Results of vitrectomy for vitreomacular traction syndrome

Rezultati vitrektomije pri bolnikih z vitreomakularnim trakcijskim sindromom

Xhevat Lumi,[1] Helena Skačej Friedrich,[2] Irena Irman Grčar[1]

[1] *University Medical Centre, Eye Clinic, Grabovičeva 46, 1000 Ljubljana, Slovenia*

[2] *University Clinical Centre Maribor, Department of Ophthalmology, Ljubljanska 5, 2000 Maribor, Slovenia*

Korespondenca/ Correspondence:
Xhevat Lumi, MD, University Medical Centre, Eye Clinic, Grabovičeva 46, 1000 Ljubljana, Slovenia
Tel.: +386 1 5221900
Fax.: +386 1 5221960
E-mail: xhlumi@hotmail.com

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Izvleček

Izhodišča: Prikazati anatomske in funkcijske spremembe po vitrektomiji pri bolnikih z vitreomakularnim trakcijskim sindromom.

Metode: Predstavljena je retrospektivna študija 23 oči 23 bolnikov z vitreomakularnim trakcijskim sindromom, starih od 58 do 86 let. Diagnoza vitreomakularni trakcijski sindrom je bila postavljena, kadar je bila prisotna očitna trakcija steklovine, ki je povzročala povečano debelino mrežnice v področju rumene pege, in ki je bila jasno vidna na izvidu optične koherenčne tomografije. Pri vseh bolnikih je bila opravljena vitrektomija za sprostitev trakcije v rumeni pegi. Spremembe v področju rumene pege so bile opredeljene z optično koherenčno tomografijo pred vitrektomijo in po njej. Podatki so bili statistično obdelani s parnim Studentovim t-testom.

Rezultati: Pri 20 (87 %) od 23 preiskovancev se je po operacijskem posegu statistično pomembno izboljšala vidna ostrina od 0,28 pred operacijo na 0,56 po operaciji s povprečnim dvigom za tri vrstice na Snellenovih tabelah ($p < 0{,}001$). Pri 3 bolnikih po operaciji ni prišlo do izboljšanja vidne ostrine. Pri vseh preiskovancih je bila po operaciji prisotna zmanjšana debelina mrežnice v področju rumene pege. Povprečna debelina mrežnice v centralnem delu rumene pege je bila 614,00 µm pred operacijo in 332,87 µm po operaciji ($p < 0{,}001$). V preiskovani skupini bolnikov med samim operacijskim posegom in v pooperacijskem obdobju ni bilo zapletov.

Zaključki: Vitrektomija, ki sprosti trakcijo v področju rumene pege, omogoča izboljšanje vidne ostrine pri večini bolnikov z vitreomakularnim trakcijskim sindromom. Optična koherenčna tomografija je pomembno diagnostično orodje za ocenjevanje stanja pred operacijo in po njej.

Abstract

Background: To review the anatomical and functional results of vitrectomy for the vitreomacular traction syndrome.

Methods: A retrospective analysis of 23 eyes of 23 patients (aged from 58 to 86 years) with vitreomacular traction syndrome is presented. The diagnosis of the vitreomacular traction syndrome was made when apparent traction of the vitreous face causing increased thickness of the macula had been detected by optical coherence tomography. All the patients underwent vitrectomy to relieve the macular traction. History, eye examination before and after vitrectomy and the follow up period were reviewed. Changes in the macular area were evaluated by optical coherence tomography before and after surgery. Statistical analysis using the Student's paired *t*-test was performed.

Results: In 20 (87 %) out of 23 patients the mean best-corrected visual acuity significantly improved from 0.28 preoperatively to 0.56 postoperatively with a mean increase by 3 lines on the Snellen chart ($p < 0.001$). In the remaining 3 (13 %) patients visual acuity did not improve postoperatively. All patients showed a reduction in the macular thickness postoperatively. The mean thickness in the central macular area was 614.00 µm preoperatively and 332.87 µm postoperatively ($p < 0.001$). Neither intraoperative nor postoperative complications were observed in this series of patients during the follow-up period.

