

Original Research Article

Assessment of risk factors, central foveal thickness, visual acuity outcome and therapeutic approach in retinal vein occlusion patients of different age groups: a retrospective record based study

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ABSTRACT

Background: This study was conducted to investigate associated systemic diseases, other risk factors, visual prognosis, treatment approach and central foveal thickness in retinal vein occlusion patients of different age groups.

Methods: This single centre, retrospective record based hospital study included patients with retinal vein occlusion presenting to ophthalmic department. All the records of 30 patients were reviewed and data was abstracted and analysed. Initial and final clinical parameters e.g. visual acuity, central foveal thickness, age-group distribution, risk factors, therapeutic approach were analysed.

Results: Out of 30 patients, 19 patients were of age-group >50 years and 11 were <50 years. In present study, most common type of retinal vein occlusion (RVO) was ST- BRVO in both the groups. Most common association of RVO in group >50 years was hypertension (84%), and <50 years was hypertension (27.3%), raised lipid level (TG, cholesterol) (27%) and raised serum homocysteine. Patients with uncontrolled DM and hypertension (in our study, 2 patients) required multiple injections even after 4 months of follow-up. Age-group <50 years had better visual acuity and central foveal thickness at initial and final presentation. Raised serum homocysteine level associated with RVO in age-group <50 years (27.3%) versus age-group >50 years (5%).

Conclusions: Patients with good control of systemic disorders with RVO shows significantly improved (p value<0.05) visual acuity and central foveal thickness, in both the age-groups. Patients of age group >50 years were more associated with systemic disorder e.g., hypertension and DM. Patients of age group <50 years were more associated with medical condition e.g. hyperlipidemia, raised serum homocysteine. In present study, single patient in age-group <50 years was associated only with sudden and severe dehydration.

Keywords: RVO, Central foveal thickness, Serum homocystein, ST-BRVO

INTRODUCTION

Retinal vein occlusion (RVO) is the second most common retinal vascular disease after diabetic retinopathy with reported prevalence ranging between 0.7%- 1.6%. RVO is divided into two types i.e. branch retinal vein occlusion (BRVO) b) central retinal vein occlusion (CRVO).

BRVO is more common than CRVO (4 times). Occlusion of retinal venous system is more common than arterial occlusions. Systemic hypertension is the most common association and thrombus formation is most likely mechanism. RVO occlusions may occur in elderly (common) as well as in young individuals.¹ Depending upon size of the vessel and site of occlusion they have been categorised into CRVO, BRVO, tributary vein

occlusion, macular vein occlusion, hemi-retinal vein occlusion. Etiologically ocular risk factors- glaucoma, trauma, retinal vasculitis, central artery occlusion, arteriovenous malformation. Cardiovascular: atherosclerotic heart disease, arterial hypertension, diabetes mellitus, hyperlipidemia, obesity, smoking, carotid artery occlusive disease. Rheological abnormalities: increased haematocrit, increased plasma viscosity, red cell aggregation, thrombophilia: hyper-homocystinemia, antiphospholipid syndrome, increased activated protein C resistance, reduced plasminogen activator inhibitor, oral contraceptives. Hyperviscosity syndrome: polycythemia, macroglobulinemia, myeloma, leukemia.

Clinical features

RVO may be incidentally detected or the patient may present with features of sudden, rapid loss of vision (due to macular haemorrhage, vitreous haemorrhage). Patient can also present with gradual blurring of vision (macular oedema, macular ischemia). The ophthalmoscopic appearance is dependent on the severity of occlusion and size of the vessel involved. Common to all is dilatation and tortuosity of the vessels and intraretinal haemorrhages in the corresponding quadrant.² Rarely, cotton wool spots and arteriolar narrowing may be seen in severe occlusion. Optic disc oedema is a common feature in CRVO. The ischemic index is calculated based on the extent of capillary non-perfusion evident on FFA (>10 DA).³

Features on FFA in RVO

Delayed arteriovenous time in the involved segment, area of capillary non-perfusion, areas of blocked fluorescence (due to retinal haemorrhages), dilatation and tortuosity of involved vessels, collaterals, retinal and disc neovascularisation, macular oedema or ischemia.

