

## R E S U L T S

### RESULTS OF APHAKIC GLAUCOMA

Cyclo-cryotherapy was applied to sixteen aphakic glaucomatus eyes. The results varied according to the etiological classification of glaucoma.

The mean preoperative tension was 43.12 mm Hg. Table (1) "The results of cyclocryotherapy after the first cryotherapy", includes the following data:

- . The age of the patient: all patients were above 40 years old.
- . The sex of the patient: seven cases were males, and nine were females.
- . The etiology of glaucoma according to the gonioscopic findings.
- . The preoperative tension. Follow up tension after cyclo-cryotherapy by 1 week, 2 weeks and 2 months.
- . The difference between the preoperative tension and the tension after two months.
- . Complications after cryotherapy.

Table (2) "The mean value of decreased tension after the first cyclocryotherapy" includes:

- . The number of patients in each type of glaucoma.
- . The mean value of decreased tension in each type of glaucoma after two months from cyclocryotherapy.

. The mean value of decreased tension in the sixteen cases.

Glaucomatus eyes which were not normalized after two months, had another cryotherapy. They are cases number 5, 6, 8, 9, 10, 11, 12, 13, 14, 15 and 16.

These cases are tabulated in Table (3). This table shows the results of the second cyclocryotherapy.

Table (4) shows the mean value of decreased tension after the second cyclocryotherapy.

- . The number of patients in each type of glaucoma.
- . The mean value of decreased tension in each group after the second cryotherapy.
- . The mean value of decreased tension in each group after the first and second time cryotherapy.
- . The total mean value of decreased tension after the first and second time cryotherapy.

Complications of cyclo-cryotherapy in cases of aphakic glaucoma:

- Iritis: 56.15% of cases developed iritis. The iritis varied from mild to severe iritis. All cases of iritis were controlled within 1 week.
- Intra-ocular haemorrhage: One case (6.25%) had hyphoema and vitreal haemorrhage.

The hyphoema was observed within 4 days and the vitreous haemorrhage disappeared after 3 weeks.

- All cases had conjunctival chemosis for 1-3 days following cryotherapy.
- 56.25% of cases had postoperative pain for 1-5 days. Most of them expressed the pain to be tolerable. Mild analgesics were effective in controlling the pain.

### RESULTS OF ABSOLUTE GLAUCOMA

Eighteen cases of absolute glaucoma had cryotherapy. They are recorded according to their etiology.

The mean preoperative tension was 41.3 mm Hg.

Cryotherapy was applied once more if the tension did not fall below 30 mm Hg after 2 months.

Table (5) shows the results of first cyclocryotherapy application:

- . The age of the patients: All patients were above 40 years except two.
- . The sex: Ten cases were males, and eight were females.
- . The type of glaucoma according to the gonioscopic finding.
- . The preoperative tension. The follow up tension after cyclo-cryotherapy by 1 week, 2 weeks and 2 months. The difference between the preoperative tension and the tension after two months.
- . Complications after cryotherapy.

Table (6) shows the mean value of decreased tension after the first cyclo-cryotherapy.

- . The number of patients in each type of glaucoma.
- . The mean value of decreased tension in each type of glaucoma.

- . The total mean value of decreased tension in the eighteen cases.

Cases which did not fall below 30 mm Hg after two months, had another cryotherapy. They are cases number 7,9,10,11,12,13,14 and 15.


These cases are tabulated in Table (7). This table shows the results of the second cryotherapy.

Table (8) shows the mean value of decreased tension after the second cyclocryotherapy:

- . The number of patients in each type of glaucoma.
- . The mean value of decreased tension in each group after the second cryotherapy.
- . The mean value of decreased tension after the first and second time cryotherapy in each group.
- . The total mean value of decreased tension in all patients after the second time cryotherapy.
- . The total mean value of decreased tension after the first and second time cryotherapy.

