ORIGINAL ARTICLE

Sub-internal Limiting Membrane Haemorrhage Treated by Pars Plana Vitrectomy

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SUMMARY

Purpose: A retrospective study of anatomical and functional results of haemorrhages sub-internal limiting membrane treated by pars plana vitrectomy with internal limiting membrane peeling.
Materials and methods: The studied group consists of 6 patients – 6 eyes with acute bleeding under internal limiting membrane at the age of 18–59 years (mean age 37,3 years). The group was ethiopathogenetically various: 1x sarcoidosis, 1x cocaine abuse, 1x alcoholic and drug-induced hepatopathy, 1x morbus von Willebrand, 1x branch retinal vein occlusion combined with macroaneuryzm, 1x unknown cause – idiopathic. Best corrected visual acuity (BCVA) was hand motion in 3 of the eyes, counting fingers at 30 cm, 20/200 or 20/63 in the other 3 eyes. After a complete ophthalmologic examination including fluorescein angiography and optical coherence tomography a 23-gauge sutureless pars plana vitrectomy with internal limiting membrane peeling was performed in all patients. The follow-up period was 3–36 months (mean follow-up 18.3 months).
Results: In all 6 patients (6 eyes) an important improvement of visual functions was observed within 2–3 days after the surgery with a corresponding improvement of anatomical ophthalmoscopic findings and findings on optical coherence tomography. The BCVA at the last examination was 20/20 in 3 eyes, 20/32 in 2 eyes and 20/25 in 1 eye. We did not experience any complications like retinal tear, retinal detachment, endophthalmitis or relapse of bleeding neither during the surgery nor during the follow-up period.
Conclusion: Sub-internal limiting membrane haemorrhage affect younger patients in workingage population. These patients need rapid visual recovery. Surgical treatment of sub-internal limiting membrane haemorrhages by pars plana vitrectomy with internal limiting membrane peeling is a safe and effective method, which facilitates a quick return to patients` previous working activities and social standard.

Key words: pars plana vitrectomy, internal limiting membrane peeling, sub-internal limiting membrane haemorrhages

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INTRODUCTION

Acute haemorrhage in front of the central area of the retina represents a dramatic event for the patient, primarily due to the sudden decrease of central visual acuity (CVA). Haemorrhage is localised between the layer of the nerve fibres and the internal limiting membrane of the retina (MLI, membrana limitans interna). Sub-MLI haemorrhage may be overlapped by haemorrhage between the MLI and the posterior cortex of the vitreous area, in the vitreous cavity or in certain cases there may be a combination thereof [2, 12]. The ophthalmologist – vitreoretinal surgeon is faced with a choice of a quick, safe and effective treatment for which he/she must decide following a precise and complete ophthalmological examination.
Etiopathogenetic sub-MLI haemorrhage represents a wide and diverse group. It frequently concerns benign Valsalva retinopathy, or the bleeding may be a manifestation of haemorrhage into the subarachnoid area – Terson's syndrome [2, 3, 12, 14]. In rarer cases we encounter sub-MLI haemorrhage following a trauma, upon shaken baby syndrome, blood and blood-formation disorders, hepatopathy, abuses and other [1, 2, 12]. In our contribution we present case studies of 6 patients (6 eyes) with sub-MLI haemorrhage and treated by pars plana vitrectomy (PPV) with MLI peeling. An overview of the sample is presented in table 1.

CASE REPORT 1

The patient – a 37 year old woman transferred from the infections department, where she was hospitalised due to inflammation of the saliva glands with ATB treatment. Over 2 days she observed a dramatic decreased of vision in her left eye. Upon admittance there was CVA hand motion in front of the eye with a finding of vitreous haemorrhage, haemorrhage beneath the posterior vitreous cortex and also sub-MLI haemorrhage (fig. 1 and 2). 23-gauge sutureless PPV with MLI peeling was used. In the postoperative period there was a rapid rehabilitation of the anatomical relations and CVA upon discharge 2 days after the operation is 20/32 (fig. 3 and 4). During hospitalisation the patient under-

went a complete interdisciplinary examination and at the pulmonary clinic sarcoidosis was newly diagnosed, with CT confirmation of the diagnosis. The patient is still undergoing long-term monitoring for sarcoidosis.

