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OFTALMOLOGIA Y OPTOMETRIA

KERATOPLASTY "A CHAUD"
RESULTS OF 52 CASES

BY

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Franchescetti and Deret [1] suggested the term of "Keratoplasty a chaud" to a group of therapeutic keratoplasty, covering such cases as acute or recidivant keratitis, corneal ulcerations and burns and reported the results of 11 cases.

Although the term of "Techtonic" on prophylactic keratoplasty were used the pionners of the so called keratoplasty a chaud are Nizetic [2], Löhlein [3], Filatov and Bajenova [4]. These authours used eye saving corneal graft operations for different cases of acute corneal inflammations.

Paufique [5,6] used therapeutic lamellar grafts in cases of acute suppurative keratitis, herpetic keratitis, ulcerous keratitis, dystrophic condition and tuberculous and syphilitic keratitis and obtained good results.

De Voe [7] reported the results of 40 cases of therapeutic keratoplasty, Kato [8] used preserved corneal grafts in 4 cases of rodent ulcer and Gudkovo [9] reported successful results obtained in cases of severe corneal pyosis by preserved corneal grafts.

Rycroft [10] used the term of keratoplasty a chaud, synonimous with therapeutic grafts or grafts during evolution, and defined this kind of operation, as "being executed during the evolutionary period or corneal affection, whether this be an irritative, inflammatory or degenerative nature" and included the following

Fig. 1. A: Hypopion ulcer resistent to treatment, L.E., in a
50-year-old male. Visión: L.P.

cases: Herpetic and disciform keratitis, torpid corneal ulcer, intracorneal abscess, acute interstisial keratitis, traumatie conditions and tumours.

In this article, excluding the cases of degenerative nature and tumours, we shall confine the subject to cases of active inflammations and ulcerations of cornea, in evolutionary period of the disease.
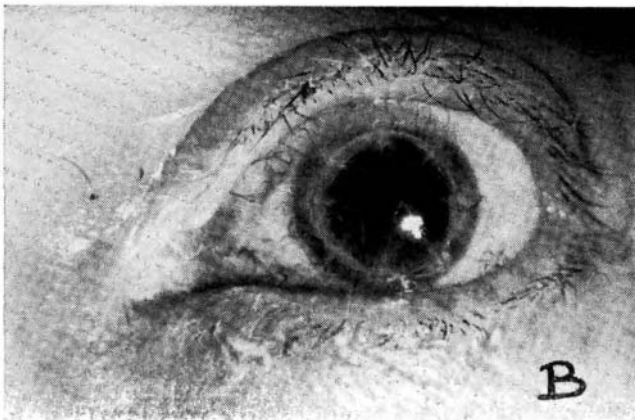
Fig. 1. B: Same eye, one mo. after a 8 mm. penetrating graft.
Vision: 0.1
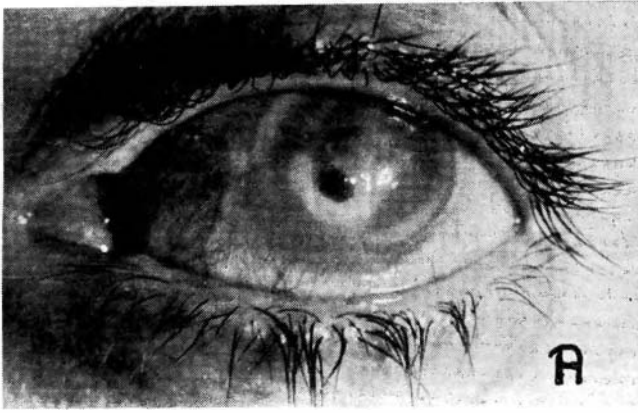
Fig. 2. A: Active keratitis and descematocele, L. E., in a 39
year old male. Vision: L.P.

During the last 2.5 years (1965-1967), in the Eye Bank and department of
Ophthalmology of Ankara University 52 cases of therapeutic keratoplasty on
active inflammatory stage were performed. This about 28.6%, of all corneal
graft operations made in this period (52 out of 181 cases).
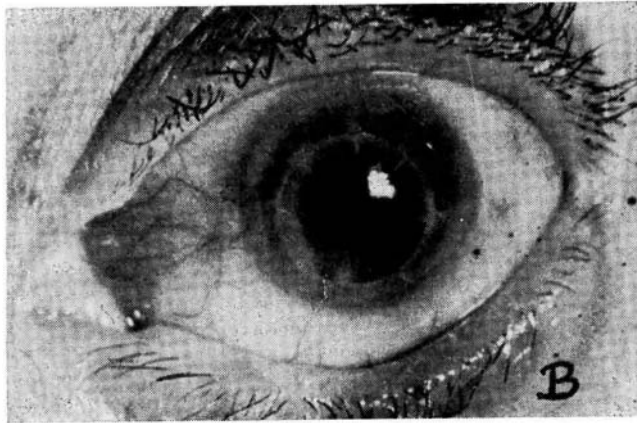
Fig. 2. B: Same eye, 2 mo. after a 7 mm. penetrating graft and
synechiotomy. Vision: 0.1

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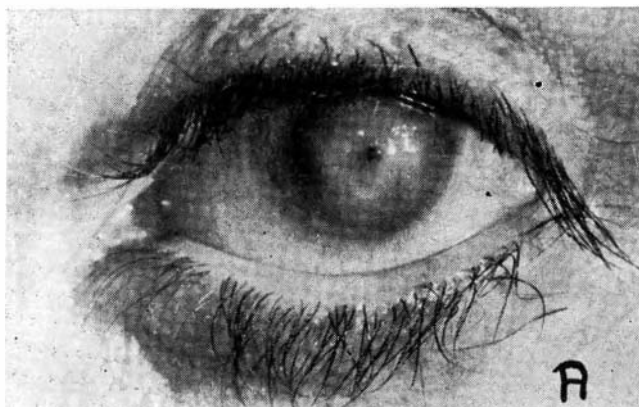
Fig. 3. A: Corneal fistula. L.E. in a 29-year-old male. 2 month ambulatory and 14 days of treatment in clinic failed. Vision: L.P.

7 cases had hypopion ulcer, resistant to treatment. Local and systemic therapy, including paracentesis and irrigations of anterior chamber with antibiotics, had failed. Average duration of preoperative treatment was about 50 days (Table). In 2 cases post-operative synechiotomy performed. 5 clear grafts were obtained
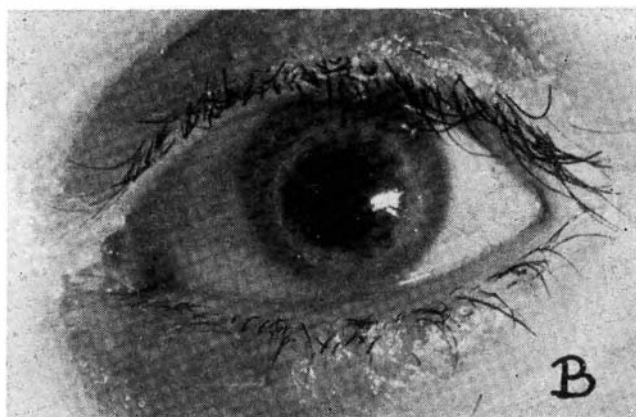
Fig. 3. B: Same eye, 5 mo. after a 7 mm. penetrating graft: 3 times synechiotomy and a peripheral iridencleisis. Ocular pressure 17 mm. Hg. Schiotz. Vision: After correction 0.6.
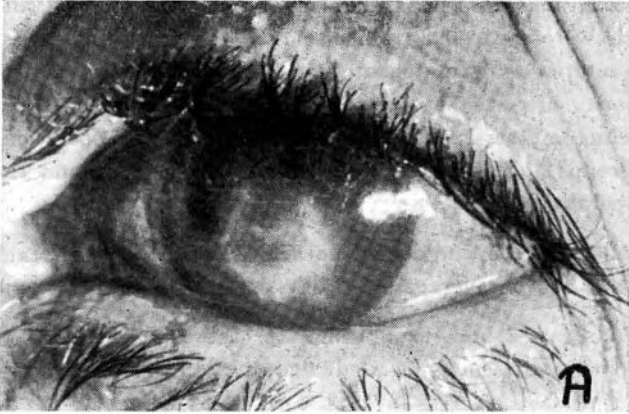
Fig. 4. A: Torpid herpetic ulcer of long stonding. L.E. in a 40-
year-old male. Vision: L.P.

(Fig. 1). 16 cases had active corneal inflamation and descematocele. 10 clear grafts were obtained (Fig. 2). 5 cases had corneal fistula. There were the most unfortunate cases. Massive anterior synechia, oclusio pupillae were common symptoms. After taking off the diseased part of cornea, the anterior chamber was irrigated with antibiotics. Fibrous membranous debris on the iris and lens
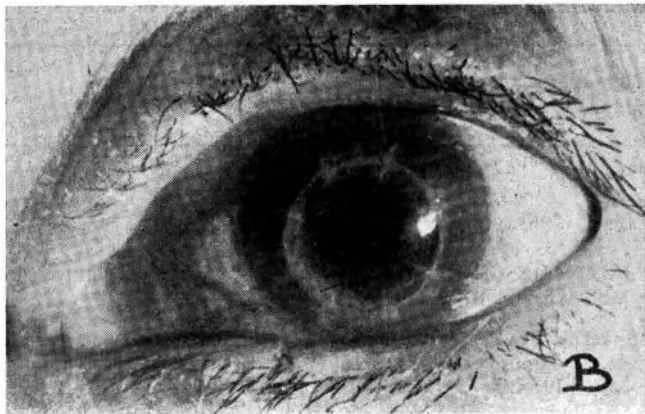
Fig. 4. B: Same eye, 2 mo. after a 7 mm. penetrating graft and
a synechiotomy. Vision: 0.5.

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were removed by on intracapsular forceps. Bleedings of iris were stopped and the peripheral parts of iris were separated from cornea. Then graft was placed and fixed with 16 direct sutures. Anterior chamber was filled with air through on amsler needle. In majority of cases some anterior synechias persisted. There were divided in 1-3 synechiotomy sessions. It some antiglaucomatous operations were perfomed. In this group 2 clear grafts were obtained (Fig. 3), and the other 3 had eye saving operations.

24 cases had metaherpetic keratitis and torpid corneal ulcers. 18 clear grafts were obtained (Fig. 4). They had on average of 49 days treatment without result.

In all groups size of grafts varied between 6-9 mm. 36 cases (50%) had 7 or 8 mm. grafts. Only 5 lamellar grafts could be used, remaining being penetrating.

TABLE: RESULTS OF THERAPEUTIC GRAFTS

Diagnosis	Nº of Cases	Average period of Preoperative Treatment		Number of Clear Grafts
		Ambulant	In Hospital	
Hypopion ulcer	7	20 days	1 mo.	5
Descemetocele	16	1 mo.	13 days	10
Corneal fistula	5	40 days	10 days	2
Meta herpetic keratitis and torpid corneal ulcers	24	36 days	13 days	18

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BILATERAL CATARACT EXTRACTION
WITH REVIEW OF 1000 CASES.

BY

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No doubt Bilateral Cataract Extraction in one sitting may appear new and exciting and has been condemned by many ophthalmologists because of the dangers of simultaneous loss of both eyes by one or other complication which may occur during or after the operation. But with the recent advances in cataract surgery particularly in the field of premedication, proper anaesthesia and akinesia, various corneo-scleral sutures and modern anti-biotics etc. it can be seriously considered particularly in developing countries where many eyes are lost because of delay in the operation due to hypermaturity, phacolytic glaucoma or due to couching. It is our common observation that most of the old persons living in remote villages do not seek the advice or undergo operation till they become completely blind in both the eyes or some painful complication supervenes. The poor daily wageearner cannot afford to stay out of home for long time as long as he can manage with one eye. It has also been our observation that bilateral cases if operated in one eye do not turn up for the second eye till some complication supervenes and the eye may be lost.

The present study has been made in 1000 consecutive cases (or 2000 eyes) during last 5 years and the results compared with similar 1000 unilateral cases.

Only simple uncomplicated bilateral mature cases or one eye hypermature and morganian and the other eye immature were selected. No special selection of the patients was made but it was proposed to have senile uncomplicated cases as far as possible. Cases of traumatic, complicated and glaucomatous cataract were

excluded. Cases who were unruly, mentally dull or uno-operative were also avoided for the study. The cases of diabetes, hypertension and with chronic bronchitis and cough were also excluded and with them only one eye was operated. The comparison of results was done in almost similar type of cases in the 2 groups who were treated alike before and after surgery.

Technique:

On the night before the operation the patient was given a tablet of Largactil 25 mg. to ensure good sleep and allay anxiety and worry. This was again repeated half an hour before the operation. For surface anaesthesia, Anethaine 1% drops were used. For retrobulbar injection 1 c. c. of 4% Procaine hydrochloride mixed with. 2 c.c. Adrenaline hydrochloride (1 in 1000) was used while 2% Procaine was used for Von-lint type of akinesia. After the bridal stitch in the superior rectus muscle, small conjunctival flap was made and a single pre-placed conjuncti-vo-episclero- limbal stitch was used in every case. It was supplemented by two additional sutures at 11 and 1 o'clock after the lens was removed.

The incision was made from 2.30 to 9.30 o'clock in left eye and 9.30 to 2.30 o'clock in right eye with a Graefe's knife. The keratome was reserved only for cases with deep endophthalmic eyes or with shallow anterior chambers. A small one or two peripheral buttonhole iridectomies were done before removal of the lens in almost all the cases to have a round pupil. The lens was taken out by Arruga's intra-capsular forceps which was used to grasp the anterior lens capsule in the lower part (Tumbling method).

Barraquer Erisophake was used in cases where lens capsule was rather slippery and could not be grasped with forceps and to the subluxated lenses in which there was no viscid anterior to the lens. Direct separation of zonule was not undertaken in any case.

In the intumescent cataracts I have found a method of micro-puncture i. e. anterior capsule is sharply perforated by fine needle in the upper part through peripheral coloboma of iridectomy and soft cortex allowed to pass to the anterior chamber. Gentle massage is then applied to the corneo-scleral margin below and soft cortex lying in the lower part of the lens, still in capsule, is massaged upwards. In this way extraction in toto is completed by holding the anterior capsule in its lower part which is now no longer streched and can be easily grasped.

Alphachymotrypsim was used only in young individuals.

I have not found two iridectomies of any extra advantage and it is my observation that it is the complete reposition of iris which is important. One

should always reposit the iris completely by several manoeuvres of iris repositor. Due regard should be given to the corneal endothelium from injury. A sub-conjunctival injection of one lac units of crystalline Penicillin dissolved in half c. c. of distilled water is given in every case. 4% Pilocarpine drop is instilled in all intracapsular cases before the bandage is applied.

Post-Operative Care:

The patient after the operation was sent to the ward on a stretcher though we have now relaxed it in many cases. The patient was given absolute rest for 6 hours after which he could turn to the un-operated side and was allowed to have liquid feeds only. The first dressing was done after 24 hours and any complication was carefully noted. On the second day the patient was allowed to sit for a few minutes supported by back rest or by means of a Fowler's bed. He was allowed to get out of the bed and go to the bath room only on the 4th day. After the second dressing which was done after 48 hours, the subsequent dressings were done on alternate days or every 4th day. In a few cases where extracapsular extraction was done, the dressings were done rather daily. Usually as far as possible the dressings were avoided on the 5th or 6th day for fear of hyphaema which could follow even after slight strain or squeezing of the lids during dressings. The bandage was opened on the tenth day and the conjunctivo-episclero-limbal stitsch was removed on the ninth day.

REVIEW OF 1000 CASES:

TABLE I

Sex	Group 1 (Bilateral)	Group 2 (Unilateral)
Male	611 cases	590 cases
Female	389 cases	410 cases
Total.................	1000 cases	1000 cases
	or	or
	2000 eyes	2000 eyes

TABLE II

Type of Cataract	Group 1 (Bilateral)		Group B (Unilateral)	
1. Both mature (includes cases of black and intumescent cataracts)	=	522 cases	1. Mature	608 cases
2. Both inmature	=	62 cases		
3. Mature one eye, immature other eye	=	182 cases	2. Immature =	232 cases
4. One eye mature and the other eye hypermature	=	204 cases	3. Hypermature =	160 cases
5. Both eyes Hypermature	=	30 cases		
Total	=	1000 cases	Total =	1000 cases

TABLE III

Age	Group 1 (Bilateral)	Group 2 (Unilateral)
20 — 30 years	2 cases	24 cases
31 — 40 years	42 cases	57 cases
41 — 50 years	402 cases	464 cases
51 — 60 years	378 cases	312 cases
over 60 years	176 cases	143 cases
Total	1000 cases	1000 cases

TABLE IV

Type of operation

Group 1 (Bilateral)		Group 2 (Unilateral)	
1. Both intracapsular including cases where enzyme was used	682 casos	1. Intracapsular extraction	752 cases
2. Both extracapsular including cases where capsule broke	102 cases	2. Intracapsular with enzyme	31 cases
3. One eye intracapsular and the other extracapsular	216 cases	3. Extracapsular	185 cases
		4. Capsule ruptured so completed like Extracapsular	32 cases
Total	1000 cases	Total	1000 cases

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TABLE V

Complication	Complications Group (Bilateral)		Group 2 (Unilateral)	
	Nº of cases 2000 eyes	Per- centage	Nº of cases 1000 eyes	Per- centage
1. Vitreous loss	84 eyes	4.2	18 eyes	1.8
2. Striate keratitis	14 eyes	0.7	10 eyes	0.1
3. Iris prolapse	50 eyes	2.5	18 eyes	1.8
4. Hyphaema	74 eyes	3.7	41 eyes	4.1
5. Opening of wound	2 eyes	0.01	—	—
6. Non-formation of Anterior Chamber	31 eyes	1.65	16 eyes	1.6
7. Choroidal detachment	24 eyes	1.2	9 eyes	0.9
8. Expulsive haemorrahage	Nil	—	Nil	
9. Iridocyclitis	24 eyes	1.2	5 eyes	0.5
10. Phako - anaphylactic endophthalmitis	Nil —	—	Nil	—
11. Infection	—	—	Nil	—
12. Disoriented or Post-operative delirium	9 cases	0.9	1 case	0.1
13. Retinal detachment	6 eyes	0.3	3 eyes	0.3
14. Post - operative glaucoma	7 eyes	0.35	3 eyes	0.3
15. Vitreous syndrome of Irvine	7 eyes	0.35	2 eyes	0.2
Total	2000 eyes		Total 1000 eyes	

TABLE VI

State of Hyaloid	State of Hyaloid Group 1 (Bilateral)	Group 2 (Unilateral)
Intact hyaloid	1820 eyes	949 eyes
Rupture hyaloid	180 eyes	51 eyes
Total	2000 eyes	1000 eyes

From the comparison of results it is evident that vitreous loss is more i.e. 4.2% in Group 1 as compared to 1.8% in Group 2 but it must not be forgotten

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that in Group 1 there were many cases of hypermature cataracts where vitreous is rather much degenerated and in fluid state. Similarly the cases of ruptured hyaloid membrane were more in Group 1 as compared to Group 2. Iris prolapse was also slightly more but probably may be not of much significance. No case of post-operative infection was met with in any group. This is due to the routine use of Penicillin sub-conjunctivally. Hyphaema in Group 1 is slightly less as compared to Group 2 though it is not of much significance but it can be said that it may be due to the fact that both eyes were bandaged and the movements of the patients were restricted. It is interesting to observe that most of the hyphaema occurred on the 5th or 6th day. It is probable that it may have something to do with the repair of the wound where capillary buds can easily bleed even on little provocation or strain etc. Hence, as far as possible, post-operative dressings were avoided on the 5th or 6th day.

