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PART 1  Surgical Retina

SECTION 5  Vitreous Surgery: Additional Considerations

Complications in Vitreoretinal Surgery

Kourosh Rezaei

Subluxated Intraocular Lens Without Haptics
Posterior Synechiae and Small Pupil During Vitrectomy
Induction of PVD in Retinal Detachment
Induction of PVD in High Myopia
Iatrogenic Retinal Breaks During Peeling
Internal Limiting Membrane Peeling
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Reopening of Peripheral Retinal Breaks During Surgery for Submacular Hemorrhage
Surgical Management of Hypotony Maculopathy
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Subretinal Perfluorocarbon Bubble
Perfluorocarbon-Induced Macular Hole
Giant Retinal Tear With Slippage on Encircling Scleral Buckle
PerFVR and Subretinal Membrane
A Problem During 27G Vitrectomy
Vitreous Incarceration in Sclerotomies
Argus II Array Implantation
Subretinal SF6 Gas After Retinal Detachment Surgery
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A complication is an unanticipated event that arises either from the original disease, the treatment, an independent cause, or a combination of above. As surgeons we are trained to predict and treat expected events during surgery. However, unexpected events are the ones that are most dangerous and usually lead to undesirable outcomes. In general, the question is not whether an unexpected event will happen but when it will occur. The early recognition of an impending unexpected event is crucial for its successful management.

The knowledge of how to predict, treat, and prevent unexpected events during surgery is extremely valuable and would make vitreoretinal surgery safer, leading to improved visual outcome for patients. The more one is acquainted with unexpected events the less they are considered "unexpected" since one has already seen these events happen and knows how they were handled and therefore the factor of surprise is eliminated.

In this chapter, experienced surgeons from around the world share with you their unexpected experiences during retinal surgery and show how they handled some of the most unusual surgical cases. Further, they share their surgical pearls on how to predict, prevent, and treat these unusual surgical situations.

SUBLUXATED INTRAOCULAR LENS
WITHOUT HAPTICS
Renaud Duval

Removal of intraocular foreign bodies usually relies on the use of forceps or magnets (in the case of magnetic objects). Removing a round, smooth optic of an intraocular lens (IOL) that is missing both haptics cannot be done in the usual fashion. Using forceps would damage the underlying macula. However, a 25-gauge (G) soft-tip cannula placed on the extrusion line can induce sufficient vacuum to lift the IOL to a position where it can be grasped safely. This technique should be kept in mind when dealing with light foreign bodies that lack grasping points.

In Video 131.1, a 72-year-old patient is presented with a history of blunt trauma to the left eye leading to superior iris loss and IOL expulsion from the globe through a superior sclerolimbal rupture. Following primary repair by a general ophthalmologist, the patient was referred for management of aphakia and vitreous hemorrhage. The hemorrhage cleared over the ensuing weeks, and the patient was re-operated for peeling of an epiretinal membrane followed by correction of aphakia with a scleral-fixed IOL.

After removal of the vitreous hemorrhage and indocyanine green-assisted peel of the epiretinal membrane, a three-piece IOL was injected into the eye through a 2.75-mm clear corneal incision and the haptics were externalized through sulus-based sclerotomies. While attempting to tuck the second haptic into its intrascleral tunnel, sudden motion of the forceps caused by forcing against an overly tight tunnel led to separation of the haptic from the optic. Subsequent maneuvers to cut the IOL and remove it by the "pacman" technique led
to the separation of the second haptic and complete dislocation of the now haptic-less optic on the macular surface. Creating a wider scleral pocket and avoiding the use of the haptics to stabilize the IOL while cutting it for explantation may have minimized the risk of haptic separation.

**POSTERIOR SYNECHIAE AND SMALL PUPIL DURING VITRECTOMY**

P0155 Ehab El Rayes

Posterior synechiae secondary to inflammation may lead to miotic pupil and limit visualization during vitrectomy surgery. Additional pharmacotherapy may be applied for dilation; however, it has a limited role when posterior synechiae are present. Mechanical stretching of the pupil would be the next option. To safely dilate the pupil one may either use iris hooks or iris stretching rings such as the Malyugin ring or the Morcher ring.

