

# Retinal vein occlusion: long-term prospects 10 years' follow-up of 143 patients

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Between the years 1960 and 1965, 226 patients were referred to the Medical Ophthalmology Clinic of the Birmingham and Midland Eye Hospital with the diagnosis of retinal vein occlusion. The first 120 consecutive patients were reported upon in 1964 in a paper on the pathogenesis of the condition (Paton, Rubinstein, and Smith, 1964). It was then decided to review the patients in 10 years' time in order to assess their long-term prospects regarding life expectancy, further morbidity, late ocular changes, and visual prognosis.

### Clinical material

Of the 226 patients, 35 who were seen mainly in the final year of recruitment were excluded from our present study because of incomplete initial documentation, and 45 could not be traced: 18 moved away, 10 left the city because of redevelopment and demolition of their homes, 17 stopped responding to our letters, and two were retrospectively re-diagnosed as cases of retinal vasculitis. Of the remaining 143 patients, 93 were found alive and were re-examined, 50 had died and we were able to establish the cause of death in 29 of them. Of the 143 patients under review, 75 were men (52.5 per cent) and 68 women (47.5 per cent). Of the survivors, 47 were men and 46 were women. Of those who died 28 were men and 22 were women.

The mean age at the time of first visit was 56 years for men and 63 for women (Fig. 1). Raitta (1965) found that men tended to be affected one decade earlier than women, and while from our material this appeared to be so for the sixth decade, it was not otherwise a striking feature.

Altogether 73 right eyes were affected and 84 left eyes, an approximately equal distribution; both eyes were affected in 14 cases. The central retinal vein was affected in 80 eyes (five bilaterally), and a branch occlusion was seen in 77 eyes (six bilaterally). The number of eyes affected by central retinal vein occlusion was about equal to those affected by branch occlusion, similar to the findings of Foster Moore (1924) and Raitta (1965). The respective figures are 55 eyes with central and 48 eyes with branch occlusion for 93 survivors, and 25 eyes with central and 29 eyes with branch occlusion for the 50 who died.

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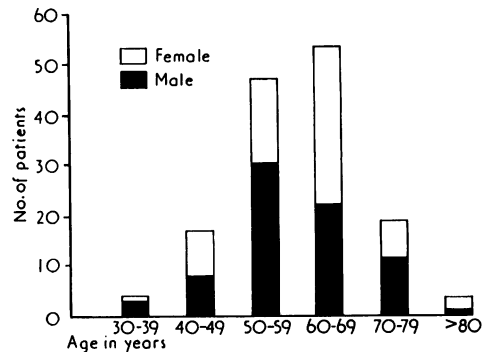


FIG. 1 *Age of patients at presentation*

There were 14 bilateral cases: in five patients the central vein was affected in both eyes, in six cases a branch was affected in each eye, but in three cases there was central vein occlusion in one eye and branch occlusion in the other (Table I). This finding throws some doubt on the concept of a different pathogenesis of these two conditions. There was no case of isolated nasal branch occlusion.

### CLINICAL PICTURE

All the patients presented with various grades of classical 'retinitis haemorrhagica', with haemorrhages, exudates, venous engorgement, and optic disc swelling. Arteriolar involvement and vitreous haemorrhages were more frequent in the patients who died than in those who survived, and this may be of prognostic interest (Table II).

### FOLLOW-UP

The mean duration of follow-up for the series was 9.8 years for the surviving group and 5.4 years for those

Table I *Bilateral involvement (14 patients)*

Central vein	—central vein	5
Central vein	—superior temporal vein	2
Central vein	—inferior temporal vein	1
Superior temporal	—superior temporal vein	4
Superior temporal	—inferior temporal vein	2

**Table II** Initial fundus (special features)

Survivors (93)	Percent-age	Dead (50)	Percent-age
Arteriolar involvement	11.1	4	8
Vitreous haemorrhage	22.2	4	8

who died (range 2 weeks to 13 years) (Fig. 2). Of those patients who survived, 19 had their final assessment during 1971-73. The remainder were examined in 1974.

**MORBIDITY**

Of the 93 patients reviewed, 83 had no significant complaints about their general health during the follow-up. Seven patients had had non-fatal cerebrovascular episodes and three had myocardial ischaemia. Only three (2.1 per cent) of the total series of 143 patients were affected by diabetes; one of them had suffered from the disease for many years before the vein occlusion.

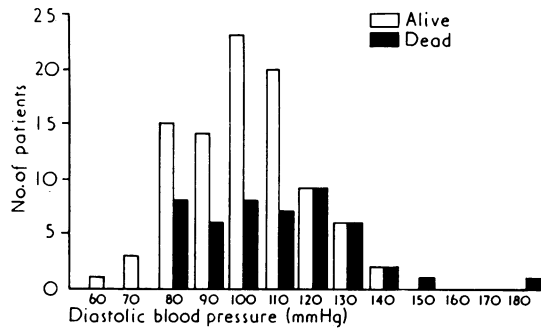
It has been stated (Gubner, 1962) that 20 per cent of the adult population is hypertensive (that is, the diastolic pressure is 100 mm Hg and over). Of the 50 patients who were now dead, 34 (68 per cent) were hypertensive on presentation, 19 (38 per cent) having diastolic pressures of more than 120 mm Hg. Even of the 93 patients who survived, 60 (64 per cent) were hypertensive, 17 (18 per cent) having a diastolic pressure of more than 120 mm Hg (Fig. 3).

