

**EXPULSIVE SUBCHOROIDAL HEMORRHAGE
ASSOCIATED WITH CATARACT EXTRACTION:
REPORT OF A CASE WITH SURVIVAL OF
THE EYE***

BY *John W. Henderson, M.D.*

SEVERAL YEARS AGO while performing an operation for cataract on the only useful eye of a 42-year-old man, I was confronted with "one of the most appalling experiences that may befall an ophthalmic surgeon" (1). Just as a successful intracapsular delivery of the lens was being completed, there was a gush of vitreous. When I looked into the eye to see what might be responsible for the precipitous loss of vitreous, I observed in the vitreous chamber a dark reddish brown mass which was increasing in size as it welled toward the pupil. Although I had not previously encountered such a situation, the color of the expanding mass could mean only an expulsive hemorrhage from the choroid. My initial recognition of this feared complication was accompanied by that feeling of anguish which must affect every ophthalmic surgeon when a patient is about to be hopelessly blinded by circumstances seemingly beyond his control. But after those first seconds, I remembered reading somewhere (I knew not where) that such eyes had been saved by immediate sclerotomy and evacuation of the blood. The truth of the old saying, "the hand is quicker than the eye," permits me to report here on the escape of both myself and the patient from this near catastrophe, and on the follow-up of eight years which was possible.

REVIEW OF LITERATURE

Sir Henry Holland, who has had very extensive experience with cataract surgery, stated that expulsive hemorrhage is "the gravest of all complications at the time of surgery" (2). The gravity of this complication and its catastrophic effect on the future of the involved eye

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have been mentioned by all ophthalmologists who have written on the subject. Vail (3) aptly refers to it as the "bête noire of the ophthalmic surgeon."

As the reader can readily understand, attempts to evaluate the incidence of expulsive hemorrhage have probably been hindered by the reticence of ophthalmic surgeons to publish details of such unfortunate cases. However, most ophthalmologists consider this complication at the time of operation rare. Owens and Hughes (4), in a review of 2,086 extractions of uncomplicated senile cataract performed at the Wilmer Ophthalmological Institute, found that expulsive hemorrhage at the time of operation occurred in one patient. Pfingst (1) observed two cases in a series of 2,500 extractions. In both of these cases the eyes became phthisic.

Pau (5) recently reported his observations on the incidence of expulsive hemorrhage in 1,520 cataract operations. He also collected 59 cases from the world literature in which expulsive hemorrhage occurred at, or at various intervals after, operations for cataract. In approximately a third (17 of these 59 cases), the hemorrhage had occurred at the time of extraction, and in another third (22 cases), within 12 hours after operation.

Vail (3) first recorded the successful treatment of an expulsive hemorrhage following extraction of a cataract, with survival of the eye. He had the unusual experience of observing the expulsive hemorrhage at the time of the first dressing on the day following the operation. His successful treatment of the hemorrhage was based on a prior report of Verhoeff (6). To Verhoeff then goes the credit for devising a treatment for expulsive hemorrhage that has proved helpful to others faced with this catastrophe. In 1915, he told of a case in which the expulsive hemorrhage occurred at the completion of an operation for glaucoma. About four hours after operation Verhoeff performed several scleral punctures in the globe with release of the hemorrhage and survival of the eye.

Vail (3), in addition to the case of hemorrhage following an operation for cataract, included in his report a case in which the expulsive hemorrhage followed iridectomy for glaucoma. A sclerotomy was performed immediately with release of the hemorrhage and survival of the eye.

The first instance of a hemorrhage occurring at the time of extraction of a cataract with the immediate and successful application of Verhoeff's sclerotomy was reported by Duehr and Hogenson (7). In this case, several factors, such as previous trauma to the eye, loss of fluid

vitreous with collapse of globe during operation, and a difficult and prolonged delivery, may have contributed to the onset of the hemorrhage. In the case that I wish to report there do not seem to be any factors which, in retrospect, would have made it possible to have anticipated such a complication.