In this Video 131.2 a Morcher ring, a 7-mm PMMA ring, is introduced into the anterior chamber by dialing it in through a 2-mm corneal incision. The inferior pupillary margin is engaged first, thus providing a 6-mm opening for visualization. Viscoelastic is injected into the anterior chamber to maintain the depth and to keep the media clear. Removing the cataract can easily be performed through the ring which maintains a dilated pupil (even in cases with floppy iris). Phacoemulsification and IOL implantation are performed. Identifying the tip of the infusion cannula before starting the vitrectomy is important and can now be easily achieved through a dilated pupil and clear media. Vitrectomy is carried out in the usual manner. Once the posterior segment procedure is completed the Morcher ring will be removed by dislodging it from the pupillary margin and then dialing it clock- or anticlockwise, via the corneal incision, to exit the eye.

**INDUCTION OF PVD IN RETINAL DETACHMENT**

P0170 Andre Comes

Inducing posterior vitreous detachment (PVD) is a key step during vitrectomy surgery for retinal detachment. Induction of PVD, however, is not always easy and the strong vitreoretinal adherence especially in young patients can make this step challenging.

The patient in Video 131.3 presented with strongly adherent posterior hyaloid and a thin and mobile retina. The induction of PVD was first attempted in the usual manner by applying suction over the peripapillary area followed by suction at more peripheral areas of the fundus. These attempts were followed by using micro-serated forceps and end grasping forceps in an attempt to peel the internal limiting membrane (ILM) while the posterior hyaloid was still attached. To improve the visualization of ILM, brilliant blue dye was injected into the eye. Attention was given to prevent any subretinal exposure. Inducing openings in the posterior hyaloid/ILM interface allowed fluid to gain access underneath the posterior hyaloid and make the induction of PVD easier. Peeling the ILM in patients with adherent posterior hyaloid can make the induction of PVD easier and safer.

**INDUCTION OF PVD IN HIGH MYOPIA**

P0185 Ramin Tadayoni

One surgical challenge during vitreectomy for retinal detachment in high myopia is the induction of posterior vitreous detachment which is one of the initial steps of the surgery. Missing this step may cause postoperative complications including increased risk for retinal redetachment.

This technical difficulty in high myopia is generally a combination of poor visualization of the posterior hyaloid, presence of vitreocochisis, and the strong adhesion of the posterior hyaloid to the surface of the retina, particularly in younger patients. The strongly adherent posterior hyaloid associated with large pockets of liquefied vitreous may make the usual techniques used for the PVD induction not very successful. Further, in high myopia the presence of vitreocochisis may give the appearance of posterior hyaloid separation while in fact the hyaloid is still attached. Visualizing the vitreous with triamcinolone acetonide suspension may help identifying the posterior hyaloid during surgery. It is usually diluted with balanced salt solution (BSS) to a lower concentration (typically 1/5) before injection into the eye. Further, new imaging technologies such as intraoperative optical coherence tomography (OCT) may help identify the status of the posterior hyaloid during surgery.

In Video 131.4 a complex situation is presented: an attached posterior hyaloid is identified by intraoperative OCT (RESCAN 700®, Carl Zeiss Meditec, Germany) during a 25G vitrectomy (Constellation®, Alcon, TX, USA) for a posterior retinal detachment secondary to macular hole in high myopia. The vitreous cannot be visualized by the surgeon through the microscope (without OCT). Diluted triamcinolone acetonide suspension is injected over the optic nerve to visualize the posterior hyaloid and allow its safe peeling.

**IATROGENIC RETINAL BREAKS DURING PEELING**

Manish Nagpal

One of the risks involved during membrane peeling is the formation of iatrogenic breaks. Their immediate detection and management is crucial to prevent a negative outcome.

The following tips may help avoid making an iatrogenic break during peeling and also help their management if formed.

1. Use a wide-angle viewing system during vitreectomy surgery to be able to evaluate optimally the periphery of the retina.
2. Peel membranes in a radial fashion and avoid anteroposterior pulling.
3. If iatrogenic breaks are formed, assess the location and extent of the break, mark the edges, and assure adequate endolaser when the retina is reattached.

In Video 131.5 a patient is presented with a semi-open funnel retinal detachment with proliferative vitreoretinopathy (PVR). Core vitrectomy is performed and perfluorocarbon liquid (PFCL) is injected over the disc to stabilize the retina. A circumferential membrane over the disc is gradually peeled to allow the flattening of the posterior pole under the PFCL liquid.

