THE IMPORTANCE OF EVALUATING THE DEVELOPMENT OF OCT FINDINGS DURING CONSERVATIVE TREATMENT OF VITREOMACULAR TRACTION COMPLICATED BY MACULAR HOLE FORMATION

SUMMARY

Macular hole (MH) was considered untreatable condition for a long time until Kelly and Wendel described the possibility of surgical treatment with pars plana vitrectomy (PPV) in the nineties of the twentieth century. Since then have both surgical instruments and operation techniques developed rapidly and PPV has become the mainstay of MH therapy. Only stage I according to Gass classification which equates vitreomacular traction (VMT) according to Vitreomacular Traction Study group classification is routinely treated conservatively with observation only. It is however necessary to assess each case individually as some small and favourable MHs may close spontaneously.

Here we present a case report of 59 years old woman with mild myopia and best corrected visual acuity (BCVA) 6/6 bilaterally. She presented on July 2017 with blurry vision in her right eye and was diagnosed with bilateral VMT according to optical coherence tomography. BCVA was 6/9 in her right eye and 6/6 in her left eye. During five weeks a full thickness MH developed in left eye that was accompanied by a decrease in BCVA to 6/12p. Considering favourable size and configuration of MH and the fact that the patient preferred conservative approach, we postponed the surgery, observed the MH and recommended bed rest. The MH closed spontaneously during five weeks with resulting BCVA 6/6. In her right eye the VMT released during four months with resulting BCVA 6/6 as well.

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Key words: retina, macular hole, vitreomacular traction, OCT, spontaneous closure

INTRODUCTION

Idiopathic Macular Hole (MH) is a pathology in which the progression of a retinal defect occurs in the region of the fovea, afflicting the entire thickness of the neuroretina, which does not originate as the consequence of a trauma or other pathological process. According to a study by McCannel et al. from 2009, in the Caucasian race the incidence of MH is within the range of 7.8 people and 8.7 eyes per 100 000 of the population per year [13]. Of the identified cases, 72% of MH were described in women, and 50% of the patients were within the age range of 65-74 years [13].

MH was first described by Knapp in 1869, the first case was recorded in a patient following a blunt trauma to the eye, and in the following decades the prevailing opinion was that the predominant majority of macular holes originated in this manner [12]. During the course of the 20th century it was discovered that the majority of MHs do not occur as a consequence of trauma or secondarily on the basis of another pathological process [2]. For these MHs the term idiopathic or later primary MH was coined. A significant advance in the study and description of MH was made by Gass, who in 1988 presented a classification dividing macular holes into 4 stages according to the finding on the ocular fundus, and at the same time defined the tractional forces of the contracting vitreous body acting directly in the fovea, as the key pathophysiological moment of their origin [6, 8]. His classification was later supplemented with regard to the finding of optical coherence tomography (OCT) in the individual stages (table 1).

Following on from these discoveries, in 1991 Kelly and Wendel published a cohort of patients in whom they resolved a hitherto untreatable diagnosis surgically, with the aid of pars plana vitrectomy (PPV), with what was then a relatively high rate of success of reattachment of macular hole (58%), although from today’s perspective this was accompanied by a relatively high incidence of perioperative and postoperative complications (15%) [10]. Nevertheless, this represented a revolutionary approach. In the following years, together with a rapid advance in instrument equip-
we diagnosed a rounded deposit in the region of the fovea in the right eye, and only an absence of a foveolar reflex in the left eye. Subsequently OCT was performed (instrument RTVue-100, manufacturer Optovue, California, USA) with a finding of perifoveolar ablation of the posterior surface of the vitreous body, with vitreomacular traction syndrome bilaterally, more in the right eye (fig. 1). We recommended bed rest for the patient. A follow-up OCT three weeks later demonstrated a similar finding, a further outpatient follow-up examination was recommended in six weeks. However, after five weeks (9/2017) the patient reported for an unplanned follow-up examination due to a deterioration of vision in the left eye persisting for several days. Vision in the right eye was unchanged, but in the left eye BCVA had decreased to 6/12. MH was perceptible in the fovea of the left eye upon a biomicroscopic examination of the fundus, with thickening of the vitreous body over it. Examination by OCT confirmed diagnosis of central MD affecting all the layers of the neuroepithelium with a width of 80 µm (fig. 2). On the posterior surface of the displaced posterior vitreous membrane, displaced operculum was perceptible over the MH.