REPORT OF CASE

The patient, a man aged 42 years, came to the Mayo Clinic on January 17, 1951. He stated that he had had poor vision in each eye for approximately four years. On March 21, 1950, in a nearby city he had undergone an operation for cataract in the left eye. The patient felt that this eye had never healed satisfactorily, and the visual result was unsatisfactory.

Examination of the eyes revealed visual acuity of 20/200 in the right eye, and ability to recognize hand movements only with the left eye. An immature cataract, chiefly nuclear in type, accounted for the poor vision in the right eye. Bullous keratitis was present in the left eye. Absolute glaucoma eventually developed in this eye and necessitated evisceration in April, 1955. No further mention will be made of this eye. Refraction of the right eye in January, 1951, did not bring about any significant improvement in vision. The patient felt so handicapped that he requested removal of the cataract although he possessed the usual apprehensions so frequent among individuals confronted with an operation on their only useful eye.

The operation for removal of the cataract was performed on February 21, 1951. A survey of the patient's general physical status had not revealed any contraindication to this type of ocular operation. The patient was given the usual amounts of secobarbital (Seconal) and codeine (the drugs in standard use at that time) as preliminary medication. In the 11 min. immediately preceding the operation, a total of 4 c.c. (12 mg.) of a preparation of d-tubocurarine was slowly administered by vein. The ocular rotations were then examined (as was customary) to determine whether the level of akinesia was adequate. Previously 10 percent solution of cocaine had been instilled on the surface of the eye for the purpose of analgesia.

A corneoscleral guide suture was placed at the limbus of the 12 o'clock meridian. A corneal section was made with the Graefe knife cutting the guide suture in the midportion of its tract. As the section was completed, there was a definite forward movement of the lens-iris diaphragm so that the anterior chamber became very shallow and the upper portion of the iris prolapsed between the lips of the incision. I made several attempts to reposit the iris into the anterior chamber, but I did not succeed. At this point I thought that the behavior of the eye might be due to squeezing of the globe by the extraocular muscles with a resulting elevation of the so-called "vitreous pressure." An additional 1 c.c. of d-tubocurarine was given intravenously to the patient. I waited a few minutes for the anterior chamber

to deepen, and when it did not do so, I performed a complete sector iridectomy although it had been my original intention to perform a "round pupil" extraction.

I grasped the lens near its lower pole with the capsule forceps and counterpressure was applied at the 6 o'clock limbus. I was agreeably surprised that the zonule gave way easily and the lens was rather quickly tumbled intact from the eye, for I had anticipated a tussle in performing an intracapsular extraction in an individual as young as this patient. However, consternation and near panic followed as the vitreous blurred precipitously out of the eye and the unmistakable red-brown mass of expulsive hemorrhage from the choroid rose inexorably toward the pupil and its ultimate freedom from the confines of the eye.

At this point the initial double loop of a surgeon's knot was made in the corneoscleral suture and the gaping incision was approximated as well as possible against the rising intraocular pressure. The point of a Graefe knife was then plunged into the lower nasal quadrant of the globe along a line corresponding to the ora serrata. A large amount of bright red blood immediately rushed through the sclerotomy and within a few seconds the brownish red mass observed through the pupil seemed to collapse. Additional 5-0 black silk sutures were then placed across the incision at the 11 and 1 o'clock meridians of the limbus. By this time the seepage of blood through the sclerotomy had almost stopped, but it became evident as I watched the color reflex through the pupil that the brownish red mass was again forming. The Graefe knife was inserted again through the initial sclerotomy puncture and the blade slightly rotated. An additional amount of bright red blood gushed from the eye. When I was reasonably certain that no further decompression was possible by manipulation of the blade of the knife, the knife was withdrawn. The sclerotomy was not closed by sutures. When the telltale mass did not reappear in the pupil of the eye after a wait of several minutes, atropine was instilled and a patch was applied.

