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Surgical approach in Terson syndrome: vitreous and retinal findings

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PURPOSE. *To report some interesting findings in patients with bilateral Terson syndrome.*
METHODS. *We describe six eyes from three patients with Terson syndrome. Pars plana vitrectomy was performed in one eye twelve weeks, and in four eyes six months after the acute event. In one eye blood was suddenly spontaneously absorbed after four months.*
RESULTS. *The four eyes operated six months after injury showed severe complications and final visual acuity was between light perception and 0.6. The eye with surgical attendance twelve weeks after the acute injury had an uneventful course, and final visual acuity was 0.7.*
CONCLUSIONS. *Because of severe ocular complications and with a view to early rehabilitation, vitrectomy has been recommended for eyes with bilateral Terson syndrome, without spontaneous blood resorption. Surgery should be performed in at least one eye not later than four to eight weeks after the acute injury. (Eur J Ophthalmol 2000; 10: 293-6)*

KEY WORDS. *Pars plana vitrectomy, Spontaneous blood resorption, Terson syndrome*

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INTRODUCTION

The Terson syndrome involves spontaneous or traumatic rupture of cerebral vessels, with a sudden increase in intracranial pressure. This disturbs the circulation in retinal vessels and may lead to retinal, subhyaloid and intravitreal hemorrhages in one or both eyes. Terson first reported massive vitreous hemorrhages associated with subarachnoid bleeding (1). The causal connection between vitreous hemorrhage and any form of intracranial or subarachnoid hemorrhage has come to be known as Terson syndrome.

This study presents three patients with bilateral Terson syndrome whose vitreous hemorrhages did not clear spontaneously, and describes some experience with pars plana vitrectomy.

METHODS

Six eyes from three patients with Terson syndrome were investigated. The age of the patients (one female and two male) ranged between 32 and 65 years.

In one eye pars plana vitrectomy was performed twelve weeks after the acute event. In four eyes surgery was done six months after the initial injury.

A high standard of surgical techniques is essential. In view of tractional retinal detachments and oral dialysis (Tab. I), and because of the risk of tractional detachments in proliferative vitreoretinopathy after pars plana vitrectomy, in general, encircling bands were placed. However, because of the patients' poor general state of health, it was impossible to use an endotamponade with gas, with the patient face-down, so silicone oil tamponades were used.

The membrane peeling included the removal of a dome-shaped membrane and of some proliferations, both peripherally and near the optic disc. Although histological investigations were uninformative, the surgically removed membrane was very probably only the inner limiting membrane. Removing the membrane near the macular cyst, a whitening of the retina and small retinal hemorrhages were visible. Some strength was necessary to remove it.

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TABLE I - CLINICAL OBSERVATIONS IN THE PATIENTS UNDERGOING VITRECTOMY

Types of retinal breaks and other complications	Number of eyes
Vitreous hemorrhages	5
Ring-shaped proliferations	4
with small traction	3
with tractional detachment	1
Tears in the central detached internal limiting membrane	4
Hemorrhagic macular cysts	4
Oral dialysis	1
Tractional detachment with tears (proliferative vitreoretinopathy)	1
Maculopathy (pigmentary dispersion in the macula)	4
Optic disc atrophy	2
Partial optic disc atrophy	3

Laser treatment was done to deal with tractional tears. In some cases the swellings near an encircling band were coagulated.

RESULTS

Case 1

A 32-year-old man had suffered a subarachnoid hemorrhage and had bilateral Terson syndrome due to a ruptured aneurysm of the ramus communicans anterior. After clipping the aneurysm and some shunt operations, with external ventricle drainages, the patient was referred to the eye clinic six months after the acute injury. Vision in both eyes was limited to light perception with intact light projection. Echographically, both eyes had dense intravitreal hemorrhages which completely obscured the fundus. The retinas were partially detached.

Surgery was performed on the left eye first. During pars plana vitrectomy and membrane peeling, the optic disc appeared atrophic. Massive pigmentary dispersions were found in the macula and tractional retinal detachments in the nasal quadrants and on the outside of the temporal vascular arcade. The detached internal limiting membrane had a hemorrhagic macular cyst and some tears. The ring-shaped proliferations were only partly removable. The peripheral retina was attached.