The residual inferior traction is reassessed and the responsive epiretinal membrane is peeled to release this traction. During the peel the peripheral inferior retina is stretched and an iatrogenic break is formed. A wide-angle viewing system allowed the immediate detection of the break. The extent of the break and its location is assessed and diathermy is applied to mark the edges and to control the bleeding. Fluid–air exchange is performed and subretinal fluid is drained through the break. Once the retina is flattened, laser endophotocoagulation is applied around the break to assure adequate retinopexy.

**INTERNAL LIMITING MEMBRANE PEELING**

Sjakon Tahija

Creating an edge of the ILM at the beginning of its peeling is part of the procedure that is associated with the highest risk for retinal bruising and damage. In Video 131.6 the surgeon is performing pars plana vitrectomy for proliferative diabetic retinopathy in a type 1 diabetic patient. After removing the
Complications

There are several potential ways to prevent opening up existing peripheral breaks in such cases. If breaks are found to be present preoperatively, they can be reinforced in the office a week or two ahead of time. Intraoperatively, if extensive subretinal fluid or air injection is being planned, it may be best to inspect the peripheral retina before the injection and, if breaks present, laser the breaks upon identifying them and minimize the volume of fluid or air subsequently injected under the retina.

It should be noted that the use of air in addition to a solution of tPA has not been proven to enhance or aid in the displacement of macular subretinal hemorrhage. A more conservative, safer approach utilizing just the subretinal tPA solution without subretinal air may be preferred approach. Further studies are warranted before routinely adopting the subretinal air technique.

SUGICAL MANAGEMENT OF HYPOTONY MACULOPATHY

Jose Garcia Arumi

Low intraocular pressure after vitrectomy surgery (postoperative hypotony) is generally due to the failure of the ciliary body to produce aqueous humor. This may be due to fibrous traction from anterior PVR, cyclodialysis, or ciliary body detachment. A diagnosis can be made with ultrasound biomicroscopy (UBM) that visualizes the ciliary body, and tissues around it.

Video 131.9 presents a 54-year-old patient with a history of vitreous hemorrhage after trauma who had undergone a 23G vitrectomy procedure elsewhere. Three months later he developed hypotony maculopathy and was referred for evaluation. Upon examination the best corrected visual acuity was 20/400 and intraocular pressure was 4 mmHg. The UBM suggested a cyclodialysis cleft and ciliary body detachment extending 360°. The OCT scan indicated increased macular thickness associated with hypotony maculopathy and choroidal folds which were visualized on fluorescein angiography.

The patient underwent a 23G pars plana vitrectomy surgery followed by posterior hyaloid separation, brilliant blue dye staining, and removal of the internal limiting membrane (ILM) in the macular area. Peeling the ILM decreases the rigidity of the retina and eases the opening of the macular folds once the hypotony is resolved. Transconjunctival cryotherapy was applied to the sclera 2.5 mm posterior to the limbus using a curved spherical retinal probe. Eight spots were applied: two spots per quadrant, each with a duration of 10 seconds and a temperature of ~80 °C (avoiding the ciliary body). Following cryopexy, fluid–air exchange is performed and 6% C3F8 gas was injected into the eye for tamponade. The postoperative course was unremarkable. Two weeks after surgery the best corrected visual acuity improved to 20/25 and IOP was 15 mmHg. Ultrasound biomicroscopy indicated that the ciliary body had reattached to the scleral spur, closing all the clefts.

Key steps in the management of hypotony maculopathy are:

- Performing preoperative UBM.
- Peeling the ILM during the surgery.
- Applying transscleral cryotherapy to the pars plana (avoiding the ciliary body).
- Gas tamponade.

INTRAOPERATIVE CHOROIDAL DETACHMENT

Homayoun Tabandeh

Intraoperative choroidal detachment may occur as a result of displacement of the infusion cannula into the suprachoroidal...
space, or it may represent suprachoroidal hemorrhage. Furthermore, continued infusion into the suprachoroidal space from a displaced infusion cannula could result in stretching and subsequent rupture of blood vessels traversing this space causing the additional suprachoroidal hemorrhage. Conversely, intraoperative suprachoroidal hemorrhage may result in displacement of the infusion cannula into the suprachoroidal space, further exacerbating the choroidal detachment.