**MORTALITY**

Just under half of the patients surveyed were found to have died (50); this mortality would be expected in the age group concerned (Registrar General's Statistics for England and Wales), but the causes of death are markedly different. Among 29 cases in which the cause of death was established, 23 (79.4 per cent) patients died of vascular disease and only six (20.6 per cent) of malignancy. This number of deaths from vascular disease—cerebral or cardiac—is about double the national figure and the number of deaths from malignant disease is proportionally lower (Table III).

**OCULAR CHANGES**

The final ophthalmoscopic fundus examination showed a variety of pathological changes, only 11 eyes showing



**FIG. 3** Initial blood pressure

regression to normal (fluorescein angiography was not performed at the final review) (Table IV). The striking finding was the high number of eyes affected by optic atrophy (39.8 per cent) and neovascularization of the optic disc (33.3 per cent) alone or accompanied by other fundus abnormalities. There was a high incidence of macular degeneration which could, however, be expected. Significantly, 15 unilaterally affected patients showed a well-established hypertensive retinopathy in the fellow eye.

Seven patients suffered from primary glaucoma: five were under treatment at the time of vein occlusion and two were diagnosed at the final re-examination having already developed glaucomatous cupping of the disc

**Table III** Cause of death in 29 patients documented

Cause	Men	Women	Total
Myocardial infarction	8	4	12
Cerebrovascular accident	3	5	8
Generalized arteriosclerosis	1	1	2
Renal disease	0	1	1
Malignant disease	2	4	6

**Table IV** Final fundus—abnormal findings (single or combined)

Normal	11
Optic disc atrophy	37
Optic disc neovascularization	31
Retinal neovascularization	21
Vascular involution	8
Retinal haemorrhage	8
Macular degeneration	33
Circinate retinopathy	2
Vitreous haemorrhage	11
Retinal detachment	1
Glaucoma (primary binocular)	7
Glaucoma (secondary unocular)	4
Diabetic retinopathy	3
Excision of eye	1

Years	2/52	6/12	1	2	3	4	5	6	7	8	9	10	11	12	13
Alive 93 patients								1	4	14	17	29	17	7	4
Dead 50 patients	1	1	4	6	4	3	7	4	4	6	7	3			

Mean follow-up time=9.8 years (live group)

**FIG. 2** Duration of follow-up

in both eyes. This contrasts oddly with two recent series: a 35 per cent incidence of glaucoma was reported by Raitta (1965) and 20 per cent was estimated by Reed and Drance (1972). There were also only four cases of thrombotic glaucoma, one eye requiring excision, an incidence of 4.3 per cent as compared with 12 per cent reported by Vannas (1961), 10–30 per cent as reported by Becker and Schaffer (1961) and 20 per cent as reported by Raitta (1965).

#### VISUAL ACUITY

The pattern of final visual acuity shows a significant dip in the moderate range 6/18–6/36; only 23 eyes (22.5 per cent) were in this range. Twice as many eyes, 42 (41.2 per cent) had 6/12 or better vision, and nearly twice as many eyes, 37 (36.3 per cent) had 6/60 vision or worse (Fig. 4).

Such an 'all or nothing' response can be found as a result of random severe insult to the eye—for example, as a consequence of injury by intraocular foreign body (Rubinstein, 1954). We found no difference in visual prognosis for the central as opposed to branch vein occlusions.

#### Conclusions

Our comments regarding the specific questions posed at the beginning of this review are as follows:

1. The life expectancy of patients with retinal venous occlusion is not shortened (when compared with statistics relating to similar age groups of population in the United Kingdom). When they die, however, the proportion of vascular cause of death—cardiac and cerebral—is about double.
2. The morbidity of patients affected by retinal

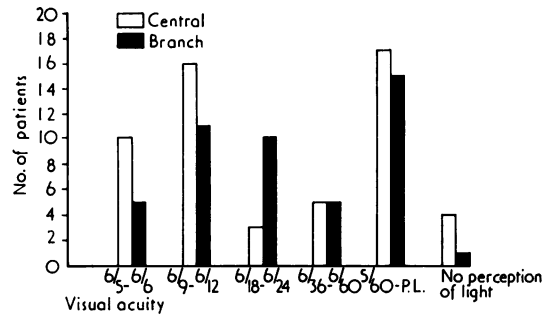


FIG. 4 Final visual acuity

venous occlusion is low, normal for their age group. It is worth noting that only three patients were diabetics. Hypertension is a crucial problem, and considered relevant to the condition.

3. The fundus shows finally, gross permanent changes in a high percentage of eyes; optic disc atrophy was found in two-fifths of patients, optic disc vascularization in one-third, and macular degeneration in one-third.
4. The visual prognosis is unpredictable. It mainly depends on the degree of the involvement of the macula and on the length of time that the macula is in a state of oedema. Two-fifths of the patients retained good visual acuity, but two-fifths fared very badly.

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#### References

- BECKER, B., and SCHAFFER, R. (1961) 'Diagnosis and Therapy of the Glaucomas'. Mosby, St Louis
- FOSTER MOORE, R. (1924) *Brit. J. Ophthalmol.*, Suppl. 2
- GUBNER, G. (1962) *Amer. J. Cardiol.*, **9**, 773
- PATON, A., RUBINSTEIN, K., and SMITH, V. H. (1964) *Trans. ophthal. Soc. U.K.*, **94**, 559
- RAITTA, C. (1965) 'Der Zentralvenen u Netzhautvenen'. Ver Schluss, Helsinki
- REED, H., and DRANCE, S. M. (1972) 'Essentials of Perimetry', 2nd ed., p. 93. Oxford University Press, London
- RUBINSTEIN, K. (1954) *Brit. J. Ophthalmol.*, **38**, 369
- VANNAS, S. (1961) *Acta ophthal. (Kbh.)*, **142**, 266