Complications of cyclo-cryotherapy in cases of absolute glaucoma:

- Iritis: 38% of cases had iritis. The iritis varied from mild to severe. All cases were controlled within one week.

- Intra-ocular haemorrhage: One case (5.5%) developed hyphoema after second time cryotherapy. It was absorbed in 3 days.
  - Patch of iris atrophy: One case (5.5%) had this complication after the second time cryotherapy.
  - Pain: 50% of cases expressed postoperative tolerable pain. Mild analgesics controlled this complication.
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### RESULTS OF DIABETIC GLAUCOMA

Seven cases of diabetic glaucoma were treated with cryotherapy. All cases were having neovascularization of the angle and iris.

The mean preoperative tension was 34.85 mm Hg.

Table (9) shows: The results of cyclocryotherapy after the first application:

- . The age of the patient: All patients were above 40 years old.
- . The sex: Three cases were male, and four were females.
- . The preoperative tension. The follow up tension after cyclo-cryotherapy by 1 week, 2 weeks and 2 months. The difference between the preoperative tension and tension after 2 months.
- . Gonioscopy after 2 months from cryotherapy to watch the effect on the neovascularizations.
- . Complications after cryotherapy.

Cases of diabetic glaucoma which were not normalized after two months from the first cryotherapy had another application of cryotherapy. They are tabulated in Table (10). They are cases No. 3, 4, 6 and 7.

Table (10) shows the results after the second cyclocryotherapy.

### RESULTS OF DENDRITIC ULCER

#### A. Results of cryotherapy:

Sixteen dendritic ulcers were involved in this line of treatment. The sixteen cases were recorded according to their recurrence i.e. first time dendritic ulcer, second time dendritic ulcer, or third time dendritic. <sup>more</sup> Further~~ly~~ each of these were divided into subgroups, according to the medical treatment received before cryotherapy application.

Seven cases were females and nine were males.

##### Group (I):

- Nine cases had dendritic ulcer for the first time.  
They are divided into three subgroups:
- Subgroup (a): Four cases did not receive antiviral treatment before cryo-therapy.
- Subgroup (b): Three cases received I.D.U. for one week before treatment.
- Subgroup (c): Two cases were I.D.U. resistant.

##### Group (II):

- Six cases had dendritic ulcer for the second time.  
They were divided into two subgroups:
- Subgroup (a): Four cases did not receive antiviral treatment.

- Subgroup (b): Two cases received I.D.U. for one week before cryotherapy.

Group (III):

- One case had dendritic ulcer for the third time. The patient did not receive any medication before cryotherapy.

Two cases were receiving cortisone topically before being examined. The cortisone was abruptly stopped, and cryotherapy was applied. These two cases are designated by the mark (x) in Table (11).

Table (11) shows the results of cryotherapy in cases of dendritic ulcers:

- The age of the patient.
- The sex of the patient.
- Period of healing: The time <sup>taken</sup> ~~consumed~~ for complete healing of the ulcer, after cryotherapy.
- Resistance: Cases which did not respond to cryotherapy (+).
  - . Two cases in group (I) were resistant to cryotherapy.
  - . One case in group (II) was resistant to cryotherapy.
- Result and complications:
  - . Resistant cases showed no healing up to three weeks.

- . One case recured after 2 weeks.
- . One case recured after 2 months.