Early detection is an important first step. Intraoperative visualization of ora serrata in the absence of scleral depression may be an early warning sign indicating choroidal detachment. Once a choroidal detachment is suspected, surgery should be stopped and the situation assessed, establishing the possible cause. Intraoperative displacement of infusion cannula may be identified by inspection of the infusion cannula internally and externally. Risk factors for infusion cannula displacement include intraoperative manipulations, oblique placement of the cannula, preoperative choroidal detachment and hypotony. Visualizing the tip of the cannula prior to opening the infusion flow at the beginning of the surgery is an important step that helps in identifying a misplaced cannula in the suprachoroidal space. In eyes with preexisting choroidal detachment, a straight cannula entry aiming towards the center of the vitreous cavity (instead of beveled incision), reduces the chance of suprachoroidal placement of the infusion cannula. Securing the infusion line by a tape helps reduce the chances of cannula displacement during surgical manipulations.

Once a displaced infusion cannula is recognized, the infusion flow should be closed immediately. The infusion line is disconnected from the cannula (leaving the cannula in place) and immediately reinserted through one of the other available cannulas (the tip needs to be visualized prior to reopening the infusion), therefore maintaining the intraocular pressure. The original infusion cannula will be left in the original location to allow drainage of fluid from the suprachoroidal space. Once the choroidal detachment is reduced, an attempt may be made to reposition the displaced cannula. Alternatively the cannula may be removed and a new cannula maybe inserted utilizing a straight entry, aiming towards the center of the vitreous cavity. A modified version of this technique may be used in the management of intraoperative suprachoroidal hemorrhage.

In Video 131.10, a patient with diabetic retinal detachment underwent pars plana vitrectomy. Towards the end of surgery, progressive choroidal detachment was noted. The infusion cannula was inspected and was noted to have been displaced into the suprachoroidal space. The infusion line was disconnected from the cannula, leaving the displaced cannula in place. The infusion line was immediately reinserted through one of the remaining cannulas, maintaining the IOP. The displaced cannula was left unplugged in the suprachoroidal space to allow drainage of fluid. The posterior segment was inspected. The choroidal detachments were found to have subsided. An attempt was made to reposition the cannula, without success. Subsequently the cannula was removed and a new cannula was inserted with a straight entry, aiming towards the center of the vitreous cavity. The infusion line was relocated and the surgery was continued uneventfully.

Massive suprachoroidal hemorrhage generally implies the rupture of the short or long posterior ciliary artery branches during intraocular surgery or after penetrating trauma. The incidence of suprachoroidal hemorrhage in vitrectomies is low. Systemic risk factors include advanced age, hypertension, atherosclerosis, diabetes, and bleeding disorders. Ocular risk factors include high myopia (decreased scleral rigidity and the increased fragility of the choroidal vasculature), prior history of retinal detachment surgery, preoperative hypertension, and intraocular inflammation. Main intraoperative risk factors are elevated blood pressure or heart rate during surgery, prolonged intraocular hypotony, scleral manipulation, and extensive cryopexy.

The goal in the management of suprachoroidal hemorrhage during surgery is to stop the bleeding by increasing the intraocular pressure, closing the surgical wound, and lowering the systemic blood pressure. Emergency drainage sclerotomies may induce transient hypotony and stimulate rebleeding. Further, they increase the risk of retina/uveal tissue incarceration due to the high pressure.

Suprachoroidal blood may not necessarily require drainage. This particularly applies to sectorial hemorrhages that do not involve the posterior pole and do not cause profound visual loss. Intraoperative hypotony may be an early warning sign indicating choroidal detachment. In the presence of a displaced infusion cannula, it should be removed and a new cannula inserted into the suprachoroidal space. The infusion pressure allows a controlled drainage of the liquefied blood through the sclerotomy. After a partial drainage, 23G cannulas are inserted into the eye through the pars plana and a limited vitrectomy is performed followed by removal of the posterior hyaloid. Injection of PFCL into the vitreous cavity induces an internal tamponade and indicate the adequate timing for the drainage procedure, which is usually 10–14 days after the incident.

