admission, but the finding of a hyperresonant distended chest and striking chest recession suggested bronchiolitis. Unfortunately no chest *x*-ray film was taken on admission; the importance of taking such a film in every case of bronchiolitis is illustrated by this case. Deaths from bronchiolitis have not been described as fully in the literature as their importance merits; more detailed clinical, virological, bacteriological, and pathological studies are needed if we are to achieve rational and effective treatment for this condition.

Summary

Virological studies of 106 children with bronchiolitis and 45 with pneumonia are reported. Viruses regarded as responsible for the disease were identified in 62% of the cases of bronchiolitis, R.S.V. being the dominant agent. Evidence of virus infection was also found in 42% of the children with pneumonia.

Bacteriological studies of cough swabs taken on admission from 39 of the cases of bronchiolitis and 26 of those with pneumonia are reported. Pathogenic bacteria were isolated from a minority and their incidence did not exceed figures available for healthy children. No evidence was found for the view that *Haemophilus influenzae* plays a part in the aetiology of bronchiolitis. Clinical and bacteriological evidence together would suggest that *Staph. aureus* is the chief bacterial hazard.

The scarcity of information about secondary bacterial infection and the causes of death in bronchiolitis is stressed. An appraisal has been attempted of present attitudes to therapy, and suggestions are made for a more discriminating approach for the use of antibiotics in the treatment of bronchiolitis.

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Use of Trans-sphenoidal Hypophysectomy in Diabetic Retinopathy: Preliminary Assessment

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Diabetic retinopathy is well recognized as a potent cause of blindness. Until recently there had been no successful treatment. In 1953 the case was reported of a diabetic woman who developed post-partum pituitary necrosis and subsequently lost her retinopathy (Poulsen, 1953). This aroused interest in the relation between the pituitary gland and diabetic complications in the eye. There are now records in the literature of 223 diabetics who have been treated by pituitary ablation for retinopathy. Improvement in the tendency to retinal haemorrhage has been claimed in 48% of them. Two British series have been reported: Ainslie *et al.* (1962), using trans-frontal removal of the pituitary, and Joplin *et al.* (1962), using pituitary ablation by yttrium implantation.

The present report concerns 15 patients with diabetic retinopathy treated by trans-sphenoidal hypophysectomy in the United Bristol Hospitals during the period 1960–4.

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Material

Since 1960 all patients attending the diabetic clinic at Bristol Royal Infirmary with severe haemorrhagic diabetic retinopathy threatening vision were considered for hypophysectomy. Of 20 patients who came into this category 15 were finally operated upon. Of the five not treated three were unwilling to have the operation, one was thought to have

irreversible retinal degeneration, and one was rejected because of renal failure.

Of the treated patients ten were men and five women. Their age at hypophysectomy ranged from 30 to 67 years (see Table I). In six the onset of diabetes was at the age of 20 years or under; in four it was over 40. Two patients (Cases 2 and 3 had the nephrotic syndrome. Both these patients had renal failure pre-operatively, and renal function deteriorated after operation. We now regard renal failure as an absolute contraindication to operation. One patient (Case 7) had primary optic atrophy in one eye before operation, which made this eye blind, but vision in the other eye was threatened by frequent vitreous haemorrhages. One patient (Case 12) had acromegaly. This man had papilloedema in the left eye and his visual-field defects suggested chiasmal compression. He was diabetic, and both retinae had microaneurysms, haemorrhages, and new blood-vessels.

In all the treated patients vision was threatened by recurrent haemorrhages, and this constituted the essential criterion for operation. All had visual symptoms either from retinal haemorrhages or of deterioration in visual acuity.

Evidence of peripheral neuropathy was found in nine patients, and one of the men was impotent. Four patients had ischaemic heart disease. No patient had severe peripheral vascular disease.

Method

On admission to hospital the patients were examined and investigated, especially for evidence of neuropathy, renal disease, and peripheral vascular and ischaemic heart disease. Assessment of neuropathy was entirely clinical. Renal function was determined by examination of the urine for protein, cellular deposit, and organisms, and by estimation of the blood urea. Vascular complications were investigated by electrocardiography and radiography of the chest.

Eyes were examined by two of us (K. R. G. and B. P. H.), who recorded the findings on a form, giving details of the individual features of the retinopathy and the presence of vitreous or lenticular opacities. Each retina was photographed, using a Zeiss retinal camera. A corrected visual acuity was recorded for each eye.