The eye was not disturbed for 40 hours. At the first dressing a small amount of reddish-tinged serum was observed on the bandage, the globe was congested, and the media was so hazy that the fundus of the eye could not be seen through the ophthalmoscope. A 1 percent solution of atropine and a 2.5 percent solution of cortisone (Cortone) were dropped into the eye, and the eye was repatched. The eye was dressed daily thereafter. The congestion of the globe gradually subsided, and the media began to clear. As the interior of the eye became visible with the ophthalmoscope, a brownish black reflex was noted across the two lower quadrants. This reflex was similar to that usually seen with choroidal detachments following operation for cataract. In several weeks the detachment of the choroid disappeared. One month after the operation, vision in the eye was 20/40 with a suitable correction for the aphakia. One and a half months after operation vision was 20/25 with the aid of a +7.25 sphere combined with a +1.50 cylinder at axis 147. Ophthalmoscopic examination revealed a



FIGURE 1. APPEARANCE OF EYE 7 YEARS AFTER OPERATION

spotty pigmentation of the retina in the lower nasal quadrant similar to the pigmentation that follows surface diathermy.

By this time the progress and recovery of the eye had seemed so miraculous that the patient was dismissed. The future for the patient and his only useful eye seemed rosy.

Re-examination of the eye one year after operation, however, revealed an elevation of the intraocular pressure. Treatment with pilocarpine was started.

Subsequent examinations were performed at intervals of six months. Gradually the intraocular pressure increased and became resistant to control by miotics. The eye became sensitized to DFP (diisopropyl fluorophosphate) and eserine. Various drugs were used locally in the eye as a replacement for pilocarpine which had lost its effectiveness, but to no avail. By 1955, four years after the operation, the visual field began to show peripheral contraction. The topical measures were supplemented with oral administration of acetazolamide (Diamox), but the eye gradually became tolerant to this treatment and the intraocular pressure could not be lowered beyond the 35 to 40 range (Schjøtz).

In August, 1956, cyclodiathermy was performed. This operation consisted of a single row of penetrating diathermy across the two upper quadrants of the pars plana of the ciliary body. The effect of this operation lasted for several weeks, but then it was found necessary to resume the local instillation of a miotic.

At the present writing (October, 1958), the patient is on a regimen consisting of the application of a 4 percent solution of pilocarpine four times a day as drops into the eye and of ethoxzolamide (6-ethoxy-benzothiazole-2-sulfonamide) (Cardrase) 125 mg. twice a day. The intraocular pressure

hovers in the high 20's and low 30's range of the Schiøtz tonometer. The color of the optic disc remains good, but a rather large cup is present temporally. The isopters for the 3 mm. white test object at 1/3 m. on the perimeter show a 10° nasal contraction and a 20° temporal contraction of the visual field. The corrected vision of the eye is not better than 20/40. The eye approximately seven years after operation is illustrated in Figure 1.

COMMENT

The question of whether a calamitous complication such as expulsive hemorrhage at the time of intraocular operation can or cannot be prevented is debated in all the publications and textbooks that have touched on this subject. Some observers consider that arteriosclerosis, vascular hypertension, and senility may predispose to such a disaster and that proper selection of patients may lessen the chance of this complication. Since the patient just presented did not have any of the attributes that are considered to predispose to expulsive hemorrhage and because I have operated on many older individuals with known weaknesses of the vascular tree without this complication, I am inclined to believe that expulsive hemorrhage occurring at the time of operation cannot be foreseen. Chandler (8) in a recent symposium on the complications of cataract extraction expressed a similar opinion.

Although an immediate evacuation of the blood by puncturing the globe with the point of a knife has seemed to be a factor in the successful outcome in the few cases reported in the American literature, other methods for handling the situation have been proposed. Gross and Fromaget (9) prevented loss of the eye by trephining the sclera. Regan (10), who seemed to be dealing with a less violent type of hemorrhage in the case that he reported, performed venesection with withdrawal of 660 c.c. of blood. Arruga (11) suggested an opticociliary neurotomy, which in his experience has permitted conservation of the eye in good condition. In recalling the alarming appearance of the eye in my case, I am dubious that an opticociliary neurotomy would have helped much. Several observers have proposed that the incision be quickly closed at the time of hemorrhage and the blood be evacuated from the eye several hours or several days later. With the present case in mind, I raise the question as to whether anything is to be gained by waiting. Finally, the method of management that seems most frequently employed should be mentioned, that is, the eye is patched and removed several days later.