CASE REPORT 2

The patient – an 18 year old woman came with 4-day anamnesis of deterioration of vision in her left eye. The previous day she had been at a disco, where she consumed 4x 50 ml of vodka, intoxicating substances negates, 2 weeks previously she used Sumamed and Paracetamol. The infection specialist evaluates the resulting hepatopathy as a consequence of the use of pharmaceuticals and alcohol. CVA was very rapidly corrected after 23-gauge sutureless PPV from 20/200 to a final 20/20.

CASE REPORT 3

The patient – a 30 year old man, whilst at a disco approx. 12 hours before arrival at the clinic, suddenly lost vision in his left eye, reportedly after someone had shone a laser beam at him or after a flash from a camera. He was admitted with haemorrhage beneath the posterior vitreous cortex and beneath the MLI, to which CVA also corresponded: hand motion in front of eye. When asked about use of intoxicating substances he confessed to using cocaine. After discharge he did not report for regular checks, and was once treated in the emergency department of our clinic several months after PPV due to inflammation of the conjunctiva with CVA of 20/32 in the left eye. To a telephone inquiry regarding his condition of health he responded that he "could see well".

CASE REPORT 4

The patient – a 48 year old woman sees a black spot in front of her left eye for 10 days, acutely admitted with sub-MLI haemorrhage with CVA 20/63. After 23-gauge sutureless PPV there is a rapid anatomical and functional correction with final CVA of 20/32.

CASE REPORT 5

The patient – a 34 year old woman with morbus von Willebrand with 10-day anamnesis of pronounced deterioration of vision in her right eye with CVA hand motion in front of the eye with sub-MLI haemorrhage, admitted for operation by 23-gauge sutureless PPV (fig. 5 and 6). The family anamnesis is positive, in which the mother, sister and brother are observed for haematology. The patient has been treated repeatedly with iron preparations for menorrhageia and subsequent severe sideropenic anaemia. She is regularly observed in our outpatient clinic, where the local finding is stabilised and CVA is 20/20 (fig. 7 and 8).

CASE REPORT 6

The patient – a 59 year old hypertonic man, noticed a pronounced deterioration of vision in his right eye after awakening after lunch. On the next day he was admitted at the clinic with a diagnosis of sub-MLI haemorrhage

Table 1 Overview of certain selected characteristics, results and diagnoses of sample.

N	sex	Age (years)	Initial CVA	CVA upon last check	Observation period (months)	Note
1	♀	37	Hand motion	20/20	14	Newly diagnosed sarcoidosis
2	♀	18	20/200	20/20	15	Hepatopathy
3	♂	28	Hand motion	(20/32) ?	(35) ?	Drug addict, cocaine
4	♀	48	20/63	20/32	7	
5	♀	34	Hand motion	20/20	36	Morbus von Willebrand
6	♂	59	Finger motion at 30 cm	20/25	3	Central retinal vein occlusion (?), aneurysm

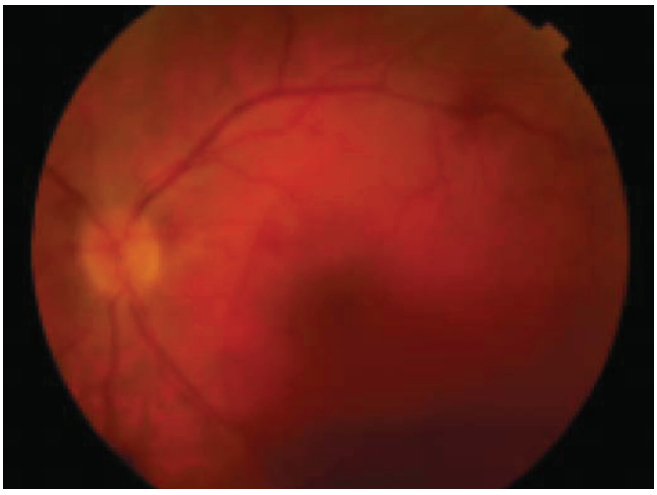

Fig. 1 Patient no. 1 – colour photograph of fundus on day of admittance before operation, haemorrhages are localised in vitreous cavity, beneath posterior vitreous cortex and beneath MLI