Conclusions: Vitrectomy surgery performed to release the macular traction improves the visual acuity in most patients with vitreomacular traction syndrome. Optical coherence tomography is a valuable tool for the assessment of the preoperative status and postoperative anatomical changes.

Introduction

Vitreomacular traction syndrome (VMT) is a clinical entity in which partial posterior vitreous detachment is combined with persistent macular adherence, leading to macular traction and detachment (Figure 1).

Macular traction, frequently accompanied by cystoid changes in the neurosensory retina of the macula, causes decreased visual acuity (VA), metamorphopsia, photopsia, and micropsia.[1-3] Vitrectomy to surgically detach the vitreous from the macular area is usually necessary in order to release the macular traction.[2-7] According to Koerner and associates, vitrectomy should not be postponed in patients who complain of disturbing visual symptoms such as reduced VA, metamorphopsia and difficulties in the binocular reading.[8]

Diagnosing the VMT by bomicroscopy may be challenging, particularly when the area of the vitreoretinal attachment is broad.[9] Optical coherence tomography (OCT) has proved to be an excellent tool to evaluate the morphological features of macular changes, incomplete posterior vitreous detachment, and postoperative resolution of macular changes in VMT with high degree of reproducibility.[10]

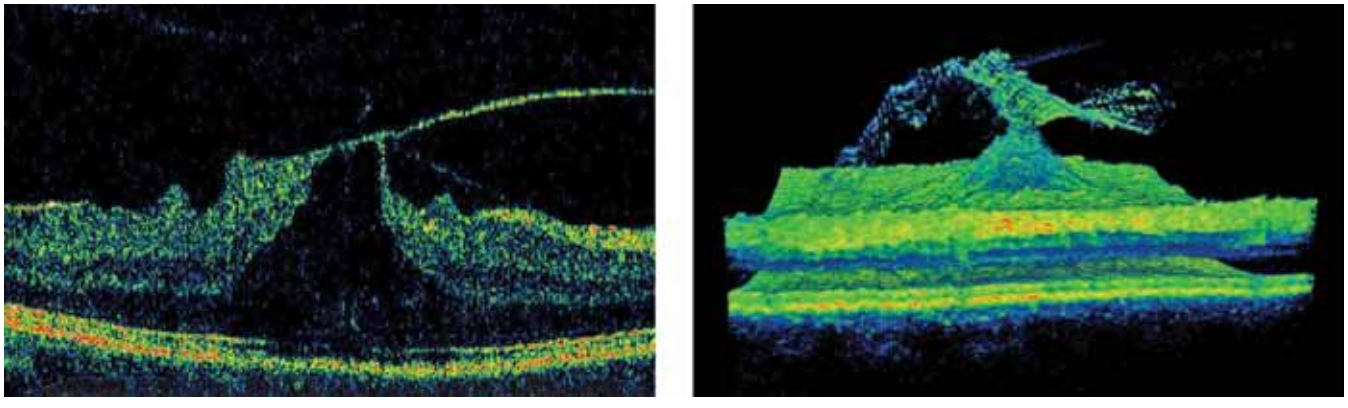

Figure 1: Typical optical coherence tomography image of a vitreomacular traction syndrome with a 3D reconstruction (right). As the vitreous remains attached to the macula, anterior traction to the fovea is exerted leading to the cystoid macular oedema. This increased macular thickness can be measured by optical coherence tomography (an optical coherence tomography image of one of our patients is shown).