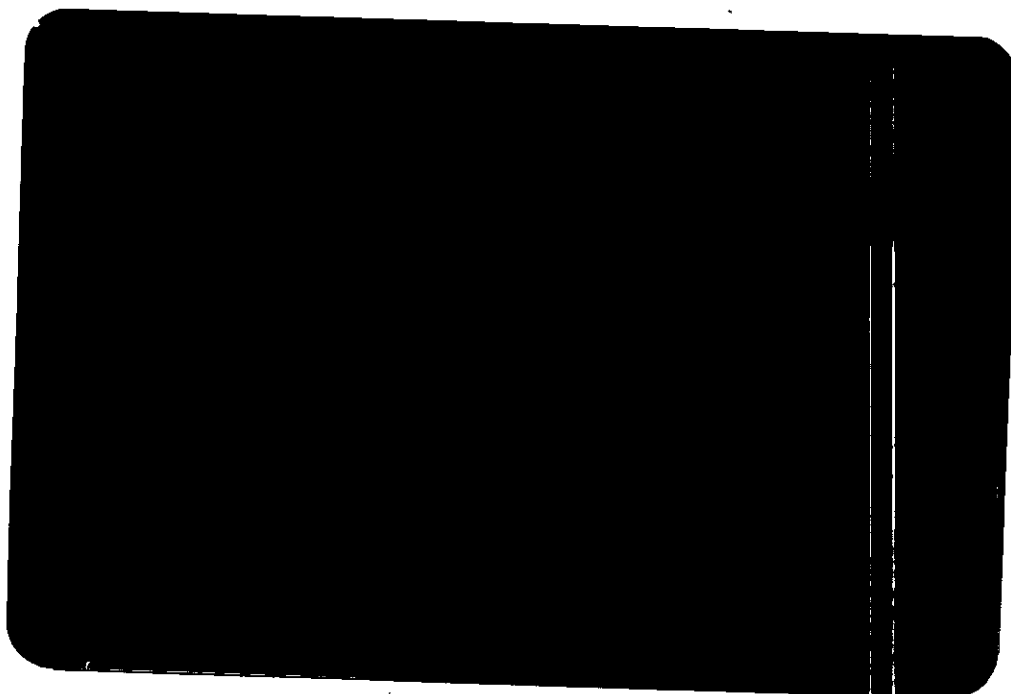
Table (12) shows the percentage of cures and the mean time of healing after cryotherapy:

- The number of patients in each subgroup.
- % of total: The percentage of each subgroup from the total number of the patients.
- No. of cures: Number of patients cured in each subgroup.
- % of cure in subgroups.
- Mean time of healing: The time <sup>Taken</sup> consumed in each subgroup till complete healing of the ulcer.
- Total:
  - . Number of cured patient out sixteen.
  - . The percentage of cured patients.
  - . The mean time of all cured cases.

Table (13) shows the percentage of resistance and recurrence after cryotherapy:

- The percentage of resistance in each subgroup.
- The percentage of recurrence in each subgroup.
- The percentage of resistance and recurrence of the total.

- . No <sup>ob</sup>patient <sup>who</sup> had expressed operative or postoperative pain in these groups.
- . Corneal oedema was not observed in any patient after healing of the ulcer.
- . No patient developed corneal vascularization after cryotherapy.
- . There was no difference in the time <sup>to heal</sup> ~~consumed~~ for healing in the cases which received wrongly topical steroids and those which did not. They also did not show any resistance to cryotherapy.



- Healed ulcer

B. Results of cryotherapy and immunotherapy:

Sixteen cases of dendritic ulcer<sup>S</sup> were included in this line of treatment. The sixteen cases were recorded according to their recurrence i.e. first time dendritic ulcer, second time dendritic ulcer, or third time dendritic ulcer. Further<sup>more</sup> each of these were divided into subgroup<sup>S</sup> according to the medical treatment received before cryotherapy and immunotherapy.

Ten cases were females, six cases were males.

Group (I):

- Ten cases had dendritic ulcer for the first time. They are divided into three subgroups:
  - . Subgroup (a): Seven cases did not receive anti-viral treatment before cryotherapy.
  - . Subgroup (b): One case received I.D.U. for one week before cryotherapy.
  - . Subgroup (c): Two cases were I.D.U. resistant.

Group (II):

- Five cases had dendritic ulcers for the second time. These were divided into three subgroups:
  - . Subgroup (a): Three cases did not receive anti-viral treatment.
  - . Subgroup (b): Two cases received I.D.U. for one week before cryotherapy.