The surgical manipulations required to release the expulsive hemorrhage among the eyes that have survived this complication varied a

little in their applications. In the four cases previously published, a knife was used to open the globe. Verhoeff's case required three punctures in three different places, Duehr reopened the one sclerotomy in his case six times, and Vail was able to evacuate the blood in each of his cases by one puncture of the eye. In my case it was necessary to reopen the sclerotomy once.

I estimated that less than 15 c.c. of blood was lost in my case and the hemorrhage seemed to stop within 5 min. In Duehr and Hogenson's case 30 c.c. of blood was evacuated in 30 min.

The period of follow-up in one of Vail's cases was approximately two and a half years and in the other case one month. In Duehr and Hogenson's (7) case it was approximately six months.

SUMMARY

In the case presented, an expulsive subchoroidal hemorrhage occurred at the time of a cataract operation on a 42-year-old man. The surgical manipulations employed to evacuate the blood and save the eye and the ultimate survival of the eye with useful vision have been described. Other interesting features of the case were the occurrence of this rare complication in the patient's only useful eye, the long period (eight years) of observation following operation, and the ultimate development of secondary glaucoma requiring further operation on the eye.

The case recorded represents the second published instance in the American literature of survival of an eye after an expulsive hemorrhage at the time of a cataract operation and the fifth in the American literature of survival following intraocular operation.

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DISCUSSION

DR. ROBISON D. HARLEY. Dr. Henderson has certainly provided us with a dramatic and exciting account of all the harrowing experiences to be encountered when dealing with a one-eyed patient, experiences which only an ophthalmic surgeon could fully appreciate. Since I had the opportunity of reviewing his paper in detail before hand, I cannot help but admire his courage and decisive action in the face of overwhelming odds.

Unless one has become a surgeon of great experience with a completely disciplined mind, it is natural to encounter a wave of panic when confronted with this hemorrhagic catastrophe. It is interesting to note that in a standard book on *Ophthalmic Surgery*, published within the last ten years, it states that for expulsive hemorrhage following cataract extraction one is faced with the problem of doing an immediate surgical evisceration with the consent of the patient or of putting a dressing on the eye, sending the patient from the operating room, and doing the evisceration later.

A thought-provoking paper such as this one by Dr. Henderson would always be a good choice when talking to ophthalmic surgeons, but it is particularly timely this year when one recalls that our President, Derrick Vail, in 1938, reported the second and third cases of successful management of expulsive subchoroidal hemorrhage. He employed Verhoeff's method of sclerotomy as soon as possible after the diagnosis was made. Verhoeff in 1915 was the first to report the successful retention of a functioning eye with release of the subchoroidal hemorrhage by sclerotomy. Our Society deserves to be proud of the pioneering efforts of these men in showing us how to deal with this disastrous complication.

There are two important considerations one can derive from Dr. Henderson's paper: first, the knowledge of how one can satisfactorily manage such a complication when it is recognized; second, the opportunity which is offered of reviewing the factors that might be concerned in the etiology of this disorder.

In the first place, unless one has a well-planned, previously conceived method for dealing with this emergency it is unlikely that one will perform with one's best efforts. A planned operation for the evacuation of the hemorrhage can be quickly and efficiently executed should the occasion demand. The experiences of Verhoeff, Vail, Arruga, Gross and Fromaget, Regan, Henderson and others have shown us that eyes can be saved in spite of this disturbing complication.

Concerning the etiology of expulsive hemorrhage, numerous factors have been suspected. Henderson and Chandler are inclined to believe that expulsive hemorrhage occurring at the time of surgery cannot be foreseen and that arteriosclerosis, vascular hypertension, and vitreous loss are uncertain factors.