With regard to the fact that the patient was not inclined to undergo an early surgical solution, and also with regard to the prognostically favourable OCT finding – very small MH without VMT, without elevation of edges, without adverse changes of the retinal pigment epithelium (RPE) and preserved structure of the membrana limitans externa (MLE), Müller cells and the line of ellipsoids of the internal segments of the photoreceptors (line of ISe) on the edges of the defect [15, 17] – a regime of strict bed rest lying on the back was recommended, with regular follow-up examinations, and an appointment was also booked for PPV if applicable.

### Table 1. Gass classification of idiopathic macular hole (modified according to OCT findings)

<table>
<thead>
<tr>
<th>Stage</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>vitreomacular traction (VMT) present, no full-thickness defect of neuroretina (only cystic changes)</td>
</tr>
<tr>
<td>II</td>
<td>full-thickness defect of neuroretina, width &lt; 400 µm</td>
</tr>
<tr>
<td>III</td>
<td>full-thickness defect of neuroretina, width &gt; 400 µm, already without vitreomacular traction (VMT)</td>
</tr>
<tr>
<td>IV</td>
<td>complete posterior vitreous detachment, even from the optic nerve papilla</td>
</tr>
</tbody>
</table>

### Table 2. IVTS classification of macular hole

<table>
<thead>
<tr>
<th>Size</th>
<th>VMT present x VMT absent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small hole (&lt; 250 µm)</td>
<td>primary x secondary</td>
</tr>
<tr>
<td>Medium hole (250-400 µm)</td>
<td>primary x secondary</td>
</tr>
<tr>
<td>Large hole (&gt; 400 µm)</td>
<td>primary x secondary</td>
</tr>
</tbody>
</table>

Fig. 1. Entry OCT image (7/2017, upper – right eye, lower – left eye)
At the same time, in the right eye also the posterior surface of the vitreous body was progressively disattached, with a relaxation of VMT and the return of BCVA to 6/6. At the last outpatient examination six weeks after diagnosis of MH (3/2018), BCVA was 6/6 bilaterally. On OCT complete ablation of the posterior surface of the vitreous body was present in the right eye in the region of the macula, and normal foveolar depression was restored with normal stratification of all layers of the retina. Also in the left eye the finding was stable. On OCT a closed MH was perceptible with an entirely intact line of ISe, on the inner

At the next follow-up examination one week after diagnosis of MH, reattachment of the edges of the MH to one another had occurred, with only a slit defect and minor subfoveal ablation of the neuroepithelium (fig. 3). Nepafenac was applied to the left eye in the usual dose (3 mg/ml once per day).

Five weeks after the diagnosis of MH (10/2017), complete reattachment of the edges of the MH to one another was evident, with only minor unevenness on the inner surface of the neuroepithelium (fig. 4). At this point BCVA in the left eye reached 6/6.

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indicate that if disruption of VMT occurs in the case of MH of smaller dimensions, the prognosis is significantly better.

It ensues from the literature that the probability of successful conservative treatment of idiopathic MH is generally very low, but small dimensions of MH and removal of VMT appear to be positive prognostic factors. Similarly important is a preserved structure of Müller cells and other structures of the neuroretina on the edges of the defect [15, 17].

In our case we selected a conservative approach, because the patient, who by coincidence is a doctor, did not wish to undergo a surgical procedure, and because this concerned a relatively prognostically favourable MH of very small dimensions.

This procedure was successful, especially as a consequence of the very small dimensions of the MH, progressive relaxation of VMT, and also as a result of the preserved structure of the Müller cells, MLE and line of ISe on the edges of the defect. The patient was very willing to accept a strict regime of bed rest on her back, in which the pressure of the vitreous body evidently also played a certain role in the healing of this minor MH. The advantage of this procedure is that MH does not require an acute solution, and the prognosis is not worsened if PPV is performed within six months [1].

CONCLUSION

The case report presented here demonstrates that MH of very small dimensions without VMT, with a favourable OCT image, may close spontaneously without a surgical solution, with resulting BCVA of 6/6. Upon selection of a therapeutic procedure in the case of small MH, we recommend individual assessment of the cases according to the OCT finding. In the case of a very favourable finding, it is possible to defer the surgical solution (by a maximum of six months) [1] and attempt conservative treatment.

LITERATURE