INTRA-OCULAR PRESSURE IN FUCHS'S HETEROCHROMIC UVEITIS*†

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GLAUCOMA is a recognized complication of Fuchs's heterochromic uveitis. Becker and Shaffer (1965) suggested that 20 per cent. of cases showed insidious rises in intra-ocular pressure in the hypochromic eye. Huber (1961) found 13 to 15 per cent. of unilateral cases and 25 to 33 per cent. of bilateral cases to have glaucoma. Coles (1964) mentioned an incidence of 15 to 25 per cent. and de Rosa (1959) one of 14 per cent. Ward and Hart (1967), in a previous study, have stated that secondary glaucoma is probably the most serious and the most common condition associated with cataract surgery in heterochromic uveitis.

Although it is a relatively frequent complication, few accounts are available of adequate investigation of the raised ocular tension in such cases; nor are there any reports of such studies in normotensive eyes of patients with heterochromic uveitis.

The present investigation into the secondary glaucoma of Fuchs's heterochromic uveitis follows upon an earlier study into the complications following cataract extraction in this type of case. It was found that a rise in ocular tension usually followed such surgery, and it was postulated that patients with heterochromic uveitis might have diminished aqueous outflow values. Decompensation with secondary glaucoma could then be precipitated by such factors as blockage of angle structures by lens breakdown products and red blood cells or surgical destruction of part of the filtration angle in the course of the operation.

The present study is designed to elucidate the aetiology of the raised ocular tension associated with heterochromic uveitis and also to discover if there is a disturbance of ocular dynamics in normotensive eyes with this condition.

Methods

A series of patients with Fuchs's heterochromic uveitis was investigated. Certain of these were aphakic, having had a cataract removed from the affected eye, without surgical complication.

These patients were not the same as those previously described (Ward and Hart, 1967).

Each patient had the intra-ocular pressures measured using the Goldmann applanation tonometer. Gonioscopic, perimetric, and central field investigations were carried out and outflow studies were performed with the Schwarzer electronic tonometer.

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Results

Of the sixteen cases of unilateral heterochromic uveitis, six had undergone lens extraction from the affected eye. The ten phakic cases are shown in Table I.

TABLE I
RESULTS IN TEN CASES OF UNILATERAL PHAKIC HETEROCHROMIC UVEITIS

Case No.	Age (yrs)	Eye with Heterochromic Uveitis	Ocular Tension (mm. Hg Applanation)		Facility of Outflow* — C value		P _o /C	
			Eye with Heterochromic Uveitis	Un-involved Eye	Eye with Heterochromic Uveitis	Un-involved Eye	Eye with Heterochromic Uveitis	Un-involved Eye
1	47	L	14	21	0.24	0.19	53	110
2	40	L	12	15	0.24	0.31	50	50
3	55	R	14	22	0.24	0.22	59	100
4	50	L	22	18	0.13	0.13	168	137
5	60	R	28	20	0.10	0.30	280	66
6	64	R	19	21	0.12	0.17	159	124
7	53	L	20	14	0.12	0.27	166	52
8	50	L	23	21	0.04	0.18	575	117
9	67	L	23	24	—	0.09	—	145
10	51	L	28	16	—	0.11	—	145

* Facility of outflow calculated from the 1955 conversion table (Becker and Shaffer).

The standards of "normal" as discussed by Becker and Shaffer (1965) and as used by Graham and Hollows (1966) were used. A pressure of over 21 mm. Hg and a P_o/C index exceeding 100 were considered to be significant indices of ocular hypertension.

Seven of the sixteen had applanation tensions of 21 mm. Hg or more and P_o/C values of 100 or more. A further three cases had P_o/C values of more than 100 but tensions of less than 21 mm. Hg. In two cases outflow studies were not performed but the ocular tension was raised. Only four of the eyes with heterochromic uveitis were "normal" from the point of view of tonometry and tonography.

Of the uninvolved eyes, five of the sixteen had ocular tensions of 21 mm. Hg or more with P_o/C indices of 100 or more. Four showed P_o/C values of 100 or more with normal tensions, and one had a tension of 22 mm. Hg with a P_o/C of 100. Six of the uninvolved opposite eyes could be regarded as "normal".

It is probably significant that the C value of the involved eye was significantly lower in ten patients, whereas that of the non-involved eye was significantly the lower in only one. In one patient the values were equal.

Gonioscopic examination was carried out in thirteen of the sixteen cases, and all showed radial vessels in the area of the iris root in the affected eye, but none in the uninvolved eye. The filtration angles of all the eyes were widely open.

Of the six aphakic cases (Table II, opposite), three showed early field changes, in the shape of enlargement and baring of blind spots, in the affected eye; these eyes showed disc excavation suspicious of glaucoma.