DeVoe carefully analyzed 453 consecutive cataract extractions for postoperative hemorrhage. Age, time of year, systolic and diastolic pressure, the presence of diabetes or syphilis, and elevated intraocular pressure were not found to be related to postoperative hemorrhage. The type of operation used, presence or absence of retrolbulbar injection, type of suturing or skill of the surgeon were not significant factors either.

In over 18,000 cataract extractions reported in the literature, the incidence of expulsive hemorrhage was 0.3 percent, according to Owens and Hughes. Such hemorrhages have been reported as occurring in patients as young as 25 years of age. Of 15 reported cases in which the blood pressure was stated, the systolic pressure was greater than 140 mm. of mercury in only five, the highest being 180 mm.

My personal experience with expulsive subchoroidal hemorrhage consists of two cases:

CASE 1. A large dark mass resembling a solid detachment was observed behind the pupil 24 hours after an uncomplicated intracapsular cataract extraction. Following two scleral trephines, approximately 5 c.c. of black liquefied blood were aspirated through the scleral openings. The gray-brown mass receded with retention of the eye and 20/400 vision. The patient was a known pernicious anemia victim who discontinued treatment without our knowledge and at the time of surgery her red blood cell count was reduced to 3.1 million.

CASE 2. An uncomplicated iridencleisis was performed upon a 70-year-old patient in whom a spontaneous subchoroidal hemorrhage occurred during the first night after the operation. She had had a profound anemia secondary to blood loss from chronic gastrointestinal bleeding. Prior to surgery she received therapy for three months with liver, iron, vitamin B₁₂, and blood transfusions. Her physician finally reasoned it would be permissible to operate even though the anemia persisted. An effort was made to remove the blood from the anterior chamber and the subchoroidal space by sclerotomy, but all light perception was lost and gradually the eye became phthisical.

Polycythemia is a known cause of hemorrhage complicating intraocular surgery. It has been my experience that other disorders of the blood in the form of anemias with disturbances in the blood constituents may be a contributing factor.

Congenital or acquired defects in the choroidal vessel wall, such as a small aneurysmal dilatation, deserve mention as a possible site of origin for expulsive hemorrhage.

Dr. Henderson is to be congratulated upon this interesting presentation and the courage he displayed in handling a difficult complication.

DR. DERRICK VAIL. This subject has been adequately covered, and I have nothing to add, except that the drama of the moment is an exceedingly exciting one, and I can promise you that an electrocardiogram attached to the surgeon at that moment would show a sudden spike in the EKG.

DR. ARTHUR J. BEDELL. When I read the title of Dr. Henderson's article, I was prompted to get out the record of a woman who when first examined was 43 years old with 20/20 vision in each eye. She had always been thin, pale, and of a neurotic disposition, the result of "brain vessel sclerosis with moderate hypertension."

When 73 years of age, she was admitted to St. Peter's Hospital for the removal of the right nuclear cataract. After the usual preoperative and table preparation she was given pentothal. A Graefe knife section was made at the limbus with a broad conjunctival flap. Two black silk sutures were then placed and a small complete iridectomy done. The lens was grasped with Arruga forceps and brought well into the incision where it was looped in capsule with little trauma. The sutures were tied and both eyes padded.

Shortly after she returned to her room, blood appeared on the dressing and through the night a profuse hemorrhage continued. Early the next morning an immense mass of vitreous and blood protruded between her widely separated lids. Under cocaine anesthesia this was excised close to the limbus. The reaction was very marked with extreme conjunctival edema which was controlled by aureomycin locally every two hours and penicillin 400,000 units subcutaneously.

She returned home and the wound closed, leaving a white eye with only slight retraction at the limbus.

The photograph here exhibited taken three years after operation shows a quiet eye, with a wide superior arc of corneal opacity, minimal limbus retraction, deep anterior chamber with an updrawn, oval pupil. No increased intraocular tension, no new vessels in the iris, and no unusual pigmentation have been seen.