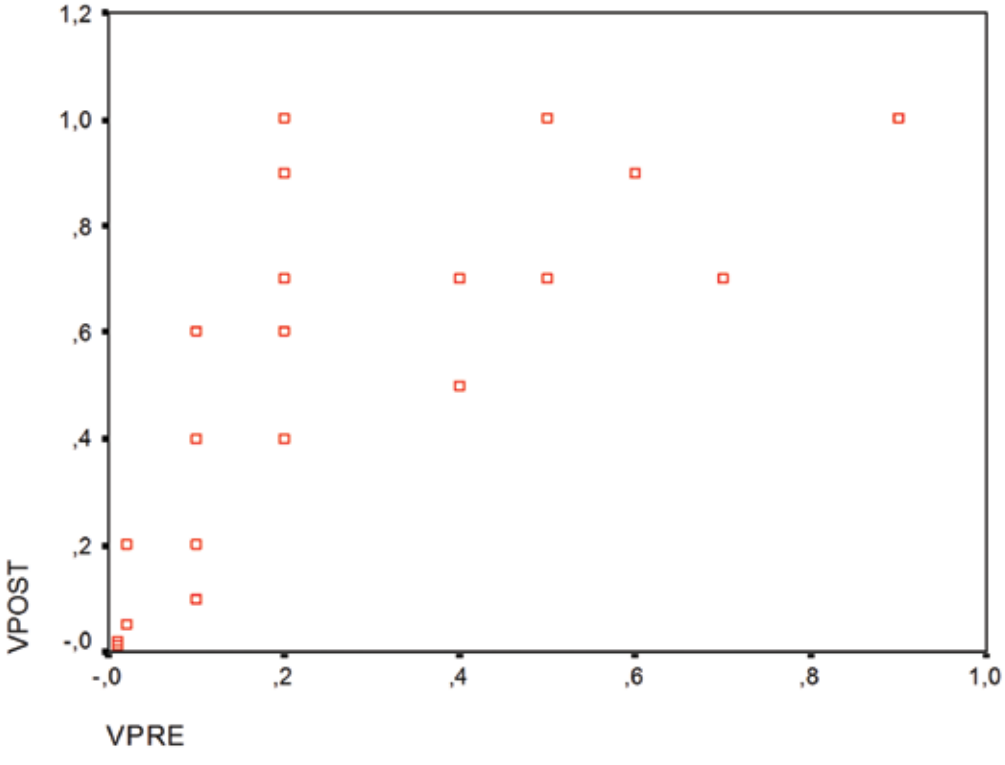

Figure 2: Visual acuity before and after vitrectomy. The improvement of visual acuity was observed in 20 out of 23 patients postoperatively. *VPRE = visual acuity before vitrectomy; VPOST = visual acuity after vitrectomy*

