Vitreoretinal Surgery on Video

Tape 6

Proliferative diabetic retinal detachments (PDRD)

Concept of treatment of PDRD
Technique in less complicated cases
Technique in complicated cases
Technique after failed operation with silicone oil (S.O.)
Anterior fibrovascular proliferation

Surgeons:
R. Živojnović, M.D.
C. Claes, M.D.

Text:
T. Das, M.D.

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TITLES IN THIS VIDEO SERIES

Tape 1. Retinal detachment combined with proliferative vitreoretinopathy (PVR) I
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Tape 3. Giant retinal tears (GRT)
Tape 4. Traumatic retinal detachment I
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Tape 6. Proliferative diabetic retinal detachments (PDRD)
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Tape 8. Complications in cataract surgery, intraocular tumors and miscellaneous

INTRODUCTION TO THE SERIES

"Vitreoretinal Surgery on Video" shows a selection of operations performed in the last eight to ten years. The series is meant for vitreoretinal surgeons who have mastered the initial difficulties of this area and now encounter more and more difficult cases in their daily work. Nonetheless, even the experienced vitreoretinal surgeon, who does not exclude any patients from his practice but treats even the most complicated cases himself, will find difficult cases here in all the regular indication groups.

The cases on the videos are divided into the usual indication groups.

From the point of view of philosophy and surgical concepts, vitreoretinal surgery has not changed much in the last ten years. The surgery undertaken in this series is based on the philosophy and surgical concepts described in my book Silicone Oil in Vitreoretinal Surgery, which are still valid. The field has, however, undergone significant modifications in its techniques. The development of new instruments, the introduction of the perfluorocarbon liquid (PFCL) and of the wide angle system are the most important recent innovations. This development can be followed on the videos in the selection of cases, but none of the cases presented can be seen as an isolated technique. On the contrary, surgeons who are not in the situation to apply the most recent techniques in their daily work will be able to see how it is possible to operate successfully with less sophisticated means. Surgeons who are in a position to apply all the modern techniques available will also find sufficiently many cases of interest.

The videos are divided into several texts and films. Each text gives relevant facts on the patient, a description of the course of the operation, with the emphasis on specific moments in the surgery, and the instruments which were used. The videos on proliferative diabetic retinopathy and on macular surgery do not always follow the
described pattern, for obvious reasons. In a number of cases we have added a short comment.

In most cases, the surgery was performed by myself, in some, particularly in the macular surgery and miscellaneous videos, the surgeon was Dr. Carel Claes. The name of the surgeon is given after each case. The text and comment of the course of the operations was written by Dr. Taraprasad Das in cooperation with myself. Most instruments presented and used in the surgery were manufactured by the Dutch Ophthalmic Research Center International.

**Part I**

This tape illustrates the concept of vitreous surgery in proliferative diabetic retinopathy. The tape is divided into various segments demonstrating the techniques and guiding philosophies of the field.

*Segment 1*

Encircling band - 360°. The encircling element at the equator, 12 mm from the limbus in an emmetropic eye and sutured to the sclera with one suture in each quadrant. Only gentle tightening is done, to ensure a gentle indentation. Since it is applied at the onset, it should not cause excessive tightening. In the surgery shown here, a 1 mm solid silicone rod is used. However, any kind and type of encircling element could be used.

*Segment 2*

Pars plana core vitrectomy.

*Segment 3*

Release of the antero-posterior tractions, and circumcision of the central membrane from the peripheral membrane. This is accomplished with the help of the vitreous cutter only.

*Segments 4 and 5*

Delamination and removal of the central membrane in one piece. This is accomplished with a variety of instruments, and obviously varies from patient to patient. The instruments used are the membrane peeler cutter; curved intra-ocular scissors; hockey stick, serrated and end-gripping intra-ocular forceps. In selected situations, bimanual vitrectomy and membrane removal were done
using the long spatula and the vitreous forceps. Delamination is accomplished in both unimanual and bimanual techniques using a light-pipe or separate light source.

Segment 6

Removal of the fibrotic stalk from the optic nerve head. The fibrotic membrane is first carefully delaminated from the retinal surface using the retinal spatula, ensuring that the stalk is attached to the optic nerve head only. Once accomplished, the stalk is grasped with the hockey stick forceps, and pulled gently using both antero-posterior and tangential force. At the time of removal of the stalk, the intra-ocular pressure is only rarely raised temporarily by elevating the infusion bottle.

Segment 7

Vitrectomy of the vitreous base. Scleral indentation is extremely useful in this step of the surgery, and in phakic eyes it is not necessary to remove the crystalline lens. It is possible to complete the vitreous base vitrectomy under the co-axial light of the operating microscope.