In Video 131.11, a 25G infusion cannula is placed into the anterior chamber through the inferior limbus and the IOP is set at 30 mmHg. A radial sclerotomy is performed parallel to the rectus muscle in the quadrant with the most suprachoroidal hemorrhage. The infusion pressure allows a controlled drainage of the liquefied blood through the sclerotomy. After a partial drainage, 23G cannulas are inserted into the eye through the pars plana and a limited vitrectomy is performed followed by removal of the posterior hyaloid. Injection of PPCLI into the vitreous cavity induces an internal tamponade which further displaces the fluid towards the periphery and allow its drainage through the sclerotomy. The eye may then be filled with gas or silicone oil.

Suprachoroidal hemorrhage is a rare but severe complication that usually results in poor vision. Intraoperative hypotony is one of the main risk factors resulting in choroidal effusion with subsequent rupture of small arteries traversing the suprachoroidal space. In addition, prolonged hypotony may directly result in rupture of the short or long posterior ciliary arteries or vortex veins. The greatest risk for suprachoroidal hemorrhage during cataract surgery occurs immediately after nucleus removal, when the eye is at greatest risk of prolonged hypotony.

The 73-year-old patient presented in Video 131.12 had had phacoemulsification elsewhere. While aspirating the cortex, the posterior capsule was ruptured with subsequent vitreous loss. Effort was made to implant the IOL into the bag; however, suddenly the choroid became elevated and suprachoroidal hemorrhage was recognized and surgery was stopped. The patient was referred for evaluation and management to our clinic. One week after the original surgery the patient was brought back to the operating room for drainage of the suprachoroidal blood. Iris retractors were placed to have a better visualization of the anterior chamber. An infusion cannula was inserted into the anterior chamber to maintain the IOP. It was noted that patient still had a large blood clot in the suprachoroidal space. A scleral cutdown was performed super-temporally and tissue plasminogen activator was injected into the suprachoroidal space to dissolve the clot. The sclera was depressed with a cotton swab to aid its removal. An
infusion cannula could now be placed through the pars plana into the vitreous cavity and vitrectomy was performed.

**SUBRETINAL PERFLUOROCARBON BUBBLE**

Maria H. Berrocal

Subretinal perfluorocarbon liquid (PFCL) after vitreectomy surgery is one of the most dreaded complications of its use. The risk factors for subretinal migration of PFCL include:

- Large breaks.
- Posterior breaks.
- Residual traction on the breaks.
- Multiple small bubbles during injection.
- Turbulence during injection.
- Injecting directly in the direction of the break.

Although extrafoveal subretinal PFCL bubbles could be monitored (although it has been reported that they can migrate intraretinally and close to the fovea, such subretinal PFCL would need to be removed), submacular PFCL bubbles would have adverse impact on visual acuity and need to be removed.

To decrease the likelihood of getting subretinal/submacular PFCL bubbles, one may relieve all traction on the breaks prior to the injection of PFCL into the eye; use a dual-bore cannula for PFCL injection or use an aspirating instrument (in the other hand) during the injection (in valved trochar systems); inject with a slow speed over the optic nerve to form a single bubble and inject inside the forming PFCL bubble; use valved cannulas to decrease the amount of turbulence during the injection procedure; and keep the PFCL level below the peripheral breaks. Washing out the residual PFCL bubbles with balanced salt solution (BSS) or infusion fluid after the removal of the main bubble may avoid having residual PFCL bubbles inside the vitreous cavity after surgery.

Utilizing a dual-bore cannula that has a side port for injection may prevent damage to the retina from the PFCL jet stream during the injection procedure. This may particularly be an issue when utilizing 25- and 27G vitrectomy systems.

Very small amounts of residual PFCL bubbles inside the vitreous cavity may be tolerated although the patient may complain of seeing the bubble when laying back. Larger amounts of PFCL in the vitreous can cause inflammation and should be removed.

In Video 131.13 the patient presents with a rhegmatogenous retinal detachment with star fold and inferior PVR. An encircling no. 41 band was placed and tied superonasally; 27G vitrectomy was performed with complete vitreous removal. PFCL was injected into the eye to flatten the retina and subretinal fluid was drained through the superior retinal tear. The PFCL was injected with a 30G needle. Multiple PFCL bubbles were dispersed inside the vitreous cavity. Air–fluid exchange was performed and laser endophotoagulation was applied around the break and the lattice degeneration inferiorly. Residual PFCL bubbles were washed out multiple times and no residual bubbles were visible. Air–gas exchange was performed and the eye was filled with 14% C3F8 gas.

