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Peripheral iridectomy in closed angle glaucoma—late complications

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SUMMARY Of 70 eyes with therapeutic peripheral iridectomy (PI), 51% suffered a loss of two or more lines on the Snellen chart; 57% developed posterior synechiae (PS) and 57% showed lens opacities. Thirty-three per cent of eyes that underwent PI prophylactically had a vision drop of two lines or more, 39% developed PS and 42% showed varying degrees of lens opacities. Although vision drop, lens opacities and PS were less marked in the prophylactic group, it appears that PI is a surgical procedure not without its hazards. We therefore suggest that peripheral iridectomy should not be performed routinely on the second eye not suffering an acute attack. This procedure should be undertaken only in cases with positive provocative tests and/or clinical signs of closed angle glaucoma.

For the past 20 years peripheral iridectomy (PI) has been a well-established method in treating closed angle glaucoma. In addition, many perform prophylactic PI routinely on the second eye of a patient who has experienced an attack of closed angle glaucoma, since they consider the procedure to be minor (Chandler and Grant, 1965).

Those who advocate the importance of prophylactic PI refer to a review of 200 cases (Bain, 1957), which shows that in 53% the attack occurred in the second eye within four and a half years. Lowe (1965) estimated that 75% of second eyes are at risk. Both authors confirmed that acute glaucoma attacks occurred in a high percentage of patients in spite of miotic treatment (Bain, 1957; Lowe, 1965).

Peripheral iridectomy, although considered a minor surgical intervention, is not without its complications. Among the late complications are drop of visual acuity, development of posterior synechiae, and possibly accelerated development of lens opacities.

In an attempt to evaluate these late complications of PI we undertook the re-examination of patients in our glaucoma clinic who had undergone this operation.

Material and methods

The investigation was carried out on 225 eyes of 134 patients who had undergone PI with the ab-externo method. Postoperative treatment included mydriatics and topical steroids for four to six weeks. Twenty-three eyes were excluded from the study because macular and corneal changes prevented a proper evaluation. Twenty eyes were not operated upon. The 225 eyes included in the study were sub-divided into two groups: (1) Therapeutic group: 70 eyes operated upon after an attack of closure angle glaucoma. (2) Prophylactic group: 155 eyes, 27 of which were the second eye of patients who had experienced an acute attack of closure angle glaucoma. The remaining 128 eyes had been operated upon after a positive dark-room test.

The follow-up period ranged from one to 11 years (average 4·2 years), with all patients seen in the glaucoma clinic at regular intervals.

The investigation included correction of refractive error, examination of anterior segment, applanation tonometry, and fundus examination. Further examination for synechiae was made after instillation of Neosynephrine (phenylephrine) 10%.

Results

The ages in our study group ranged from 40 to 79 years (mean 65·3 years) with the majority of the patients in the sixth decade. There was a predominance of females (103) over males (31). (Table 1.)

VISUAL ACUITY

Data on visual acuity are presented in Table 2. Both therapeutic and prophylactic groups were sub-

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Table 1 *Distribution of patients according to age and sex*

Age (years)	*Male*	*Female*	*Total*
40–49	3	6	9
50–59	7	33	40
60–69	18	47	65
70–79	3	17	20
Total	31	103	134

divided according to duration of follow-up. The first subgroup was observed from one to three years (100 eyes) and the second subgroup from four to 11 years (125 eyes). At the end of the shorter observation period there was a loss of two lines or more in 38% of the eyes with therapeutic PI and in 23% of the eyes that had undergone the same procedure prophylactically. At the end of the longer follow-up period, however, a loss of two lines or more was seen in 62 and 41% of the patients in the therapeutic and prophylactic groups, respectively.

POSTERIOR SYNECHIAE

Posterior synechiae (PS) were looked for attentively at frequent intervals during the first two months after operation, and in every subsequent examination (once in three to six months).

Table 3 depicts the presence of PS. The cases where information concerning PS was insufficiently recorded were categorised as 'unknown'. The incidence of PS immediately after operation was 42% in the therapeutic group and 17% in the prophylactic group. At the end of the observation period the frequency of PS was 57 and 39%, respectively. In a number of eyes in both groups there was no evidence of PS two months after operation, but it was demonstrated in one of the subsequent routine examinations months or even years later.

Table 4 represents the percentage of eyes with a drop in visual acuity as related to PS at the end of the observation period. A loss of two lines or more on the Snellen chart was recorded in 56% of eyes with PS and in 27% of eyes without this complication.

LENS OPACITIES

Only eyes where the visual drop could be attributed to lens opacities were included in this study. Eyes with mature and progressive cataract preventing

Table 4 *Visual drop and posterior synechiae**

Visual drop in number of lines	*% of eyes*			*Total number of eyes*
	With posterior synechiae	*Without posterior synechia*	*Unknown*	
0	33	46	21	96
1	43	41	16	30
⩾2	56	27	17	99

*Visual drop was measured as number of lines lost on the Snellen chart.

Table 2 *Vision drop following peripheral iridectomy**

Duration of follow-up	*Therapeutic group*			*Prophylactic group*		
	Visual drop in number of lines	*No. of eyes*	*% of eyes*	*Visual drop in number of lines*	*No. of eyes*	*% of eyes*
1 to 3 years (100 eyes)	0	9	30	0	43	62
	1	10	32	1	10	15
	⩾2	12	38	⩾2	16	23
4 to 11 years (125 eyes)	0	8	20	0	35	40
	1	7	18	1	16	19
	⩾2	24	62	⩾2	35	41

*Vision drop was measured as number of lines lost on Snellen chart.