Step 8

Peripheral cryo and posterior endophotocoagulation. The cryo is applied transsclerally to the peripheral retina just anterior to the encircling band. Four to five applications in each quadrant will usually be sufficient. Laser photocoagulation of the posterior retina is done using the endolaser. It is important not to do any further vitrectomy after cryocoagulation, and possibly also after photocoagulation, as the retina will be rather friable and likely to tear.

Surgeon: R. Živojnović

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PART II

Patient data

Thirty-year old male patient, juvenile diabetic. One eye lost following surgery for complication of proliferative diabetic retinopathy. He suffered a significant reduction in visual acuity in the other eye over a period of six months. On examination, he was found to have traction retinal detachment involving the macula. The peripheral posterior vitreous was detached. The lens was clear. He had previously undergone panretinal photocoagulation for proliferative diabetic retinopathy.

Surgery

1. Pars plana vitrectomy and release of the anterior-posterior traction.
2. The central membrane delamination with the help of curved vitreous scissors.
   While doing this, it is important to look for the edge of a more peripheral membrane.
3. Peripheral vitrectomy using the vitreous shaver and scleral indentation.
4. Injection of PFCL to check for any retinal breaks.

The surgery was completed with removal of the PFCL. It was not considered necessary to inject silicone oil or gas into the vitreous cavity, since there was no retinal break.

Instrumentation

Curved vitreous scissors; end-gripping and hockey stick vitreous forceps; vitreous shaver; silicone-tipped backflush needle.
Comments

These so-called additional membranes are correlated to the thick fibrotic membranes. They are transparent and lie on the retina without contracting it or deforming the vessels. They spread to the periphery. Because of the before-mentioned characteristics, they are not easily detectable. A scratcher or a silicone-tipped back-flush needle can be used to lift the additional membrane. Once lifted it can be delaminated together with the main fibrotic membrane, which ensures a clean cleavage plane.

Surgeon: R. Živojnović

PART III

Patient data

Forty-year old male patient, a juvenile diabetic with a twenty-year history of diabetes. He had panretinal photocoagulation earlier for proliferative diabetic retinopathy. He developed a gross reduction in vision over a threemonths period. On examination, total traction retinal detachment was found with involvement of the macula. There was incomplete posterior vitreous detachment. Operation on the left eye.

Surgery

1. Inspection of the retina and initial pars plana vitrectomy. The vitreous membrane was circumcised to relieve the antero-posterior traction.
2. Bullous retinal detachment in the upper part of the fundus seen. Vitreous base surgery done with the vitreous shaver in the area of sclerotomies to avoid any incarceration of the retina in the sclerotomy site.
3. Unimanual separation of the vitreous traction membranes from the underlying detached retina using the curved scissors, and both the long and the pointed spatula.
4. Conversion into bimanual vitrectomy by introducing the endo-illuminator through an additional inferior port. Removal of the inferior peripheral vitreous before the sclerotomy. Inside-out delamination (against the rules!) of the vitreous membranes. The inferior posterior vitreous was not detached.
5. Injection of PFCL to stabilize the posterior retina.
6. Peripheral vitrectomy using the vitreous shaver and careful dissection of the vitreous membrane flushed with the detached retina.
7. Peripheral anterior cryo application.
8. PFCL-air exchange and endophotocoagulation.

Instrumentation

Curved vitreous scissors; vitreous shaver; membrane spatula, long and pointed; four-port vitrectomy; end-gripping and hockey stick forceps.

Surgeon: R. Živojnović

PART IV

Patient data

Thirty-year old male patient, a juvenile diabetic. One eye lost due to macular traction retinal detachment. Operation on the right eye. The patient developed a significant reduction in visual acuity in a period of three weeks. On examination, he was found to have massive subhyaloid hemorrhage involving the macular area. He had panretinal photocoagulation earlier for proliferative diabetic retinopathy.
Surgery

1. Pars plana vitrectomy.
2. Attempt to remove the subhyaloid hemorrhage did not succeed due to lack of a posterior vitreous detachment (PVD).
3. The PVD was created with careful posterior vitrectomy, and the subhyaloid hemorrhage was evacuated using the back-flush needle.

Surgeon: C. Claes

PART V

Patient data

Twenty-five year old female patient. The right eye lost due to complications of proliferative diabetic retinopathy. She suffered a significant reduction in visual acuity in the left eye over a period of four months. She had a history of panretinal photocoagulation and cataract extraction with implantation of IOL. On examination, she was found to have combined traction and rhegmatogenous retinal detachment.