In addition to the clinical features described, the decision whether or not to recommend hypophysectomy was influenced in some degree by the marital status, potency, desire for children, as well as the intellectual and emotional status of the patient. If suitable for operation the patient was told what is known of its effects and its chances of success. If he or she agreed to pituitary removal (and three did not) they were subjected to hypophysectomy. All the operations were performed by one of us (J. A. J.), and the Chiari trans-sphenoidal approach was used.

Patients were reviewed at six-monthly intervals, all the pre-operative ophthalmological examinations being repeated. The diabetic and endocrine control was managed in the diabetic clinic. Some patients were readmitted for an assessment of residual pituitary function. The results of this study will form a separate publication.

The information in Table II was obtained by combining the findings from retinal photographs and repeated ophthalmoscopy. Each feature of retinopathy has been graded from 0 to +++ in severity.

Results

The period of follow-up for those patients still alive varies from 15 to 52 months, with an average of 26 months (See

TABLE I.—*Clinical Features of Treated Patients Before Hypophysectomy*

Case No.	Sex	Date of Hypophysectomy	Age at Onset of D.M.	Age at Onset of Retinopathy	Age at Hypophysectomy	Blood-Pressure	Evidence of Nephropathy	Evidence of Neuropathy	Evidence of Vascular Disease
1	M	12/8/60	60	61	67	180/100	None	None	None
2	M	28/11/60	14	31	32	170/110	Proteinuria. Oedema. Urea 76 mg.	Absent reflexes. Sensory loss	,,
3	M	12/6/61	45	45	46	185/105	Proteinuria. Oedema. Urea 68 mg	None	Myocardial infarction
4	M	30/7/61	32	32	32	155/110	None	,,	None
5	M	12/1/62	17	36	42	130/75	,,	Sensory loss	Myocardial infarction
6	M	3/9/62	20	39	42	120/80	,,	Impotent. Absent reflexes	None
7	F	7/9/62	1½	18	31	140/80	,,	Diminished reflexes	,,
8	F	12/11/62	32	46	52	200/110	Recurrent urinary infections. No other.	Absent reflexes. Sensory loss	Angina pectoris
9	F	4/1/63	30	38	44	160/100	None	Absent reflexes	None
10	F	15/2/63	34	22	34				
11	M	27/5/63	52	52	53	150/90	,,	,, ,,	Left ventricular hypertrophy
12	M	7/6/63	39	57	59	190/100	,,	Sensory loss in hands	Ischaemic heart disease, heart failure
13	M	22/7/63	18	28	30	140/100	,,	None	None
14	M	29/7/63	7	30	32	140/90	,,	,,	,,
15	F	26/8/63	52	61	63	150/70	Urinary infection. No other	Diminished reflexes. Paraesthesia	,,

TABLE II

Case No.	Immediate Pre-operative Findings						F.U. in Mths.	Most Recent Post-operative Findings						Comments
	Haem.	Ven. Dil.	M.A.	Hard Ex.	N.B.V.	Prolif.		Haem.	Ven. Dil.	M.A.	Hard Ex.	N.B.V.	Prolif.	
1	+++	++	?	++	?	0	52	+	?	?	+++	?	?	Dense cataracts
2	+++	++	++	0	+	0	5	+++	++	++	0	+	0	Died. No change
3	+++	++	?	+++	0	0	20	+	+	?	+++	0	0	Died. Eyes improved
4	+++	+++	+++	+	0	+	41	+	0	0	+	0	++	Improved
5	+++	?	?	?	?	?	35	0	0	0	++	0	0	,,
6	+++	+++	+++	++	+	0	27	0	+	+	+	0	+++ rt. only	One eye improved
7	+++	++	+++	0	+	0	27	0	0	0	0	+	0	Improved
8	+++	++	++	++	+	0	25	+	+	+	++	++	0	,,
9	+++	++	+++	0	0	+ lt. only	23	0	+	0	0		++ both eyes	Worse
10	+++	++	++	++	++	0	1							Died post-op.
11	++	++	++	+	+	0	19	+	+	+	+	+	0	No change
12	+++	+	+++	0	+	+	18							Worse
13	++	++	++	0	++	0	17	+	+	+	+	+	0	Improved
14	+++	+++	++	+	+	0	16	rt. 0; lt. ++	+++	+	+	+	+ lt. eye	One eye improved
15	+++	+++	+++	+	0	0	15	++	++	++	++	+	0	No change

The features of retinopathy are graded 0 to +++ in severity. Haem. = Haemorrhages. Ven. Dil. = Venous dilatation. M.A. = Microaneurysms. N.B.V. = New blood-vessels. Prolif. = Retinitis proliferans. F.U. = Follow-up.