**PERFLUOROCARBON-INDUCED MACULAR HOLE**

Yusuke Oshima

Perfluorocarbon (PFCL) liquid is a very useful tool for flattening the detached retina during vitrectomy, especially in giant retinal tear detachment or detachment associated with proliferative vitreoretinopathy. Special attention should be given to PFCL injection during surgery, especially in small-gauge surgery where resistance to the injection is increased due to the narrower size of the injection lumen.

In Video 131.14 PFCL is injected over the macula. A macular hole is formed due to the pressure caused by the injection stream. The surgeon should keep in mind to gently inject PFCL over the optic nerve (or nasal to it) and avoid injecting it directly over the macular area. Further, the injection should be done by the surgeon (rather than an assistant) and a safe distance from the surface of the retina should be kept during the injection procedure (one has the tendency to move closer to the surface of the retina during the injection). If any resistance is felt during the PFCL injection, the cause needs to be evaluated outside the eye instead of applying additional pressure. In this case a standardized macular hole surgical technique was performed including peeling the ILM followed by fluid–air exchange and gas tamponade.

**GIANT RETINAL TEAR WITH SLIPPAGE ON ENCIRCLING SCLERAL BUCKLE**

Carl Regillo

A combined pars plana vitrectomy (PPV) with encircling scleral buckle (SB) was being performed for a giant retinal tear (GRT) extending approximately 180° in a phakic patient.

Despite meticulous drying of the edge of the retina during fluid–air exchange, when the perfluorocarbon liquid (PFCL) was completely removed, there was posterior slippage of the retina. Another attempt with the same technique, again paying close attention to patiently removing as much fluid over the PFCL as possible, yielded the same results. The scleral buckle was then loosened significantly and the same technique was attempted. This time, the retina did not slip. We hypothesize that excessive cerclage effect of the encircling scleral buckle promoted posterior slippage which was resolved by loosening the buckle (Video 131.15).

Posterior slippage of the retina in the setting of a GRT-related retinal detachment is generally from anterior fluid (i.e., the layer of fluid between the PFCL and the infused air) displaced posteriorly through the large break. To minimize this effect, it is important to remove all of the anterior fluid in the vitreous cavity before removing the PFCL under air along with any anterior subretinal fluid above the PFCL meniscus by extruding over the break.

In this case, presumable there was the additional factor of excessive 360° of scleral buckle indentation. A “high” indentation may be undesirable and, therefore, best avoided to minimize slippage. Furthermore, there is no proof that encircling significantly enhances the success rate of vitrectomy for retinal detachment repair, with or without GRT. Many surgeons would argue that this combined approach (i.e., PPV plus SB) is not necessary and only adds to the surgical morbidity.

**PVR AND SUBRETINAL MEMBRANE**

Stanislao Rizzo

Subretinal membranes are associated with rhegmatogenous retinal detachment due to proliferative vitreoretinopathy (PVR). Several surgical techniques are available for the removal of subretinal membranes during PVR surgery.

When the subretinal membrane is in the form of branching bands and the extent of the membrane can be visualized through the retina, the membrane can be removed using forceps passed through preexisting retinal breaks or small
131-6 PART 1 Surgical Retina

Vitreous incarceration may be avoided by:

1. Thorough removal of the peripheral vitreous around the sclerotomy sites.
2. Careful examination of the peripheral retina around sclerotomy sites using scleral depression.
3. Avoiding increased IOP during trocar removal.
4. Performing a partial air–fluid exchange to have air seal the sclerotomies.
5. Placing the light pipe inside the cannula during its removal (pushing back incarcerated vitreous).
6. Inspecting the sclerotomy sites for vitreous strands.
7. Suturing the leaking sclerotomies.

Vitreous incarceration does not always cause peripheral breaks or detachments, but can potentially be a tract for entry of bacteria into the eye and consequent endophthalmitis as well. During the postoperative period it can only be detected if the peripheral retina is visualized and a peripheral break or detachment occurs. The management is to treat the secondary complications that ensue, namely new breaks, opening of existing breaks, and redetachment.

The 62-year-old female patient in Video 131.18 presented with a pseudophakic total rhegmatogenous retinal detachment with one tear identified at 11 o’clock. Since the patient had to travel by air she did not want a gas bubble in the eye. It was decided to proceed with a scleral buckling procedure and an encircling scleral buckle with a 41 band was placed around the eye under visualization with microscope. The band was measured and was left with a circumference of 70 mm. A trochar-cannula with a chandelier light was inserted into the eye to serve as light source. The fundus was visualized under the microscope using the wide-angle viewing system. A vitrectomy was not performed.