- . Subgroup (c): One case was I.D.U. resistant.

Group (III):

- One case had dendritic ulcer for the third time.
- Three cases were receiving topical steroids before being examined. The steroids were stopped and cryo-therapy plus immunotherapy were started. These were designated by the mark (x) in Table (14).

Table (14) shows the results after cryotherapy plus immunotherapy:

- The age of the patient.
- The sex of the patient.
- Period of healing: Time consumed until complete healing of the ulcer.
- Resistance: Cases which did not heal after treatment.
- Result and complications:
  - . No resistant cases. .
  - . One case recured after two months.
  - . One case had slight corneal oedema for ten days after healing of the ulcer. This may be due to the ice ball had reached the endothelial cells.
  - . Four cases had ocular pain for one day after treatment.

Table (15) shows the percentage of cure and the mean time <sup>taken for</sup> of healing after cryotherapy plus immunotherapy:

- The number of patients in each subgroup.
- % of total: The percentage of each subgroup from the total number of the patients.
- No. of cures: Number of cured patients in each subgroup.
- % of cure in each subgroup.
- Mean time of healing: The time <sup>taken</sup> consumed in each subgroup till complete healing of the ulcer.
- Total:
  - . Number of cured patients out of sixteen.
  - . The percentage of cured patients.
  - . The mean time of all cured cases.

Table (16) shows the percentage of resistance and recurrence after cryotherapy and immunotherapy:

- The percentage of resistance in each subgroup.
- The percentage of recurrence in each subgroup.
- The percentage of resistance and recurrence of the total.

Complications after cryotherapy and immunotherapy:

- Four patients (25%) expressed moderate to severe ocular pain in the first day after treatment. This may be

due to the imbalanced pH and osmolarity of the tears caused by the serum therapy.

- One patient developed corneal oedema for ten days.
- No patient developed corneal vascularization.

### RESULTS OF CATARACT CASES

Forty two cases of different stages of cataractous lenses were studied to choose the best grip for cryoextraction of the lens. Thirty one were females, eleven were males.

These cases were divided into two groups:

Group (I) includes twenty one cases. They are tabulated in Table (17) which shows the results of the anterior pole grip in cataract extraction.

- The age of the patient.
- The sex of the patient.
- Stage of cataract:
  - . Eleven cases were mature.
  - . Six cases were intumescent.
  - . Four cases were hypermature.
- The site of grip: Anterior pole grip.
- Complications:
  - . Rupture capsule.
  - . Vitreous loss.
  - . Distortion of the pupil.

Group (II) includes twenty one cases they are tabulated in Table (18) which shows the results of the pre-equatorial grip in cataract extraction.

Table (1): The results of cyclocryotherapy after the first application.

Case No.	Age (yrs)	Sex	Typing of glaucoma	Site of application	Preoperative tension (mm Hg)	Follow up tension			Difference between original and final Complications
						1 w.	2 w.	2 m.	
1	54	M	Open angle	6 in upper half	28	8	14	17	11
2	53	M	"	"	37	13	18	22	15
3	68	F	"	"	40	10	14	19	21
4	58	F	"	"	44	12	18	24	20
5	41	M	"	"	45	8	20	38	7
6	57	F	"	"	55	18	24	32	23
7	51	F	Vitreous Ant. Ch.	"	33	15	19	23	10
8	58	M	"	"	34	11	17	29	5
9	56	F	"	"	38	15	22	32	6
10	48	F	"	"	48	20	27	37	11
11	57	F	"	"	56	18	24	37	23
12	60	M	"	"	65	25	37	55	10
13	50	F	Pupillary block	"	34	15	22	31	3
14	55	M	"	"	40	18	23	28	12
15	60	F	Narrow angle	"	43	25	31	36	7
16	53	F	"	"	49	24	29	39	10

The success rate is 31.25%

Five cases of sixteen were normalized.