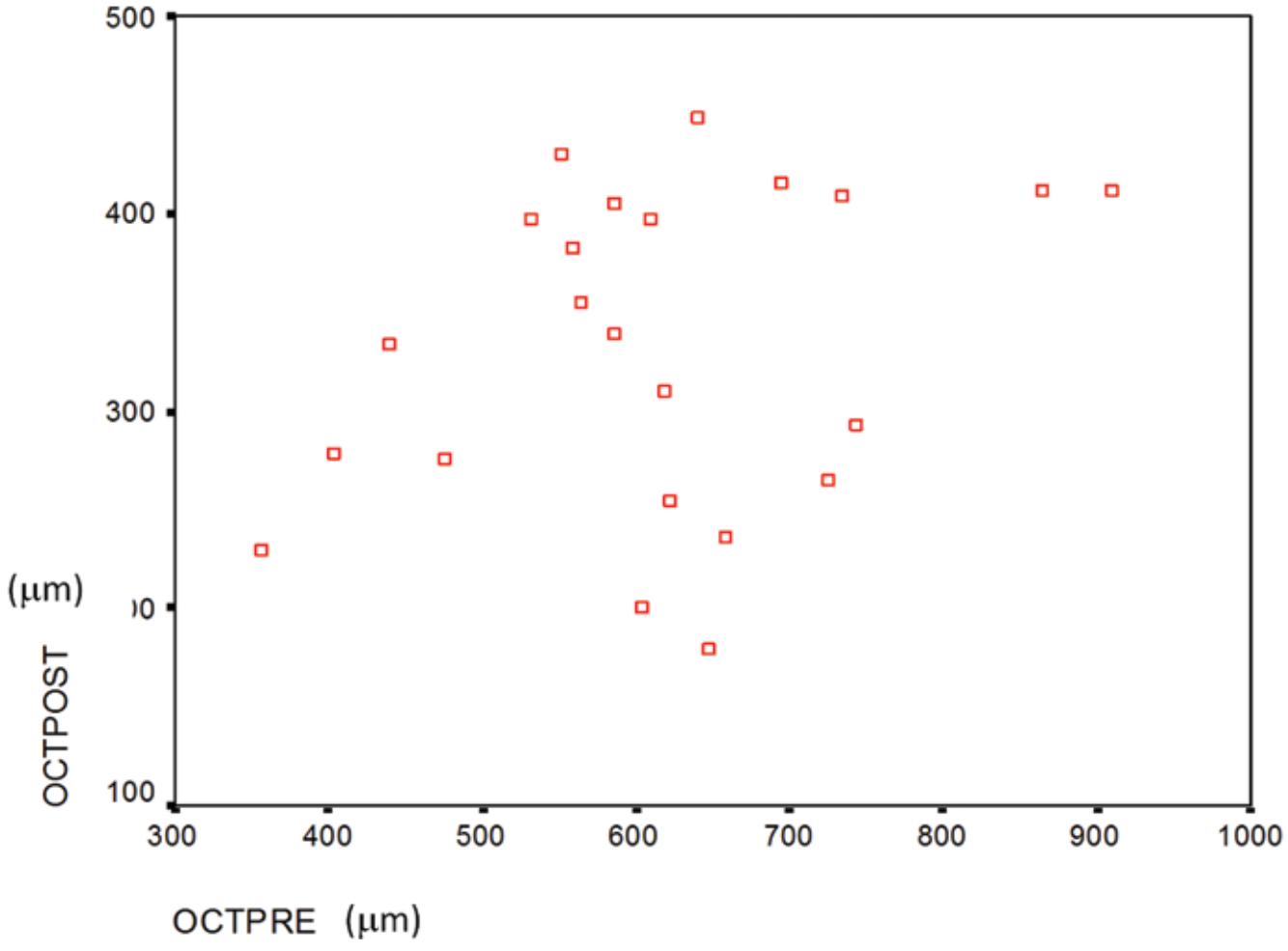

Figure 3: Mean central macular thickness before and after vitrectomy. Decrease of the central macular thickness was observed in all the patients postoperatively. *OCTPRE = mean central macular thickness before vitrectomy; OCTPOST = mean central macular thickness after vitrectomy*

The aim of this study was to review the anatomical and functional results of vitrectomy in our patients with VMT. All the examinees were evaluated by OCT before and after surgery.

Methods

Medical records of the patients diagnosed with VMT who underwent the pars plana vitrectomy between September 2007 and November 2011 were reviewed. The diagnosis of VMT was made when apparent traction from the vitreous causing increased thickness of the macula had been observed and had been clearly seen by OCT. Epiretinal membranes were not present in any of the examinees. 23 eyes of 23 patients were included in the study. The examinees' age ranged from 58 to 86 years. Nine (9) eyes were pseudophakic. Others had clear lenses, which did not affect the visual acuity. All the patients were examined and operated on at the Eye Hospital, University Medical Centre Ljubljana, Slovenia. Each of them underwent a complete preoperative and postoperative examination including the best-corrected VA measured with the Snellen chart, intraocular pressure measurement and the anterior as well as the posterior biomicroscopy.

OCT fundus image assessment (3D OCT 1000, Topcon, Tokyo, Japan) was performed before and after the vitrectomy. Thus, the morphological changes were determined and the central macular thickness was measured. The most central area of 1mm in the diameter with the fovea in the centre was used for the calculations. For the statistical analysis, the Student's paired *t*-test was used.