Table II). Assessment of visual changes after hypophysectomy is summarized in Tables II and III.

TABLE III.—*Visual Acuity Before and After Hypophysectomy Corrected for Refractory Errors*

Case No.	Immediate Pre-operative Acuity (Corrected)		Most Recent Post-operative Acuity (Corrected)	
	Right	Left	Right	Left
1	4/60	2/60	1/60	H.M.
2	5/60	1/60	1/60	2/60
3	6/24	6/18	6/12	6/12
4	1/60	6/36	H.M.	6/6
5	6/9	P.L.	6/6	P.L.
6	6/4	6/9	F.C.	6/9
7	F.C.	6/9	F.C.	6/9
8	6/18	6/18	6/36	6/36
9	6/9	H.M.	6/36	P.L.
10	6/12	6/12		
11			6/18	6/24
12	6/24	2/60		
13	6/18	6/9	6/18	6/12
14	6/24	3/60	6/9	6/36
15	6/36	3/60	6/12	6/60

H.M. = Hand movements. F.C. = Finger count. P.L. = Perception of light.

Visual Acuity

The corrected visual acuity has been recorded on many occasions, both before and after hypophysectomy in most patients, but in Table III only the recordings immediately before operation and the latest assessment are set out. Five patients (Cases 3, 4, 5, 14, and 15) had an improvement in visual acuity in at least one eye, so that operation has been of benefit. In Cases 1 and 8 the visual acuity deteriorated in both eyes. In Case 1 this was due to progression of cataracts, and in Case 8 to bilateral retinitis proliferans. In Cases 6 and 13 acuity became worse in one eye only. In Cases 2, 7, and 9 visual acuity was not effectively changed post-operatively in either eye. If assessment is made on individual eyes nine became worse, six remained the same, and nine improved.

Retinopathy

Each feature of the retinopathy shown in Table II was assessed by a combination of retinal photography and ophthalmoscopy. The grading 0 to +++ for each feature was made on an arbitrary basis, with an assessment pre-operatively and at each follow-up visit. The figures in Table II are for the pre-operative assessment and the most recent visit for follow-up.

(*a*) *Haemorrhages.*—In Cases 5, 6, 7, and 9, retinal haemorrhages ceased, but in three of these eight eyes there was extensive retinitis proliferans, Case 9 having both eyes affected. (We found, however, that the development of retinitis proliferans may be associated with cessation of visible retinal haemorrhage in patients who have not had hypophysectomy.) In eight patients (Cases 1, 3, 4, 8, 11, 13, 14, and 15) there was a definite reduction in the frequency of haemorrhages. In Case 1 this was partly accounted for by the resolution of retinal venous thrombosis in one eye. Except where there was retinitis proliferans, good correlation occurred between the reduction of retinal haemorrhage and improvement or maintenance of visual acuity. Case 6 had a massive right retinal haemorrhage a few days after hypophysectomy and lost useful vision in that eye; he has had no further haemorrhages in the other eye. Case 5 recovered normal vision in his right eye after operation but had a large haemorrhage three months later which returned his vision to its pre-operative state. He has had no further haemorrhages. Case 14 had a recurrence of haemorrhages in the left eye only, one year after hypophysectomy.

(*b*) *Venous Dilatation.*—Venous dilatation was reduced or lost in 9 out of 11 patients assessed for this. In two it was unchanged.

(*c*) *Hard Exudates.*—These appeared in Case 13 and were more extensive in Cases 1 and 15 after hypophysectomy. There was some reduction in Case 6.

(*d*) *New Blood-vessels.*—These appeared in Case 15 and increased in Case 8 after hypophysectomy. Photographs suggested a slight reduction in the new vessels in Case 4. In four patients (Cases 2, 7, 11, and 14) there was no change.

(*e*) *Retinitis Proliferans.*—This was present pre-operatively in Cases 4, 9, and 12. There has been obvious progression after operation in Cases 4 and 9, and in Case 12 no adequate assessment was made. Two patients developed retinitis proliferans after hypophysectomy; in Case 6 it followed a massive haemorrhage a few days after operation, and in Case 4 it slowly appeared a year after hypophysectomy following recurrent haemorrhages.