Post-operative delirium:

It is another condition whose incidence was more in our bilateral cases. Some of the cases actually became violent and got up from the bed and even removed bandage etc. It is our observation that it occurs more in poor class females who may have some nervous background. Whether prolonged 8-10 days binocular bandaging has something to do with it is not yet quite clear.

Phaco-anaphylactic endophtalmitis: was no noticed in any case in both the Groups. In Bilateral cases there are very few chances of developing any allergy to lens proteins as both the eyes are done at one sitting even it may be by extracapsular method.

No serious attempt has been made to evaluate the long term post-operative complications as there seems to be no reason to think that it will be in any way different than in the usual uniocular extraction cases.

With the figures submitted there appears to be enough justification for the adoption of bilateral procedure in selected cases and in my experience most of our patients welcome this opportunity of accepting what is to them in fact a single operation. Even in complicated cases I am sometimes requested to undertake both the eyes in one stage. No doubt the critics of this surgical procedure will suggest that no greater catastrophe could occur than the simultaneous loss of both eyes by one or other complication during or after the operation. But it may be said that with the modern development of akinesia, technique and corneoscleral sutures and various antibiotics its likelihood is negligible. The results submitted speak so eloquently about it specially if we compare the number of eyes lost in India because of hypermaturity, iridocyclitis and phacolytic glaucoma

or couching etc. It rather gives an added confidence to the operating surgeon. Not a single case of loss of both eyes has been met with. Phaco-anaphylactic endophthalmitis will be a remote possibility in Group 2 or bilateral cases even if both eyes are operated by extra-capsular method.

Summary

With the advent of proper akinesia, various corneoscleral sutures and improvements in surgical technique and introduction of modern antibiotics, it can be said that there is enough justification for the adoption of bilateral procedure in selected uncomplicated cases. It is my experience that our patents welcome this opportunity which to them is in fact a single operation. In making selection of cases for the intervention, one should avoid complicated and unco-operative patients with diabetes or hypertension.

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UNA TECNICA MAS DE OPERACION FILTRANTE

POR

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El glaucoma mantiene su condición de afección quirúrgica, a pesar de los progresos de la terapéutica médica. En la mayoría de los enfermos se impone una indicación operatoria, sea breve tiempo después del diagnóstico por el in-control de la tensión, sea después de un lapso más o menos prolongado de tra-tamiento medicamentoso, por el progresivo descontrol, descontando desde ya que ambas situaciones prosiguen el deterioro del campo visual.

También en alto porcentaje de casos, estudiados los elementos semiológi-cos para la elección de una técnica quirúrgica adecuada, nos inclinamos a la realizacion de operaciones fistulizantes externas, por el predominio de las formas clínicas de ángulo abierto y en los casos de cierre de ángulo, por el compromiso trabecular evidente en casos evolucionados largamente, o previniendo elevaciones tensionales tardías en los casos dudosos.

En las diversas operaciones filtrantes, poca disparidad existe en la talla del colgajo, sí en cambio, innumerables variaciones técnicas se idearon con la fina-lidad de obtener una fistulización perdurable. Una de las más fisiológicas en el sentido de menos destructiva y de más anatómica es a nuestro criterio la iridectomía filtrante de Malbrán:

1º porque la incisión se realiza paso a paso en forma gradual,

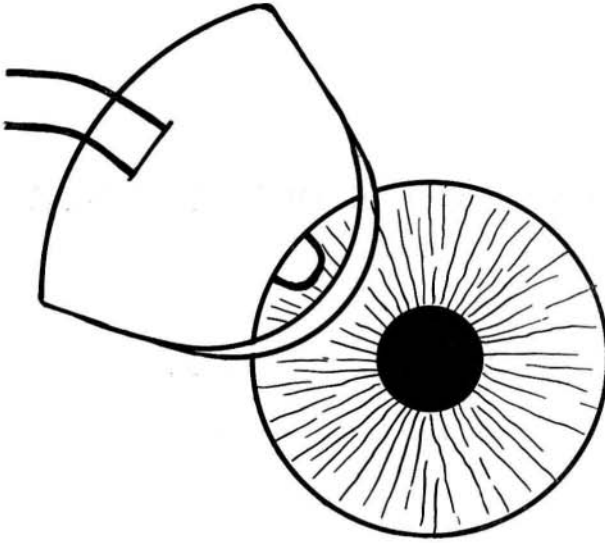2º también la diatermía se aplica a medida que se profundiza la sección escleral.

Fig. 1

3º el iris se secciona ab-externo, es decir, prolapsado de la cámara anterior.

Su técnica no es complicada; sin embargo notamos: que tiene que ser mínimo el espesor final de esclera que queda sin cauterizar al abrir la cámara anterior,
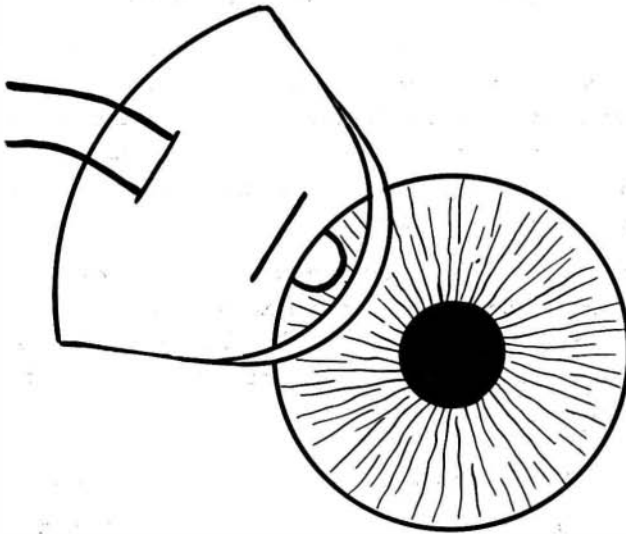
Fig. 2

para evitar el posterior cierre de la brecha, porque al comenzar a manar humor acuoso no puede proseguirse con la aplicación diatérmica.

Que al completar la paracentesis puede seccionarse la raiz del iris, en especial si hay sinequias, lo que dificulta o impide su prolapso, obligando a la toma instrumental dentro de cámara anterior.

Basándonos en lo realizado por Sánchez Peña, utilizamos un procedimiento que nos permite una fistulización sin estos inconvenientes:
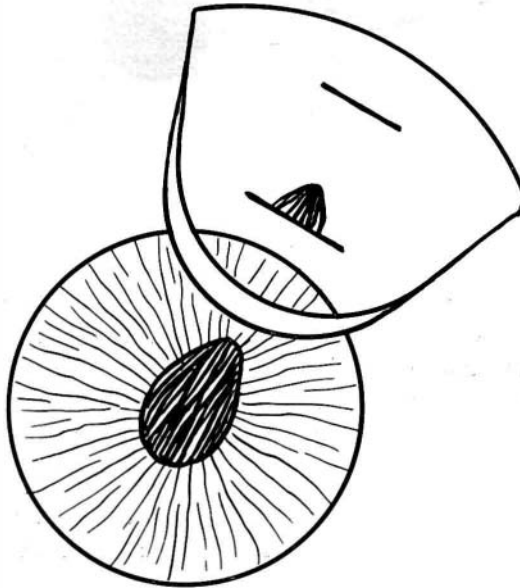
Fig. 3

Luego de un colgajo convencional realizamos a 6 mm de limbo una incisión de ciclodialisis, del ancho mínimo para introducir la espátula de Sánchez Peña o una de ciclodialisis ancha, llevándola directamente a cámara anterior hasta observar su extremo, sin practicar ninguna dialisis.

Debemos notar que no se pierde acuoso en este tiempo, pudiendo hacerlo, si se desea disminuir la tensión, deprimiendo la espátula.

Introducida la espátula, tenemos la ventaja de visualizar exactamente dónde comienza la esclera opaca para ubicar adecuadamente la incisión.
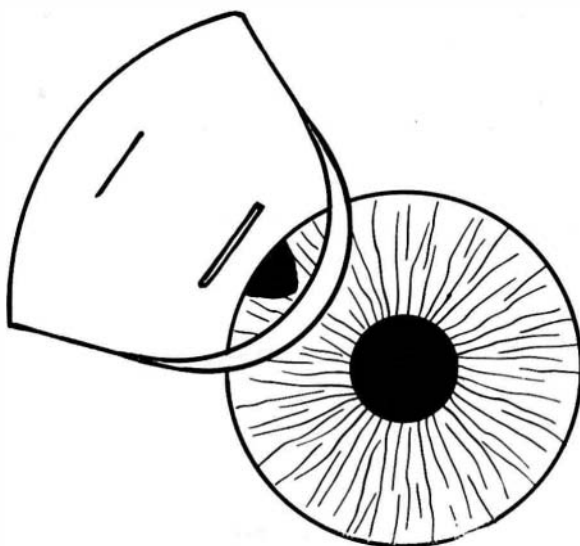
Fig. 4

La sección escleral la realizamos con una hoja de galvano al rojo sombra, para al tiempo que corte cauterice los bordes de la incisión, en uno o dos trazos hasta llegar a la espátula, dándole una extensión variable, término medio de 4 mm. Observamos nuevamente la poca salida de acuoso, aunque la cámara ya está abierta, haciéndolo en cambio al retirar la espátula, presentándose también el iris en la brecha.

La iridectomia se realiza con tijera, o en casos de iris vascularizados con la misma hoja de galvano al rojo vivo, lo cual logra una adecuada hemostasia.

Creemos que esta técnica logra:

1º adecuada visualización de la zona de transición limbar,

2º la cauterización de todo el espesor de los labios al usar el galvano cortando hasta contactar con la espátula,

3º que esta protege el iris y el cristalino del trauma mecánico y térmico, facilitando la iridectomía del iris no tocado y haciendo profilaxis de opacidades cristalinianas.

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ACCOMMODATIVE POSTURE AT ZERO FIELD LUMINANCE LEVELS

BY

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Abstract

The reaction of the accommodative mechanism to a zero level of field luminance was studied. Accommodative posture was measured by photographing the third Purkinje image in darkness, and in light with the subject fixating on and maintaining subjective clarity for a distant target. Comparison of the two series of photographs revealed fluctuating positive accomodative action in the dark with individual increases to 2.00 diopters. Mean accommodative level for 14 subjects was 0.94 diopter.

Introduction

For many years, discussions have existed in the literature concerning the posture of accommodation in the absence of visual stimulus and the possibility of a resting level of accomodation about a point other than its infinity position. Many investigators have studied the commonly observed refractive changes that accompany low levels of illumination, the so called night myopia, and their investigations have generated a number of possible causes for the apparent increase in refractive power of the eye under these conditions. Only a few studies, however, have been performed to determine objectively the behavior of accommodation in the complete absence of visual stimulus and these, possibly because of their varied experimental means, offer wide, and in some instances conflicting, results.

The purpose of the present investigation was to objectively study observed accommodative changes in a totally dark environment, uninfluenced by any distracting or otherwise contaminating element that may have raised questions about some of the earlier works.

Background

Early studies of accommodative behavior in the dark have been largely limited to subjective determinations of total refractive change in dim illumination. Until the 1950's, efforts of investigators were hampered by lack of accurate objective means of observing the refractive changes that would not, at the same time, contaminate their findings by providing excessively bright stimuli to accommodation. Since that time, several investigations have been made using either high speed photography or infra-red skiascopy to record the activity of accommodation in the absence of visual stimulus.

Objective experiments performed by Otero[4] in 1950 were among the first to indicate accommodative ac
mophakometer he photographed the third Purkinje images in darkness, and in light with the eye accommodated for various distances corresponding to known dioptric stimuli. By these means he determined the natural resting level of accommodation corresponded not to zero diopters, as had formerly been thought, but to a positive accommodative level of 1.25 diopters.

In 1953 Koomen[3], et al, performed similar ophthalmophakometric studies of accommodative posture in the dark in which he found no positive accommodative activity in a dark environment for 3 subjects of a 4 subject group. The one outstanding individual exhibited positive accommodative activity of an erratic and unpredictable degree. Koomen's experimental procedure differed from Otero's, however, in that he used a fixation light, periodically flashed, to properly orient his subject's gaze in the dark.

Also in 1953 Campbell[1] conducted Purkinje image studies of accommodative activity in the dark. Campbell's studies also utilized a small fixation light for subject orientation, which disappeared when coincident with the dark adapted fovea, thus indicating when the visual axis of the subject was properly aligned. Campbell's results indicated a continual fluctuation of accommodation in the dark between absolute levels of 0.25 and 1.20 diopters.

Following these earlier experiments, Heath[2] performer Purkinje image and infra-red retinoscopic studies of accommodation in absence of visual stimulus. His findings indicated a rapid increase in positive accommodation to about 2.0

diopters obtains when the eye is first confronted by a totally dark environment. This, according to Heath, is followed by a continual fluctuation thereafter, between the limits of 0.62 and 1.25 diopters.

Instrumentation and subjects

The method used to objectively study accommodative behavior in this investigation was that of analysis of the size changes of third Purkinje image photographed in darkness, and in light with the subject fixating and accommodating at infinity.

The equipment followed the general plan of that used by Otero and Campbell. The third Purkinje image is the catoptric image of an external light source reflected from the convex anterior surface of the crystalling lens. Authorities generally agree that the anterior lens surface becomes more convex in shape during the active accommodative process, and it is expected, therefore, to find that the third Purkinje image decreases in size during accommodation.
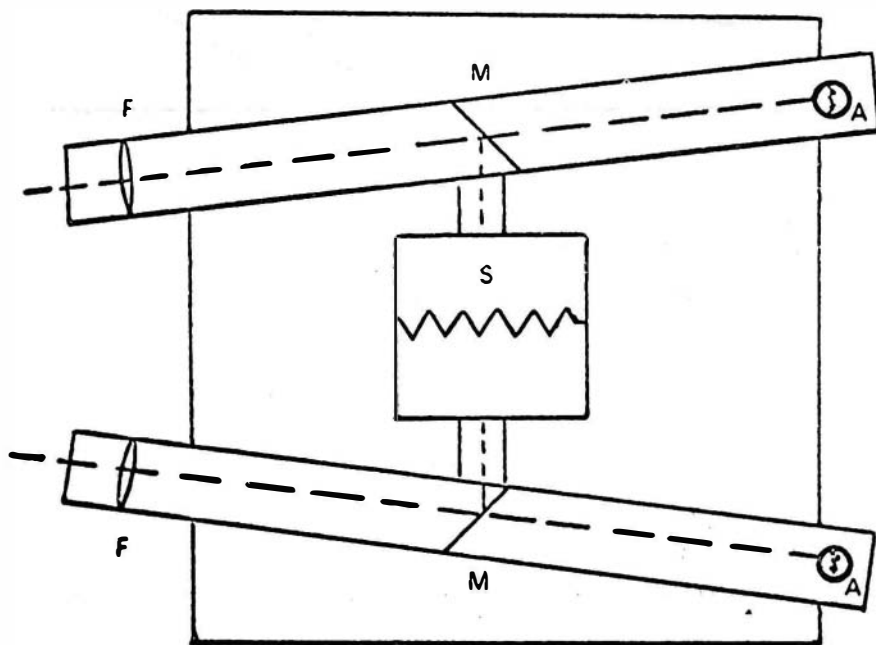
Figure 1. Schematic of Ophthalmophakometer Used for Objective Studies of Accommodation in Total Darkness.

The Photographic apparatus used in this experiment is shown in Figure 1. An electronic flash unit S, of 1200 candle-seconds energy output and flash

duration of 0.001 second, was mounted in a light tight metal box. Two metal tubes which opened into each side of the flash unit converged toward the front of the housing. Partly silvered mirrors M (transmittance 40%, reflectance 60%) were placed within the tubes so that some of the light generated by the electronic flash unit was reflected toward the ends of the tubes nearest the subject. Behind the mirrors, at the distal ends of the tubes, were mounted a pair of auto headlight bulbs of 21 candles intensity each, which were used during focusing of the camera to be described.

The entire unit was positioned 40 centimeters from the subject's eye at an angle of 30 degrees nasal to the line of sight. See Figure 2.

c :camera
p : phakometer
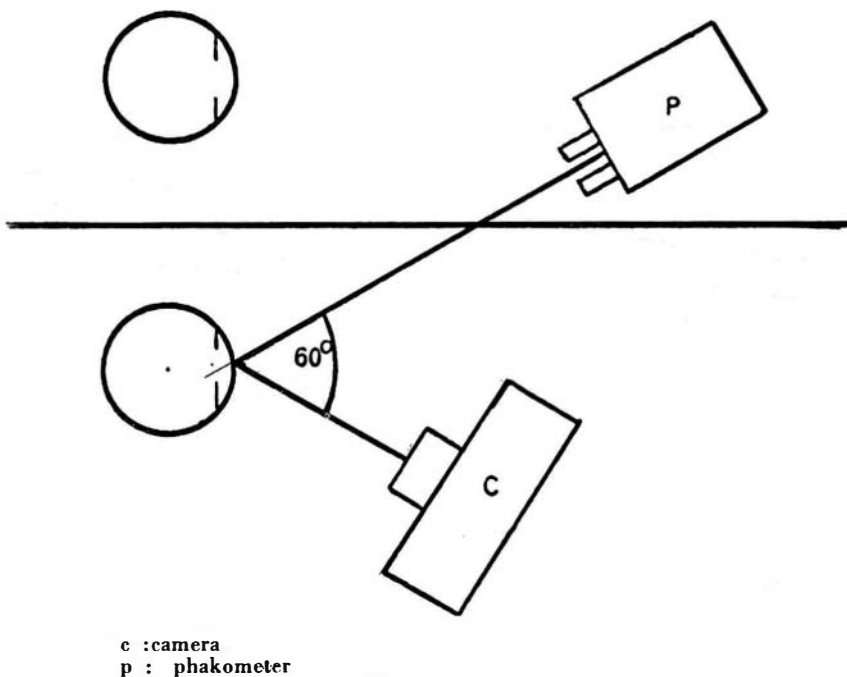
Figure 2. Details of the Arrangement of the Ophthalmophakometer-Camera Apparatus Used in Objective Measures of Accommodation.