Table 3 *Development of posterior synechiae following peripheral iridectomy*

		With posterior synechiae		*Without posterior synechiae*		*Unknown*	
		No. of eyes	*% of eyes*	*No. of eyes*	*% of eyes*	*No. of eyes*	*% of eyes*
Therapeutic group (70 eyes)	After operation	29	42	32	46	9	12
	Last examination	40	57	16	23	14	20
Prophylactic group (155 eyes)	After operation	27	17	113	72	15	11
	Last examination	61	39	66	43	28	18

fundus examination were included in the survey when previous data did not indicate significant macular changes.

After observation periods of one to three years lens opacities were found in 45 and 23% of the therapeutic and prophylactic groups, respectively (Table 5), while after four to 11 years the frequency was 67 and 58%, respectively. Progressive cataract was found in 28% and mature cataract in 19% of patients in the therapeutic group, as compared to 12 and 8%, respectively, in the prophylactic group (Table 6).

INTRAOCULAR PRESSURE

Intraocular pressure (IOP) was considered adequately controlled when the tension was less than 24 mmHg. IOP remained within those limits in all eyes (Table 7). Seventy per cent of patients in the therapeutic group received treatment in order to control and maintain the tension. Of the prophylactic group only 35% of the patients needed treatment. No definite cupping or significant visual field loss was noted.

Table 5 *Incidence of lens opacities after peripheral iridectomy*

	Incidence of lens opacities	
Duration of follow-up	*Therapeutic group*	*Prophylactic group*
1–3 years (100 eyes)	14/31 (45%)	16/69 (23%)
4–11 years (125 eyes)	26/39 (67%)	50/86 (58%)

Table 6 *Incidence of progressive* and mature† cataract after peripheral iridectomy*

	Therapeutic group		*Prophylactic group*	
Time	*Progressive cataract (%)*	*Mature cataract (%)*	*Progressive cataract (%)*	*Mature cataract (%)*
Before operation	6·0	7·0	5·2	4·3
End of follow-up period	28·0	19·0	12·0	8·0

*Progressive cataract—vision 6/20 to 6/30.
†Mature cataract—vision 6/60 or less.

Table 7 *Intraocular pressure at the end of the follow-up period*

	Controlled IOP				
	With treatment		*Without treatment*		
	No. of eyes	*% of eyes*	*No. of eyes*	*% of eyes*	*Uncontrolled IOP*
Therapeutic group	49	70	21	30	0
Prophylactic group	54	35	101	65	0

Table 8 *Late complications after peripheral iridectomy at the end of the observation period*

	Therapeutic group		*Prophylactic group*	
	Fraction of eyes and per cent		*Fraction of eyes and per cent*	
Vision loss ⩾2 lines	36/70	51%	55/155	35%
Posterior synechiae	40/70	57%	60/155	39%
Lens opacities	40/70	57%	66/155	42%
Mature cataract	13/70	19%	12/155	8%

Discussion

The present study was undertaken in an attempt to evaluate late complications of peripheral iredectomy.

The predominance of women (77%) in our series is in accordance with the higher incidence of closed angle glaucoma in females (67%) (Duke-Elder, 1969b).

Some reports record no vision loss after PI (Goshal and Blaxter, 1969; Primrose, 1960; Douglas and Strachan, 1967), while Lowe (1962) observed a drop in vision of varying degrees in eight out of 58 eyes in which PI was performed therapeutically and in one out of 64 eyes in which surgery was carried out prophylactically. A recent publication by Lowe (1973) reports visual acuity of 6/12 five years after prophylactic PI in 90% of the eyes. Williams *et al.* (1968) reported vision loss of two or more lines in 19% of eyes after a follow-up period of one to six years. However, in our study a vision drop of two lines and more was seen in 33% of the eyes that had undergone prophylactic PI, and in 51% of the therapeutic group (Table 8). In both groups loss of vision became more pronounced with protracted observation time, indicating that the time factor was important in acuity drop (Table 2). Vision loss may be attributed to posterior synechiae and to accelerated lens opacification (see below).

Posterior synechiae are a fairly common finding after PI, ranging from 33 to 49% in the therapeutic patients and from 17 to 19% in the prophylactic group (Goshal and Blaxter, 1969; Phillips and Snow, 1967). Lowe reported PS in six out of 26 eyes that underwent prophylactic PI, while others (Goshal and Blaxter, 1969; Primrose, 1960; Douglas and Strachan, 1967) thought PS to be a negligible complication. However, in our series PS was found in 57% of the therapeutic and in 39% of the prophylactic group (Table 3). In both groups the incidence of PS increased with the passage of time. There was no marked difference in PS formation

between eyes receiving steroids subconjunctivally postoperatively and those that did not. It did not appear to us that a broad PI had a greater predisposition for developing PS than a small PI (Phillips and Snow, 1967). A possible cause for PS developing months or years after operation with no obvious ocular inflammation, as seen in our study (Table 3), may have been the prolonged administration of pilocarpine (Duke-Elder, 1962a). Vision loss of two or more lines was more frequently apparent in patients with PS (56%) than in those without (27%) (Table 4). It seems to us that PS plays a role in visual deterioration, as has been suggested by Phillips and Snow (1967), who found that when observation time ranged from four to eight years the average visual drop was one line on the Snellen chart in eyes without PS and two lines in eyes with PS.

Lens opacities were recorded by Lowe (1973) in ten out of 26 eyes (37%) five years following prophylactic PI. In our prophylactic group this disorder was observed in 42% (Table 8), which is in agreement with Lowe's findings. In the therapeutic group lens opacities occurred in a higher percentage of patients.

There is good correlation between PS, lens opacities, mature cataract, and vision drop (Table 8). This may indicate a possible influence of PS on accelerated cataract formation and vision drop.

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