CATARACT EXTRACTION AND DIABETES*

BY

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THE results of cataract extraction in diabetics are undoubtedly much better now than they have been in the past (Townes and Casey, 1955; Dollfus, Haye, and Pinchon, 1958; Beckett and Hobbs, 1961; Greaves, 1962; Kirmani, 1964), but there is still uncertainty over the relative frequency of some of the complications of the operation in diabetics and non-diabetics, and over the importance of diabetic retinopathy in determining the visual result. The present investigation is an attempt to resolve some of these difficulties by a study of the cataract extractions carried out in the Oxford Eye Hospital during the years 1957 to 1962. Certain conclusions about the relative incidence of cataract extraction in diabetics and non-diabetics have already been published (Caird, Hutchinson, and Pirie, 1964).

Material

In the period stated, 1,485 cataract extractions were carried out on 1,281 patients aged 20 years or over; 1,259 operations on 1,083 patients fulfilled the following criteria: (1) they were done for senile cataract, that is, cataract not consequent on trauma, iridocyclitis, glaucoma, or other presumably causal ocular disease, nor associated with general disease other than diabetes (e.g., dystrophia myotonica or hypoparathyroidism); (2) the records available contained visual acuities recorded pre- and post-operatively. The pre-operative acuity taken was in almost all cases that recorded on admission for cataract extraction. The post-operative acuity was the best recorded, after needling if necessary, and after full refraction.

Of the 1,259 operations for senile cataract, 118 were on the 102 diabetics. Diabetes was diagnosed on customary biochemical criteria. Diabetic retinopathy was present either before or immediately after operation in 47 eyes in 36 patients, as shown by observations made either in the Oxford Eye Hospital or by ophthalmologists in the Radcliffe Infirmary Diabetic Clinic.

Table I shows the distribution by age and sex of the diabetics and non-diabetics.

Results

There were no substantial differences by age or sex in the incidence of the complications of operation or in the visual results, either in diabetics or non-diabetics. Age and sex have therefore been ignored in the subsequent analysis.

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TABLE I
AGE AND SEX DISTRIBUTION OF DIABETICS AND NON-DIABETICS

Age (yrs)	Sex	Non-diabetics		Diabetics	
		Patients	Operations	Patients	Operations
30-39	M	2	2	1	1
	F	1	1	0	0
40-49	M	14	19	0	0
	F	10	11	5	8
50-59	M	61	73	4	4
	F	55	68	10	13
60-69	M	89	111	7	8
	F	137	176	19	25
70-79	M	158	183	7	8
	F	245	286	34	35
80-89	M	68	76	6	6
	F	124	130	9	10
90+	M	2	2	0	0
	F	5	5	0	0
Total	M	394	464	25	27
	F	587	677	77	91
	Total	981	1141	102	118

TABLE II
COMPLICATIONS OF OPERATION

Complications	Non-diabetics		Diabetics	
	No.	Per cent.	No.	Per cent.
Total number of operations	1141		118	
Operative Vitreous loss	26	2.3	5	4
Early Post-operative				
Hyphaema	207	19	27	23
Iris prolapse	21	1.8	1	1
Choroidal detachment	31	2.7	7	6
Delayed healing	5	0.4	0	0
Iritis	19	1.7	2	2
Late Post-operative				
Glaucoma	15	1.3	4	3
Retinal detachment	11	1.0	1	1
Vitreous haemorrhage	2	0.2	2	2
Corneal dystrophy	6	0.6	0	0
Epithelial downgrowth	6	0.6	3	3
Sympathetic ophthalmia	3	0.3	0	0

Complications of Operation.—These have been divided into operative, early post-operative, and late post-operative (Beckett and Hobbs, 1961). Table II shows that the incidence of the various complications is essentially the same in the diabetics and the non-diabetics when allowance is made for the smaller numbers of the former. The presence of diabetic vascular disease, as evidenced by retinopathy, did not affect the incidence of hyphaema.