Mild iritis  
Mild iritis  
Severe iritis  
Mild iritis  
Mild iritis  
Mild iritis

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Table (2): The mean value of decreased tension after the first cryotherapy.

No. of cases	Typing of glaucoma	Mean value of decreased tension (mm Hg)
6	Open angle	14.6
6	Vitreous in Ant. Ch.	10.83
2	Pupillary block	7.5
2	Periph. Synech.	8.5

Table (3): The results of the second cryotherapy.

Case No.	Age (yrs)	Sex	Typing of glaucoma	Site of application	Preoperative tension (mm Hg)	Follow up tension			Difference between original and final tension (mm Hg)	Complications
						1 w.	2 w.	2 m.		
5	41	M	Open angle	6 in lower half	38	7	12	18	20	
6	57	F	"	"	32	4	0	19	13	Mild iritis
8	58	M	Vitreous in Ant. chamber	"	29	7	11	17	12	
9	56	F	Vitreous in Ant. chamber	"	32	9	13	17	15	
10	48	F	"	"	37	9	19	25	12	
11	57	F	"	"	33	11	18	22	11	Vitreous higher mild iritis
12	60	M	"	"	55	19	27	38	17	
13	50	F	Pupillary block	"	31	8	13	23	8	Mild iritis
14	55	M	"	"	28	3	9	14	14	
15	60	F	Closed angle Periph. Synech.	"	36	20	29	33	3	
16	53	F	"	"	39	17	22	32	7	

- Success rate is 72.7% - Eight cases from eleven were normalized.

Table (4): The mean value of decreased tension after second cryo-therapy.

No. of cases	Typing of glaucoma	Mean value of decrease in tension of the second time (mm Hg)	Mean value decrease in tension of the first & second time (mm Hg)
2	Open angle	16.5	32.0
5	Vitreous in Ant. Ch.	13.4	24.0
2	Pupillary block	11.0	18.5
2	Periph. Synech.	5.0	13.5
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Total		12.0	22.72

- A total success rate of 81.25% was obtained after first and second cryosurgery. Thirteen out sixteen cases were normalized.
- The mean drop of tension in all cases is 20.3 mm Hg.

Table (5): The results after first cryotherapy.

Case No.	Age (yrs)	Sex	Typing of glaucoma	Site of application	Preoperative tension (mm Hg)	Follow up tension			Difference between original and final tension (mm Hg)	Complications
						1 w.	2 w.	2 m.		
1	45	M	Open angle	6 in upper half.	32	9	15	18	14	
2	60	M	"	"	34	6	9	15	19	Mild iritis
3	58	F	"	"	43	13	18	29	14	
4	62	M	"	"	44	18	23	28	14	
5	52	F	Narrow angle.	"	32	13	19	17	15	
6	51	F	"	"	35	12	20	29	6	Mild iritis
7	43	F	"	"	35	14	23	34	1	
8	46	M	"	"	38	14	19	30	8	
9	54	F	"	"	46	15	23	40	6	Severe iritis
10	59	M	"	"	48	19	25	36	12	
11	49	M	"	"	53	22	34	44	9	
12	63	F	"	"	58	25	29	38	20	
13	50	M	"	"	58	55	43	55	13	Mild iritis
14	31	F	Pupillary block ring synechia.	"	33	17	25	33	0	
15	22	M	"	"	37	15	24	36	1	Mild iritis
16	55	F	Diabetic glaucoma.	"	35	19	16	25	10	"
17	53	M	"	"	44	18	21	28	16	Severe iritis
18	45	M	Peripheral Ant. synechia.	"	38	15	22	30	8	

Table (6): The mean value of decreased tension after first cryotherapy.

No. of cases	Typing of glaucoma	Mean value decreased tension (mm Hg)
4	Open angle	15.25
9	Narrow angle	10.0
2	Pupillary block	0.5
2	Diabetic gl.	13.0
1	Periph. Ant. synechiae.	8.0
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Total		10.6

- Ten cases out of eighteen had postoperative tension below 30 mm Hg.