Subjective Assessment of Retinal Haemorrhages.—Eight patients had pre-operative visual symptoms suggesting retinal haemorrhage. These symptoms were of small areas of obscured vision lasting hours to days and often described as looking like tadpoles, or episodes of visual blurring in one eye clearing in days to weeks. Three of these patients found that the symptoms stopped after operation, four found a reduction in their frequency, and in one patient they continued. There was a good correlation between the subjective and the objective assessment of large retinal haemorrhages.

Effect of Operation on Other Clinical Features

Renal Disease.—Cases 2 and 3 had the nephrotic syndrome before hypophysectomy, and renal function in these patients continued to deteriorate. None of the other patients developed proteinuria or renal failure after hypophysectomy. Case 8 continued to have recurrent urinary infections.

Neurological Disease.—Nine patients had evidence of peripheral neuropathy. There was no objective evidence of improvement in any. One patient (Case 15) noticed a reduction in paraesthesia in the hands and arms for nine months after hypophysectomy.

Degree of Pituitary Ablation

Ten of the 12 surviving patients require cortisone replacement. Table IV shows the pre- and post-hypophysectomy insulin requirements and the present hormone replacement therapy. Two patients (Cases 5 and 7) required no hormone replacement, and one patient (Case 7) continued to menstruate. Nevertheless she has had no post-operative retinal haemorrhages, and Case 5 only one. The others have continued to take cortisone, and eight have also needed thyroxine. Cases 13 and 14 were potent before hypophysectomy, but impotence has been corrected post-operatively in both by giving methyltestosterone.

Complications of Hypophysectomy

In this small series there have been no deaths related to the operative procedure, and complications occurred in only three patients (Cases 9, 11, and 15). In Case 9 exposure of the pituitary was difficult, and a heavy post-operative haemorrhage from the left cavernous sinus occurred after removal of a pack on the tenth day. A second operation under general anaesthesia was required to arrest bleeding. The patient was discharged home well four weeks after admission. In Case 15 meningitis developed one month after hypophysectomy and was successfully treated with sulphadimidine and increased doses of cortisone. Only one patient (Case 11) had a leak of cerebrospinal fluid; this was slight and lasted for one day.

All patients had a urinary output of over three litres in the immediate post-operative period, but only in Case 9 was Pitressin required for more than three months. At least three patients complained of transient anosmia.

Deaths

Three patients died during the period of study: two (Cases 2 and 3) from renal failure 5 and 20 months respectively after operation. The terminal event in Case 2 was an acute pyelonephritis, while in Case 3 renal failure was steadily progressive. Case 3 survived long enough for a definite improvement in the tendency to retinal haemorrhage to be observed. The third patient (Case 10) died three weeks after operation with fulminating bronchopneumonia.

Discussion

No adequate long-term studies of the natural history of diabetic retinopathy have yet been made. Clinical impressions suggest that retinopathy may be present in some patients for many years without producing visual impairment, while in others it may progress rapidly towards blindness. Although there have been occasional reports of spontaneous improvement in retinopathy (Wagener *et al.*, 1934 ; Caird and Garrett, 1962), the normal course is one of progression of the retinal lesions and visual deterioration. Thus Wagener *et al.* (1934) found that of 66 patients observed by ophthalmoscopy over a three-year period 37 progressed, 25 were unchanged, while 4 showed some improvement. Caird and Garrett (1963), in a retrospective study of visual acuity as an index of change in retinal disease, found that 14.5% of eyes with an initial acuity of 6/18 or better deteriorated to 6/60 or worse in five years.

Although little is known of the factors which control the rate of progression of the eye disease, there is good evidence that the degree of diabetic control is unimportant in preventing progression of the established retinopathy (Wagener *et al.*, 1934 ; Schlesinger *et al.*, 1960 ; Caird and Garrett, 1963). Caird and Garrett in their study of visual acuity found that the rate of deterioration was greater in those in whom the onset of diabetes occurred after the age of 40 than in those in whom its onset was earlier. Wagener *et al.* (1934) found no correlation between the dose of insulin and the rate of progression of retinopathy. Although the evidence is fragmentary and incomplete, there seems little doubt of the uniform tendency to retinal destruction and blindness in patients with grossly haemorrhagic diabetic retinopathy. It is this threat of blindness in these patients, and the lack of effective means of treatment hitherto, which have led to the use of such a fundamental procedure as hypophysectomy when the mechanism of its beneficial effects is obscure.