TABLE III
PRE-OPERATIVE VISUAL ACUITIES

Pre-operative Visual Acuity	Non-diabetics		Diabetics	
	No. of Eyes	Per cent.	No. of Eyes	Per cent.
6/12 or better	11	1	1	1
6/18 to 6/60	180	16	17	14
Less than 6/60	950	83	100	85
Total	1141	100	118	100

TABLE IV
POST-OPERATIVE VISUAL ACUITIES

Post-operative Visual Acuity	Non-diabetics		All diabetics		Diabetics			
	No. of Eyes	Per cent.	No. of Eyes	Per cent.	No retinopathy		Retinopathy	
					No. of Eyes	Per cent.	No. of Eyes	Per cent.
6/12 or better	912	80	79	67	57	80	22	47
6/18 to 6/60	174	15	19	16	5	7	14	30
Less than 6/60	55	5	20	17	9	13	11	23
Total	1141	100	118	100	71	100	47	100

Visual Results.—Table III shows the pre-operative and Table IV the post-operative visual acuities. The pre-operative visual acuities have the same distribution in the diabetics and non-diabetics, over 80 per cent. being below 6/60, one-sixth being between 6/18 and 6/60, and 1 per cent. being 6/12 or better. The post-operative acuities of the non-diabetics and the diabetics without retinopathy are not dissimilar, 80 per cent. being 6/12 or better in both groups. Acuities between 6/18 and 6/60 were found in 15 per cent. of the non-diabetics and 7 per cent. of the diabetics without retinopathy, and acuities of less than 6/60 in 5 per cent. and 13 per cent. respectively. The results in the diabetics with retinopathy were, as expected, substantially worse than in those without retinopathy. Yet 47 per cent. of those with retinopathy gained an acuity of 6/12 or better and 30 per cent. between 6/18 and 6/60. The Figure shows these findings graphically.

Table V shows briefly the apparent reasons for the poor visual results, i.e., those eyes with an acuity of less than 6/60. Among the non-diabetics half the poor results (26 out of 55 eyes, or 2.3 per cent. of all eyes) were due to other ocular

FIGURE—Visual acuities after cataract extractions.

TABLE V

APPARENT REASONS FOR POOR VISUAL RESULTS (POST-OPERATIVE VISUAL ACUITY LESS THAN 6/60)

Reason for Poor Visual Acuity	Non-diabetics		All diabetics		Diabetics	
					No Retinopathy	Retinopathy
	No. of Eyes	Per cent. of all Eyes	No. of Eyes	Per cent. of all Eyes	No. of Eyes	No. of Eyes
Operative complication alone	11	1.0	5	4.2	5	0
Other ocular disease alone	26	2.3	3	2.5	3	0
Complication and other disease	4	0.4	1	0.9	1	0
Retinopathy alone	—	—	10	8.5	0	10
Complication and retinopathy	—	—	1	0.9	0	1
Not known	14	1.2	0	—	0	0
Total	55	4.9	20	17.0		

disease, mostly senile macular degeneration or myopia and its complications. One-fifth were due to the complications of operation as defined (11 eyes, 1 per cent. of the total). The remainder were due to other ocular disease and operative complications together, or were of unknown cause, some at least of these last being due to inadequate follow-up. Among the diabetics the proportion of eyes with a poor result due to other ocular disease was the same (2.5 per cent.), but operative complications were the cause of a poor result in 4 per cent. (though this figure is based on only 5 eyes). Diabetic retinopathy was the only demonstrable cause in 8.5 per cent., and various combinations in the remaining two eyes.

Retinopathy is thus the most important single cause of poor visual results in diabetics, but the higher incidence of poor results associated with the complications of operation, which are themselves no commoner in diabetics, suggests that complications, when they occur in a diabetic, may possibly have more serious visual effects.

Discussion

Studies of cataract extraction in diabetics have shown that the incidence of complications of operation is in general no higher at the present time than among non-diabetics (Dollfus and others, 1958; Beckett and Hobbs, 1961; Greaves, 1962; Kirmani, 1964), with the possible exception of iritis and hyphaema. The recorded incidence of post-operative iritis in diabetics varies very widely, from 7 per cent. (Townes and Casey, 1955; Greaves, 1962) to 30 per cent. (Clegg, 1920), and that in non-diabetics from 1.5 per cent. (Beckett and Hobbs, 1961) to 17 per cent. (Kirmani, 1964). Where direct comparison has been made, iritis has usually been commoner in diabetics (Table VI). Beckett and Hobbs (1961) found it to be more frequent in those with retinopathy. In the present study the incidence of iritis is identical in the diabetics and the non-diabetics, and in both is only 2 per cent. The reason for the discrepancy between this and previous investigations is not clear.