Surgery

1. Initial pars plana vitrectomy.
2. Removal of epiretinal membrane under the co-axial illumination of the operating microscope. (This was possible due to high elevation of the retina).
3. Delamination of the membrane with various instruments.
4. Fluid-silicone oil exchange with simultaneous endodrainage of the subretinal fluid through previous or iatrogenic retinal breaks. The retina still appeared contracted under the silicone oil. Endophotocoagulation was done around the retinal breaks. The surgery was done before introduction of PFCL.

Instrumentation

Retinal spatula; membrane peeler cutter; curved vitreous scissors; hockey stick and end-gripping forceps; silicone-tipped back-flush needle.

Surgeon: R. Živojnović

PART VI

Patient data

Twenty-five year old male patient, a juvenile diabetic for past 15 years. Operation on the left eye. He had previously had panretinal photocoagulation and pars plana vitrectomy with silicone oil injection. Two months after the last surgery, he had a shallow retinal detachment involving the macula. There was proliferation from the optic disc with fibrotic tissue remnants of the previous surgery. The lens was clear.

Surgery

1. General inspection of the retina. Proliferations from the disc and other area of the retina seen.
2. The initial surgery was done under the old silicone oil. An edge of the membrane was found with the spatula and removed with hockey stick forceps. The stalk was also removed from the optic disc. The membranes were removed with the help of a variety of instruments, notably curved and horizontal scissors, and hockey stick and end-gripping forceps.
4. The fibrotic tissue in the nasal periphery was dissected and removed.
5. General inspection of the retina. It was not considered necessary to inject gas or silicone oil into the vitreous cavity.
6. Fluid-air exchange.

Instrumentation

Vitreous scissors, curved and horizontal; vitreous forceps: hockey stick and end-gripping; membrane spatula; cannula with side-port, 19 g; silicone-tipped back-flush needle.

Surgeon: R. Živojnović

PART VII

Patient data

Twenty-year old male patient; operations on the left eye. Juvenile diabetic for 15 years. Operated on both eyes six months ago for proliferative diabetic retinopathy with vitreous hemorrhage; he had good postoperative visual acuity. Two months later he developed recurrent vitreous hemorrhage and both eyes were re-vitrectomised, with good visual recovery. Four months later he developed neovascular glaucoma in both eyes. The right eye was blind with massive rubeosis and very high intra-ocular pressure. Visual acuity in the left eye was correct projection of light. Intra-ocular pressure was very high, and further massive rubeosis with ectropion uveae was noticed. There was no fundus view because of vitreous hemorrhage.

Surgery

1. Pars plana lensectomy and removal of the anterior chamber blood.
2. Huge fibrovascular proliferation from the ciliary body seen and removed.
4. Newly formed proliferating membrane all over the retina with shallow retinal detachment was seen. The membranes were removed with the help of the retinal scratcher and the serrated forceps.
5. The peripheral fibrovascular tissue was diathermised, and removed using the vitreous cutter and the forceps. Fibrovascular proliferations were seen, arising from the previous sclerotomy sites.
6. Cleaning away residual blood from the iris and retina with the silicone-tipped cannula.
7. Posterior retinotomy with the diathermy.
8. Injection of PFCL.
10. Inferior peripheral iridectomy.
11. PFCL - silicone oil exchange.

Comments

The day following the surgery the patient developed a total hyphema and increased intra-ocular pressure. He was immediately re-operated, for removal of the silicone oil, total extraction of iris and fresh silicone oil injection. The postoperative IOP was normal and there was no further bleeding. The eye remained stable with visual acuity of 1/60 for six months.
See Part VIII for further development.

Instrumentation

Sato knife; vitreous forceps: end-gripping and hockey stick; retinal scratcher; curved scissors.

Surgeon: R. Živojnović
PART VIII

Patient data

See Part VII.

Six months after the last operation, the patient's visual acuity decreased and subtotal retinal detachment developed due to new proliferative membranes coming from the disc and fibrotic scars. Huge retinal tears were noticed. Intra-ocular pressure was normal and the cornea was fairly clear.

Surgery

1. Pars plana vitrectomy under silicone oil.
2. Membrane peeling.
4. Endodiathermy with $270^\circ$ retinotomy.
5. Removal of subretinal proliferations.
6. PFCL injection.
7. Endolasercoagulation.
8. PFCL-silicone oil exchange.

Instrumentation

Serrated end-gripping forceps and hockey stick forceps; vertical and curved scissors; silicone-tipped back-flush needle.

Comments

After a few months a new reproliferation occurred and finally the eye was lost.

Surgeon: R. Živojnović

The video series “Vitreoretinal Surgery on Video” by R. Živojnović consists of eight videos, which are available in PAL and NTSC, either separately or as a complete set.

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