Here we have not a threatened expulsion, but a case where the entire vitreous and a large hemorrhage were actually extruded through the corneal wound; yet the eyeball was saved.

DR. RALPH W. DANIELSON. I wish to make two very short reports. The first one almost made me wish to give up the practice of ophthalmology. I had been in my residency for two months when a lady came in for cataract extraction and we had one of these unfortunate expulsive hemorrhages. A year later she came in with a completely mature cataract of the other eye and the question came up whether surgery should be done. The head of our Eye Department at the time said that a hemorrhage would, in all proba-

bility, not happen in the second eye. He had never known it to occur. A cataract extraction was undertaken, and the patient immediately had another expulsive hemorrhage. She was, of course, completely blind as a result. I wonder if any of you have ever seen a double, or bilateral, case.

The next case I wish to report occurred after I had been out in private practice about a year. When I dressed the patient's eye the morning after cataract extraction, the patient said that she had had pain during the night. When I took the dressing off the eye, I could see a mammoth blood clot hanging from between the eyelids. With heavy heart and shaking fingers, I removed this clot very, very carefully, bit by bit, and opened the lid, and to my great amazement and relief, discovered it had all come from the conjunctival flap, and the eye was perfect.

DR. RAMÓN CASTROVIEJO. I should like to comment on this paper, because I have had an experience with what might be called an abortive expulsive hemorrhage in two eyes of the same patient. It is not similar to the case of Dr. Henderson, which was a true expulsive hemorrhage, or to the one discussed by Dr. Bedell. My patient was affected with bilateral senile cataracts. In the first eye the operation was performed preplacing before the extraction three corneoscleral sutures. The lens was delivered, the three corneoscleral sutures were tied, and at that moment the vitreous began to prolapse and a dark area of the fundus could be seen coming forward. There was no time to do anything except to close the wound tightly with additional corneoscleral sutures. Air could not be injected into the anterior chamber. Postoperative recovery took place with a flat anterior chamber and a very extensive choroidal detachment, which subsided gradually with a final vision close to 20/20. At the time of the operation on the second eye, a note was dictated remarking that the same complication might be duplicated in the second eye. To be better prepared for this possible complication, five corneoscleral sutures were preplaced before the delivery of the cataract. The cataract was delivered without difficulty, and before we had time to tie the second corneoscleral suture the vitreous began to prolapse in the same fashion as in the first eye, with what appeared to be another abortive choroidal hemorrhage. The remaining corneoscleral sutures were tied and additional ones placed. The second eye also recovered with a flat anterior chamber and extensive choroidal detachment lasting several weeks. The choroidal detachment receded, and final vision in both eyes remained at 20/25 for several years. The maneuver of draining the choroidal hemorrhage at the time of operation described by Dr. Henderson would probably have considerably shortened the postoperative course in this patient. The interesting feature in this patient, where the abortive choroidal detachment occurred in the first eye, was the anticipated similar complication in the second eye which did take place, and the final recovery of vision in both eyes within fairly normal limits.

DR. FREDERICK C. CORDES. Through the courtesy of the AFIP and some of my friends I am at present studying 112 eyes which were lost following congenital cataract surgery, and it is interesting in that group of 112 eyes there were four expulsive hemorrhages, three of them occurring on the table, the fourth the next day. The age of the patients was between four months and 21 years. In each case there was a linear extraction. I think we should keep in mind this possibility and be prepared to proceed as Dr. Henderson has outlined if the expulsive hemorrhage occurs on the table.

DR. WENDELL L. HUGHES. I have enjoyed the report of Dr. Henderson's remarkable case and should like to add the report of another case in which the eye was saved with, however, rather serious postoperative complications four months later.