A Pentax single lens reflex 35mm camera, having a 55mm, f/1.4 lens, was mounted at an angle of 30 degrees temporal to the line of sight. Auxiliary tubes were used to extend the camera lens for proper focusing at 7 centimeters from the subject a distance that created a one-to-one object-image ratio. This would

have allo

factor necessary to find the actual Purkinje image size, is such were desired.

During preliminary focusing and positioning of the apparatus the lights, A, at the distal ends of the flash tubes (Figure 1) were turned on, providing constant Purkinje images for focusing of the camera. When photographs were made, the focusing lights were extinguished. Upon release of the camera shutter, light from the flash unit, S, traveled the tubes, was collimated by lenses F at the exit ports of the tubes, and proceeded to be imaged catoptrically as two dots by the anterior face of the crystalline lens after refraction at the other ocular surfaces. Purkinje images one and four, reflected from the anterior corneal surface and the posterior surface of the crystalline lens respectively. also appeared with the third image but were not used.

Film used was Kodak Tri X, 35mm. Exposure time was 1/50 of a second at f/5.6. The film was developed for maximum contrast. All measurement of third Purkinje image size were made directly from the negatives by means of a measuring microscope.

Fourteen subjects, thirteen males and one female, participated in the experimental procedures. Subjects ranged in age between 20 and 30 years, with the exception of two whose ages were 40 and 41. Selection of subjects was made on a three point basis: 1) refractive error. 2) quality of the third Purkinje image, and 3) pupil size.

1. Refractive Error

All subjects selected were nearly emmetropic in each eye, only one being more than plus or minus 0.25 diopter from a plano refractive state in one meridian as determined by normal refraction techniques. The one exception to this was subject NL, whose static refraction was 0.75 diopter of myopia.

A slight amount of astigmatism, up to 50 diopter ,was allowed. This condition of subject selection was maintained in an attempt to keep the procedures uncomplicated by some optical or visual factor that might have led to spurious results.

2. Quality of Third Purkinje Image

Considerable difficulty was encountered in selecting eyes with lens surfaces that would provide suitable images for Purkinje image photography. The irregularity of third images among individuals has been described in the literature.

being attributed in part to changes with age (Wulfeck [6]). However, Heath [2] found similar conditions in his studies of high school students 15 to 18 years of age.

A wide range of image quality was noticed by this investigator during the process of selecting subjects for the experiments being described. Twenty-five subjects were examined in order to obtain fourteen with the necessary lens quality for the experimental work.

3. *Pupil Size*

Only those individuals who exhibited 4mm or larger diameter pupil sizes in daylight illumination were accepted as subjects. Persons having pupil sizes smaller than 4 mm in diameter were rejected. This restriction was necessary to ensure pupillary apertures large enough to permit Purkinje image photographs to be taken easily in the normal room illumination for calibration purposes.

Procedures

Three groups of photographs were taken of each subject. The first, using moderate room illumination with subject maintaining subjective clearness for a distant target, was taken to establish a base, or infinity dimension for the individual Purkinje image to which all other measurements could be compared.

The second group consisted of calibration photographs, used to determine the Purkinje image size for each stimulus to accommodation. Methods of calibration by accommodative stimulus, rather than accommodative response, were used to permit accurate comparison of these data to those of earlier experimenters, all of whom also used stimulus calibration methods.

The third group of photographs was taken of the Purkinje images in total darkness using the procedures described below. Dimensions of these images were subsequently compared to those in group one to determine the amount of accommodation, if any, that had occured in the dark.

A. *Purkinje Image Photography, Moderate Room Illumination.*

The subject's chin was placed securely in the chin rest provided and his attention was directed to the illuminated Snellen target, 7.6 meters distant. Target luminance was approximately 8 foot-lamberts. Focusing lights of the instrument were switched on. The camera was positioned and focused on the third Purkinje image which appeared centered in the subject's pupil when his eye was properly aligned. The subject was requested to keep the target as clear as possible. Focusing lights were switched off and the camera shutter was tripped, automatically triggering the electronic flash unit.

B. *Calibration Photography, Moderate Illumination.*

The process in (A) was repeated, with subject fixation on the target now placed in succession at 6 meters, 2 meters, 1 meter, and 0.5 meter from the eye, again using target luminance of 8 foot-lamberts. These were calibration photographs to determine the Purkinje image size for each stimulus to accommodation.

C. *Purkinje Image Photography, Total Darkness.*

All lights were extinguished and a photograph was taken immediately. Estimated time in the dark before this first photo was 30 seconds for most individuals. The subject was allowed to adapt to the dark for 5 minutes. Another Purkinje image photograph was taken then and after each 5-minute interval for a total period of 20 minutes. A total of 5 photograps was taken in the dark for each subject.

The procedure was essentially the same as outlined in (A) above, but with some necessary modifications. The correct position of the subject's eye had been established in taking the previous photographs. In total darkness, the subject was requested to fixate on the spot where the target had formerly appeared. To reinforce his orientation a weak light was flashed at the desired fixation stop 10 seconds before the photograph was to be taken. A 0.02 second flash duration was used to avoid creating any change in accommodative posture. The subject was asked to look toward the spot where the test light flashed, and the camera shutter was tripped.

Early in the investigation considerable difficulty was encountered in establishing the precise fixation necessary for accurate photography of the Purkinje image in the dark. Needless to say, even slight inaccuracies of fixation were sufficient to render the photographs completely useless. Numerous procedures were tried in an attempt to gain accurate fixation in the dark. Included in the attempts were:

1. Subject directed to point with arm and forefinger toward the imagined spot of fixation in an attempt to direct the eyes to the proper place.

2. Subject required to hold taut one end of a string extending from the desired fixation spot to the subject.

3. Placement of a sound generator at the desired fixation spot in an effort to guide the direction of gaze by the direction of the emitted sound.

4. Brief flash of light at the desired fixation spot just prior to taking the photograph. The flash was of a duration shorter than the reaction time of accommodation and therefore was not expected to influence the existing accommodative posture of the subject.

Techniques (1), (2) and (3), above, were tried and abandoned as unsuccessful. Ultimately, technique (4) was employed as the most fruitful approach.

Supplemental Test: Extended Period in the Dark.

One subject was selected to undergo further testing, which consisted of Purkinje image photography in total darkness over a period of one and one-half hours. Photographs were taken at three minute intervals. The subjetc was seated before the instrument as described earlier. Lights were then extinguished, and subsequent photos were taken at three-minute intervals. The subject directed her fixation toward the last seen position of the fixation target, but no reminder lights or other fixation aids were used in this portion of the experiment.

Results

Representative photographs of third Purkinje images as obtained in this investigation are shown in Figures 3, a, b, and c. The two bright images seen in the extreme right portion of the pupil are Purkinje images number one, the corneal images. Those in the extreme left portion of the pupil are Purkinje images number four, reflected from the posterior lens surface. Purkinje images number thee are seen centrally in the pupil and are less bright than the adjacent corneal images.
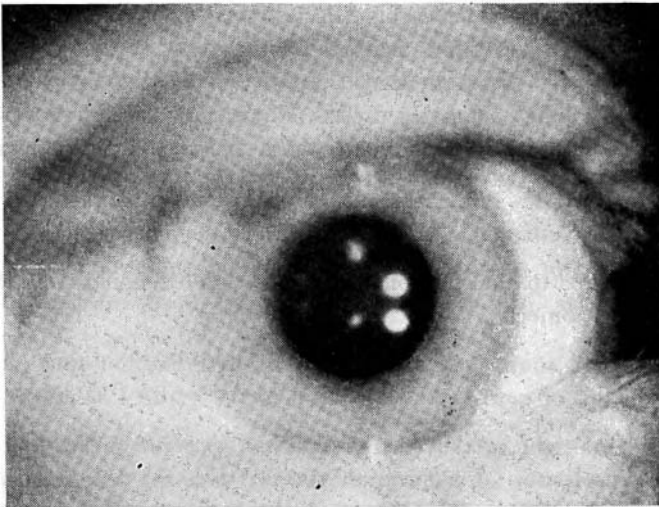
Figure 3a. Normal Room Illumination.
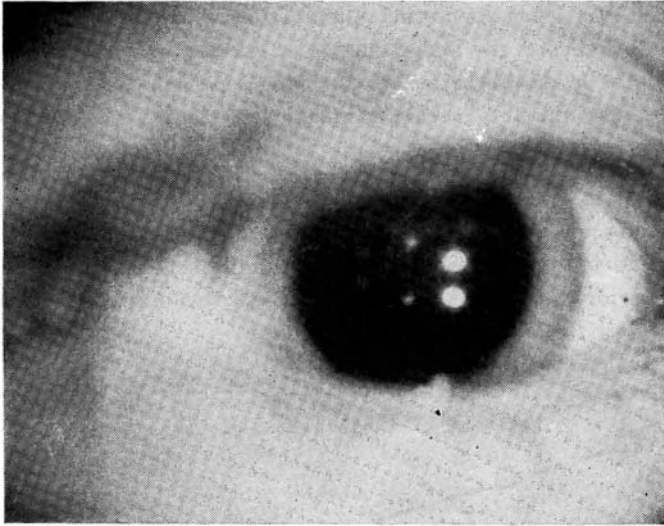
Figure 3c. Ten Minutes in the Dark.
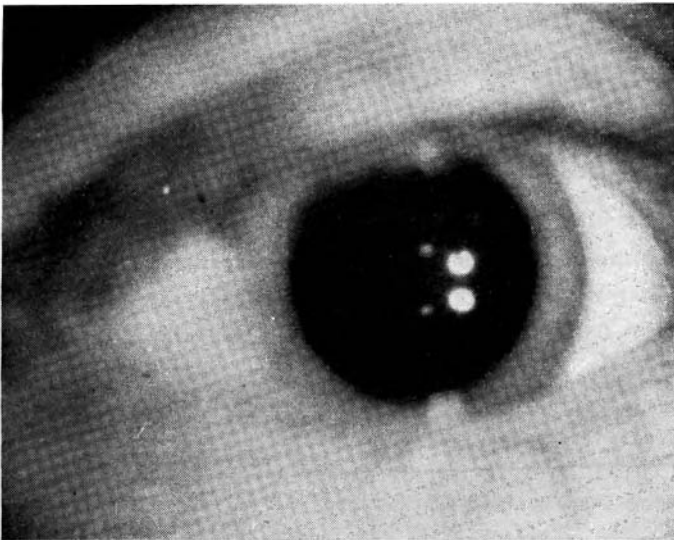
Figure 3b. Five Minutes in the Dark.

Figures 3a, 3b, and 3c: Sample photographs of third Purkinje images obtained in this investigation. Subject WL. Note the large pupils in the dark in b and c.

Photograph 3a was taken in normal illumination with subject fixation at 7.6 meters. Figure 3b indicates the image change at the end of a five-minute interval in the dark; Figure 3c shows the results of a longer period (ten minutes) of dark adaptation. Close examination reveals an image size change between photographs 3a and 3c.

Measurement of the image size made directly from the negative by means of a measuring microscope. Comparison of the third image size on the photographic negatives made during experimental darkness conditions with the image size on negatives made prior to the dark, when the subject was fixating known distance
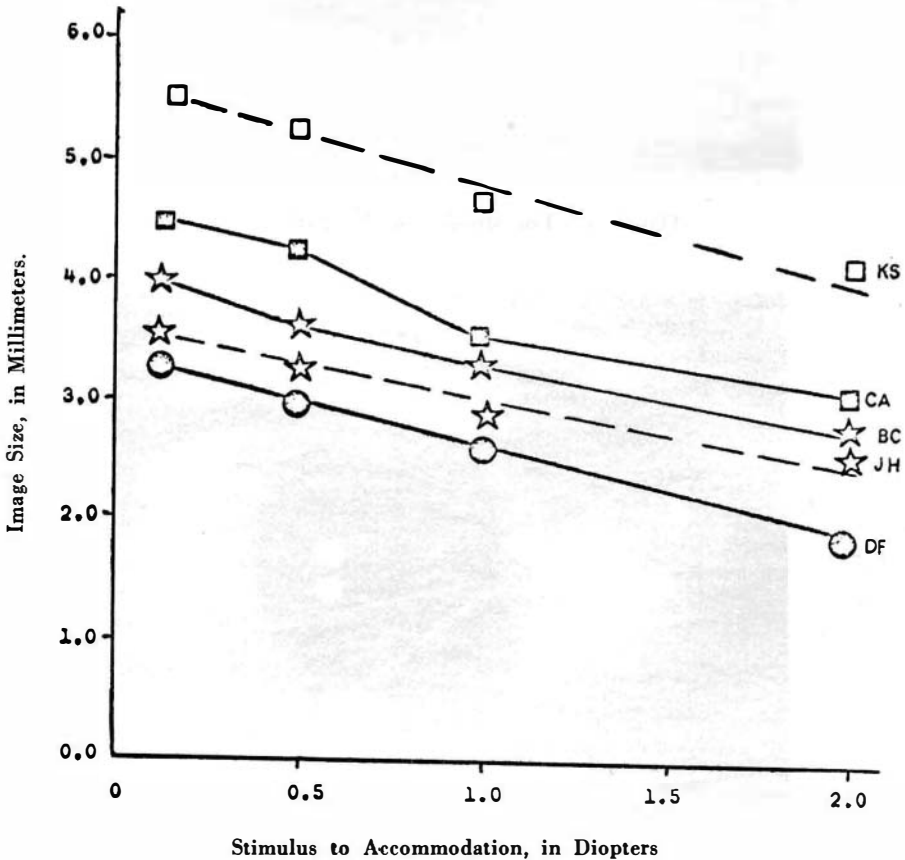
Figure 4. Sample Calibration Curves for 5 Subjects Showing Variation in Third Purkinje Image Size as a Function of Dioptric Accommodative Stimulus. Each plotted point represents one measurement. Dashed lines are estimates of the line of best fit in each case.

in normal illumination, permitted an estimation of the diopthic amount of accommodation that occurred during the absence of visual stimuli. Sample calibration curves drawn from these data are shown in Figure 4.

As will be noted in Figure 4, the slopes of the straight lines relating image size to accommodative stimuli (as measured by Purkinje image photography in the calibration procedures) are not necessarily the same for all individuals tested. The variation is small, however, and for purposes of enumeration in this experiment a fixed ratio of 0.25 diopter of accommodation change per 0.2 mm image size change is used, except for subjects CA, DS, BC, and JP where values derived from individual calibration curves are used in the interest of improved accuracy.

The measurements of third image size for all subjects are given in Table 1. The data of four subjects are plotted in Figures 5, a through d. Ordinate values are (left) millimeters of decrease in size of the third Purkinje image from its original size for a target 7.6 meters away and (right) diopters of accommodation approximately equivalent to the image size differences. The abscissa values are units of time in the dark. The data of these four observers, representing the kinds of variability found, are presented in the figures.

TABLE 1

OBJETIVE MEASUREMENTS OF ACCOMMODATION

Purkinje Image Size, in mm,
Over Six Readings

Subject	Calibration Photo**	0.50 Minute***	5.0 Minutes	10.0 Minutes	15.0 Minutes	20.0 Minutes
	1	2	3	4	5	6
WL	3.00	2.80	2.80	2.90	2.40	2.75
CA	4.50	4.10	3.70	3.70	3.75	3.45
NK	3.14	2.84	2.75	2.75	——	2.85
BC	4.01	3.50	3.31	3.18	3.07	3.18
JP	2.80	2.30	1.70	1.35	0.98	1.15
DS	4.48	3.88	2.35	3.03	3.25	2.70
GW	4.56	4.16	——	2.90	2.93	——
CP	3.90	3.70	——	——	3.55	3.40
KS	5.50	5.20	4.83	4.72	——	4.80
DF	3.25	2.75	2.48	2.50	——	
JS	2.53	2.55	2.15	2.00	2.15	2.20
JH	3.53	4.10	4.02	——	3.88	3.85
RN	2.89	2.54	2.36	2.32	2.40	2.10
NL	4.20	3.71	3.64	3.28	3.08	3.31

**   2 thrirugh 6 were taken five minutes apart in the dark Columns.
        fixation at 7.6 meters.

***   Columns 2 through 6 were taken five minutes apart in the dark.

Table 2 contains measurements of third image size obtained on one subject at three-minute intervals over a time period of one and one-half hours. Figure 6 exhibits the plotted results of this data. Ordinate values represent (right) diopters of accommodation approximately equivalent to (left) image size change from the first reading, taken in room illumination. Abscissa units are time in the dark.