Objectives were to investigate associated systemic diseases, other risk factors, visual prognosis, treatment approach and central foveal thickness in retinal vein occlusion patients of different age groups.

METHODS

It was a hospital record based retrospective study.

Patients attending ophthalmology department in Sir T. Hospital Bhavnagar with sudden/gradual loss of vision and on slit lamp biomicroscopy patient is having features of RVO. Sample size- 30 patients. Duration- each patient followed for 4 months (October 2018- February 2019) and data collected retrospectively.

Method

Measurement of visual acuity, intraocular pressure (IOP), gonioscopy, ocular examination. Patient was clinically examined by slit lamp biomicroscopy for dilated fundus

examination. Dilating drops used were tropicamide (0.8%) and phenylephrine (5%) eye drops. Optical coherence tomography examination (OCT) was done by Topcon machine. FFA was done in all patients.

Ocular examination

According to the patients' records, all the RVO patients had undergone clinical ophthalmological examination, including BCVA, measurement of IOP (Goldman applanation tonometry), slit lamp biomicroscopy examination and gonioscopy. Ocular involvement and treatment were also reviewed by studying the patients' records, fundus photographs, fluorescein angiograms and optical coherence tomography (OCT) scans, of the available data at the first presentation and at repeated follow up visits. The patients' first and most recent visits were designated as the initial and final study visits.

Systemic investigation

All the patients underwent screening for complete blood count (CBC), renal function test (RFT), serum electrolyte (Na⁺, K⁺), random blood sugar level (RBS), thrombophilic risk factors (BT, CT, PT-INR), analysis of homocysteine, lipid profile. The presence of systemic disease, blood pressure (BP), ECG reading was evaluated by general physician. The systemic examination included general physical examination. The medical history of the patient was thoroughly established, including alcohol intake, fasting, and intense exercise (to rule out dehydration) at the initial visit as well as clinical consultation with a general physician. Systemic hypertension, diabetes mellitus and hyperlipidemia were defined as pre-existing diseases for which patients were treated. The dehydration was confirmed if patient developed RVO following an episode of dehydration as a result of high alcohol intake or intense exercise without proper rehydration and if general medical, as well as analysis of thrombophilic profile (PT-INR, BT, CT) proved negative.

Fluorescein angiography

Intravenous bolus injection of fluorescein sodium solution (3 ml of 20% solution) was given when performing FFA and pictures were taken of central fundus and of the mid-periphery in all the four quadrants. The disc area (DA) was used as a reference area when evaluating the degree of ischemia.

Less than 10 DA of capillary dropout was considered in non-ischemic RVO (CRVO). FFA was performed in all patients.

Inclusion criteria

Patients who attended Ophthalmology department/ OPD, patients' age group was in between 20-65 years, clinically

(slit lamp biomicroscopy 90 D I/O) diagnosed as case of retinal vein occlusion (RVO) were included in this study.⁴

Exclusion criteria

Patients age less than 20 years and more than 65 years, known cases of glaucoma, patient having history of anti-glaucoma surgery, patient with high myopia, patients with other diseases of retina i.e. ARMD (CNVM), patients with renal dysfunction (RFT, serum electrolyte) were excluded.

Statistical analysis

It was hospital record based retrospective study. Data was analysed from the records that was available in hospital /departmental records. Analysis was done in the form of visual acuity, central foveal thickness (CFT) from the data of each visit.

RESULTS

Out of total 30 patients, 19 patients were of age-group >50 years and 11 patients were of age-group <50 years. In present study, most common type of retinal vein occlusion was supero-temporal BRVO in both the groups. Most common association of RVO in group >50 years was hypertension (84%). Most common association of

RVO in group <50 years was hypertension (27.3%), increased lipid level (TG, cholesterol) (27%) and raised serum homocysteine.

Patients with uncontrolled DM and hypertension (in present study, 2 patients) required multiple injections even after 4 months of follow-up. Age-group <50 years had better visual acuity and central foveal thickness at initial and final presentation. Raised serum homocysteine level commonly associated with RVO in age-group <50 years (27.3%) versus age-group >50 years (5%).