CASE REPORT. A man, age 35, was first seen October, 1956, with absolute glaucoma in the right eye with no light perception, and vision of 20/70 in the left eye. Moderately advanced nuclear sclerosis and some peripheral cortical changes in the lens of this eye, with vision unimproved by lenses, were noted. Tension of the left eye was found to be 27 mm. mercury. Peripheral limits of the field were normal to 3/330 object. The size of the blind spot was normal. He was placed on Diamox, 250 mg., four times daily, and pilocarpine, 2 percent, in the left eye four times daily. Gonioscopic examination revealed many peripheral adhesions with closure of most of the angle in the left eye. The patient was seen again nine days later, at which time the tension had been reduced to 15 mm. mercury, and three days later he returned with a tension of 45 mm. mercury in the left eye. Enucleation of the right eye was advised and carried out October 26, 1956.

The pathologic report (by Dr. M. Hogan and Dr. F. R. Harriker) follows:
Clinical diagnosis (right eye). Absolute glaucoma.

Clinical history. The patient's eye was injured when he was a child. The eye was enucleated October 26, 1956, because of chronic irritation and possible intraocular tumor.

Gross examination. The eye was enlarged with a hazy cornea and deep anterior chamber. The pupil was irregular and the vitreous liquefied and blood-stained. There was a total retinal detachment. The lens was dislocated posteriorly to the equator. There was an extensive choroidal exudate around the disc, containing bone.

Microscopic examination. The entire eye shows considerable postmortem degeneration due to the late fixation. There is considerable inflammation of the conjunctiva and peripheral cornea. There are marked peripheral anterior synechias on one side and low-grade iridocyclitis. The lens has been injured and dislocated and is completely cataractous. There is a suprachoroidal hemorrhage. The retina is completely detached and almost completely disorganized. Bone is present in the choroid around the disc.

Diagnosis. Atrophy, bulbi, traumatic.

Comment. The extensive changes around the disc and the total retinal separation make the most likely diagnosis in this eye a retinal detachment due to injury. At the present time there is no evidence of a previous uveitis.

The tension of the left eye varied from 23 to 35 under glaucoma therapy, local and general. By November 21 there was some contraction of the field and it was decided to remove the cataract from the left eye and at the same time perform an anterior sclerectomy with iris inclusion. This was done according to the technique reported before this Society in 1955. Shortly after the incision was made at the limbus and before the lens was removed, the patient complained of a sudden sharp severe pain in the eye and the upper part of the iris was seen to bulge forward, and iris and lens presented in the wound, and the lens capsule ruptured. The wound was pulled together with the sutures that had already been placed and an immediate sclerotomy was made at 12 o'clock over the pars plana. A considerable amount of blood escaped through this wound and the intra-ocular pressure seemed somewhat relieved. After about 20 min., when no further developments were seen, the limbal wound was gently opened and the remaining portion of the soft lens matter and nucleus was eased out of the anterior chamber with a lens loop. The choroid could be seen bulging convexly forward into the pupil temporally and above. One pillar of the iris was laid out in the prepared limbal sclerectomy opening and the mattress sutures pulled tight to close the corneoscleral wound. Additional sutures were placed in the conjunctival flap to reinforce the wound and a drop of atropine was instilled.

Subsequent course. There was stringy hemorrhage seen in the anterior chamber, and on the fifth day postoperatively the hemorrhage in the anterior chamber seemed to be increased, with the iris pushed forward against the cornea. The patient was unable at this time to be sure that light could be recognized. Four days later he began to notice light perception and the anterior chamber depth increased to normal appearance. The aqueous appeared somewhat cloudy. The choroid could still be seen in the upper temporal part of the pupil. When he was discharged from the hospital on the fourteenth postoperative day, his eye was sensitive to light and the anterior chamber was of good depth, the iris was visible, and in fairly normal position. On December 29, five weeks after surgery, the patient's vision was found to be 20/100 with a +10.00 lens. One month later vision was found to be 20/40 with a +7.25s+2.25c \times 145. The fundus could be quite clearly seen. There was a small blood clot at the margin of the iris adjacent to the lower part of the pupil. There was still considerable congestion of the eye. Two and one-half months after the operation vision had improved to 20/30 +4 with +8.25s+2.50c \times 125. The patient was not seen again for another month at which time he noticed that he had a blur over his left eye and when seen March 27, 1957, four months from operation, a detachment of the retina was found in the

lower part of the fundus with a hole in the lower nasal portion and two more holes below at about the 6 o'clock position. He was referred to Dr. Graham Clark for treatment for the detachment of the retina. The only treatment that this man had was Trypsin intramuscularly given twice daily postoperatively, atropine for one week, and after nine days hot compresses, zinc sulphate, and Metimyd ointment. The tension postoperatively remained normal at all times.