TABLE 2

LONG DURATION PURKINJE IMAGE MEASURES OF ACCOMMODATION

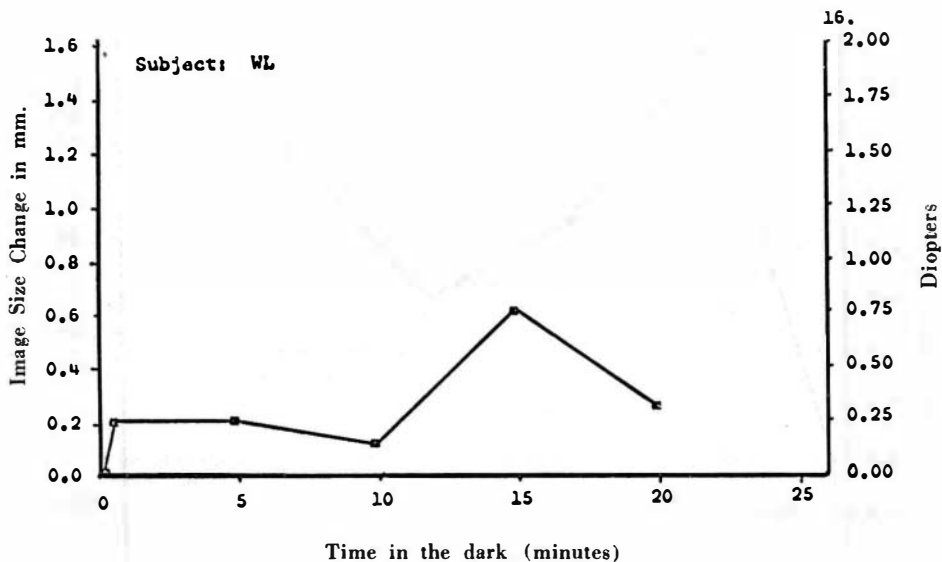| Minutes in the Dark	Image Size in mm.	Size Difference from First Measure (Illuminated)	Minutes in the Dark	Image Size in mm.	Size Difference from First Measure (Illuminated)
3	2.54	———	54	2.38	0.16
6	2.35	0.19	57	1.95	0.59
9	2.38	0.16	60	2.04	0.50
12	2.36	0.18	63	2.24	0.30
15	2.38	0.16	66	2.27	0.33
18	2.30	0.24	69	———	———
21	2.32	0.22	72	———	———
24	2.10	0.44	75	———	———
27	2.40	0.14	78	2.35	0.19
30	2.28	0.26	81	2.26	0.28
33	2.38	0.16	84	2.24	0.30
36	2.12	0.42	87	———	———
39	2.30	0.24	90	2.37	0.17
42	2.22	0.32	93	———	———
45	2.26	0.28	96	2.19	0.35
48	2.39	0.15	99	2.09	0.45
51	2.30	0.24	102	———	———

Figure 5a (above) and 5b (below): Objective Measurements of Accommodative Status in the Dark.

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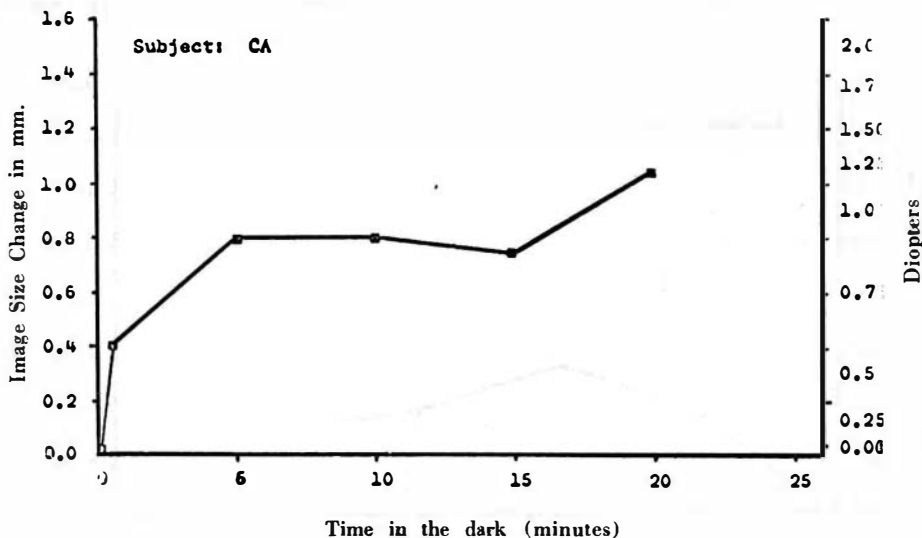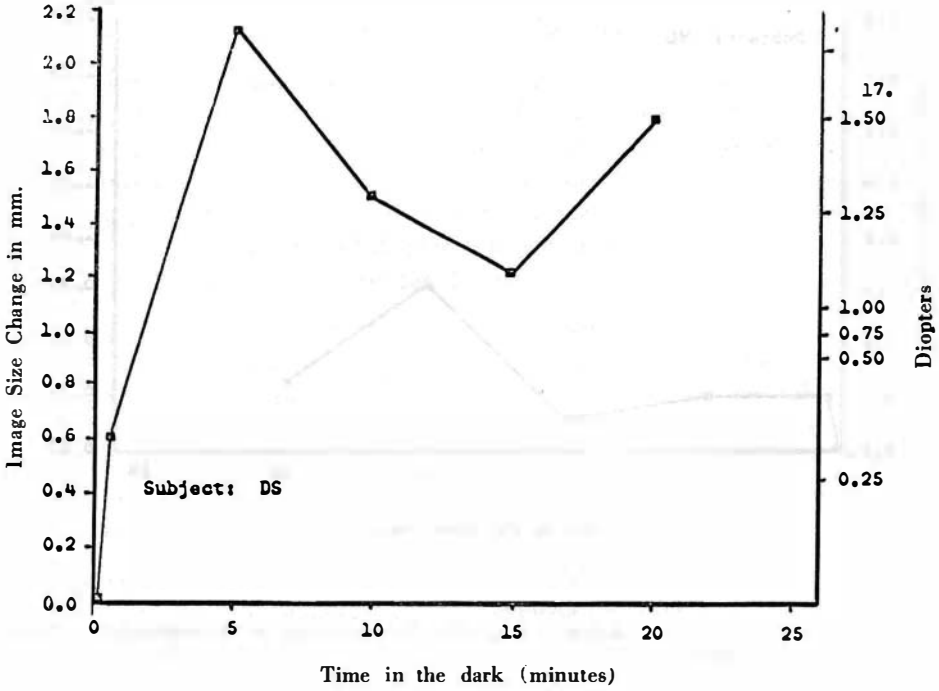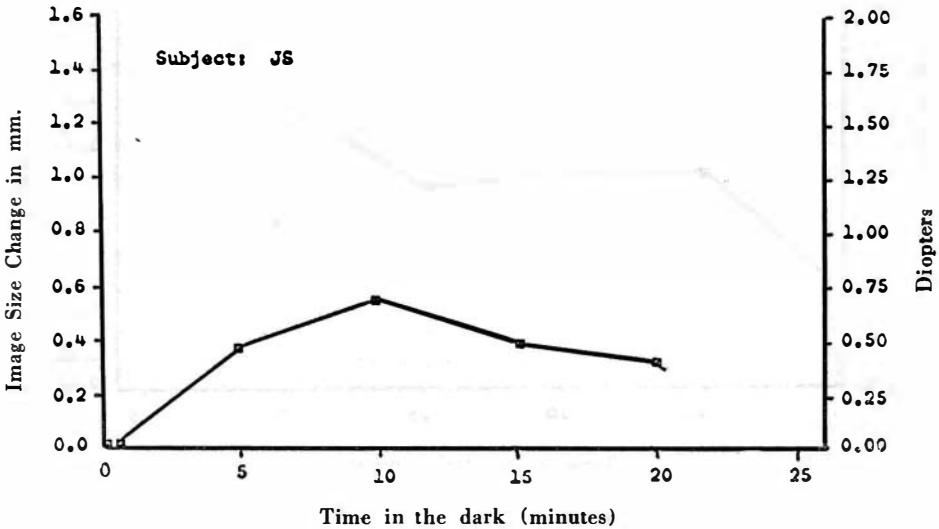
Figure 5e (above) and 5b (below): Objective Measurements of Accommodative Status in the Dark.
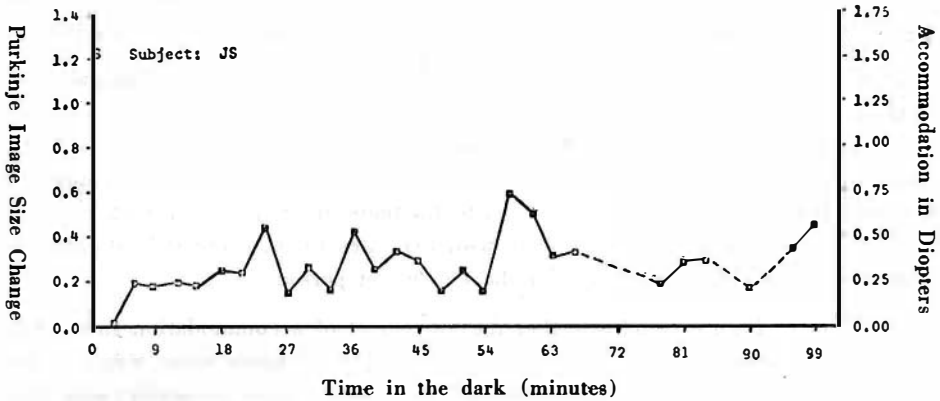
Figure 6. The amount and frequency of accommodative fluctuation during an extended period in the dark.

Discussion

Inspection of the 20 minute studies of accommodative behavior as plotted in Figures 5 a through d, reveals a define and consistant pattern of accommodative activity in the dark. In all cases, there is an immediate increase in accommodation upon cessation of the visual stimulus, which is noticeable as early as 30 seconds from the onset of the dark. From this point in time, responses appear to be individual. In certain cases, accommodation continues to increase to higher positive levels; others have moderate or no accommodative increase beyond the initial rise until much later in the time sequence. All subjects showed continual fluctuation of accommodation in varying amounts throughout the entire testing procedure. Mean accommodative level* at the end of 20 minutes in the dark for all subjects was 0.94 diopter. Individual values at the end of the 20 minute period were between 0.15 and 2.00 diopter, with fluctuations within the dark period in relative amounts to 0.62 diopter.

It must be recognized that measurements in these experiments were taken at 5 minute intervals. The possibility exists that more rapid fluctuations occur within each of these 5 minute intervals, and that artificial smoothing of the curves has resulted from the use of these arbitrary time steps.

Accommodative level, as this term is used herein, presumes ecuality of accommodative response and stimulus during the calibration procedure. Since the response might deviate from the stimulus by up to one half the dioptric value of the depth of focus of the eye and since most subjects tend to allow their res-

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ponses to lag slightly behind the stimulus values, the nominal values assigned to the accommodative levels herein could reflect very modest underestimation.

To further investigate the time characteristics of fluctuation of accommodation in the dark one subject was selected to undergo the long duration accommodative study as previously described. See Figure 6. As was the case in nearly all the short duration studies, accommodation rose rapidly from zero at the onset of the dark period and quickly leveled off to fluctuate at each three minute interval around a mean value of 0.32 diopter with extremes to 0.75 and 0.25 diopter. It appeared to remain at this level for the entire test period.

The data of Figure 6 indicate that the movement of accommodation in a totally dark environment consists of rapid changes about a mean value wihch is individual for a given subjet. Qualitatively the data compare favorably with that of Heath [2], whose experimental instrument was the infra-red retinoscope. Quantitatively, however, the results of the present study were slightly lower than those found by Heath, which might be expected on the basis of the difference in instrumentation.

The mean accommodative level obtained in this extended test compares quite closely with the 0.32 diopter mean accommodative level obtained for the same subject in the short term accommodative study. Closer monitoring of accommodation does not apear to produce a real change in quantitative test results.

Summary and conclusions

Fourteen nearly emmetropic subjects between the ages of 20 and 41 were investigated to determine the be havior of accommodation at zero field luminance levels. The accommodations present when each subject was placed in a totally dark environment was measured objectively by means of photographing and measuring the size of the third Purkinje image reflected from the anterior lens surface. Calibration photographs taken with each subject fixating on and maintaining subjective clarity for various known distances allowed the third Purkinje image size change to be converted into diopters of accommodative change.

Two independent testing sequences were performed. In the first, objective measurements were taken at the beginning of a twenty minute period in the dark, and after each five minutes of that period. In the second, accommodation was objectively measured each three minutes over a total duration of ninety minutes in the dark. The second sequence was performed on one subject only.

Two outstanding facts became evident from analysis of the data of this study.

1. Objective measurements give unmistakable evidence of accommodative activity, as defined by deviation from clinical emmetropia, in the absence of visual stimulus at levels of zero field luminance. Ophthalmophakometric measurements yielded amounts of accommodation under these conditions closely approximating but slightly lower than those found by Otero, Campbell, and Heath in earlier investigations using similar methods. Considering the means of the 14 subjects in the present study, one finds an average accommodative level 0.94 diopter over a twenty minute period in the dark. There was, however, individual variation in which accommodation was as low as 0.3 diopter and as high as 2.25 diopters.

2. A continual fluctuation of accommodation was found to exist in the eye deprived of a visual stimulus for an extended period of time. Under these conditions, accommodation of the subject tested was found to vary between absolute amounts of 0.25 diopter to 0.75 diopter. The findings are similar in character to the long duration findings of Westheimer [5] (0.75 to 1.50 diopters) and Heath [2] (0.50 to 1.50 diopters) using the subjective optometer and infra-red retinoscope, respectively.

The fluctuation measured in this experiment could be described as that of an accommodative mechanism that is wandering, within limits, and is increased in its mean dioptric value as compared to photopic, structured field conditions, Certainly, its presence would raise serious question of the validity of the fixed focus concept of ampty field accommodative behavior that has often been mentioned in older literature.

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CISTO CONGENITO ESCLERO-CORNIANO

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Cistos congênitos cornianos, esclerais e esclero-cornianos sâo raros. A observação de um caso "esclero-corniano", longa e minuciosamente estudado, justifica esta apresentação.

Os cistos pròpriamente cornianos são de três tipos *(Bischler, 1947)*. Précornianos, intraparenquimatosos, e da face posterior (comunicantes com a câmara anterior). Cistos congênitos primários da córnea são extremamente raros não havendo na Literatura, atá a revisão de *Bischler,* nenhum registro.

Os cistos congênitos esclerais são os que nos interessam aqui. São, por vêzes, córneo-esclerais, isto é, situam-se na intimidade da esclera com divertículos intracornianos.

Embora a primeira descrição seja bem antiga, poucos casos se compulsam na Literatura.

Segundo *Bischler* (1947), *Appia* registrava, em 1853, o caso princeps ("cisto intracorniano"). No ano seguinte, *Mackensie* (*in Rogman,* 1897) nos dava o

seu caso "escleral". O caso de *Mackensie* é um bom exemplo da terapêutica válida. Cisto de conteúdo aquoso, cuja cura se conseguiu pela ressecção da parede anterior.

Em 1866, *Waldhauer* (in *Rogman*, 1897) registrou o seu caso "escleral inferior", curado por incisão e compressão.

Just (1873) descreveu um caso "corniano temporal", de conteúdo líquido claro, tratado pela incisão sem resultado e curado por excisão da parede anterior.

Em 1893, *Rock* (in *Rogman*, 1897) descreveu um caso em ôlho colobomatoso, cujos detalhes não nos foram acessíveis.

Em 1896, *Colburn (in Bischler, 1947)* descreveu um cisto "esclero-corniano temporal", contendo líquido claro e tendo sua face anterior constituída por tecido escleral e corniano.

Rogman (1897) nos deu magnífico trabalho trazendo nos, inclusive (parece-nos que pela primeira vez) uma contribuição histológica. O caso de ROGMAN foi "esclero-corniano nasal inferior", curado pela excisão da parede anterior. A histologia mostrou epitélio conjuntival e feixes de tecido conjuntivo.

Em 1907, *Wernicke* (*in Villard*, 1910) descreveu um cisto "límbico superior", cuja parede anterior excisada mostrou sua natureza escleral.

En 1910, *Seefelder* (in *Bischler*, 1947) observou um caso cujus detalhes também nos fogem, mas que mostrava um cisto atingindo o limbo.

Villard (1910) descreveu, com minúcia, um "cisto seroso congênito da esclerótica", de localização nasal inferior. Embora *Villard* o descreva como cisto escleral, em realidade era córneo-escleral, pois êle mesmo o diz: "cette tumeur empiète la cornée de 1 à 2 millimètres au maximum". Líquido claro como conteúdo. É muito eloquete que transcrevamos aqui as palavras de *Villard*, relatando o ato cirúrgico, pois nos trazem a convicção de que a terapêutica deva ser sempre a excisão da parede anterior.

Diz *Villard*: "Après avoir mis en place le blépharostat, je fis, parallèlement au limbe scléro-cornéen, une incision de la conjonctive qui recouvrait le kyste, puis je la disséquai avec soin, de façon à dégager toute la face antérieure de la tumeur. Cette manoeuvre fut tees facile, mais quan j'essayai de la poursuivre pour disséquer la face postérieure du kyste, que j'aurais voulu énucléer en totalité et sans perforation, je ne tardai pas à m'apercevoir que cela m'était absolument impossible: en effet, comme je m'en étais douté, le kyste était constitué par un véritable clivage des lames sclérales, et pour enlever sa face profonde,

il aurait fallu réséquer une portion étendue de la coque oculaire elle-même. Aussi, je me vis dans la nécessité de le perforer et de n'exciser que la partie antérieure qui était constituée par une lame assez épaisse et qui avait une consistance fibreuse très manifeste. Au moment de la ponction, il s'écoula un liquide-transparent, aqueux, sans trace d'hydatides ou de poils. Quand j'eus terminé la réssection de toute la paroi antérieure, ce qui ne présenta aucune difficulté, j'eus devant les yeux la face profonde du kyste qui avait un aspect brillant et nacré absolument analogue à celui de la sclérotique; je ne perçus aucune trace de la communication avec l'intérieur du globe oculaire qui garda sa tonicité normale. La face postérieure du kyste se continuait manifestement avec le tissu scléral environnant, mais elle était nettement enfoncée et excavée par rapport à la sclérotique voisine, ce qui démonstrait bien que le kyste était logé, et en quelque sorte creusé, dans le tissu sclérotical. Je curretai soigneusement toute cette face profonde, et, par prudence, je crus bon de cautériser légèrement".

Willard, como *Rogman*, traz-nos a observação histológica da parede anterior excisada, em que sobressai o revestimento epitelial da cavidade cística. *Willard* conclui: "trata-se, provàvelmente, de uma inclusão embrionária do epitélio da conjuntiva bulbar na espessura da esclerótica".

O caso de *Friede* (1920) tem uma característica original, como acentua *Bischler*: "vesícula que se podia fàcilmente empurrar para a câmara anterior".

Em 1926, *Usher* (*in Bischler*, 1947) registrou a cura de um caso pela excisão da parede anterior.

Em 1927, *Nitsch* (*in Bischler*, 1947) descreveu um caso nìtidamente "esclerocorniano" de localização nasal, de conteúdo claro, porém com um depósito leitoso à moda de um hipópio. Registre-se essa imagem tipo hipópio, que se repetirá em algumas observações, inclusive a nossa.