Hence, for the final outcome of RVO depends on risk factors, age, associated systemic diseases, medical conditions and their control and treatment. P value was less than 0.05 which is statistically significant means there is significant difference between initial and final V/A values.

Table 1 shows that out of total 11 patient most common was ST-BRVO followed by CRVO and IT-BRVO.

In more than 50 years group also most common was ST-BRVO followed by CRVO and the IT-BRVO (Table 2).

Table 3 shows final improvement in visual acuity and CFT was more in age group less than 50 years as compared to age group more than 50 years.⁷

Table 1: Diagnosis diseased eye in age less than 50 years- type of vein occlusion present in number and percent.

		Frequency	Percent	Valid percent	Cumulative percent
Valid	CRVO	4	36.4	36.4	36.4
	ST-BRVO	6	54.5	54.5	90.9
	IT-BRVO	1	9.1	9.1	100.0
	Total	11	100.0	100.0	

Table 2: Diagnosis diseased eye in age more than 50 years- type of vein occlusion present in number and percent.

		Frequency	Percent	Valid percent	Cumulative percent
Valid	CRVO	7	36.8	36.8	36.8
	ST-BRVO	8	42.1	42.1	78.9
	IT-BRVO	4	21.1	21.1	100.0
	Total	19	100.0	100.0	

Table 3: Group statistics-visual acuity and CFT at final in both age groups.

Age group		N	Mean	Std. deviation	Std. error mean
Age group 50	VA of diseased eye final (log MAR)				
	≤50 years	11	0.327	0.1954	0.0589
	>50 years	19	0.568	0.2001	0.0459
CFT diseased eye final	≤50 years	11	184.00	9.940	2.997
	>50 years	19	227.21	82.115	18.839

Table 5 shows out of 30 total participants, 19 having hypertension (64%) that is common in both age groups. Out of total 30 patients only 4 are having diabetes mellitus (13.3%).

According to Table 6, 36% patients associated with altered lipid profile. Table 7 shows 13.3% patients associated with raised homocysteine level. In 30 patients injection ANTI-VEGF given- 3 doses in 25 patients, 2 doses in 4 patients, no injection in 1 patient (Table 8).⁸

Table 4: Comparison of incidence of type of vein occlusion in both age group.

		Age group (in years)		Total	
		≤50	>50		
Diagnosis diseased eye	CRVO	Count	4	7	11
		% within age group 50	36.4	36.8	36.7
	ST-BRVO	Count	6	8	14
		% within age group 50	54.5	42.1	46.7
	IT-BRVO	Count	1	4	5
		% within age group 50	9.1	21.1	16.7
Total	Count	11	19	30	
	% within age group 50	100.0%	100.0	100.0	

Table 5: Association of hypertension and DM.

	Hypertension	Frequency	Percentage	Valid percent	Cumulative percent
Valid	Yes	19	63.3	63.3	63.3
	No	11	36.7	36.7	100.0
	Total	30	100.0	100.0	
Valid	DM				
	Yes	4	13.3	13.3	13.3
	No	26	86.7	86.7	100.0
	Total	30	100.0	100.0	

Table 6: Lipid profile (triglycerides, cholesterol).

		Frequency	Percentage	Valid percent	Cumulative percent
Valid	Raised	11	36.7	36.7	36.7
	WNL	19	63.3	63.3	100.0
	Total	30	100.0	100.0	

Table 7: Serum homocysteine.

		Frequency	Percentage	Valid percent	Cumulative percent
Valid	Raised	4	13.3	13.3	13.3
	WNL	26	86.7	86.7	100.0
	Total	30	100.0	100.0	

Table 8: ANTI-VEGF (Ranibizumab).

		Frequency	Percentage	Valid percent	Cumulative percent
Valid	0	1	3.3	3.3	3.3
	2	4	13.3	13.3	16.7
	3	25	83.3	83.3	100.0
	Total	30	100.0	100.0	

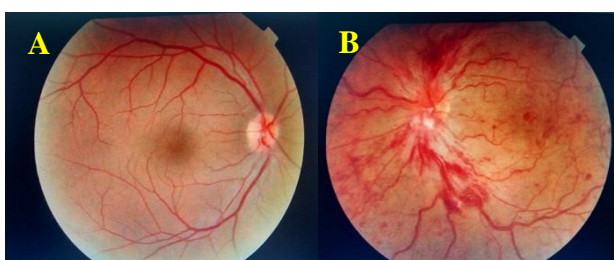


Figure 1: Dilated tortuous vein, superficial, flame shaped haemorrhages, macular haemorrhage, edema, disc edema, dot haemorrhages (A) RE-normal, (B) LE CRVO.

