences in SFTC between two groups at 2, 3, 6, and 12 months.

Subfoveal choroidal thickness
- The SPRL group decreased until 1 month and showed a tendency to recover. Consequently, there was significant difference compared with baseline only at 1 month.
- Unlike the SPRL group, the mean SFT in PDT group significantly decreased with baseline at 1, 2, 3, and 12 months. In the comparison between the two groups, there were significant differences in SFTC between two groups at 2, 3, 6, and 12 months.

Figure 1. Analysis of mean best-corrected visual acuity (BCVA, LogMAR), central macular thickness (CMT), and subretinal fluid height (SRFH) in the oral spironolactone group compared with initial presentation.

References
7. Cardillo M et al. Intravitreal injections of subretinal fluid height in the oral spironolactone group  compared with initial presentation.