Huber (1930) descreveu um caso "esclero-corniano", de forma lobulada, cuja cura se obteve pela excisão da parede anterior córneo-escleral.

Em 1932, *Custodis* (*in Bischler*, 1947) descreveu um cisto "escleral superior" cuja parede anterior foi excisada, curando-o. Mostrou também o revestimento epitelial por outros comprovado (3 fileiras de células epiteliais).

Em 1937, *Hasebe* (*in Bischler*, 1947) divulgou um cisto "escleral nasal". Cura obtida pela excisão da parede anterior que também exibia revestimento epitelial.

Vrolijk (1941) registrou um cisto "esclero-corniano nasal". Conteúdo claro com corpúsculos flutuantes. Excisada a parede escleral, *Vrolijk* incisou e rebateu

a corniana, para curetar e cauterizar com iôdo o seu revestimento interno. Revestimento que a histologia mostrou tambén epitelial.

Bischler (1947) (da escola de *Franceschetti*) trouxe-nos, com um caso pessoal, magnífica revisão da literatura, que muito nos valeu. O caso de *Bischler* tem grande afinidade com o nosso. Tratava-se de um menino de 10 anos de idade, com cisto "esclero-corniano", em que se viam muito bem os dois lobos desiguais (o corniano maior que o escleral), unidos por um ístmo límbico quase capilar. O lobo intra-corniano ocupava o quadrante nasal inferior; o pequeno lobo escleral justalímbico estava às IX horas, onde também se localizaba o canalículo de interligação horizontal. O cisto corniano era devido à clivagem entre os 2/3 anteriores e o 1/3 posterior da córnea. Ao corte óptico, uma linha branco-brilhante indicava os limites do cisto.

A excisão da parede anterior *escleral* esvaziou também o cisto corniano, que desapareceu definitivamente, fundindo-se as suas paredes. A histologia mostrou que o revestimento do cisto era epitelial (do tipo conjuntiva bulbar).

Para *Bischler,* o cisto iniciou-se na esclerótica invadindo, secundàriamente, o parênquima corniano onde tomou proporções agigantadas.

Ruedmann (1956) observou um cisto "esclero-corniano nasal", de conteúdo líquido claro com depósito leitoso, cuja excisão da parede anterior levou à cura. Também aqui o revestimento epitelial do cisto se comprovou.

Esta revisão bibliográfica se resume no quadro anexo. Anotemos que, no período que se seguiu à descrição de *Ruedemann* (1956) não encontramos, percorrendo a literatura oftalmológica, nenhuma monografia sôbre cistos congênitos córneo-esclerais.

Nossa observacão

No dia 10 de Outubro de 1949, examinàmos uma menina com 4 anos de idade, brasileira, residente em Lavras (Minas Gerais-Brasil).

Mãe teve dois abortos (não sifilíticos e não provocados). A gestação da nossa cliente foi normal, como também o parto, a têrmo.

A mãe informa que, aproximadamente há 2 anos, surgiu em OD uma formação inferior que a pouco e pouco se espraiou pela córnea acima. Não tivemos possibilidade de saber se essa localização inferior foi *escleral* ou, como parece mais provável, *límbica* inferior às VI horas.

A opacidade corniana era piriforme, afunilando-se no limbo às VI horas onde se perdia (Fig. 1). Localizava-se, preferentemente, nas camadas mais profundas do parênquima, exibindo pontos ou nódulos mais leitosos. Não havia nenhum aspecto cístico. Ausência de qualquer outra anomalia.
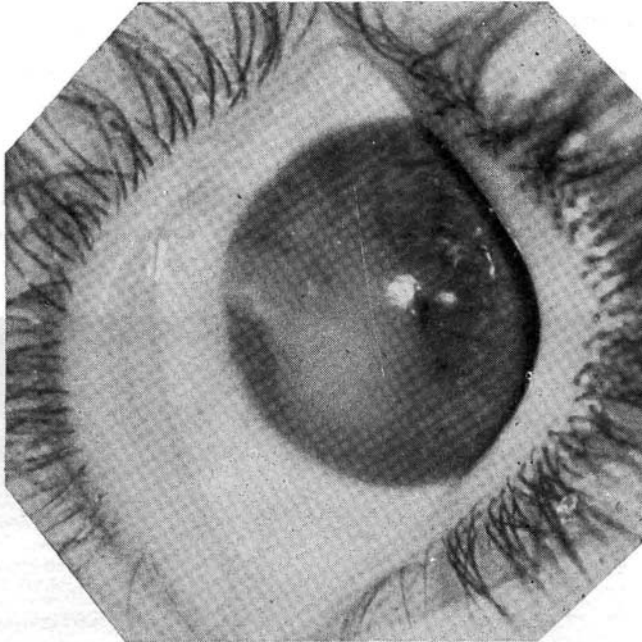
Figura 1 - Aspecto de OD por ocasião do primeiro exame (paciente com 4 anos de idade). Opacidade corniana afunilando-se no limbo às VI horas, sem aspeto cístico. Esclera aparentemente normal.

Os exames complementares então realizados permitiram a suspeita da natureza tuberculosa do processo cerático. Isso porque a reação de Mantoux foi positiva e existia um gânglio calcificado no mediastino. Mas nenhum processo pulmonar evolutivo. Contudo, o tratamento especifico foi instituído, e prudente roentgenterapia ocular prescrita. A opacidade estacionou, o ôlho tranquilizou-se e perdemos o contato com a paciente.

A 21 de Setembro de 1954, cinco anos após o primeiro exame, voltou-nos a paciente porque OD se inflamou e a opacidade recrudesceu. Realmente, a opacidade se intensificou à moda de um hipópio intracorniano, isto é, sedimentando-

se uma camada mais leitosa cujo nível alterava um pouco com a posiçãn da cabeça.

Já então (1954), o corte óptico não deixava dúvida sôbre a formação cística. O conteúdo do cisto clivava a córnea profundamente: entre os 2/3 anteriores e o 1/3 posterior. Mesmo afunilamento anterior ao nível do limbo, mas nada se percebia na esclera.

Firmamos, então, o diagnóstico de "cisto corniano congênito" e acenamos com a prospecção cirúrgica.

A doente só nos voltou nove anos após (Janeiro de 1964), já agora com o quadro novamente alterado. É que, ao lado do quadro corniano, mais ou menos inalterado, surgira formação vesiculosa ou cística sub-conjuntival inferior, com halo congesto (Fig. 2).
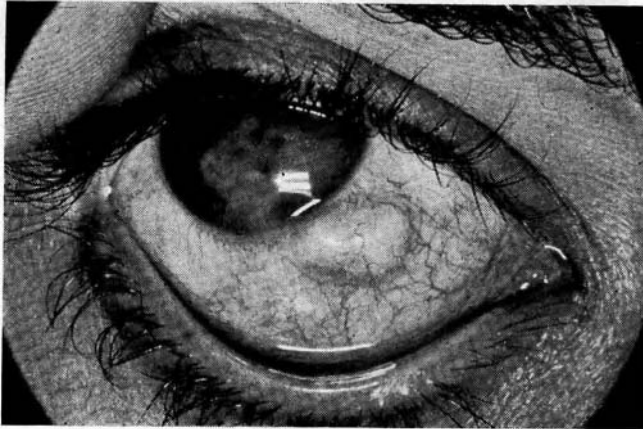
Figura 2 - Aspecto de OD quinze anos após o primeiro exame (paciente com 19 años de idade). Ao lado do quadro corniano, nìtidamente cístico, havia formação sub-conjuntival cística inferior com halo congesto. Notar discreto estrangulamiento.

Resolvemos puncionar essa formação subconjuntival. A punção denotou resistência do tipo "escleral" de sua parede, dando saída a pequena quantidade de líquido, que no entanto se refez inteiramente dentro de 25 dias.

A biomicroscopia cuidadosa e com a punção evacuadora, caracterizava-se, sem dúvida, um cisto escero-corniano inferior. O lobo corniano piriforme afunilando-se inferiormente às VI horas, onde se entrevia o canalículo de ligação com o cisto
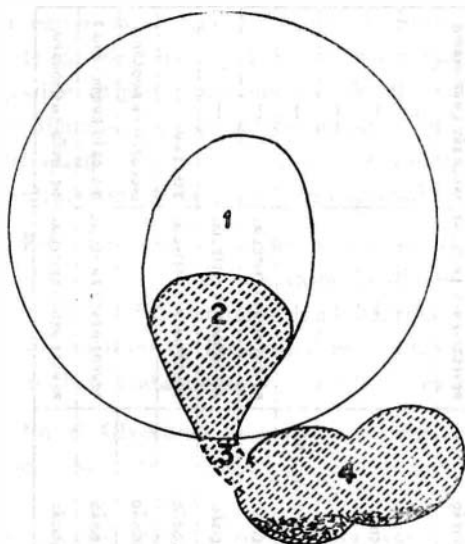
Figura 3 - O cisto corniano (2) conti-
nua-se inferiormente com um canículo
escleral profundo (3) mal definido, que
se abre no cisto escleral (4), êste bem
visível, quase sub-conjuntival, e com pe-
queno estrangulamento central. Anote-se
um depósito leitoso no fundo do cisto
esclerial.

escleral recém-aparecido (Figs. 3 e 4). A parede anterior do cisto corniano era
leitosa, bem como a posterior (sendo esta de opacidade mais densa).

A gonioscopia da metade inferior (única viavel) nada adiantou, apenas nos
mostrando pigmentação trabecular. A citologia do líquido da punção revelou

Figura 4 - A opacidade corniana exibe duas porções distintas: uma
central (1), não cística que, ao corte óptico, se localiza, co-
mo linha leitosa e pontos brilhantes, na zona da membrana
de Descemet; e outra inferior (2) realmente cística, conti-
tinuadose, inferiormente, com o canalículo de ligação (3).

CISTOS CONGÊNITOS DA ESCLERA E DA CÓRNEA

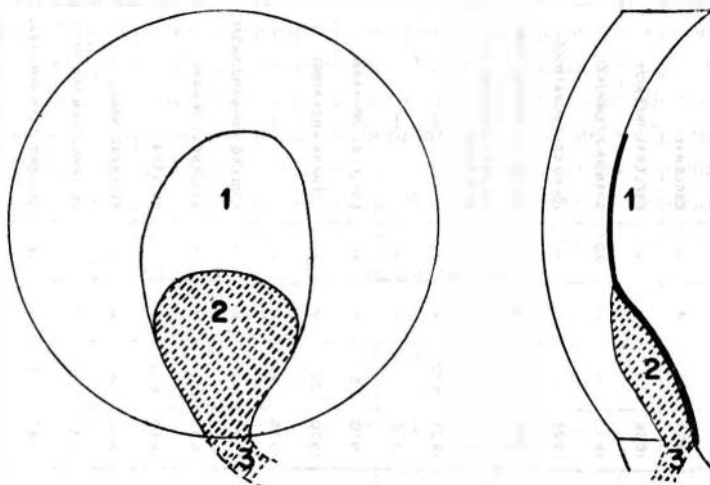| AUTOR	ANO	IDADE	SEXO	ÔLHO	TOPOGRAFIA	CONTEÚDO	TRATAMENTO	HISTOLOGIA	ETIOPATOGENIA
APPIA	1853	—	—	—	INTRA-CORNIANO	—	—	—	—
MACKENZIE	1854	10	M	—	ESCLERAL	—	EXCISÃO	—	—
WALDHAUER	1866	13	—	—	ESCLERAL INFERIOR	—	INCISÃO	—	—
JUST	1873	—	—	OD	CORNIANO TEMPORAL	LÍQUIDO CLARO	INCISÃO	—	—
BOCK	1893	—	—	—	(ÔLHO COLOBOMATOSO)	—	—	—	—
COLBURN	1896	15	M	—	ESCLERO-CORNIANO TEMP.	—	—	—	—
ROGMAN	1897	13	F	OE	ESCLERO-CORNIANO INFE-RIOR NASAL	LÍQUIDO CLARO	EXCISÃO	SEM REVESTIMENTO EPIT.	FENDA FETAL
WERNICKE	1907	5 1/2	F	OE	—	—	EXCISÃO	—	—
SEEFELDER	1910	—	—	—	—	—	—	—	INCLUSÃO EMBRIONÁRIA
VILLARD	1910	5	F	OD	ESCLERAL INF. NASAL	LÍQUIDO CLARO	EXCISÃO	REVESTIMENTO EPITELIAL	INCLUSÃO EMBRIONÁRIA
FRIEDE	1920	20	F	—	(CÂMARA ANTERIOR)	—	—	—	—
USHER	1926	4	M	—	—	—	EXCISÃO	—	—
NITSCH	1927	6	M	—	ESCLERO-CORNIANO NASAL	LÍQUIDO CLARO DEPÓSITO BRANCO	—	—	—
HUBER	1930	13	M	—	ESCLERO-CORNIANO	—	EXCISÃO COR. ESCL.	—	—
CUSTODIS	1932	3 1/2	M	—	ESCLERAL	—	EXCISÃO	REVESTIMENTO EPITELIAL	—
HASEBE	1937	4	M	—	ESCLERAL NASAL	—	EXCISÃO	REVESTIMENTO EPITELIAL	—
VROLIJK	1941	10	F	OE	ESCLERO-CORNIANO NASAL	LÍQUIDO CLARO	EXCISÃO	REVESTIMENTO EPITELIAL	SCHLEMM
BISCHLER	1947	10	M	OE	ESCLERO-CORNIANO NASAL	LÍQUIDO CLARO DEPÓSITO BRANCO	EXCISÃO	—	INCLUSÃO EMBRIONÁRIA
RUEDEMANN	1956	23	M	OE	ESCLERO-CORNIANO NASAL	LÍQUIDO CLARO DEPÓSITO BRANCO	EXCISÃO	REVESTIMENTO EPITELIAL	INCLUSÃO EMBRIONÁRIA ?
ROCHA E GALVÃO	1967	22	F	OD	ESCLERO-CORNIANO INF.	LÍQUIDO CLARO DEPÓSITO BRANCO	EXCISÃO	REVESTIMENTO EPITELIAL	INCLUSÃO EMBRIONÁRIA

"alguns polimorfonucleares neutrófilos e alguns núcleos incaracterísticos". A tensão ocular era normal. A injeção endovenosa de fluoresceína não coloriu o cisto, mostrando-o, assim, independente da câmara anterior.

A cirurgia impunha-se e a realizamos em Junho de 1964. Incisada a conjuntiva, expusemos o lobo escleral que era oblongo de grande eixo horizontal. Ressecamos a parede anterior do cisto escleral o que propiciou, também, o esvasiamento do cisto corniano. Cauterizamos com iôdo a face profunda do cisto escleral e todo o revestimento interno do cisto corniano. Sutura conjuntival.

O caso evoluiu identicamente ao de *Bischler* (1947), fundindo-se, definitivamente, as paredes do cisto corniano, para não mais se reformar a coleção cística. Cura.

O exame histológico da parede escleral excisada reproduziu, aproximadamente, a imagem publicada por *Villard* (1910) revestimento epitelial.

COMENTÁRIOS

A evolução do nosso caso não deixa dúvida sôbre o diagnóstico: "cisto congênito esclero-corniano".

Sua evolução foi, porém, singular, desnorteando, inicialmente, o diagnóstico. Por outro lado, a inexistência *aparente* de um lobo escleral permitiria uma interrogação improvável: teria sido a córnea o ponto de partida do processo cístico. —Sabe— se que, por vêzes (como no caso de *Bischler* o componente escleral primário pode ser de muito ultrapassado pelo componente corniano secundário. Mas, em nosso caso, só muito tardiamente se poude caracterizar o componente escleral. O possível é que êste último preexistisse, apenas minúsculo e profundo, não permitindo sua comprovação. Fica-nos a impressão de que, também aqui, o cisto esclero-corniano teve, como ponto de partida, a esclera.

Quanto à terapêutica, uma vez estabelecido o diagnóstico, parece tranquila a indicação cirúrgica, que terá sempre como base a excisão da parede anterior do componente cístico *escleral* e a cauterização do epitélio de revestimento. Quanto ao cisto corniano, poderá ou não exigir a incisão de sua parede anterior para a curetagem ou cauterização de seu revestimento; mas só por exceção pensar-se-ia em excisar a parede anterior do cisto da córnea. Curado o cisto, sim. Como no nosso caso, restando opacidade cicatricial residual que comprometa a visão, caminhar-se-á para a ceratoplastia que não será terapêtica do cisto, mas do leucoma residual.

Finalmente, algumas palavras sôbre a origem dêsses cistos. Várias hipóteses têm sido aventadas. Divertículo da câmara anterior? Relacão com a fenda fetal Relação com o canal de Schlemm?

Parece-nos que a hipótese mais racional, inclusive pelo achado habitual do epitéiio de revestimento, é que se trate de um cisto de inclusão. Como diz *Bischler* (1947) : "une incusion embryonaire de l'épithelium bulbo-conjonctival de la sclérotique en voie de constitution, constitue une explication tout à fait satisfaisante".

RESUMO

Descrição de caso de cisto congênito córneo-escleral observado em criança de 4 años de idade e cuja evoluçã foi seguida durante 18 anos. O tratamento cirúrgico, realizado 16 unos após o primeiro exame, constou de excisão da parede escleral anterior e cauterização com iôdo. O exame histológico mostrou revestimento epitelial da cavidade cística. A hipótese etiopatogênica mais satisfatória é a de cisto de inclusão embrionária.

SUMMARY

A congenital corneoscleral cyst in a child 4 years old is briefly described. Surgical treatment consisted of excision of the anterior scleral wall and chemical cauterization with iodine. Histological examination showed epithelial linning, according to the etiopathogenic hypothesis of embryonary inclusion cyst.

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HIPERTENSION LABERINTICA, HIPERTENSION INTRAOCULAR Y LA VIDA EFECTIVA

POR

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En enero 8 de 1861 Próspero Meniere leyó ante la Academia de Medicina Francesa, reunida en París, un trabajo sobre las últimas investigaciones y concepciones sobre patología y funciones del oído interno. Un paciente con un oído normal puede repentinamente desatar una crisis de Tinitus de intensidad variada, Sordera y Vértigo, todo esto pone de manifiesto una lesión en el laberinto.