Reports have been published of 223 patients with diabetic retinopathy who have undergone pituitary ablation by one of several techniques (Luft *et al.*, 1955 ; Kinsell, 1957 ; Javid *et al.*, 1958 ; Vannas *et al.*, 1959 ; Ray, 1960 ; Field *et al.*, 1961, 1962 ; Bryan, 1962 ; Gordon and Javid, 1962 ; Pearson *et al.*, 1962 ; Joplin *et al.*, 1962 ; Sjögren, 1962 ; Lundbaek *et al.*, 1962 ; Ainslie *et al.*, 1962 ; Lawrence *et al.*, 1963). Records of results have varied in form and adequacy, but they suggest that 98 (48%) patients showed a reduction in the tendency to retinal haemorrhage. In these reports an assessment of change in visual acuity was recorded on 98 eyes: 34 improved, 34 were worse, and 30 were unchanged. The methods of pituitary ablation used were transfrontal hypophysectomy or pituitary-stalk section in 104 cases, transsphenoidal hypophysectomy in 38, yttrium implantation in 10, and heavy particle irradiation in 71.

Renal and neurological complications, though not so carefully observed, seem to have been less favourably influenced than the retinopathy. Four patients developed or had worsening of orthostatic hypotension after ablation (Lundbaek *et al.*, 1962 ; Lawrence *et al.*, 1963). Renal disease when severe has always progressed. However, several instances in which moderate or slight proteinuria has been reduced or lost following ablation are on record (Luft *et al.*, 1955 ; Vannas *et al.*, 1959 ; Ainslie *et al.*, 1962). Luft *et al.* (1955) measured the glomerular filtration rate and found a marked fall in all of 12 patients after hypophysectomy. Such a fall would explain the worsening renal failure in ablated patients who had an elevated blood urea pre-operatively, and may at least partly explain the reported reduction in proteinuria.

In the present series 8 of the 15 cases have had some visual improvement after hypophysectomy. The feature of the retinopathy showing most improvement has been the tendency to retinal haemorrhage. All the survivors have shown some degree of improvement in this direction. Venous dilatation was also reduced significantly in nine patients. Hard exudates appeared or became more extensive in three patients. Retinitis proliferans always progressed. There was no good evidence that new blood-vessel formation was favourably influenced, and in two it progressed after operation. This is unlike other series (Field *et al.*, 1961 ; Joplin *et al.*, 1962) in which new vessels were seen to regress. The degree of pituitary ablation has varied and has shown no close correlation with the therapeutic response (see Table IV). The change in insulin requirements has been less than in other series, but the overall improvement in vision has been similar. Both patients with the nephrotic syndrome died of renal disease, one surviving long enough to show some improvement in his retinopathy. Neither of these patients would now be thought suitable for hypophysectomy because of the degree of renal impairment, although in neither was the blood urea above 75 mg./100 ml. at the time of operation. (An upper limit of 75 mg./100 ml. was suggested by Joplin *et al.* (1962).)

TABLE IV.—*Post-operative Hormone Replacement and Insulin Requirements*

Case No.	Insulin Requirements		Radioactive Iodine Uptake		Daily Replacement Doses (mg.) of:			Comments
	Pre-hypoph.	Post-hypoph.	Pre-hypoph.	Post-hypoph.	Cortisone	Thyroxine	Methyl-testosterone	
1	Nil	Nil	48 hr. 50%		37·5	0·2	0	Dependent on cortisone
2	90	32	48 hr. 36%	48 hr. 60%	50	0	0	No pituitary tissue found at P.M.
3	40	50	4 hr. 6%	4 hr. 10%	37·5	0·05	—	Pituitary eosinophil cells found at P.M.
4	Nil	28	48 hr. 45%	48 hr. 0	37·5	0·2	50	Dependent on cortisone
5	84	24	48 hr. 51%	48 hr. 53%	0	0	0	No replacement therapy needed
6	48	36		P.B.I. 2·9 μg./100 ml.	37·5	0·2	0	Dependent on cortisone
7	36	24		48 hr. 40%	0	0	0	Continued to menstruate. No replacement needed
8	86	24			37·5	0·3	0	Dependent on cortisone
9	60	72			25	0	0	Insulin risen from 20 to 72 post-op. has persistent D.I.
10	32	?						Died 3 weeks after op.
11	168	124		48 hr. 44%	50·0	0	0	Dependent on cortisone
12	88	24	4 hr. 16%	4 hr. 16%	50	0	0	Acromegalic
13	70	50			50	0·2	50	Potent after testosterone
14	112	48			50	0·2	50	Dependent on cortisone. Potent after testosterone
15	Nil	Nil			37·5	0·1	0	Dependent on cortisone

