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Do Medical Conditions have an Influence on Central Retinal Vein Occlusions?

While the clinical features of central retinal vein occlusion (CRVO) are well known it has never been clearly established whether any medical conditions have a causative role to play or have an important influence on its final outcome.

In order to establish the role of associated medical conditions in the occurrence, evolution and visual end result of CRVO an unselected group of patients was studied and the results are reported in this paper.

Patients and Methods

During the years 1971–73 all patients with CRVO attending the casualty department of Moorfields Eye Hospital (104 patients) and King's College Hospital (12 patients) were referred for examination and were therefore unselected. The age and sex distribution of the patients is shown in Table 1. The majority of the patients were in the older age groups, but almost 10% (11 patients) were under the age of 40.

Table 1

Age and sex distribution of patients

Age	Males	Females	Total
Under 40	5	6	11
40–49	5	7	12
50–59	15	5	20
60–69	28	19	47
70 and over	13	13	26
Total	66	50	116

Seventy-six of the patients were examined by one of the authors (E M K) while the other 40 were seen by the physicians of Moorfields Eye Hospital and King's College Hospital.

The main emphasis of the medical examinations was to establish the presence or absence of medical conditions previously incriminated as being associated with CRVO. They include causes of high blood viscosity (though viscosity itself was not measured, but inferred from the other parameters studied), malignancy and arterial disease. Where possible the results were compared with population studies available.

Results

Conditions associated with high blood viscosity: It is well known that high values of packed cell volume (PCV) are associated with high viscosity. Hæmoglobin (Hb) concentrations reflect the PCV and the results obtained in the patients were compared with results of a population study carried out by Campbell *et al.* (1968) in Wales. Fig 1 shows that similar to the general population male patients with CRVO had higher Hb levels than female patients but contrary to expectation the levels for both sexes tended to be lower than in the general population. This difference was most marked in the age group 40–49, where 3 of the male patients suffered from peptic ulcer. Two with severe anæmia (Hb <9g/100 ml) were not previously known to suffer from this condition.

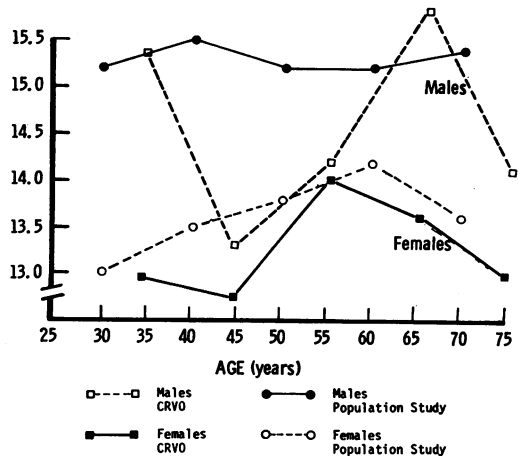


Fig 1 Hæmoglobin concentration by age and sex in patients with CRVO compared with the results of the population study of Campbell *et al.* (1968)

In a subgroup of 35 patients detailed studies of blood clotting showed no abnormality. None of the patients suffered from myeloma, cryoglobulinæmia or any of the paraproteinæmias causing increased blood viscosity. Minor abnormalities of serum proteins were present in 12 patients and included changes in α and γ globulins mainly. These results do not suggest that an increased blood viscosity can be incriminated in the causation of CRVO or affect its final outcome.

Malignancy: Previous work (Ellis *et al.* 1964) indicated that malignancy, especially that of the large bowel, was common in CRVO. In this group of patients only 4 had malignant disease, one of the large bowel, one of the kidney, one of the prostate and one of the breast. This is not an unusually high number, and thus malignancy does not seem to be of importance in CRVO.

Arterial disease: Various aspects of vascular disease were found commonly in patients with CRVO (Braendstrup 1950, Kohner 1964, Raitta 1965). It seemed to be essential to determine whether they were seen more commonly than in the general population and whether they affect the end result of the disease.

Diabetes (a condition associated with vascular disease) was only seen in 3 of the patients while 3 others had abnormalities of the glucose tolerance curve. Taking into account the age distribution of the patients there are probably no more diabetics among those with CRVO than in the general population.