En 1871 Knapp expresó la gran similitud entre Glaucoma y Enfermedad de Meniere; Portmann en 1927 dijo que la hipertensión del laberinto se trataba en la misma forma que la hipertensión intra-ocular y para ello ideó una operación para abrir y drenar el saco endolinfático. El conocimiento de que el Glaucoma y la enfermedad de Meniere fuera el resultado de un fenómeno de aumento de presión no tuvo sentido hasta que Hallpike y Cairns demostraron la dilatación del sistema endolinfático en el hueso temporal tomado de cadáveres de pacientes que habían padecido la enfermedad de Meniere.

Muy poco se conoce acerca de la fisiopatología del sistema endolinfático y se necesita más especulación científica para explicar la razón de dicha hipertensión.

Hasta el presente se acepta que el líquido endolinfático es secretado por la Estría Vascularis y que suministra la nutrición a las células ciliares y las otras estructuras del Organo Corti; estas células ciliares carecen de vasos sanguí-

neos por lo que lógicamente se presume que el líquido endolinfático es su fuente de nutrición. Estas células presentan un alto metabolismo por la gran actividad eléctrica que suministran a la cóclea; necesitan gran consumo de oxígeno, una caída de oxígeno en el líquido endolinfático resulta en una disminución de la actividad electrofisiológica de las células ciliares. En el oído normal existe un volumen constante de endolinfa; por lo tanto, a una rápida formación de endo-linfa corresponde una rápida reabsorción; los sitios de reabsorción son menos claramente definidos que los sitios de producción.

Existen muchas teorías, entre ellas la teoría de circulación longitudinal lla-mada de Guild, en que la producción de Endolinfa por la Estría Vascularis es enviada hacia el saco endolinfático, el que posee un endotelio rugoso y muy vascularizado que absorbe los flúidos; si este saco endolinfático se oblitera, se desatan los síntomas de Meniere. Lindsay, Watyke y Bast dicen que fuera del saco endolinfático deben existir otras zonas de reabsorción del líquido endolin-fático. La teoría de circulación radial de Naftalin y Harrison no depende en total de la reabsorción de la endolinfa en el saco endolinfático; la endolinfa es reabsorbida en el área de la escala media, en la cual es producida, asumiéndose una circulación radial a través de la Escala Media que nos lleva a la conclusión que la endolinfa tan pronto como se produce es reabsorbida en la misma zona radial de la escala media; si el mecanismo de salida falla la endolinfa se acu-mula y da origen a la enfermedad de Meniere. Necesariamente puede existir una hiperproducción y una reabsorción defectuosa de flúidos, o puede existir tam-bién una producción de un fluido anormal con cambios en la relación de presión osmótica de endolinfa y perilinfa a través de la membrana de Reissner.

La enfermedad de Meniere en su mecanismo puede ser similar al Glaucoma en el cual existe un trastorno en la reabsorción del Humor Acuoso.

En el comienzo de la enfermedad de Meniere la pérdida de la audición es debido a hipertensión mecánica y puede ser reversible; si esta hipertensión no es combatida o tratada, se establece una degeneración neurosensorial de las estructuras del oído y la audición perdida llega a ser irreversible. Este mismo fenómeno se opera en el Glaucoma, cuando el campo visual se deteriora notable-mente, no hay reversibilidad cuando se trata la hipertensión intra-ocular. Cuando la hipertensión endolinfática se sucede lesiona la membrana bacilar y resulta primero una pérdida auditiva más acentuada en los tonos bajos que en los altos; en los continuos episodios hipertensivos se afectan más y más los tonos altos.

El tinitus es debido probablemente a un daño en las células neuro-sensoriales de la membrana Bacilar cuya intensidad es mayor mientras la hipertensión se

aumente; conviene mencionar el tinitus originado por agentes técnicos como estreptomicina, quinina, canamicina, salicilatos, nicotina, etc.

El vértigo en la enfermeda dde Meniere es muy difícil de explicar, existen varias teorías, entre ellas la de Lawrence y Mc Cabe, quienes hablan de rupturas y cicatrizaciones espontáneas y sucesivas de la membrana de Reissner; dicen que la contaminación de la endolinfa con la perilinfa resulta en un repentino estímulo del epitelio sensorial vestibular, el que perdura hasta que la ruptura se coapte. Schuknecht reporta tres huesos temporales que muestran estas rupturas en el sistema endolinfático; él afirma que el ataque ocurre en el momento de la ruptura. Para William F. House el ataque se termina en el momento de la ruptura del sistema endolinfático dentro del sistema perilinfático. Guilford dice que aproximadamente ⅔ partes de los pacientes experimentan distensión del sistema endolinfático con ruptura y fistulización de él; este proceso ofrece un escape para el exceso de endolinfa y conserva los síntomas bajo control; esto explica también la curación espontánea de algunos pacientes de la enfermedad de Meniere.

Podemos concluir por lo expuesto que la enfermedad de Meniere es causada por la acumulación de endolinfa con obstáculo en la reabsorción de ella; en condiciones normales la presión endolinfática en ambos lados de la membrana Bacilar es igual; la acumulación de endolinfa aumenta la presión en el sistema endolinfático al causar pérdida de la audición, tinitus y vértigo por una presión mecánica. La ruptura del sistema endolinfático dentro del sistema perilinfático iguala la presión entre los dos sistemas y los síntomas se terminan. Ruptura o posiblemente el retorno del mecanismo normal de reabsorción cura los síntomas en aproximadamente ⅔ partes de los casos; con la tercera parte restante parece que el exceso de presión destruye el oído interno y por lo tanto cesan los síntomas. Es un estado similar al Glaucoma Absoluto que es el resultado final de un proceso patológico no tratado.

En la hipertensión intra-ocular sabemos muy bien el aporte inmenso que ha habido en las investigaciones científicas, para explicar los hechos fundamentales del origen de la secreción del flúido Humor Acuoso y del mecanismo de la absorción o salida del medio interno ocular de este flúido; por cuanto a su origen todos los científicos se han puesto de acuerdo hasta el presente, que el Humor Acuoso es secretado por continua y lenta filtración de los vasos de la Pars Plana del proceso ciliar. Por cuanto al avenamiento o salida del humor acuoso del interior del ojo el Canal de Schlemm ha sido demostrado clínica y filogenéticamente el lugar principal de drenaje; existen otros tejidos como el iris que ayudan de una manera secundaria.

La gonioscopía ha demostrado a cabalidad la función de avenamiento desplegada por el canal de Schlemm. Como es sabido, la presión intraocular normal al tonómetro de Schiotz es considerada entre 16 y 24 milímetros de mercurio y que por el mecanismo de secreción, circulación y salida del humor acuoso los tejidos oculares permanecen inalterables y la función sensorial también permanece normal; una vez alterado este círculo por infinidad de causas viene un bloqueo ocular de más o menos intensidad con tendencia hacia la evolución anormal, si no se trata, provoca diversos fenómenos que conducen a la destrucción del tejido del nervio óptico con el nefasto pronóstico de la irreversibilidad, al originar la ceguera en el paciente.

La presión normal intraocular es sostenida por dos factores, la elasticidad de los tejidos esclero-corneanos y el volumen del contenido por esta cubierta, el que es conservado a través de la presión sanguínea. Existe una ligera variación de uno a dos milímetros de mercurio en la presión intraocular que sigue al ritmo del pulso y de la respiración; durante la noche la presión sube lentamente por aproximadamente las primeras 6 horas y es seguida por un aumento mayor de 3 milímetros de Hg entre las 5 a.m. a las 7 a.m. para caer durante el día y continuar el mismo ciclo; eso se cree que es debido a la falta de actividad de los músculos intra y extra-oculares durante el sueño. El mecanismo del aumento de la presión intraocular en el Glaucoma se debe a múltiples causas; entre ellas mencionaremos las siguientes: bloqueo mecánico de los espacios trabeculares por el iris o por otras materias; falta de comunicación entre la cámara anterior y la cámara posterior; obstrucción de las venas de drenaje; hiperproducción del humor acuoso debido a irritabilidad de los procesos ciliares; hiperhemia vascular; interferencias con vasos en el mecanismo del canal de Schlemm por esclerosis o estrechamiento de las arteriolas aferentes; los trastornos de refracción; en las personas con hipermetropía hay más predisposición que en las con miopía; la profundidad de la cámara anterior decrece cuando la hipermetropía crece.

Los estados emocionales pueden producir trastornos en los procesos fisiológicos, los que pueden originar cambios orgánicos; en el Glaucoma, lo mismo que en la enfermedad de Meniere, no hay duda que estados emocionales de angustia, de depresión, de tensión, de ansiedad, de irritabilidad, de inestabilidad, de excitabili
o intra-laveríntica; es necesario precisar que ello no puede ocasionar un ataque de enfermedad de Meniere o de Glaucoma en un paciente normal, sino que existen condiciones especiales de desequilibrio en los procesos fisiológicos; en otras palabras, una meiopragia ocular o laberíntica para desatarse con más facilidad

la patología de que hablamos. Existe un trastorno en el funcionamiento de los sistemas simpático y para-simpático que regulan el ojo y el oído; en vista del posible origen psicosomático de algunos casos de Glaucoma y de enfermedad de Meniere, en especial en ataques agudos; es necesario recalcar la participación del estado emocional y por lo tanto, regular la terapéutica de sedación para contrarrestar toda posible emotividad.

En cuanto al tratamiento, considero primero el médico. En la enfermedad de Meniere está sujeto a vasodilatadores y a sedantes; dieta salina, dieta hídrica, diurético, bioflavonoides con vitamina C y K, Marezine, bonadoxina, benadryl, ácido nicotínico, histamina en solución intravenosa, subcutánea y vía sublingual. Este tratamiento vasodilatador es recomendado por 6 semanas.

En el Glaucoma el tratamiento médico es de acuerdo con la clase de glaucoma; se deben considerar muchos factores, si es agudo o crónico; si el ángulo es cerrado o abierto y la reacción del ojo del paciente a las diferentes clases de drogas: mecolil, pilocarpina, furmethide, eserina, neostigmina, D F P (Diisopropyl fluorophosphate), TEPP (tetraethylpyrophosphate), mintacol, carbachol, ureocholine, phospholine iodide, epitrete (epinephrine bitartrate), glaucon (epinephrine base), diamox intravenoso o por vía oral, oratrol vía oral, daranide vía oral, glicerol vía oral, urea vía intravenosa, ethamide vía oral. En cuanto al tratamiento quirúrgico no se ha alcanzado el mismo nivel de confidencia para el drenaje endolinfático como para el drenaje del Humor Acuoso. En cuanto a técnicas quirúrgicas son muy numerosas para reducir la presión intra-ocular, cada tipo de glaucoma requiere una técnica especial, los cirujanos responsables son numerosos y llegan a familiarizarse con determinados procedimientos quirúrgicos. En la hipertensión laberíntica la técnica quirúrgica más adecuada en el presente es la operación de William F. House: "avenamiento endolinfático subaragnóideo", que consiste en colocar un tubo de caucho de silicón entre el saco endolinfático y el espacio subragnoideo.

Resumen

Del estudio que se acaba de exponer se esboza lo siguiente:

1) Existe un factor común en la Enfermedad de Meniere y en el Glaucoma, cual es la hipertensión endolinfática en la primera y del humor acuoso en la segunda.

2) Ha habido más investigación científica en el Glaucoma que en la Enfermedad de Meniere.

3) Es más común la hipertensión intra-ocular que la hipertensión laberíntica.

4) En el presente es más fácil el tratamiento médico-quirúrgico en el glaucoma que el Hidrops del Laberinto.

5) Ambas entidades conducen a un fin común cuando no son tratadas adecuadamente: atrofia irreversible absoluta del óptico y del acústico.

6) Las vías de aborde para avenar el laberinto son escasas, difíciles y delicadas, al requerir un equipo y un entrenamiento humano más especializado que lo que requiere la descompresión del globo ocular.

7) La vida afectiva juega un papel preponderante tanto en el Glaucoma como en la hipertensión laberíntica.

8) En el estado actual del avance tecnológico de todas las ciencias, la otología ha avanzado más de 5 años para acá que la oftalmología.

9) Con el advenimiento del Laser y cooperación de científicos y del hombre de empresa, se aproxima una verdadera revolución en el campo oftalmo-otológico que aclarará muchas lagunas y solicionará múltiples problemas en el tratamiento de muchas enfermedades que atacan a los seres humanos.

CLINICAL AND EXPERIMENTAL RESEARCH ON THE ACTION OF CHLORAMPHENICOL, THE TOTAL EYE EXTRACT (ETO) AND VITAMIN B 12

BY

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The research undertaken at the ophthalmological clinics of Bucharest and Iassy during the last 10 years have shown that ETO has numerous biological characteristics which have imposed it as a precious auxiliary therapeutic agent in the treatment of the most varied eye affections (1, 2, 3).

Thus under the action of ETO the experimental ulcerations of the cornea are completely healed in 4-5 days, while the healing of the same ulcerations needs nearly twice that time with the witness animals.

The study of the "in vitro" action of ETO on pathogenic germs (staphilococcus, piocyanic bacillus, bacillus prodigiosus, typhic and carbon bacteride) by different methods (increased quantities of ETO added to cultures, integrated extract in a medium of cultures or disks steeped in extract) have shown that ETO has no action whatever on the development of these bacteria.

The therapeutic effects of ETO being favourable in more than 80% of the cases in which it has been administered (2), we have tried to associate with it other medicamentous agents and in the first place an antimicrobian product. In the choice we have made we resorted to chloramphenicol, an antibiotic with a wide spectrum of action even when administered per os. Indeed it is known that the spectrum of action of this antibiotic bacteriostatic is very wide, comprising:

—Gram-positive cocci (strepto-staphylo-pneumoccocci)

—Gram-negative cocci (gonococci, meningococci)

—Gram-negative bacilli

—Spirochaetae (syphilis, leptospirosis, recurrent)

—Rickettsiae

—Large size viruses (trachoma), etc.

On the other hand, knowing that vitamin B_{12} has a regenerative power on the epitheliai even in local applications and, apart of the rôle played by it in the general process of growth, that it has an elective action on certain nervous fibres, we have associated this vitamin also to the total eye extract, thus creating a medicamentous catalyzer, of specially favourable action in corneal ulcers.

I. *Experimental research*

The effects of the mixture ETO-vit. B_{12} chloramphenicol have been studied primarily on traumatic experimental ulcers of the cornea.

The research has been made on rabbits. With a Filatow trephine of 4 mm diameter we provoqued ulcerations in the central zone of the cornea interesting the corneal epithelium and the superficial strata of the parenchyma.

The animals of the experiment have been divided into *two groups* each comprising three batches.

The first batch of group 1 comprizing 10 rabbits have been treated twice daily with instillations of a collyrium having the following composition: vit B^{12} 25o gamma, physiological serum 14% q. s. to 5 cc.

To all the animals the medicament was administered to the right eye, the other, the left eye serving as witness. The cicatrization process was followed up by measuring the diameter of the wound with a compass.

In all the cases the cicatrization of the ulcers treated was progressive from the periphery towards the centre and the healing was completed after 3-4 days, while the ulcerations of the witness eyes have healed after 8-10 days.

On the second batch of rabbits, the traumatic ulcerations of the cornea were treated with twice daily instillations of a mixture of vit. B_{12} (25o gamma), physiological serum 5 cc and ETO 4 cc (corresponging to 0.5 of dry substance).

The cicatrization of the corneal lesions has taken place in two days, while with the witness eyes the process has been extended to 8-10 days.

With the animals of the third batch the corneal ulcerations have been treated with daily instillations of a collyrium having the following composition: vit. B_{12} 25o gamma, ETO 4 cc, chloramphenicol 5 mgr, physiological serum 14%, 5 cc.

The lesions were scarred over completely after 3-4 days, while the witness eyes needed a time of 8-10 days.

On the *second group of rabbits* the corneal wounds have been infected with staphylococci of fresh cultures.

After 48 hours the rabbits of the *first batch* were treated like those of the first batch of group I, with instillations of vit. B_{12}.

The results obtained were the following:

—30% of the cases, the ulcers were healed after 8-10 days

—20% of the cases, the ulcers were healed after 12-14 days

—12% of the cases, have shown an evolution to perforation

— 8% of the animals succumbed, while the remaining

—30% of the animals were healed in 14-30 days

In the *second batch of animals* the corneal ulcers were treated with instillations of ETO and vitamin B^{12}. The proportion of healed was approximately the same.

There were no perforations of the cornea and no animal died.

Lastly, *the animals of bach* 3 were treated with daily instillations of the collyrium with ETO, vit. B_{12} and chloramphenicol.

The results obtained have been definitely superior to those of batches 1 and 2. Indeed:

—in 85% of the cases the ulcers were healed in 4-5 days

—in 10% *of the cases* the healing process has taken 8 days

—in 5% of the cases up to 12 days.

No eye was lost by perforation and no animal died.

From this research it results that the cicatrizing action of ETO is strengthened by vit. B_{12}, while by association with chloramphenicol a therapeutical product of remarkable efficacy in the treatment of suppurating keratitis is obtained.

II. *Clinical research*

The therapeutical effects of the mixture ETO-vit B12 —chloramphenicol— in the clinic have been watched on patients with corneal affections of different etiologies: serpiginous corneal ulcers (25 cases), traumatical erosions (50 cases), herpetic ulcers (17 cases), eczematous ulcers (29 cases).

It is known that the ulcerating keratites either of infectious or 'i or of uninfectious origin is characterized primarily by infiltrations, which evolve more or less rapidly toward an ulcerous phase. This evolution rep
reaction of the cornea to a factor which may be toxi-infectious, allergic or dystrophic, a factor which must be known in order to apply an efficient therapy.

In the treatment of corneal ulcers,
of defence of the cornea and more generally of the anterior segment of the eye. This is necessary for establishing a potentiating therapy and for applying on the pathogenic factors an action both precocious and as energetic as possible, especially when it is a matter of bacteria and viruses (therapeutics of attack).

Potentiating therapy. The potentiating therapy comprises the application of heat by means of mois or dry dressings, lightly olcoholized, generalized proteinotherapy, autohaemotherapy, reconstituents, vitaminotherapy, calcium, helio-marine cure, etc.).

The *attacking therapeutics* purpose the destruction of the germs which produced the corneal ulcer. By classical means this is obtained by galvanic cauterization, by curetting the ulcer followed by chemical cauterization by diathermy, ultraviolet rays, betatherapy, radiumtherapy, etc.

There are also applied *local medicamentous means of potentializing and of attacking* among which we mention: caustics or antiseptics, sulfonamides, antibiotics, and as is well understood, mydriatics.

In general our patients have been treated according to this scheme.