TABLE II
RESULTS IN SIX APHAKIC CASES

Case No.	Age (yrs)	Eye with Heterochromic Uveitis	Ocular Tension (mm. Hg Applanation)		Facility of Outflow - C value		P _o /C	
			Eye with Heterochromic Uveitis	Un-involved Eye	Eye with Heterochromic Uveitis	Un-involved Eye	Eye with Heterochromic Uveitis	Un-involved Eye
11	68	R	12	30	0.35	0.12	34	250
12	62	R	18	15	0.07	0.25	257	60
13	75	L	22	17	0.08	0.15	275	113
14	42	L	30	16	0.06	0.22	500	73
15	67	L	28	16	0.10	0.11	280	145
16	54	R	23	16	0.13	0.36	180	45

Neither field nor disc changes had been found in either eye of the phakic cases, and such changes were not found in the uninvolved eyes of the aphakic cases.

It is of interest that one patient (Case 8), who was given steroid drops for her affected eye, used them in both eyes. This provoked a marked rise in the tension of the uninvolved eye from the usual level of 21 mm. Hg to 32 mm. Hg; it returned to normal on withdrawing the drops.

Discussion

Ward and Hart (1967) reported that the ocular tension was raised in many eyes with heterochromic uveitis after cataract extraction. It was postulated that the aqueous outflow might be diminished in certain cases of heterochromic uveitis.

The present investigation has shown that the aqueous outflow of the eye with heterochromic uveitis was almost always worse than that of the opposite eye and could be considered as below normal in two-thirds of the cases.

Generally the aphakic cases had appreciably worse outflow values than the phakic cases. This finding was not unexpected. Previously it had been postulated that surgery might destroy part of the filtration system.

The tension of the eye with heterochromic uveitis was above normal more often than not. However, it was not grossly elevated, and was rather out of keeping with the poor outflow values. This would suggest that a hyposecretory factor might be operative. Becker and Shaffer (1965) suggested that there was evidence of such a compensatory mechanism in normal eyes.

Our investigations indicate that lens extraction has a deleterious effect upon the dynamics of eyes with heterochromic uveitis. The ocular tension tends to be increased and the outflow value is usually markedly diminished. In half the aphakic cases early field defects were found.

Coles (1964) suggested that cataract extraction had a beneficial effect on the secondary glaucoma of Fuchs's heterochromic uveitis. This could have been so in Case 11 (Table II), in which the aphakic eye was normal and the phakic hypertensive. Otherwise the present series would suggest that the operation markedly diminishes the aqueous outflow.

Investigation of the intra-ocular pressure both before and after cataract extraction is of value in the management of cases of this type. An aphakic eye with heterochromic uveitis would seem to be at risk unless the ocular tension and visual field are periodically checked. Such an eye is frequently left in the uncorrected aphakic state and, unless there is a positive approach towards its management, may well suffer permanent visual impairment.

Huber (1961) found that the pressure in the aqueous veins was normal in Fuchs's heterochromic uveitis, but this factor was not investigated in the present series. Huber also considered that gonioscopically the appearance of radial vessels in the iris root area was pathognomonic of heterochromic uveitis. Becker and Shaffer (1965) said that twig-like neovascularization of the iris periphery and trabecular meshwork was often seen, and such vessels have certainly been seen in all the present cases. In addition it was considered that the trabecular structures had a rather paler colour than normal associated with a characteristic irregularly-defined appearance. There was no sign of abnormal pigmentation.

An interesting point in the present series was the relatively high number of uninvolved opposite eyes showing moderately raised tensions and diminished outflow values. Only a third of the uninvolved eyes were completely normal tonometrically and tonographically, but the discs and fields appeared normal in all cases.

Although the number of cases is small and is statistically insignificant, the high percentage with hypertension in the uninvolved eye is worthy of note. It is recognized that ocular hypertension becomes more frequent with age, as was shown by Strömberg (1962) and confirmed by Graham and Hollows (1966). Nevertheless, taking into account the age group of many of the present patients and the small numbers involved, the finding of ocular hypertension in this group could be significant.

Most patients had a lower C value in the eye with heterochromic uveitis, but the tensions of the opposite uninvolved eye were higher in approximately half of the phakic patients. This suggests that, whereas an aqueous hyposecretory element might be acting in the eye with heterochromic uveitis, this was not so important in the uninvolved eye.

In all eyes examined there was sufficient evidence of aqueous outflow impairment to account for the ocular tensions observed. There appeared to be no evidence of aqueous hypersecretion.

Summary

Sixteen cases of unilateral Fuchs's heterochromic uveitis were investigated. Six of these had had a complicated cataract removed from the affected eye.

It was found that the eyes with heterochromic uveitis frequently showed a raised tension with a diminished outflow value.

Cataract extraction appeared to exert a deleterious effect on an already impaired aqueous outflow in such eyes. Early visual field impairment was found in three of six such cases.

An unexpected finding was that, in approximately half the patients examined, the uninvolved eye also showed abnormal tonometric or tonographic findings. No visual impairment was found in such eyes.

The importance of the periodic assessment of each eye in patients with Fuchs's heterochromic uveitis is stressed.

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