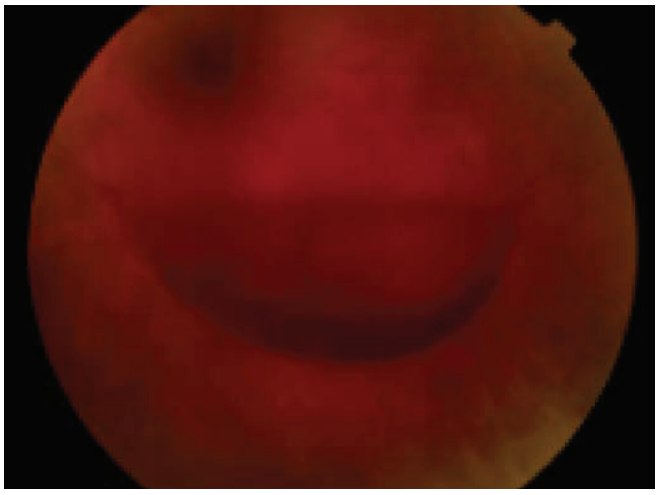

Fig. 2 Patient no. 1 – more detailed view of surface of haemorrhage beneath posterior vitreous cortex. CVA before operation: hand motion in front of eye

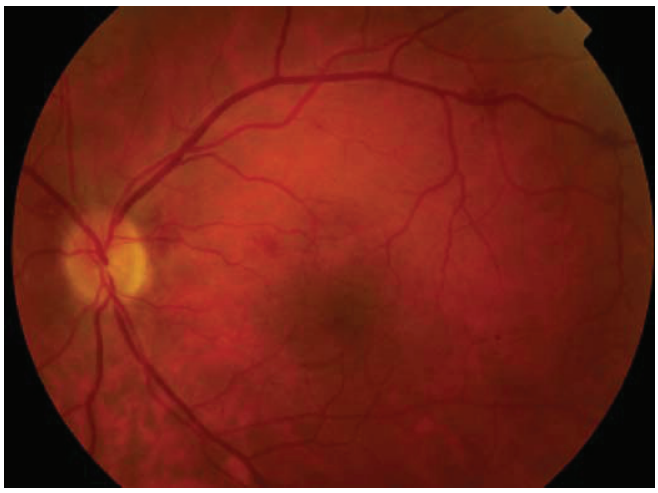

Fig. 3 Patient no. 1 – colour photograph after operation, discrete intraretinal haemorrhage can still be observed, as well as changes on blood vessels within the framework of systemic disorder of sarcoidosis

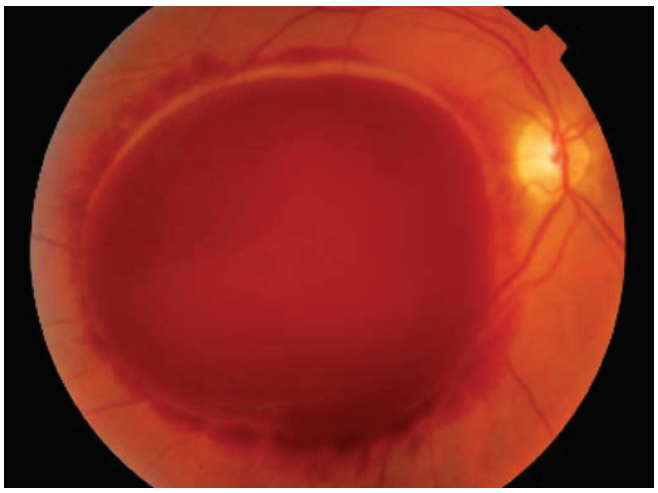

Fig. 4 Patient no. 1 – OCT after operation, in which the central area of the retina is visibly configured. CVA very rapidly stabilised at 20/20 after the operation.