With one of them, patient B. C., 54 years of age, having an ulcer with hypopyon and iritis on the R. E., this treatment stopped the evolution of the ulcer, but the proces of cicatrization being lingering, the instillations of ETO, vit. B$_{12}$ and chloramphenicol have healed the ulcer in 2 days.

Another patient, P. B., 44 years of age, having a serpiginous ulcer with hypopyon of a height of approximately 4 mm, treated exclusively with atropine, ETO, vitamin B$_{12}$ and chloramphenicol in instillations from 2 to 2 hours only after three days began to reduce it gradually, so that it was completely healed

after 10 days. The inflammation phenomena, the watering of the eyes, the photophobia and the pain began to diminish after 48 hours. The hypopyon was evacuated during the 5th day from the beginning of the treatment by a paracentesis and it has not formed again.

The third patient treated under the same conditions was healed in three days.

Traumatic erosions of the cornea were brought to cicatrize in 2-5 days without leaving any traces.

Herpetic keratitis. It is known that at present no therapeutic may be counted specific in the affections with herpetic virus. The gravity and the frequency of the herpetic corneal lesions has led to the use of a number of remedies in corneal herpes.

The results obtained are extremely contradictory so that it is very difficult to form an idea on their efficacy as long as we have no personal experience in this problem.

From a clinical point of view, the herpetic keratites are divided into *superficial* and *profound* ones, each of them requiring local and general treatment, besides the treatment of the complications and of the sequelae.

The local treatment in the incipient or *limited* forms will be a treatment of attack by which the ulcer is cleaned with a view to removing the tissue in which the virus is hidden. This is followed by the disinfection of the virus by chemical substances of the type of iodine tincture, methylene blue, phenol.

Recently antibiotics have been resorted to. At the same time the eye which is touched is dressed and mydriatics are administered against the iridic reaction.

The *profound* forms have benefitted less of antiinfectious treatments, the local treatment tending to reduce the infiltration phenomena and the necrosis while tending to increase the power of defence of the cornea by activating the lymphatic circulation and the limbic sanguine circulation.

In these forms the tissue-therapy finds the most suitable indications and the results which we have obtained with ETO are conclusive from this point of view.

With all the patients subjected to treatment with ETO, vit. B_{12} and chloramphenicol, there has been a clear improvement both from a subjective point of view and objectively. The pain, the photophobia, the watering have dimished progressively and the daily colouring of the ulcer with fluorescein showed a progressive reduction of its surface.

These results however are not lasting. In five cases a new outburst of keratitis took place after 7 days;

— in two cases after 12 days

— in one case after 20 days, and

— in three cases the duration of the improvement has exceeded 30 days.

The *eczematous ulcers* have all reacted favourably to the treatment with ETO, vit. B_{12} and chloramphenicol, some of them healing up in 4-5 days, although previously they had been treated for weeks on end with atropine, dionin, aureomycin, vitamin A, etc.

From the study of the cases observed we can affirm that the corneal erosions and the serpiginous ulcers are best influenced by ETO, vitamin B_{12} and chloramphenicol.

Another affection which is favourably affected by this medication is the eczematous ulcer. The herpetic keratitis, although it is much improved both as regards the subjective symptomatology as also the objective one, shows no lasting results.

CONCLUSION

1. ETO, vit. B_{12} and chloramphenicol represent a medication with favourable, effects on traumatic ulcers of an infectoius character of the cornea, shortening the evolution and speeding up the cicatrization.

The medication influences first the subjective symptoms: the pains, the photophobia, which diminish progressively; later the cicatrization of the lesions takes place.

2. Eczematous kerato-conjunctivites are also benefiting by the treatment with ETO, B_{12} and chloramphenicol, especially if the classical treatment has yielded no results.

3. The herpetic keratites show results which are not constant, because after a period of improvement which is variable, new outbreaks of lesions take place at the level of the cornea.

ABSTRACT

Associating the total eye extract (ETO) with chloramhenicol and vitam B_{12}, there is obtained a catalyzing medicament which is specially favourable in corneal ulcers, either experimental or clinical. Constant action in the case of serpiginous or eczematous ulcer. Important improvement in herpetic keratitis, but of temporary (non-durable) results.

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OPERACION DE LA CATARATA
CON ALPHA-QUIMOTRIPSINA
UTILIZACION DE DOSIS BAJAS

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Desde el año 1958 en que Joaquín Barraquer descubrió la propiedad zonulolítica de la alpha-quimotripsina, ha venido usándose cada vez con mayor amplitud esta sustancia en la extracción intracapsular de la catarata.

Dos circunstancias, en muchas ocasiones, dificultan la extración in toto de la catarata: la friabilidad de la cápsula y la resistencia de la zónula. Nada hay que pueda modificar la consistencia de la cápsula, pero en cambio se ha encontrado la forma de disminuir la dureza del ligamento suspensor, resolviéndose casi totalmente los problemas de la extracción.

Así se explica que el mundo oftalmológico haya acogido con tanto interés el gran descubrimiento de Barraquer.

Sin embargo, se ha escrito bastante también, sobre los efectos indeseables de la alpha-quimotripsina, tanto que su uso se ha tratado de limitar a ciertos casos, tomando como base, la edad del sujeto y casi proscribiéndola en pacientes de avanzada edad.

Se acusa a la alpha-quimotripsina de dificultar la cicatrización de la herida corneal, de provocar queratitis bullosa, reacciones congestivas del iris y del cuerpo ciliar, glaucomas secundarios y manifestaciones alérgicas, principalmente.

Quienes tengan suficiente experiencia en la extracción con alpha-quimotripsina, no podrán negar que a veces se presentan efectos indeseables atribuidos al producto; pero son tantas las dificultades que se sortean con su uso, que es necesario buscar el procedimiento para que tales efectos sean mínimos, que prácticamente no alteren el postoperatorio.

Quizás el descubrimiento de un inhibidor, sería la fórmula ideal y las investigaciones en este sentido serían valiosas, como lo dice Joaquín Barraquer.

El objeto del presente artículo es poner a consideración de los oftalmólogos el método que seguiremos, que podríamos denominarlo "la extracción intracapsular de la catarata con dosis mínimas de alpha-quimotripsina", el cual nos ha dado buenos resultados en nuestra práctica.

Apuntes históricos. La extracción de la catarata se remonta a miles de años y su técnica está vinculada a cultores eminentes de la Medicina, cuyos nombres ha recogido la historia. Su evolución podría dividirse en tres grandes etapas: la reclinación, practicada por Susruta en la vieja India, descrita con admirables detalles 3.000 años antes de Cristo; la extracción extracapsular, practicada por primera vez por Daviel en 1745; y la extracción total o intracapsular unida a Pagenstecher, Bowman (1865) Wecker (1868), Elschnig y Smith (1910).

La técnica de la extracción in toto ha alcanzado un alto grado de perfección y de seguridad y salvo contraindicaciones excepcionales, es la técnica preferida y adoptada por todos los oftalmólogos.

En esta última etapa hay que anotar un hecho de importancia trascendental: el descubrimiento de la alpha-quimotripsina hecho por Joaquín Barraquer en 1958, que marca nuevos rumbos en la cirugía del cristalino.

Alpha-Quimotripsina. Esta substancia es una enzima proteolítica de orígen pancreático, cuya aplicación en Oftalmología se debe al Doctor Joaquín Barraquer, de Barcelona, España, quien descubrió su acción lítica preponderante sobre el ligamento suspensorio del cristalino.

Las soluciones de alpha-quimotripsina son poco estables. Después de pocas horas pierden su propiedad a la temperatura ordinaria, pero a dos grados centígrados mantiene su actividad durante 30 días.

La dificultad de mantener estéril la solución obliga a que solo se use durante una operación. Sin embargo, una solución cuidadosamente utilizada y mantenida en refrigeradora, puede usarse sin peligro y sin menoscabar su propiedad lítica, durante ocho días.

El efecto enzimático de alpha-quimotripsina se inactiva fácilmente en presencia de jabón, detergentes, ácidos, álcalis y antisépticos, tales como el alcohol. Por tal motivo las soluciones deben hacerse con los sueros de los propios fabricantes del producto y utilizando jeringuillas esterilizadas al calor seco. Debe desecharse toda solución de aspecto turbio o que tenga precipitados.

En solución al 1 x 5.000, que es la usada en cirugía del cristalino, inyectada en la cámara anterior, tiene una acción casi exclusiva sobre la zónula, produciendo su debilitamiento o su lisis. La córnea no se altera, a menos que haya soluciones de continuidad en su cara anterior o posterior, lo cual permitiría su acción sobre el parénquima. El iris y el cristalino permanecen inalterables.

Extracción de Catarata con Alpha-Quimotripsina. Nuestra experiencia de extracciones con alpha-quimotripsina se inicia desde los comienzos de su uso en Oftalmología.

Hemos usado Quimostrase de los Laboratorios P. E. V. Y. A., preferentemente, y *Zolyse* de los Laboratorios *Alcón*.

Al comienzo hacíamos el baño de la zónula con 5 c.c. de la solución tal como lo indicaba su descubridor y los fabricantes del producto.

Fue precisamente en esa etapa de ensayos que pudimos observar con cierta frecuencia, retardo en la cicatrización de la herida corneal, congestiones del iris, y hasta hipertensiones secundarias por ligeros desplazamientos pupilares ocasionados por la lentitud en rehacerse la cámara anterior, en casos de filtración del humor acuoso.

Era indudable que se había obtenido una substancia que facilitaba extraordinariamente la extracción de la catarata. Este hecho quedó claramente establecido, y lo que se necesitaba era tratar de encontrar la forma de disminuir o de eliminar los efectos colaterales.

Con este propósito empezamos a disminuir la cantidad de solución inyectada y a limitar el tiempo de acción. Después de muchos ensayos encontramos que una inyección de ½ c.c. durante 3 minutos eran la cantidad y el tiempo suficiente para obtener una zonulolisis que si no es completa, permite, sin embargo, una extracción fácil, con mucho menor peligro de ruptura de la cápsula. Debemos dejar anotado que cuando la cápsula es muy friable, se rompe, a pesar de la quimotripsina.

Por cierto, para asegurar los resultados se necesita, además, cumplir con una serie de requisitos, que los podríamos resumir en los siguientes términos, que constituyen la técnica que hemos empleado:

1.º Evitar en lo posible que en los diferentes tiempos de la operación a partir de la queratotomia, se introduzcan en la cámara anterior partículas extrañas provenientes de la gasa, algodón o hilos de sutura, para lo cual humedecemos las torundas y apósitos que utilizamos en el acto operatorio.

2.º Luego de hacer la iridectomia irrigamos la cámara posterior con 3 c.c. de alpha-quimotripsina. La inyección debe hacerse con lentitud.

3.º Hacemos los tres puntos previos de sutura, tiempo en el cual transcurren 3 minutos. Si sobra tiempo hay que esperar que se cumpla.

4.º Acto seguido lavamos la cámara anterior con 4 c.c. de suero fisiológico y los labios de la herida con 1 c.c.

5.º La extracción la realizamos por tracción (pelliscamiento de la cápsula) y presión, con la pinza y el gancho de Arruga.

6.º Repuesto el iris y antes de anudar los hilos colocados previamente, volvemos a lavar la cámara con 1 c.c. de suero, con el fin de eliminar cualquier resto de alpha-quimotripsina y los puntos de pigmentos que se desprenden de la cara posterior del iris.

7.º Cuando la midriasis es acentuada inyectamos aire en la cámara anterior para evitar la protrusión del vitreo.

8.º Finalmente inyectamos en el fondo del saco conjuntival inferior, una pequeña cantidad de un corticosteroides de absorción lenta.

Hemos de anotar que la sección de la córnea la hacemos limbar, iniciándola con cuchillo y terminándola con tijera.

Con esta técnica, rigurosamente observada, hemos obtenido resultados prácticamente iguales a los obtenidos en las operaciones realizadas sin alpha-quimotripsina, en lo referente a las reacciones post-operatorias.

Nuestra experiencia comprende algunos centenares de casos que nos permiten hacer apreciaciones basadas en la realidad de los hechos.

Ultimamente, hemos realizado 56 operaciones de catarata con el propósito de precisar algo más ciertos detalles. Algunos casos fueron intervenidos sin alpha-quimotripsina, otros con la aplicación de la enzima, con lavado después de la extracción. Todos fueron observados atentamente en el post-operatorio, durante un mes, aproximadamente, y sistemáticamente sometidos a examen biomicroscópico

Nom-bre	Edad Años	Sexo	Diagnóstico	Extrac-ción	Cápsula	Lavado Después Extracción	Examen al Biomicroscopio	Post-Opera-torio
					OPERACION			
M.B.	65	F	OD Catarata Senl Madura	Zónula Resis-tente	Ruptura Extracción inmediata total	Sí	P.P. en H (++) P.P. en H (++)	S.C.
N.R.					———	Sí	M.C.P. E.P.P.	S.C.
F.Y.	54		Catarata Senil	Normal	———	Sí	M.C.P. en H MP.P. en V. A.	S.C.
M.R.	52		OD Catarata Senil	Zónula Resis-tente		Sí	P.P. en H (+) M.C.P. en V. A.	S.C.
R.L.	62		OI Catarata Senil Madura	Normal	———	No	M.C.P. en V. A. E.P.P.	S.C.
E.T.	52		ata Nu-	Zónula Resis-tente	———	Sí	P.P. en H (++) P.P. en H (++)	S.C.
J.Q.	52		OD Catarata Com-plicada	Zónula Resis-tente	Ruptura Extracción inmediata	Sí	P.P. e H (++) P.P. e H (+) P.P. e H (+)	S.C.
D.F.	53	F	OD Catarata Senil Madura		———	No	M.C.P. E.P.P.	S.C.

Nombre	Edad Años	Sexo	Diagnóstico	OPERACION Extracción	OPERACION Cápsula	Lavado Después Extracción	Examen al Biomicroscopio	Post-Operatorio
C.V.	62	F	OI Catarata Senil	Zónula Resistente	Ruptura Extracción inmediata total	Sí	P.P. en H (+) M.C.P.	S.C.
M.T.	62	F	OI Catarata Senil Madura	Fácil	———	Sí	M.C.. en H E.P.P.	S.C.
J.V.	56	M	OI Catarata Senil Madura	Normal	———	Sí	P.P. en H (+)	S.C.
T.M.	40	F	OI Catarata Pre-Senil	—	Ruptura Extracción inmediata total	Sí	P.P. en H (++)	S.C.
L.L.	62	F	OD Catarata Senil	Normal	———	Sí	P.P. en cara anterior H (·¹·+) V. Hernia a través pupila NoT. No cambios apreciables	S.C.
M.N.	62	F	OD Catarata Senil	Normal	———	Sí	P.P.E. en H (+). NoT. Igual Estado.	S.C.
J.A.	59	F	OD Catarata Senil	Normal	———	Sí	M.C.P. en H. NoT Pequeña brizna algodón hacia las 11	S.C.
L.P.		F	OD Catarata Senil	Normal	———	Sí	P.P. en H (++) - Iris ligeramente adematoso - NoT La pupila reacciona normal a la luz	S.C.

(Sigue)

Nombre	Edad Años	Sexo	Diagnóstico	OPERACION			Lavado Después Extracción	Examen al Biomicroscopio	Post-Operatorio
				Extracción	Cápsula				
M.G.	61	F	OI Catarata Senil	Normal	———		Sí	P.P. en H (++) - Iris ligeramente adematoso - NoT Reacción normal de la pupila a la luz	S.C.
R.M.	53	F	OD Catarata Senil	Normal	———		Sí	E.P.P. en H (+) - NoT	S.C.
E.A.	64	F	OD Catarata Senil	Normal	———		Sí	P.P. en H (++) - NoT Presencia pequeña brizna de algodón	S.C.
E.A.	72	M	OI Catarata Senil Madura	Normal	———		Sí	P.P. en H (+)	S.C.
F.C.	43	M	OI Catarata Pre-Senil	Fácil	———		Sí	P.P. en H (+) Protrusion V M.C.P.	S.C.
A.R.	66	F	OI Catarata Senil	Zonula Resistente	———		No	E.P.P.	S.C.
M.P.	70	F	OI Catarata Senil Madura	Fácil	———		No	P.P. en H. - NoT P.P. en H (++)	S.C.

P.P. = Puntos de Pigmento   H = Hialoides   S.C. = Sin Complicaciones.
E.P.P. = Escasos Puntos de Pigmento   V.A = Vitreo Anterior
M.C.P. = Mínima Cantidad de Pigmento   NoT. = No fenómeno de Tyndall

CATARATA

Nombre	Edad Años	Sexo	Diagnóstico	Extracción	Cápsula	Lavado Después Extracción	Examen al Biomicroscopio	Post-Operatorio
				OPERACION				
P.B.	59	F	OI Catarata Senil Madura		Friable Ruptura Extracción inmediata total	Sí	H.P.P. en H. (**) Protrusión Vítreo a través Pupila	S.C.
R.B.	56	F	OD Catarata Senil	Normal	——	Sí	E. P. P. en H M.C.P. en H.	S.C.
D.P.	54	F	OD Catarata Senil	Fácil	——	Sí	No cambios apreciables	S.C.
R.R.	52	F	OD Catarata Senil	Fácil	——	Sí	E.P.P. en H. Ligera Protrusión V. M.C.P.	S.C.
R.M.	49	F	OI Catarata Senil Madura	Fácil	——	No	M.P.P. en V. A. M.C.P. en H	S.C.
A.F.	57	F	OI Catarata Senil		Friable Ruptura Extracción inmediata total	Sí	E.P.P. en H M.C.P.	S.C.
A.L.	62	M	OD Catarata Senil Madura	Normal	——	Sí	M.C.P. en H E.P.P.	S.C.

J. M. VARAS SAMANIEGO

Nom-bre	Edad Años		Diagnóstico	OPERACION			Lavado Después Extracción	Examen al Biomicroscopio	Post-Operatorio
				Extrac ción	Cápsula				
C.P.	70	F	OD Catarata Senil Madura		Friable Ruptura Extracción inmediata total		Sí	Segmento de la cápsula E. P. P. P. Segt. Cáp. - M.C.P.	S.C.
R.P.	59	F	OD Catarata Senil	Fácil	—		Sí	P.P. en H E.P.P. en H	S.C.
M.B.			OI Catarata Senil	Normal	—		Sí	No Reacción - Uo P.P. M.P.P. en H	S.C.
J.A.	54		OD Catarata Senil		—		Sí	M.P.P. en H M.C.P.	S.C.
J.C.	63		OD Catarata Senil	Fácil	—		Sí	M.P.P. en H. - V. E.P.P.	S.C.
M.V.	54		Catarata Senil		—		No	M.C.P. en H E.P.P.	S.C.
L.M.	73		Catarata Senil Madura	Normal	—		Sí	E.P.P. en H M.P. en H hacia las 9-10	S.C.