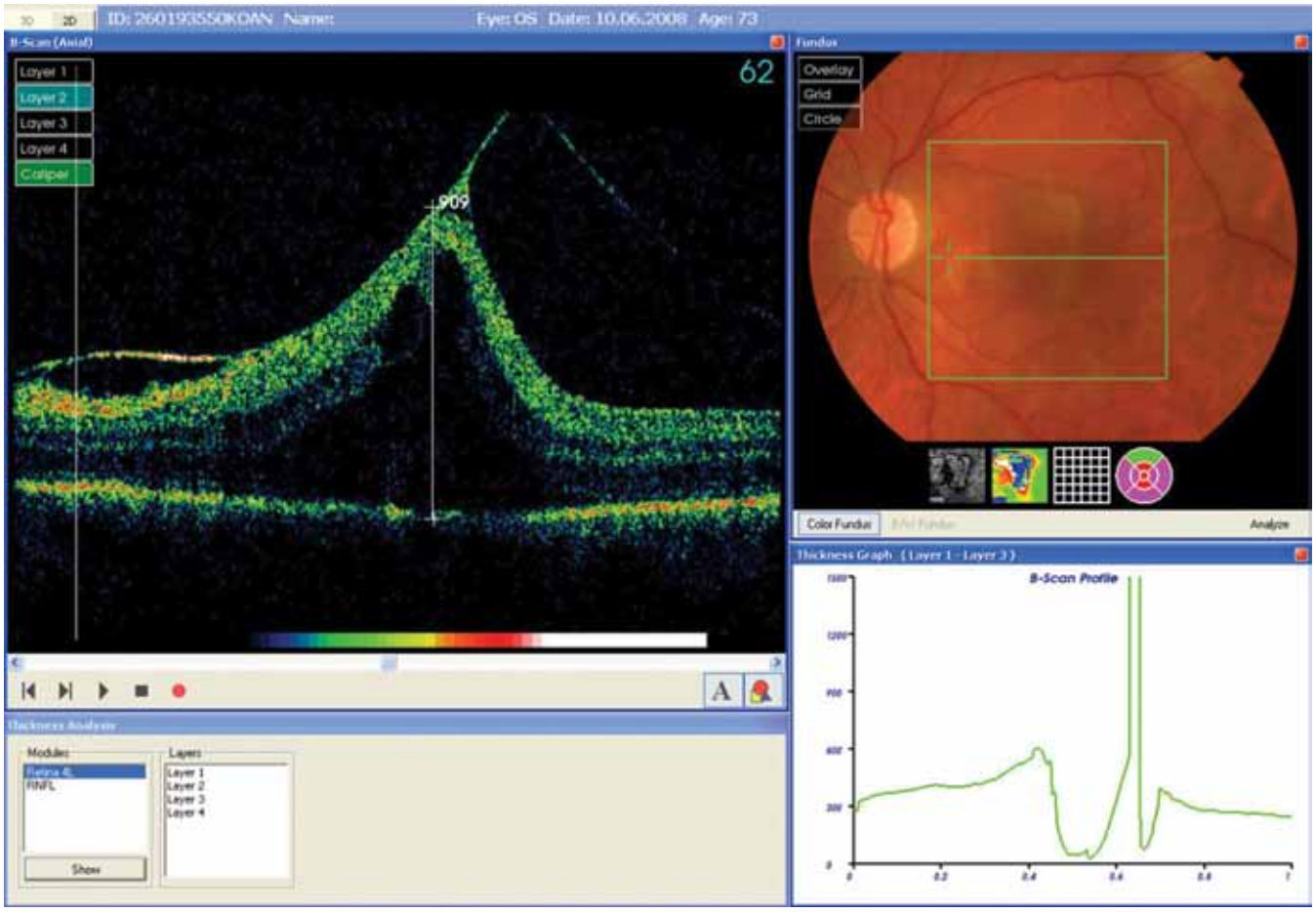

Figure 4: OCT image of the macular area of patient number 12, whose visual acuity did not improve postoperatively. The image shows the photoreceptor layer atrophy.

Patients underwent pars plana vitrectomy with the hyaloid membrane removal by a single surgeon using the transconjunctival sutureless vitrectomy system (XL). The core vitrectomy was followed by the circumferential cutting of the posterior hyaloid using a high speed cutter. After the retinal traction had been released, the remnant of the posterior hyaloid membrane was peeled off with a microforceps. Simultaneous cataract surgery was not performed in any of the patients from this group.

Results

Out of the 23 patients under investigation, 13 were male and 10 female. The average age of the examinees was 72.3 years. All the patients had reduced VA and metamorphopsia preoperatively. Duration of symptoms ranged from 3 to 72 months. Mean postoperative follow up was 15.4 months (range 6–30 months). Characteristics of patients are summarised in Table 1.

All the patients were operated on using either 23 or 25 gauge vitrectomy. There were no intraoperative complications.