Ten days later, during pars plana vitrectomy combined with membrane peeling and laser treatment in the right eye, we again observed optic disc atrophy, pigmentary dispersions, ring-shaped proliferations with small tractions within and outside the temporal vascular arcade, and tears in the detached internal limiting membrane with a hemorrhagic macular cyst. Only some particles of the ring-shaped proliferations were removable.

Ten days later again, in the left eye we observed a retinal detachment combined with an oral dialysis between 12 and 2 o'clock.

Therefore, vitrectomy and cryotherapy were repeated. During the surgery, an encircling band was placed, and silicone oil was used as an intraocular tamponade.

The final visual acuity in the right eye was 0.4, and the left had light perception with defective light projection. Both eyes had atrophic optic discs, massive pigmentary dispersions, and attached retinas.

Case 2

The cause of bilateral Terson syndrome in this 36-year-old man was an acute subarachnoid hemorrhage with ventricle lesion due to a ruptured aneurysm of the arteria cerebri posterior. Six months after the acute injury the patient was admitted to the eye clinic. Vision was limited to hand movements in the left and 1/40 in the right eye. Because of the vitreous hemorrhages, the fundus view in the left eye was obscured, whereas in the right eye the retina was partially visible.

First, surgery was done on the left eye (pars plana vitrectomy including placement of an encircling band, membrane peeling, endolaser treatment and silicone oil tamponade). After removal of the intravitreal bleedings, a massive hemorrhage was visible in the posterior pole between the detached internal limiting membrane and the retina. The defective limiting membrane had to be removed up to the temporal vascular arcade, in which traction was observed. An oral dialysis at the 10, 12 and 4 o'clock position with par-

tial atrophy of the optic disc and maculopathy was visible.

Postoperatively, a secondary glaucoma was diagnosed in the left eye due to some silicone oil in the anterior chamber.

Therefore, three days later the left eye had to be reoperated. After removal of the silicone oil, cataract extraction, Ando-iridectomy and silicone oil tamponade were performed.

One week later, surgery was done on the right eye. The patient underwent pars plana vitrectomy with placement of an encircling band, membrane peeling, endolaser treatment and silicone oil tamponade.

The internal limiting membrane with a hemorrhagic macular cyst was defective and detached, and was removed. Along the temporal vascular arcade there was a ring-shaped traction, and at the mid-periphery in the 12 o'clock position there was a retinal detachment with a tractional hole. Partial atrophy of the optic disc and maculopathy were diagnosed.

Postoperatively, an additional argon laser treatment was done in both eyes. By the end of the overall therapy, the patient's visual acuity in both eyes was 0.3, and the retinas were attached.

Six months after the first surgery, the silicone oil was removed from the right eye and a cataract operation with lens implantation in the posterior chamber was performed. Nine months after the first operation, the visual acuity in both eyes was 0.16.

Case 3

Following ruptured aneurysm of the arteria cerebri anterior, this 65-year-old woman suffered from a subarachnoid hemorrhage and a bilateral Terson syndrome, and the aneurysm was clipped. Because of an initial hydrocephalus, external ventricle drainage was placed. Twelve weeks after the acute injury, the patient was referred to the eye clinic. Vision was hand movement in the right and 1/40 in the left eye. The lens was opacified. Central dense intravitreal hemorrhages were visible and the fundus view in both eyes showed red light. Echographically, the retinas appeared attached.

Pars plana vitrectomy was performed on the left eye first, including placement of an encircling band. Intraoperatively, the vessels seemed narrowed and enveloped in membranes. The optic disc had turned pale. By the end of the clinical course visual acuity in the left eye was 0.7, and hand motion in the right. The retina of the left eye was attached.

Four months after the subarachnoid hemorrhage, sudden visual improvement was observed in the right eye, reaching 1.0 in the right and 0.6 in the left eye. The blood had suddenly been resorbed spontaneously. In both eyes the retina remained attached but the macula showed pigmentary dispersions. Some intravitreal blood residues were visible.

DISCUSSION

Schultz et al (2) showed that the most common cause of Terson syndrome (79%) was an acute subarachnoid hemorrhage attributed to rupture of an intracranial aneurysm in 87% of the patients.

Turss (3) pointed out that 4% of the cerebral subarachnoidal bleedings were followed by vitreous hemorrhages, and Roux et al (4) reported that 10.5% of patients with subarachnoid hemorrhages had intraocular bleeding.