Raised blood pressure is common in patients with retinal vein occlusion. Is it more common than in the population at large? Fig 2 compares the mean systolic and diastolic blood pressures in the group reported by Miall & Oldham (1958) in the Rhondda Fach and the Vale of Glamorgan. The striking feature is the close agreement of these results with those of Miall & Oldham, indicating that patients with CRVO do not differ greatly from those who do not have this disease. There was no correlation between blood pressure (systolic, diastolic or mean) and either initial or final visual acuity. However, the blood pressure was significantly higher in those whose final visual acuity was 6/60 or worse compared with those whose final visual acuity was better than 6/60 ($P < 0.01$). At first this appeared to be of importance. But the final visual acuity also appears to deteriorate with increasing age. While the

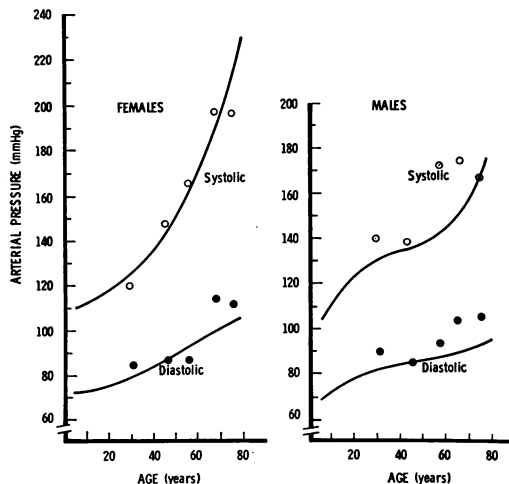


Fig 2 Blood pressure curves obtained from the study of Miall & Oldham (1958) with the results of the CRVO patients indicated by open circles for systolic and closed circles for diastolic pressures

Table 2

Serum cholesterol levels

	Total No.	Over 320 mg/100ml	Over 280 mg/100 ml
Men			
Population study	142	2	15
CRVO	54	4	12
		$P < 0.005$	$P < 0.05$
Women			
Population study	146	0	15
CRVO	48	4	11
		$P < 0.005$	$P < 0.05$

Table 3

Serum triglycerides levels

	Total No.	Over 200 mg/100 ml	Over 180 mg/100 ml	Over 150 mg/100 ml
Men				
Population study	142	17	21	31
CRVO	54	9	14	23
		$P < 0.05$	NS	$P < 0.01$
Women				
Population study	146	2	4	7
CRVO	40	4	7	11
		$P < 0.05$	$P < 0.01$	$P < 0.005$

mean of the final visual acuity of the 40–49 age group was 6/12, it rose to 6/36 in the 50–59 age group and to 6/60 in those over 70. Fig 2 indicates that blood pressure also increases with increasing age. From these preliminary studies (which are not sufficiently detailed) it is therefore not possible to appoint a unique role to blood pressure in the final visual result; age may be of greater significance.

Blood urea in these patients was not grossly different from the Welsh population studied by Campbell *et al.* (1968) except in the age group of 60–69 where both males and females with CRVO appear to have higher blood ureas. Again no correlation was found between blood urea and visual outcome. But it is of interest that three patients had renal failure indicating that chronic renal disease of a severe degree may well be associated with increased risk of thrombosis.

Serum uric acid levels as expected were higher in males than females at all ages except those 70 and over. There were however 23 patients, i.e. 1 in 5 whose uric acid was over 7 mg/100 ml, the upper limit of 'normal' for our laboratory. This upper limit may be an underestimation of that seen in the general population. No correlation was found between the level of serum uric acid and visual acuity. In this group uric acid also failed to correlate with blood urea or Hb and fasting lipid levels.

Finally, fasting serum cholesterol and triglycerides were studied in the patients. The

results were compared with the recent report by Lewis *et al.* (1974) who studied a North London population. The mean serum cholesterol levels were similar in patients with CRVO and the normal population while triglycerides tended to be higher in most age groups. Taking arbitrary cut-off points for both cholesterol and triglycerides at levels which are considered to be raised, it can be seen in Tables 2 and 3 that there are more patients with CRVO in these high-lipid groups than members of the population study. Since raised lipids are associated with vascular disease this finding may prove to be of importance, but further studies will be needed to determine their exact role.

Conclusion

In this group of 116 patients with CRVO no definite medical predisposing factor could be found, though the role of lipids has not been clearly defined. No medical or biochemical parameter studied could be related to the visual outcome. It is possible that multiple conditions in the medical background are of importance – and this will have to be studied in greater detail – but the role of local factors may be of much greater significance.

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 Lewis B, Chait A, Wootton I D P, Oakley C M, Krikler D M, Sigurdsson G, February A, Maurer B & Birkhead J (1974) *Lancet* i, 141
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The following paper was also read:

The Measurement of Choroidal Blood Flow Using Krypton 85

Dr T M Wilson

(*Tennent Department of Ophthalmology, University of Glasgow, Western Infirmary, Glasgow, G11 6NT*)

Meeting 13 December 1973

The following speakers contributed to a discussion on the subjects:

(1) Is Your Operating Microscope Really Necessary?

(2) With Reference to Placebo Therapy – ‘A Little of What You Fancy Does You Good’

Mr Dermot Pierse
 (*Croydon Eye Unit, Mayday Road, Croydon*)

Mr Peter Choyce
 (*Regional Eye Centre, Southend General Hospital, Essex*)

Mr Michael Gilkes
 (*Royal Sussex Eye Hospital, Brighton*)

Mr Peter Wright
 (*King's College Hospital and Moorfields Eye Hospital, London*)