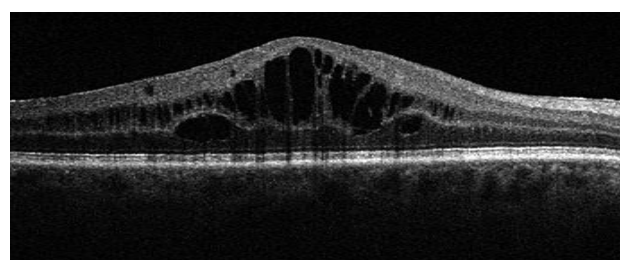


Figure 2: Normal vitreomacular interface, loss of normal foveal contour, cystoid macular edema with few schitic spaces central macular thickness- 495µm sign of CRVO.

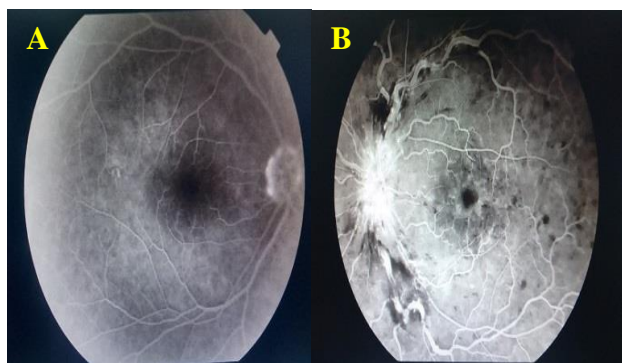


Figure 3: FFA images; (A) normal RE, (B) LE- showing dilated tortuous veins showing hyperfluorescence, disc leakage, CNP areas.

DISCUSSION

Retinal vein occlusion (RVO) is the second most common retinal vascular disease after diabetic retinopathy with reported prevalence ranging between 0.7%-1.6%. In present study, out of total 30 patients, 19 patients were of age-group >50 years and 11 patients were of age-group <50 years. In eye disease control study of the Royal college of Ophthalmology also RVO is common in age group more than 55 years.

In present study, most common type of retinal vein occlusion was supero-temporal BRVO in both the groups. Most common association of RVO in group >50 years was hypertension (84%). According to eye disease control study the association of hypertension is 65%.

Most common association of RVO in group <50 years was hypertension (27.3%), increased lipid level (TG, cholesterol) (27%) and raised serum homocysteine. Patients with uncontrolled DM and hypertension (in present study, 2 patients) required multiple injections even after 4 months of follow-up. Age-group <50 years had better visual acuity and central foveal thickness at initial and final presentation. Raised serum homocysteine level commonly associated with RVO in age-group <50 years (27.3%) versus age-group >50 years (5%).

Hence, for the final outcome of RVO depends on risk factors, age, associated systemic diseases, medical conditions and their control and treatment.⁵ Prevalence of retinal vein occlusion increases as age increases. Patients with good control of systemic disorders with RVO shows significantly improved (p value<0.05) visual acuity and central foveal thickness, in both the age-groups.⁶

Patients of age group >50 years were more associated with systemic disorder e.g. hypertension and DM. Patients of age group <50 years were more associated with medical condition e.g. hyperlipidemia, raised serum homocysteine. In present study, single patient in age-group <50 years was associated only with sudden and severe dehydration.

CONCLUSION

Prevalence of retinal vein occlusion increases as age increases. Patients with good control of systemic disorders with RVO shows significantly improved (p value<0.05) visual acuity and central foveal thickness, in both the age-groups. Patients of age group >50 years were more associated with systemic disorder e.g. hypertension and DM.

Patients of age group <50 years were more associated with medical condition e.g. hyperlipidemia, raised serum homocysteine. In present study, single patient in age-group <50 years was associated only with sudden and severe dehydration.

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