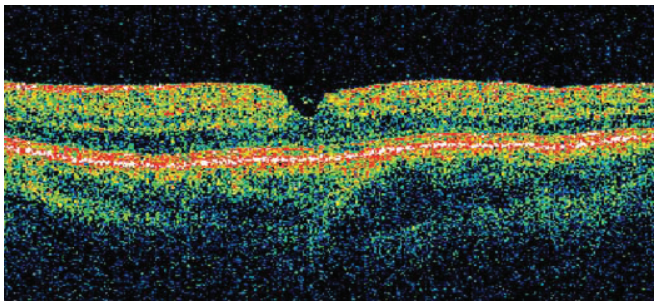

Fig. 5 Patient no. 5 – Morbus von Willebrand, on day of admittance before operation. CVA: hand motion in front of eye

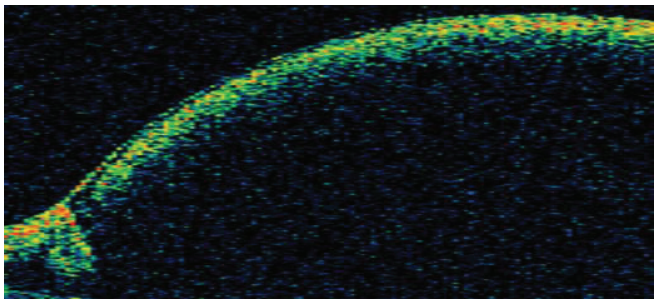

Fig. 6 – Patient no. 5 – on OCT dome-shaped bulging of MLI caused by sub-MLI haemorrhage

and with CVA counts fingers at 30 cm. Partial central retinal vein occlusion was verified by fluoroangiographic examination. Immediate acutely operated with 23-gauge sutureless PPV with MLI peeling and after drainage of the haemorrhage upon revision of the posterior pole we determined the presence of a macroaneurysm. The surgical procedure was supplemented with decompression of A/V crossing in the affected area. Two days after the operation, upon discharge for home treatment CVA was 20/63, upon a check one month later CVA had improved to 20/25. The macroaneurysm was verified by fluoroangiographic examination.

DISCUSSION

The diagnostic process of sub-MLI haemorrhage relies on anamnesis and complete ophthalmological examination, including optical coherent tomography (OCT) and ultrasound examination (US) [2, 12].

In the patient's case this represents a dramatic event with sudden deterioration of visual functions and CVA frequently drops beneath 0.1 [2, 8, 12]. Biomicroscopic and/or ophthalmoscopic examination, in the case that other localisations of haemorrhage are not present, reveal haemorrhage in the macula, where there is a detached MLI with fine fibres. In the surrounding area of the haemorrhage it is possible to observe a cellophane reflex from the detached and folded MLI [2, 5, 12]. Upon OCT this is more or less hemispherical bulging, where there are one to two hyper-reflexive layers on the surface, corresponding to the posterior vitreous cortex and MLI. The deeper layers of the retina, pigment epithelium and choriocapillaris are covered [2, 12, 14]. On the USG A-display there are a number of high echo-s corresponding to the anterior wall of the haemorrhage and MLI [11]. Despite the combination of various diagnostic and examination methods, sub-MLI haemorrhage cannot be diagnosed until during PPV upon MLI peeling and subsequent drainage of the haemorrhage [2].