The recorded incidence of hyphaema also varies very greatly, from 6 per cent. to 41 per cent., doubtless with the definition employed and the diligence with which it is sought. Comparisons between diabetics and non-diabetics have sometimes shown it to be commoner in diabetics (Table VI), but the difference in the present study, between 23 per cent. in the diabetics and 19 per cent. in the non-diabetics, is small and of no real consequence. Hyphaema is not commoner when retinopathy is present (Beckett and Hobbs, 1961; present paper).

There is general agreement that retinopathy is at present the main factor limiting the proportion of good visual results of cataract extraction in diabetics. It is doubtful what significance can be placed on the finding (*see* Table V) that complications of operation may carry a worse prognosis for vision in diabetics, since the numbers are very small. The findings in this study are essentially similar to those of Beckett and Hobbs (1961), Greaves (1962), and Kirmani (1964), with which they

TABLE VI
INCIDENCE OF HYPHAEMA AND IRITIS

Author	Non-diabetics			Diabetics		
	Total No. of Eyes	Per cent. with Hyphaema	Per cent. with Iritis	Total No. of Eyes	Per cent. with Hyphaema	Per cent. with Iritis
DeVoe (1942)	413	21	—	40	22	—
Nutt (1953)	50	—	12	30	—	20
Townes and Casey (1955)	1844*	10.5*	5*	130	22	7
Beckett and Hobbs (1961)	135	6	1.5	69	10	10†
Greaves (1962)	130	24	4	116	41	7
Kirmani (1964)	100	13	17	100	12	11
Present study	1141	19	1.7	118	23	2

* Non-diabetics and diabetics combined.

† 12 per cent. of those with, 5 per cent. of those without, retinopathy.

TABLE VII
VISUAL RESULTS

Author	Non-diabetics		All Diabetics		Diabetics			
	No. of Eyes	Post-op. Visual Acuity 6/12+ per cent.	No. of Eyes	Post-op. Visual Acuity 6/12+ per cent.	No Retinopathy		Retinopathy	
					No. of Eyes	Post-op. Visual Acuity 6/12+ per cent.	No. of Eyes	Post-op. Visual Acuity 6/12+ per cent.
Nutt (1953)	50	64	30	73	—	—	—	—
Beckett and Hobbs (1961)	135	79	69	48	20	80	49	49
Greaves (1962)	138	78	142	48	67	73	75	34
Kirmani (1964)	100	80	100	56	44	77	56	39
Present study	1141	80	118	67	71	80	47	47

are compared in Table VII. Approximately 80 per cent. of non-diabetics and the same proportion of diabetics without retinopathy may expect a post-operative visual acuity of 6/12 or better. The comparable proportion of diabetics with retinopathy, whatever its degree, is 50 per cent. or less. The proportion of post-operative visual acuities below 6/60 is higher in diabetics without retinopathy than in non-diabetics (*see* Tables IV and VII), and higher still (20 per cent. to 25 per cent.) in diabetics with retinopathy. Yet there is no doubt that these figures, which must reflect in part the poorer prognosis for vision in older diabetics with retinopathy (Caird and Garrett, 1963), should not deter or delay cataract extraction in diabetics with retinopathy when operation is indicated.

Summary

A comparison has been made between 1,141 extractions of a senile cataract in 981 non-diabetics and 118 extractions in 102 diabetics, carried out in the Oxford Eye Hospital during the years 1957 to 1962.

Operative complications are no commoner in diabetics than in non-diabetics.

The visual results are very similar in non-diabetics and in diabetics without retinopathy, 80 per cent. gaining a visual acuity of 6/12 or better. If retinopathy is present, 47 per cent. achieve this level.

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