Discussion. In this remarkable case, the eye was saved, I believe, by a fortunate incision over a point near the source of the hemorrhage. One could see the iris and lens bulging forward into the pupillary area from above; so the sclerotomy opening was made above the 12 o'clock position in the pars plana. We were fortunate enough to obtain a good flow of blood which stopped within about 10 min. I feel also that the Trypsin aided materially in the rapidity of absorption of the hemorrhage postoperatively. The bleeding and clotting time, blood pressure, blood count, and general examination were all normal.

DR. CONRAD BERENS. Dr. Danielson asked whether anyone had had the unfortunate experience of having expulsive hemorrhages occur in both eyes of a patient. It has happened to me at the New York Eye and Ear Infirmary. Dr. Romaine told me before an operation, "We have a patient who has had an expulsive hemorrhage in one eye with a cataract in the second eye." During the extraction the patient had an expulsive hemorrhage, but I did not have the sense to do what was done by Dr. Henderson, and the second eye was lost.

Because of good results without puncturing the sclera, the following report may be of interest. A young ophthalmologist who had been injured in the left eye twice as a young boy—once with an arrow—asked me to attempt an intracapsular extraction. With the patient under sodium pentothal, three subconjunctival corneoscleral sutures were preplaced. As the tumbled lens emerged from the wound, vitreous and blood appeared as the result of an expulsive type of hemorrhage. My associate, Dr. Carter, and I dragged on the conjunctiva and pressed on the wound. We were then able to tighten the sutures and close the wound. We thought of perforating the sclera, but decided not to. The retina and choroid were completely detached and could be seen back of the cornea. I asked Dr. DeVoe in consultation whether we should do anything to get the subchoroid material out, and he said no, to wait. We did wait, and the patient now has 20/20 vision with a contact lens, and even though he has some unpleasant subjective symptoms at times, he operates and plays tennis and has useful binocular vision.

DR. BISHAN NATH CONSUL. I have no experience in making the puncture described by Dr. Henderson, but certainly we do come across these expulsive hemorrhages. In a series of 200 cases, one or two will occur, and in these we can only put a few additional sutures and then wait. In 50 percent of the eyes, useful vision is obtained.

DR. CHARLES E. ILIFF. There is one symptom which has not been mentioned in expulsive hemorrhage. I have had two cases, one occurring under local and the other under general anesthesia. The one under general anesthesia occurred one and a half hours after the patient returned to the ward; so it does not enter into the picture. The patient under local anesthesia complained of very great pain as an initial symptom. This patient was a very stoic priest who had lost the first eye from an infection. The operation was done under local anesthesia because the patient had requested it. The first evidence of expulsive hemorrhage was severe and excruciating pain. The contents of the globe were expelled despite the fact that trephines were done and a great deal of blood was withdrawn. I was wondering whether anyone else had noted severe pain as the first evidence of an expulsive hemorrhage.

DR. HENDERSON. I am pleased with the amount of discussion that this case report has aroused, particularly from surgeons with much wider experience than my own.

It is true that many of these people have pain at the onset of the hemorrhage unless they are under general anesthesia. The pain has been reported by some patients as almost agonizing.

I am a little suspicious—a lot of this is in retrospect—that my patient had had a hemorrhage at the time the first eye was operated on. He never told me who did his first cataract operation, and I never inquired. He did say that he never recovered vision after he came back from the operating room. The doctor who performed the operation said, later on, that he thought the patient had had a hemorrhage in the eye; so possibly this man was one of those examples of the bilateral situation.

Let me thank Dr. Harley particularly for his discussion. He covered many of the points my time would not permit me to discuss.