Table (7): The results of second cryotherapy.

Case No. (yrs)	Age	Sex	Typing of glaucoma	Site of application	Preoperative tension (mm Hg)	Follow up tension			Difference between original and final tension (mm Hg)	Complications
						1 w.	2 w.	2 m.		
7	43	F	Narrow angle.	6 in lower half	34	8	16	30	2	Patch of iris atrophy.
9	54	F	Narrow angle.	"	40	13	19	35	5	
10	59	M	"	"	36	15	17	36	0	
11	49	M	"	"	44	18	29	38	6	Severe iritis
12	63	F	"	"	38	7	12	25	13	
13	50	M	"	"	55	27	41	46	9	
14	31	F	Pupillary block (ring synechiae)	"	33	14	23	31	2	Hypaema
15	22	M	"	"	36	15	23	33	3	

- Success rate of 12.5%.

- One case out of eight had postoperative tension below 30 mm Hg.

Table (19): The percentage of capsular rupture.

Groups	Mature (%)	Intumescent (%)	Hypermaturation (%)	Total (%)
Group I	9.09	33.33	50	23.80
Group II	0.0	16.67	0.0	4.76

Table (20): The percentage of vitreous loss.

Groups	Mature (%)	Intumescent (%)	Hypermaturation (%)	Total (%)
Group I	9.09	16.677	-	9.52
Group II	-	16.677	-	4.76

Table (21): Distortion of the pupil.

Groups	Mature (%)	Intumescent (%)	Hypermaturation (%)	Total (%)
Group I	-	-	25.0	4.76
Group II	9.09	-	-	4.76

Table (9): The results after first cryotherapy.

Case No.	Age	Sex	Typing of glaucoma	Site of application	Pre-operative tension (mm Hg)	Follow up tension (mm Hg)			Difference between original and final tension (mm Hg)	Complications	Gonioscopy after 2 months
						1 week	2 weeks	2 months			
1	58	M	Rubeosis angle	6 in upper half.	28	12	15	18	10		The rubeosis decreased much.
2	49	F	"	"	30	7	10	22	8	Mild iritis	The rubeosis decreased
3	55	M	"	"	34	10	18	28	6	Mild iritis	The rubeosis decreased
4	65	F	"	"	36	13	20	34	0	Hyphoema & vitreous Hge.	Minimal decrease in rubeosis.
5	62	M	"	"	36	12	18	21	13	Severe iritis	The rubeosis vanished
6	51	F	"	"	39	15	24	32	7	Hyphoema	The rubeosis vanished
7	57	F	"	"	43	14	28	39	16	Mild iritis	The rubeosis vanished

Table (10): The results after second cryotherapy.

Case No.	Age	Sex	Typing of glaucoma	Site & number of applications	Pre-operative tension (mm Hg)	Follow up tension (mm Hg)		Complications	Gonioscopy after 2 months	Difference between original & final tension (mm Hg)
						1 week	2 weeks			
3	55	M	Rubeosis of angle & iris peripheral synech.	6 in lower half	28	6	10	31	Rubeosis decreased in the lower half.	15
4	65	F	Rubeosis of angle & iris peripheral synech.	6 in lower half	3	15	26	31	Rubeosis decreased in lower half.	4
6	51	F	Rubeosis of angle	6 in lower half.	32	8	15	19	Mild iritis patch of iris atrophy	13
7	57	F	Rubeosis of angle.	6 in lower half.	39	9	14	35	Severe iritis Rubeosis decreased lower half.	4

- A success rate of 57.1% was obtained. - Four cases from seven were controlled.

- The mean drop of tension in all cases is 14.3 mm Hg.

Table (11): The results of cryotherapy in dendritic ulcers.