Although no controlled trial of pituitary ablation for diabetic retinopathy has yet been published, it seems likely from the evidence available that ablation of the pituitary has a beneficial effect on the eye. The mechanism of this effect is quite unknown. That growth hormone may be important in diabetes has been suggested in many ways. Luft and Cerasi (1964) have produced diabetes and hyperinsulinism in patients with Simmonds's disease by giving growth hormone. The height of children measured within three months of the onset of diabetes was found to be greater than normal (White, 1959). Diabetic and pre-diabetic mothers tend to have big babies, and about 17% of acromegalics have diabetes (Coggeshall and Root, 1940). There is, however, no evidence that growth hormone is important in the production of diabetic retinopathy, and acromegalic diabetics do not have a greater incidence of diabetic retinopathy than do other diabetic patients (Ranke, 1959). Furthermore, acromegalics do not have the retinopathy in the absence of diabetes. A large proportion of diabetics treated by pituitary ablation have a fall in insulin requirement, and Lawrence *et al.* (1963) found a correlation between maximal fall and greatest improvement in retinopathy. This simple reduction in insulin requirement seems unlikely to explain any benefit to the eyes, as no correlation has been found between incidence or progression of diabetic retinopathy and insulin requirements in patients who have not had hypophysectomy (Wagener *et al.*, 1934 ; Spoont *et al.*, 1951 ; Keiding *et al.*, 1952 ; Skouby, 1956).

The most interesting case in the present series is the patient (Case 7) who has had minimal interference with pituitary function but a remarkable improvement in retinopathy. She has had the most dramatic cessation of retinal haemorrhages and no further deterioration in the visual acuity of her good eye. Since her operation for removal of the pituitary she has continued to menstruate, requires no cortisone or thyroxine replacement, and has a normal radioactive-iodine uptake by the thyroid gland, a normal excretion rate of hydroxycorticosteroids, and a normal response to metyrapone. The results of these tests and her good health in the absence of replacement hormones suggest that gonadotrophin, adrenocorticotrophin, and thyrotrophin secretions are adequate. However, her insulin requirement has been reduced by one-third, a change that could occur by reducing growth-hormone production. This raises the possibility that a reduction in growth-hormone secretion may be responsible for her improvement. No estimate has yet been made of her ability to produce this hormone. Joplin *et al.* (1962) were unable to correlate the degree of ablation with improvement in retinopathy. The present series, and in particular Case 7, confirms this conclusion.

Though the results of adrenalectomy in 18 patients (Malins, 1962 ; Graef and Maier, 1962) have been disappointing, there is evidence that suprarenal activity is abnormal in complicated diabetics. Becker (1952) found that in diabetics with renal lesions there was a high incidence of vacuolation of the zona fasciculata which was not found in other diabetics. Similarly there was an increase in the weight of the adrenal glands in complicated diabetics. Lentle and Thomas (1964), in a study of 15 diabetics, found abnormal suprarenal function in those with vascular and neurological complications. In the complicated cases plasma-steroid levels were higher and lacked diurnal variation, the excretion of 17-hydroxycorticosteroids was high and not suppressed normally by dexamethazone, and there was a greater than normal response to adrenocorticotrophic hormone and pyrogen. These changes were not found in the uncomplicated cases. Becker (1952) has also reported that during pregnancy two diabetic women developed retinopathy which later improved spontaneously, and that two patients being treated with adrenocorticotrophic hormone developed microaneurysms which regressed on cessation of treatment. It may be that the disappointing results with adrenalectomy were entirely due to the selection of patients, 12 of whom had retinitis proliferans and two being in renal failure pre-operatively.

Conclusion

We have been encouraged by our own experience of hypophysectomy and will continue to offer it to selected patients. The criteria we now consider necessary are that there should be a predominantly haemorrhagic retinopathy which is obviously threatening vision, that neither retinitis proliferans nor extensive retinal degeneration should affect both eyes, that renal failure is absent, and that the patient is intelligent and reliable enough to understand the implications of pituitary removal and to co-operate fully in taking replacement hormones.

Summary

Reports of 15 cases of diabetic retinopathy treated by transsphenoidal hypophysectomy are presented. Three of these patients have since died, one of them three weeks after operation. All the survivors have had a reduction in the number of retinal haemorrhages since hypophysectomy, and in four these have ceased. Neuropathy and renal disease showed no objective evidence of improvement. The criteria for selection of cases for hypophysectomy are stated and the literature is reviewed.

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