The improvement of the best-corrected VA was observed in 20 (87 %) out of 23 patients. The VA improved from 0.28 to 0.56 with a mean increase by 3 lines on the Snellen chart (Figure 2). This difference was statistically significant (paired samples T--test, $p < 0.001$). However, in the remaining 3 (13 %) examinees the visual acuity did not change postoperatively.

All the patients showed a reduction in macular thickness after vitrectomy.

The mean preoperative central macular thickness was 614.00 µm and significantly decreased to 332.87 µm postoperatively (paired samples T-test, $p < 0.001$) (Figure 3).

None of the patients had any signs of persistent vitreomacular traction after sur-

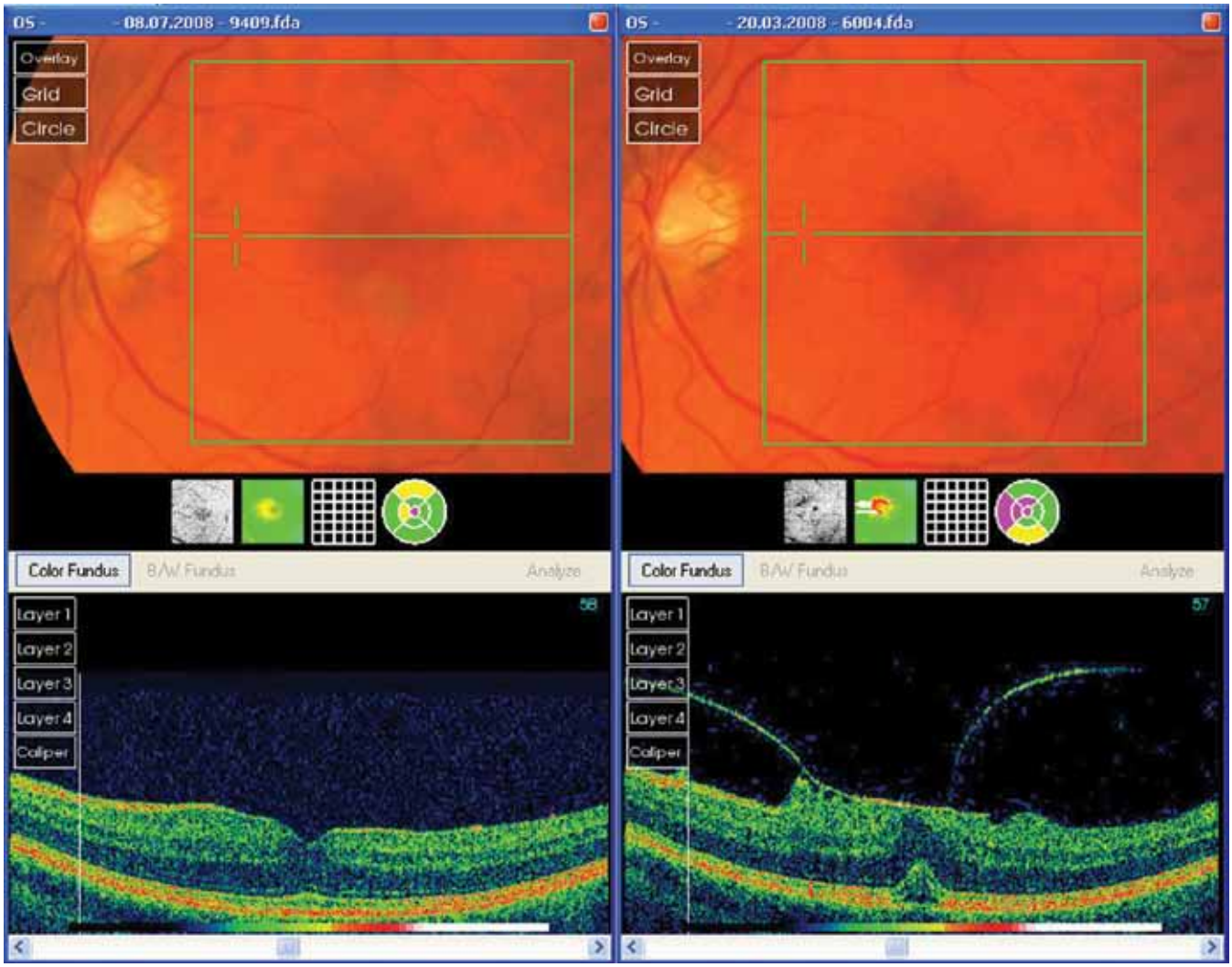

Figure 5: OCT image of the macular area of patient number 22 before (right) and three months after vitrectomy (left). Normal macular structure with the foveal umbo can be observed (left).

gery. Moreover, no postoperative complications during the period under observation were noted.