Case No.	Age	Sex	Subgroup	Period of healing (days)	Resistance	Results & complications
<u>I. First time dendritic ulcer</u>						
1	33	F	a(x)	4	-	--
2	43	a	a	No healing	+	
3	25	M	a	4	-	--
4	30	M	a	3	-	Recurrence after 2 weeks.
5	18	F	b	3	-	--
6	29	M	b	No healing	±	
7	22	M	b	5	-	
8	31	F	c	4	-	
9	40	M	c	4	-	
<u>II. Second time dendritic ulcer</u>						
1	25	M	a	4	-	
2	32	M	a	3	-	
3	42	F	a	3	-	
4	30	M	a	No healing	±	
5	38	M	b(x)	3	-	
6	20	F	b	5	-	Recurrence after 2 months.
<u>III. Third time dendritic ulcer</u>						
1	27	M		5	-	

Table (12): The percentage of cure and mean time of healing.

Sub-group	No. of cases	% of total	No. of cure	% of cure in sub-group	Mean time of healing (days)
<u>I. First time dendritic ulcer</u>					
a	4	25	3	75	3.6
b	3	18	2	66	4
c	2	12	2	100	4
<u>II. Second time dendritic ulcer</u>					
a	4	25	3	75	3.3
b	2	12	2	100	4
<u>III. Third time dendritic ulcer</u>					
a	1	6	1	100	4
Total	16	100	13	81	4

Table (15): The percentage of cure and mean time of healing.

Sub-group	No. of cases	% of total	No. of cure	% of cure in each group	Mean time of healing
(I) <u>First time dendritic ulcer</u>					
A	5	31.25	5	100	3.8 days
B	2	12.50	2	100	4 days
C	3	18.75	3	100	4.66 days
(II) <u>Second time dendritic ulcer</u>					
A	3	18.75	3	100	4 days
B	2	12.50	2	100	4 days
(III) <u>Third time dendritic ulcer</u>					
A	1	6.25	1	100	5 days
Total	16	100	16	100	4.06 days

Table (16): The percentage of resistance and recurrence.

Group	% of Resistance	% of Recurrence
I		
A	-	-
B	-	50%
II		
A	-	-
B	-	-
III		
A	-	-
Total	0.0%	6.25%

Table (17): Results of anterior pole grip in cataract extraction.

Case No.	Sex	Age	Stage of cataract	Site of grip	Complications
1	F	53	Mature	Anterior pole	Vitreous loss
2	F	58	"	"	Rupture capsule
3	M	55	"	"	
4	F	51	"	"	
5	F	53	"	"	
6	F	67	"	"	
7	M	57	"	"	
8	F	63	"	"	
9	F	61	"	"	
10	F	70	"	"	
11	M	58	"	"	
12	F	50	Intumescent	"	Rupture capsule
13	F	48	"	"	Rupture capsule & vitreous loss.
14	M	54	"	"	
15	F	52	"	"	
16	M	53	"	"	
17	F	58	"	"	
18	M	64	Hypermature	"	Rupture capsule
19	F	57	"	"	
20	F	60	"	"	Distortion of the pupil.
21	F	55	"	"	Rupture capsule

Table (18): Results of pre-equatorial grip in cataract extraction.

Case No.	Sex	Age	Stage of cataract	Site of grip	Complications
1	F	58	Mature	Pre-equatorial	
2	F	57	"	"	
3	F	60	"	"	
4	F	63	"	"	
5	M	52	"	"	
6	F	58	"	"	
7	F	51	"	"	Distortion of the pupil.
8	F	55	"	"	
9	M	48	"	"	
10	F	54	"	"	
11	M	59	"	"	
12	F	50	Intumescent	"	Rupture capsule
13	F	55	"	"	Vitreous loss
14	F	54	"	"	
15	M	60	"	"	
16	F	50	"	"	
17	M	52	"	"	
18	F	57	Hypermature	"	
19	F	61	"	"	
20	F	63	"	"	
21	F	56	"	"	