Nom-bre	Edad Años	Sexo	Diagnóstico	OPERACION			Examen al Biomicroscopio	Post-Opera-torio
				Extrac-ción	Cápsula	Lavado Después Extracción		
E.Z.	54	F	OD Catarata Senil Madura	Normal	—	Sí	P.P. Iris (++) - Hernia del V A través de la pupila. NoT. P..P. (++)	S.C.
F.M.	58	F	OD Catarata Senil	Normal	—	Sí	P.P. (+) Ligera Protrusión V. M.C.P. - L. Protrusión V	S.C.
J.V.	54	M	OI Catarata Senil	Fácil	—	Sí	M.C.P. No Reacción. No P.	S.C.
T.S.	52	M	OD Catarata Senil Madura	Normal	—	Sí	E.P.P. en H. M.C.P. en H.	S.C.
R.L.	51	F	OD Catarata Senil Madura	Fácil	—	No	E.P.P. en H. M.C.P.	S.C.
P.M.	57	F	OD Catarata Senil Madura	Fácil	—	Sí	P.P. en H (++) Ligera Protrusión V. a través Pupila	S.C.
R.V.	56	F	OD Catarata Senil Madura	Normal	—	Sí	P.P. en H (+) P.P. en H (+)	S.C.

J. M. VARAS SAMANIEGO

(Sigue)

Nom-bre	Edad Años	Sexo	Diagnóstico	OPERACION			Examen al Biomicroscopio	Post-Opera-torio
				Extrac-ción	Cápsula	Lavado Después Extracción		
J.G.	56	M	OI Catarata Senil Madura	Normal	—	Sí	M. C. P. en H. E. P. P. en H.	S.C.
J.P.	59	M	OI Catarata Senil Madura	Fácil	—	Sí	M.C.P. en H. E.P.P. en H.	S.C.
L.B.	62	F	OI Catarata Senil Madura	Fácil	—	Sí	P.P. en H. (++) Puntos grises en V. A. P.P. en H. (++)	S.C.
L.L.		F	OI Catarata Senil	Normal	—	Sí	E.P.P. en H.	S.C.
J.P.	53	M	OD Catarata Senil Madura	Fácil	—	Sí	M.C.P. en H. P.M.C.	S.C.
L.S.	65	F	OD Catarata Senil	Normal	—	Sí	P.P. en H (++). Presencia Brizna de algodón	S.C.
C.G.	65	F	OI Catarata Senil	Normal	—	Sí	E.P.P. M.C.P.	S.C.

Nombre	Edad Años	Sexo	Diagnóstico	OPERACION			Lavado Después Extracción	Examen al Biomicroscopio	Post-Operatorio
				Extracción	Cápsula				
D.L.	75	F	OI Catarata Senil	Normal	——		Sí	P.P. (+)	S.C.
C.C.	60	F	OD Catarata Senil Madura	Fácil	——		Sí	P.P. en H (+) E.P.P. en H	S.C.
A.D.	70	F	OD Catarata Senil Madura	Normal	——		Sí	E.P.P. Vestigios de P.	S.C.
V.P.	85	F	OD Catarata Senil	Fácil	——		Sí	P.P. en H (+) P. Vestigios	S.C.
E.Z.	50	F	OD Catarata Senil	Normal	——		Sí	P.P. (+) Protrusión V E.P.P.	S.C.

P.P.   = Puntos de Pigmento
E.P.P. = Escasos Puntos de Pigmento
M.C.P. = Mínima Cantidad de Pigmento

H   = Hialoides
V.A = Vitreo Anterior
NoT. = No fenómeno de Tyndall

S.C. = Sin Complicaciones.

CUADRO Nº 2 (a)

EXTRACCIONES SIN QUIMOTRASE

EXTRACCiON		
FACIL	NORMAL	ZONULA RESISTENTE (RUPTURA CAPSULA)
5 Casos	11 Casos	7 Casos

LAVADO DESPUES EXTRACCION	
Si	No
19 Casos	4 Casos

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M.C.P.	P.P.(+)	P.P.(++)	M.C.P.	P.P.(+)	P.P.(++)
3 Casos	8 Casos	8 Casos	3 Casos	——	1 Caso

Complicaciones
0 Casos

Total Operados
23 Casos

CUADRO Nº 2 (b)

EXTRACCIONES SIN QUIMOTRASE

EXTRACCION		
FACIL	NORMAL	ZONULA NO RESISTENTE (RUPTURA CAPSULA FRIABLE)
15 Casos	15 Casos	3 Casos

LAVADO DESPUES EXTRACCION	
Si	No
30 Casos	3 Casos

BIOMICROSCOPIA

M.C.P.	P.P.(+)	P.P.(++)	M.C.P.	P.P.(+)	P.P.(++)
19 Casos	6 Casos	5 Casos	3 Casos	—	—

Complicaciones

0 Casos

Total Operados

33 Casos

Adjuntamos dos cuadros. El primero se refiere al número de pacientes trata-dos; el segundo, a los resultados obtenidos.

De su estudio se deduce que la utilización de una dosis pequeña de alpha-quimotripsina aumenta el porcentaje de extracciones fáciles, reduciéndose, como lógica consecuencia, el número de rupturas de la cápsula; las reacciones post-operatorias casi no difieren de las que se presentan en las operaciones sin alpha-quimotripsina.

Para terminar, ponemos a consideración de nuestros lectores las siguientes con-clusiones:

1ª La alpha-quimotripsina es una sustancia que tiene una extraordinaria propiedad zonulolítica.

2º La alpha-quimotripsina usada a la dosis pequeña de ½ c.c., permite una extracción fácil en un alto porcentaje de casos, sin efectos colaterales.

3º Para asegurar los resultados es necesario: a) lavado de la cámara anterior con 4 c.c. de suero fisiológico antes de la extracción de la catarata; b) lavado de la cámara anterior con 1 c.c. de suero fisiológico después de la extracción; c) lavado cuidadoso de los labios de la incisión corneal; d) puntos de sutura correctamente hechos; e) inyección de un corticosteroides de absorción lenta en el fondo del saco conjuntival inferior.

4º La alpha-quimotripsina debe de usarse en todos los casos de catarata, para mayor seguridad de la extracción in toto.

5º Debe usarse, sin excepción, en todos los casos con antecedentes glauco-matosos, operados antes o no, de cuya extracción total depende, en gran parte, el mantenimiento de una buena presión ocular.

6º La obtención de una sustancia neutralizante de la alpha-quimotripsina que fuere inocua para los tejidos oculares, sería de gran utilidad para eliminar los aislados casos de efectos secundarios.

Queda ahora por descubrir algún producto que de resistencia a la cápsula que algunas veces se rompe por su excesiva friabilidad, a pesar de la quimo-tripsina, y dificulta la extracción total.

Apartado de Correos 1174

ACTIVIDADES DE LA SOCIEDAD AMERICANA DE OFTALMOLOGIA Y OPTOMETRIA

I.—LA ESTESIA CORNEAL

HERNANDO HENAO, O. D.

Bogotá - Colombia

Inervación Corneal. Las sensaciones corneales son enviadas por medio de los nervios ciliares cortos y largos al nervio nasociliar, rama del Oftálmico (1ª división del V par craneal). La raíz sensitiva del V par, se encuentra en la región bulbo-protuberancial y tiene conexiones con los núcleos del VII y III par, lo cual explica reflejos tales como el parpadeo, epífora y efectos mióticos.

Von Frey en 1894 fue el primero en diseñar instrumentos y obtener datos precisos de estesiometría corneal.

Actualmente, a partir de 1953 se dispone de tres tipos de estesiómetros:

1. Francesquetti (fabricado por M. Casona, Ginebra, Suiza) : consta de 10 pelos, calibrados de 1 a 100 mg./mm ^{2}.

2. Cochet-Bonnet (fabricado por la casa francesa Luneau & Co.) : consta de un solo hilo de nylon cuya longitud es variable por medio de una cremallera. Siendo dicha longitud inversamente proporcional a la presión que se necesita para doblarlo, la escala del estesiómetro indica directamente cifras de presión en mgr./mm².

3. Nakabashashi. Accionado por mecanismo eléctrico y usado desde 1960 por el profesor japonés Hikaru Hamano.

Expresada en cifras de peso (mgr.), la sensibilidad corneal muestra las cifras límites representadas en el siguiente diagrama:

15/50

15/20   15   15/20

15/25
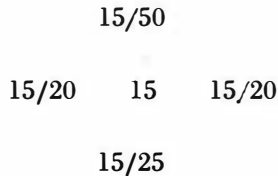
En la conjuntiva pericorneal las cifras oscilan entre 70/200.

Tiene interés práctico el menor grado de sensibilidad en la parte superior de la córnea, por cuanto generalmente los lentes de contacto se toleran mejor cuando su adaptación física se localiza superiormente.

Técnica de manejo de los estesiómetros (Francesquetti y Cochet)

La cifra a ser anotada es aquella en la cual la flexión del hilo hace que el paciente reporte la más leve sensación táctil. Eventualmente, el paciente no reporta ninguna sensación pero parpadea; este umbral puede tomarse como cifra indicativa si el valor coincide al hacer varias pruebas.

Antes de practicar la estesiometría es muy importante explicar al paciente la inocuidad del procedimiento.

Indicación de estudios estesiométricos

a. Estesiometría topográfica para lentes de contacto.

b. Estudio de reinervación en cirugía refractiva y queratoplastias.

c. En el proceso de adaptación de lentes de contacto es muy importante el estudio rutinario de la sensibilidad. Es normal que se presente cierta pérdida de sensibilidad con el uso prolongado de los lentes, pero grandes pérdidas de sensibilidad son peligrosas y se asocian a lesiones epiteliales inadvertidas por el paciente. Afortunadamente, no hay relación directa entre hipoestesias y fragilidad epitelial.

Variaciones fisiológicas de la estesia

Se acepta clínicamente que la sensibilidad corneal decrece del centro a la periferia; sin embargo, la zona anular intermedia, denominada por Norman Bier "negativa", parece que es la zona de menor sensibilidad. Este hecho sugiere la

idea de construir lentes de contacto que utilicen la zona intermedia como punto de apoyo principal.

Hallazgos de estesia asimétrica fisiológica solo se han notado en casos de anisometropía miópica.

En algunos estudios estadísticos (Rougier) las mujeres tendrían mayor sensibilidad que los hombres, pero en el campo de la adaptación de lentes de contacto es un dato irrelevante puesto que los pacientes del sexo femenino son más fácilmente adaptados, sin dudas por factores psicológicos.

La sensibilidad corneal decrece con la edad.

Comentario. Es nuestro criterio, que los pacientes hiperestésicos deben ser adaptados con lentes de contacto de menor diámetro y bases de curvatura más cortas en radio a fin de lograr una liberación de la zona apical.

Discusión general y preguntas

SR.—¿Qué características especiales aparecen en los pacientes sometidos a cirugía refractiva?

B.—La proliferación nerviosa precede a la recuperación de la sensibilidad, es decir, a pesar de comprobar el crecimiento de fibras nerviosas a la lámpara de hendidura, la córnea permanece hipoestésica por algún tiempo más.

Aún no hay estadísticas sobre la velocidad de recuperación estésica en cirugías refractivas; los datos aproximados son de 6 meses en Keratomileusis y algún tiempo más en Keratofaquias.

La velocidad de recuperación estésica es mayor en jóvenes que en ancianos; hay casos de ancianos operados de catarata cuya sensibilidad corneal permanece siempre hipoestésica, igual que en el postoperatorio inmediato.

II.—PROTESIS OCULAR PLASTICA — CONFECCION

DELFIN BORRERO DURAN, M.D.

1. TECNICA

Primera Etapa: hechura del iris.

El diámetro visible del iris, coincide con el círculo limbar, que varía entre 11 y 13 mm. De acuerdo, pues, con mediciones de compás, se delimita una cir-

cunferencia sobre una lámina de material plástico perforado en el centro (pupila). El disco de plástico se monta sobre una varilla de madera a manera de una rueda en su eje y se pinta al óleo con un pincel de pelo de marta, copiando el iris natural. Para reproducir con toda fidelidad el iris, el trabajo debe hacerse colocando una gota de agua sobre el disco, para reproducir la refringencia luminosa que en condiciones naturales produce la córnea.

Segunda etapa: el botón

El molde de iris ya pintado se coloca sobre un molde de acero en forma de una corona de esfera, cuyo diámetro y curvatura asemejan la córnea. El "disco de iris" se cubre por su cara posterior con otro disco negro que constituirá la pupila y el conjunto se cubre con material acrílico que una vez polimerizado constituirá un botón transparente, reproducción de la pupila, iris, cámara anterior y córnea.

Tercera Etapa: Ojo en cera

Con una lámina de parafina de dentistería se fabrica una semiesfera hueca, de acuerdo a la capacidad y anfractuosidades de la cavidad orbitaria. Una vez obtenida, se excava una depresión en el sitio apropiado para colocar el botón de plástico pre-fabricado. Se pule y se corrige ensayándolo varias veces en la cavidad orbitaria.

Cuarta Etapa: El molde de yeso

A partir del modelo de cera, se construye un molde negativo de yeso dental en el cual será vaciado el material plástico usado para el ojo artificial.

Quinta Etapa: El ojo en plástico

Se separa el botón del modelo de cera, se coloca en el lugar apropiado del molde de yeso, se vierte el plástico y se lleva a una prensa; una vez firme, se retira del molde, se pule y se le da brillo.

Sexta Etapa: Pintura de la esclerótica

Se hace con óleos, reproduciendo sombras y vasos (esto último puede hacerse también con fibras de rayón). En esta etapa debe probarse la prótesis en la cavidad orbitaria para perfeccionar detalles.

Séptima Etapa: Vitrina y pulimento final

En el molde de yeso, se recubre la prótesis con una delgada capa de acril transparente que servirá de vitrina a la esclera pintada. Se le da un pulimento final.

2. CAUSA DE PROTESIS DEFECTUOSAS.

A. Imperfecciones intrínsecas:

1) Prótesis mal acabadas, mal pulidas o de tamaño inapropiado.

2) Materiales inadecuados, intolerables para el paciente.

3) Defectos artísticos en la pintura y forma de las diversas estructuras oculares.

B. Cavidades orbitarias inadecuadas:

Estrechas, fondos de saco anormales o con bordes cicatrizales, defectos en los párpados (ectropión o entropión).

En el caso de cascarillas superpuestas a ojos recubiertos con conjuntiva, el resultado cosmético sera bueno solamente en caso de ojos pequeños o subatróficos, pero si el tamaño es normal o mayor, la apariencia estética será deplorable.

3. PREGUNTAS Y DISCUSION GENERAL.

HH. Uno de los problemas es la tolerancia del acrílico por el paciente. Por qué no se ha popularizado el uso de la porcelana?

DB. La confección de prótesis de porcelana es muy complicada y la perfección parece exclusiva de algunas de confección alemana y checa.

HH. En los EE.UU. comienzan a fabricarlas en porcelana. En la Argentina un artista alemán las fabricaba de vidrio soplado pero aparentemente murió con el secreto.

La porcelana es biológicamente inerte y por ello es deseable el perfeccionamiento de elaboración con este material.

DB. El acril puro en bien tolerado; el que a veces no lo es, es aquel mezclado con sustancias que le dan color (O Zn); por eso es necesario que la prótesis quede totalmente cubierta con acril puro.

HH. He notado excelentes resultados de tolerancia despúes de someter las prótesis a limpieza con ultrasonidos.

DB. En efecto, el aseo de las prótesis es condición necesaria para lograr buena

tolerancia: las secreciones oculares despulen la superficie y dan así origen a intolerancias.

BB. ¿Con qué recomienda la limpieza?

DB. Con ácido acético (vinagre) que la libera de sales cálcicas y luego brillarlas con gamuza.

FR. ¿En qué época después de la enucleación debe debe implantarse la prótesis?

DB. Considero que en el post-operatorio temprano debe adaptarse una prótesis provisional que conserve los fondos de saco. Al cabo de 20 días o 1 mes, puede adaptarse la órotesis definitiva.

HH. Cabe anotar que muchas personas enucleadas usan parches de esparadrapo en forma continua; es recomendable en estos casos esperar un tiempo prudencial, para que ceda el edema inducido por el parche y así la confección de la prótesis pueda ser más perfecta.

DB. Esta es una razón más para la adaptación de una prótesis provisional temprana.

DB. Esta es una razón más para la adaptación de una prótesis provisional temprana.

José Miguel Varas T. M.D.
Secretario Científico

SOCIEDAD ARGENTINA DE OFTALMOLOGIA

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Announces its "PRIMUM FORUM OPHTHALMOLOGICUM", to be held in Bogota, Colombia, on March 16th. thlu 20th. (immediately after the "XXI CONCILIUM OPHTHALMOLOGICUM UNIVERSALE" of Mexico).

Sujects:

　　1) Refractive Kera　　　　　a - Myopia Correction.

　　　　　　　　　　　　　　　 b – Hyperopia and Aphakia
　　　　　　　　　　　　　　　　　Correction.

　　　　　　　　　　　　　　　 c - Astigmatism Correction.

　　2) Cryoextraction of the Lens.

The lectures will be completed with round table discussions, films and surgical demonstrations.

Information: Apartado Aéreo 20945 Bogotá (2) - Colombia

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LOGICUM", tendrá lugar en Bogotá, Colombia, del 16 al 20 de marzo de 1970. (inmediatamente después del XXI CONCILIUM OPHTHALMOLO-GICUM UNIVERSALE de México).

Temas:

　　1) Queratoplastia Refractiva:　a - Corrección Miopía.

　　　　　　　　　　　　　　　　b - Corrección Hipermetropía y
　　　　　　　　　　　　　　　　　Afaquia.

　　　　　　　　　　　　　　　　c - Corrección Astigmatismo.

　　2) Crioextracción del Cristalino.

Los temas serán complementados con mesas redondas, proyección de pe-

lículas y sesiones quirúrgicas televisadas.
Información: Apartado Aéreo 20945 Bogotá (2) - Colombia.