External drainage was performed by scleral cutdown: applying cautery to the scleral edges and choroidal bed, and puncturing the choroid with a 30G needle under direct visualization with the microscope. The chandelier light was removed and an illuminated endolaser probe was inserted into the eye through the same cannula to laser around the break. The cannula was removed, the sclerotomy site was not sutured, and the conjunctiva was closed. On the first postoperative day the retina was completely attached. A week later the patient returned with a recurrent retinal detachment and a break near the sclerotomy site (for chandelier light) with vitreous strand visible incarcerating into the sclerotomy. A reoperation was recommended and pars plana vitrectomy was performed with SF6 gas and additional laser treatment. The retina has remained attached.

ARGUS II ARRAY IMPLANTATION

J. Fernando Arevalo

In Video 131.19 an Argus II array was implanted in the usual manner in a retinitis pigmentosa (RP) patient with bare light perception vision. Core and peripheral vitrectomy was performed with the assistance of triamcinolone acetonide. The microelectrode array was then inserted through a temporal sclerotomy (5.2 mm). The array was positioned over the macula, and then tacked using a custom retinal tack. However, the retinal tack dislodged from the implant, and fell into the vitreous cavity. The retinal tack needed to be removed, similar to an intraocular foreign body (IOFB). The microelectrode array was then placed again over the macula and was stabilized using a new retinal tack without any further issues.

Pearls on how to avoid this complication:

- Open a large inferonasal sclerotomy to tack the array and enlarge it further if necessary (19G).
Complications in Vitreoretinal Surgery 131-7

At this point the patient was referred to our department. The visual acuity was light perception. The cornea was reasonably clear but there was a large corneoscleral wound involving the center. The temporal half of the iris was missing and nasally there were points of iris root dislocation with a mild hyphema. B-scan ultrasonography confirmed the diagnosis of a total retinal detachment.

Twenty-gauge vitrectomy was started by inserting an illuminated infusion cannula. After the removal of the blood, a total retinal detachment with extensive proliferative vitreoretinopathy and multiple posterior retinal breaks was visualized; these perhaps resulted from multiple unsuccessful attempts to remove the large piece of glass. The foreign body was located in the inferonasal quadrant, with an irregular triangular shape. The length was around 15 mm width 9 mm.

A basket that is generally utilized by the urologists for the removal of kidney stones was used to remove the foreign body. This retractable instrument with a diameter of 1.1 mm was introduced through an enlarged sclerotomy site. With this device, a thin network made of memory metal was then extruded inside the eye paying attention not to touch the retina while trying to engage the object with the basket. The large piece of glass is gently moved inside the basket with the help of an illuminated spatula, which permitted us to lift it up from the retina and guide it toward the metal network. The illumination from the spatula allowed us to overcome the shadow that was projected by the large foreign body. (When the object is large, it is crucial to start the maneuver from the most posterior part. In this way, you promote a spontaneous movement inside the basket due to the gravity and prevent it from rotating and getting stuck in the retina.) Finally, the metal network was retracted with the object inside. Once brought behind the iris plane the large size of the foreign body could be appreciated. The next step was to find the least invasive method of taking the basket with the object inside it out of the eye. In general, when the foreign body is firmly held with an instrument, it is best to enlarge the same sclerotomy with the other hand and remove it through a scleral incision at 3–4 mm posterior to the limbus. However, in this case we would have cut the sclera for more than one quadrant in addition to the extensive corneal wound and the corneoscleral incision already present in the superonasal quadrant. We chose to reopen the corneoscleral incision used during the previous operation. But this approach was tricky because the slippery foreign body needed to be regrasped. In order to reduce the risk of dropping the foreign body, the basket was directed toward the corneoscleral incision that was kept open with a spatula and then the basket was slowly opened while with the left hand the piece of glass was grasped with forceps. The basket was retracted after at least one-third of the foreign body was extruded with forceps. The wound was sutured, the membranes were removed, the retina was flattened, and silicone oil tamponade was injected.

The accompanying videos for this chapter can be found online at http://www.expertconsult.linkling.com.