Spontaneous absorption of sub-MLI haemorrhage is known and described from literary sources, but is connected with a toxic effect on the retina, the formation of a pre-macular traction membrane, proliferative vitreopathy, which are the result of the long-term effect of sub-MLI haemorrhage [7, 9]. In the case that MLI is a basal membrane of Müller cells, sub-MLI haemorrhage is haemorrhage into the neuroretina [12], and we must emphasise that at the present time it is not acceptable to wait for spontaneous reabsorption. Laser drainage or membranectomy enables the release of the haemorrhage into the vitreous cavity with its progressive absorption [4, 7, 13]. During the observed period after this procedure a number of complications are described in the literature, such as formation of an epimacular membrane, development of macular hole, retinal detachment and other [10, 16]. The histological findings of secondary epimacular membranes obtained operatively following laser drainage confirmed a finding of intracellular iron and hemosiderin deposits and nuclei in fine glial epiretinal membranes [10]. A recombined tissue and plasmin activator in combination with intravitreally administered expansive gas is used upon haemorrhage beneath the central area of the retina, e.g. in the case of age-related macular degeneration [6, 8]. This technique can be similarly su-

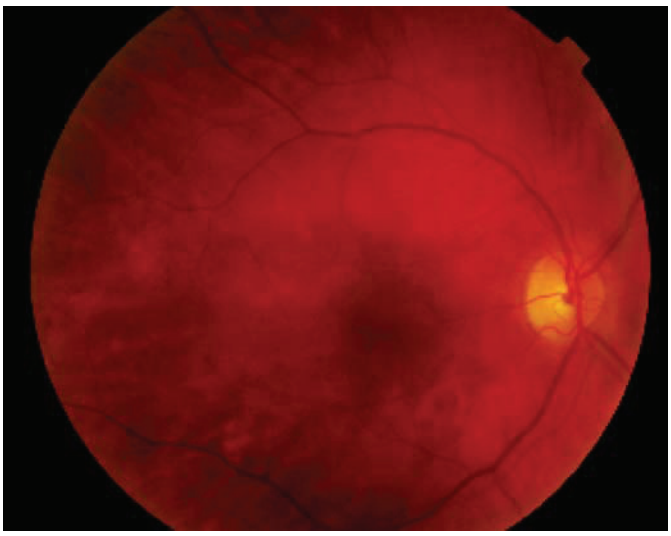

Fig. 7 Patient no. 5 – a few days after the operation the condition was rapidly corrected and CVA gradually increased to the final 20/20

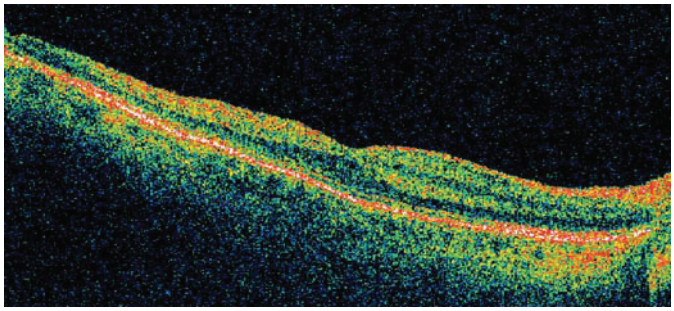

Fig. 8 Patient no. 5 – OCT confirmed ophthalmoscopic finding

ccessfully used in the case of sub-MLI haemorrhage [15]. Together with the literary data [2, 12] and in accordance with our results, PPV with MLI peeling and drainage of the haemorrhage appears to be an effective, fast, and in the case of the use of 23 gauge sutureless PPV a safe operative treatment of sub-MLI haemorrhage. In our sample we did not record serious complications, such as retinal ruptures, retinal detachment, endophthalmitis, proliferative vitreoretinopathy, secondary formation or development of an epimacular membrane either during the operation or in the postoperative period.

CONCLUSION

Sub-internal limiting membrane haemorrhage affects younger age groups in active age, whilst etiologically this represents a wide range of clinical units. These patients require rapid visual rehabilitation, i.e. successful anatomical correction, which provides a basis for rapid renewal of visual functions. Surgical treatment via pars plana vitrectomy with peeling of the internal limiting membrane upon sub-internal limiting membrane haemorrhage is a safe, fast and effective method, enabling a quick return of the patient to the process of employment, family and social life.

LITERATURE

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