We observed different clinical courses of the Terson syndrome in six eyes of three patients. In five eyes there was no blood resorption and, in general, the prognosis was poor. On account of the patient's poor general state of health, early surgery was impossible in most cases. On one eye vitrectomy was done twelve weeks after the acute injury and in this case the postoperative course was good, visual acuity reaching 0.6 three months after the intervention. On the other hand, four eyes with vitreoretinal surgery six months after the acute event, showed severe complications (ring-shaped proliferations and hemorrhagic macular cysts as well as tractional retinal detachments and optic disc atrophy; Tab. I). Our findings are supported by similar observations from other authors (5-8).

Yokoi et al (9) showed that the epiretinal membrane formation in Terson syndrome can be classified in two groups: with complete or incomplete posterior vitreous detachment. Werry and Brewitt (10) found that the mixture of vitreous body and blood caused an organized membrane system after some weeks, inducing tractional detachments of the retina. This membrane system is also believed to be responsible for delayed blood resorption. Nevertheless, in most eyes waiting some time for spontaneous blood resorption

is the best course in Terson syndrome. For instance, Meier and Wiedemann (11) reported visual acuity without vitrectomy increasing to 1.0. A similar result was also seen in this study (case 3). However, because of the risk of severe complications in Terson syndrome, several reports have proposed intensive medical care including vitrectomy. For instance, Velikay et al (12) suggested that early, extensive surgical treatment should be considered in patients with severe intravitreal bleeding, epiretinal membrane formation and retinal detachment with proliferative vitreoretinopathy.

In our opinion, in patients with vitreous hemorrhage one should first watch for spontaneous blood resorption. If this does not occur, in cases with bilateral vitreous hemorrhages a vitrectomy should be done in one eye not later than four to eight weeks after the acute injury. Too long a span between the acute event and vitrectomy frequently resulted in operative difficulties and a less satisfactory final outcome because proliferative vitreoretinopathy has time to develop.

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REFERENCES

1. Terson A. De l'hémorrhagie dans le corps vitré au cours de l'hémorrhagie cérébrale. Clin Ophthalmol 1990; 6: 309-12.
2. Schultz PN, Sobol WM, Weingeist TA. Long-term visual outcome in Terson syndrome. Ophthalmology 1991; 98: 1814-9.
3. Turss R. Vitrektomie bei Terson-Syndrom. Fortschr Ophthalmol 1984; 81: 257-9.
4. Roux FX, Panthier JN, Tanghe YM et al. Syndrome de Terson et complications intra-oculaires dans les hemorragies meningées (26 cas). Neurochir 1991; 37: 106-10.
5. Daus W, Käsmann B, Alexandridis E. Terson-Syndrom. Komplizierte klinische Verläufe. Ophthalmologe 1992; 89: 77-81.
6. Körner F, Meier-Gibbons F. Vitrektomie bei Terson-Syndrom. Bericht über 18 Fälle. Klin Monatsbl Augenheilkd 1992; 200: 468-71.
7. Friedman SM, Margo CE. Bilateral subinternal limiting membrane hemorrhage with Terson syndrome. Am J Ophthalmol 1997; 124: 850-1.
8. Morris R, Kuhn F, Witherspoon CD, Mester V, Dooner J. Hemorrhagic macular cysts in Terson's syndrome and its implications for macular surgery. In: Wiedemann P, Kohen L, eds. Macular and retinal diseases. Karger, Basel. Dev Ophthalmol 1997; 29: 44-54.
9. Yokoi M, Kase M, Hyodo T, Horimoto M, Kitagawa F, Nagata R. Epiretinal membrane formation in Terson syndrome. Jpn J Ophthalmol 1997; 41: 168-73.
10. Werry H, Brewitt H. Pars-plana Vitrektomie beim Terson-Syndrom. Fortschr Ophthalmol 1983; 79: 424-7.
11. Meier P, Wiedemann P. Glaskörper- und Fundusveränderungen beim Terson-Syndrom. Klin Monatsbl Augenheilkd 1996; 209: 244-8.
12. Velikay M, Datlinger P, Stolba U, Wedrich A, Binder S, Hausmann N. Retinal detachment with severe proliferative vitreoretinopathy in Terson syndrome. Ophthalmology 1994; 101: 35-7.