Discussion

Vitrectomy surgery to release the macular traction has been proven to be an effective and successful treatment for the patients wih VMT.[1-4,8,9,11] According to these studies, visual improvement can be expected in 44 %,[3] 63 %,[2] 73 %,[8] 75 %,[4] 87.5 %[9] or even in 100 %[11] of cases. Spontaneous detachment of the vitreous from the macula in VMT with the resolution of macular oedema and improvement in the VA is usually limited only to a few case reports.[12-14] Hikichi and associates reported that during a follow up period of 60 months only 6 (11 %) of 53 patients with VMT developed a complete spontaneous posterior vitreous detachment.[1]

In the present series, visual and anatomical recovery after the surgical release of vitreomacular traction was very good. Twenty out of 23 operated patients showed visual improvement, while in the remaining 3 patents VA did not change postoperatively. Two of these cases showed atrophic retinal changes on the OCT images at the first presentation. Even though the history was not always clear enough, in our opinion there was a chronic macular traction, which resulted in the degeneration of the photoreceptors (Figure 4).[15] The third patient presented with a good visual acuity (0.7 in Snellen charts) at the beginning and this visual acuity remained

Table 1: Patients' characteristics.

Patient No.	Age (years)	Sex	Duration of symptoms (months)	Follow up (months)	Type of surgery (G)	Preop VA	Postop VA	Preop mean central macular thickness (µm)	Postop mean central macular thickness (µm)
1.	80	F	6	16	23	0.20	0.60	564	355
2.	69	M	72	10	23	0.20	0.40	609	397
3.	72	F	3	20	25	0.50	1.00	532	397
4.	81	M	9	30	23	0.40	0.70	647	179
5.	59	M	48	29	25	0.20	0.70	743	293
6.	62	F	6	25	25	0.20	0.90	622	254
7.	73	M	72	20	23	0.02	0.05	909	412
8.	58	M	3	19	23	0.50	1.00	403	278
9.	76	M	5	16	25	0.20	0.70	585	339
10.	82	M	24	13	25	0.50	0.70	552	430
11.	81	M	12	13	25	0.15	0.20	734	409
12.	74	F	6	6	23	0.01	0.01	603	200
13.	78	M	8	16	23	0.15	0.40	475	275
14.	75	M	6	13	25	0.20	1.00	865	412
15.	60	F	12	15	23	0.01	0.02	659	236
16.	72	F	6	11	23	0.90	1.00	356	230
17.	64	M	60	18	23	0.40	0.50	559	382
18.	84	F	24	6	23	0.15	0.60	725	265
19.	62	F	26	23	23	0.15	0.15	695	415
20.	86	M	12	10	23	0.20	0.60	586	405
21.	72	M	12	8	23	0.70	0.70	440	334
22.	70	F	13	8	23	0.02	0.20	640	449
23.	72	F	12	9	23	0.60	0.90	619	310

No = number; F = female; M = male; G = gauge; VA = visual acuity; Preop = preoperative; Postop = postoperative

throughout the follow-up period. Similar surgical outcomes had been reported previously.[11,16,17] The type of VMT was not defined in these case series.[18]

Conclusion

In conclusion, decrease in the central macular thickness without any remaining VMT at the follow up was observed in all eyes under investigation (Figure 5). OCT is a very important diagnostic tool for the VMT as a more precise understanding of the vitreoretinal attachment can be obtained and analysed. This enables the surgeon to make a more certain diagnosis and to select a safer access point into the subhyaloid space.[6,7,10] According to the studies mentioned above, vitrectomy should not be postponed in patients suffering from vitreomacular traction syndrome.

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