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RESEARCH ARTICLE

TO STUDY RISK FACTORS AND CLINICAL PROFILE OF BRVO AT A TERTIARY CARE CENTRE

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Abstract

Introduction: After diabetic retinopathy, retinal vein occlusion is the second most prevalent retinal vascular condition. BRVO is brought on by blockage of the retina's branch vein, which affects a specific quadrant. The patient will have venous dilatation within the affected sector, superficial and deep retinal hemorrhages, and either macular or retinal edema during ophthalmoscopic examination. Age and systemic vascular diseases are the most well-known risk factors for BRVO.

Materials and Methods: Prospective observational study was done for 1 year. Patients more than 25 years of age attending ophthalmology OPD found to have BRVO were evaluated for various risk factors and other clinical findings after taking proper consent.

Results: In this Study 24 patients of more than 25 years of age found to have BRVO out of which 14 were male and 10 were female. 15 cases (62.5%) having hypertension, 5 case (20.8 %) having diabetes, 4(16.6%) were smokers, 9 (37.5%) were having altered lipid profile, 2 (8.33%) were alcoholics.

Conclusion: Modern tools and technology make it simple to diagnose and treat branch retinal vein occlusion. Be cautious of the four Hs: increased age, hypertension, hyperlipidemia, and homocysteinemia. This multifactorial disease affects the eyes of a person with hypertension and other risk factors including aging.

Introduction:-

After diabetic retinopathy, retinal vein occlusion (RVO) is the second most prevalent retinal vascular condition. There are three types of retinal vein occlusions: branch (BRVO), hemi (HRVO), and central (CRVO). More people have BRVO than CRVO. A branch of the retinal vein system is occluded in BRVO, whereas the central retinal vein is occluded in CRVO [1, 2]. An HRVO is a subtype of either CRVO or BRVO that is caused by occlusions in the proximal portion of the central retinal vein trunk.

The inner retina is supplied by retinal vessels, while the outer retina, which extend to the outside portion of the inner nuclear layer, is supplied by choroidal vessels.

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There is still much to learn about its etiology. Virchow's triad, which consists of three systemic alterations, could be the cause of the condition: (1) hemodynamic alterations (venous stasis), (2) vessel wall degeneration, and (3) blood hypercoagulability [3].
The primary cause of visual loss in BRVO is macular edema. In the context of BRVO, retinal epithelial cells, endothelial cells, and Müller cells create excess VEGF, which causes vascular permeability and causes macular edema.[4]

Classification:
There are two types of BRVO: macular BRVO and major BRVO.Occlusion of a retinal vein draining one of the quadrants is referred to be major BRVO. Occlusion of a venule inside the macula is known as macular BRVO.

Superotemporal quadrants have the highest incidence of BRVO (58.1-66%), followed by inferotemporal quadrants (29%), and nasal quadrants (12.9%).[5,6] It is believed that more arteriovenous crossings in the superotemporal quadrant are the cause of the elevated incidence in that quadrant.

Purpose:
This research article presents risk factors and clinical profile of BRVO through a prospective study of 24 patients presented in department of ophthalmology at M.L.B. Medical College Jhansi between November 2023 to November 2024.

Materials and Methods:-
It is a prospective observational study carried out at tertiary care centre for period of 1 year.

It was performed under the Helsinki Declaration of 1975, as revised in 2000. The necessary permission from the Ethical and Research Committee was obtained for the study.

Inclusion Criteria:
All the patients of 25 years of age and older having BRVO. Those giving consent to enroll in study.

Exclusion Criteria:
1. Subjects having proliferative diabetic retinopathy with vitreous haemorrhage.
2. Subjects having corneal opacity and mature cataract
3. Eyes with HRVO (hemi retinal vein occlusion) or CRVO

All patients were subjected to a detailed history taking and complete ophthalmic examination including fundus examination and OCT imaging.

Results:-
A total of 24 patients were studied.
Among the patients 58.33% (n= 14) were male and 41.66% (n=10) were female. {table 1}
Table 1:- Gender Distribution.

Gender	No. of patients (percentage)
Male	14 (58.33%)
Female	10 (41.66%)

Table 2:- Age Distribution.

Age	**Male**	**Female**
25-40	1	0
41-50	3	2
51-60	4	3
61-70	6	4
>71	0	1

The affected patients mostly belong to the age group of 61-70 years (n= 10) followed by age group of 51-60 years (n= 7). [table 2]

Table 3:- Systemic conditions associated with BRVO cases (Risk Factors).

Systemic condition	No. of cases	Percentage
Hypertension	15	62.5%
Diabetes	5	20.8%
Smokers	4	16.6%
Alcoholics	2	8.33%
Altered lipid profile	9	37.5%

Most common systemic association was found to be hypertension. Mostly all these systemic conditions were causing BRVO in a combination.

Table 4:- Analysis of risk factors (N=24).

Disease	Single disease	In combinations
Hypertension	5 (20.83%)	10 (42.1%)
Diabetes	1(4.17%)	4 (16.66%)
Smoking	1(4.17%)	3 (12.5%)
Alcohol	0	2 (8.33%)
Lipid	2(8.33%)	7 (29.16%)

Most patients have multifactorial risk of BRVO.

Discussion:-

Vascular stiffness that results in venous compression in the common adventitial sheath is the primary pathogenic mechanism for the development of BRVO.

The sixth decade is the average age of the patients at the time of occurrence. It is commonly known that the second eye might become involved after a single episode of BRVO.

According to Tewari et al, hypertension is the most frequent risk factor for BRVO, with up to 50% of cases happening in those who already have high blood pressure. [7]

People with a history of systemic hypertension, glaucoma, elevated body mass index, and elevated serum levels of α2-globulin are at a higher risk of developing BRVO [8] while those who consume more alcohol and have higher serum levels of high-density lipoprotein have a lower risk of BRVO.

Diabetes mellitus has not been identified as a significant independent risk factor, in contrast to central retinal vein occlusion [9]

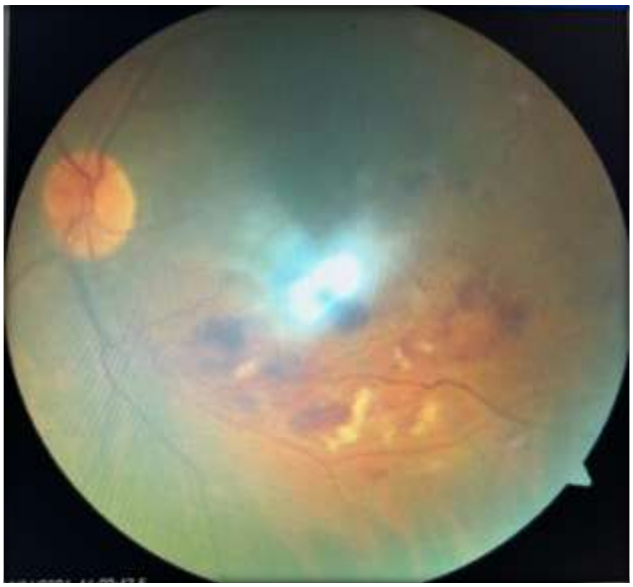
Eyes with shorter axial lengths have a higher risk of BRVO. [10]

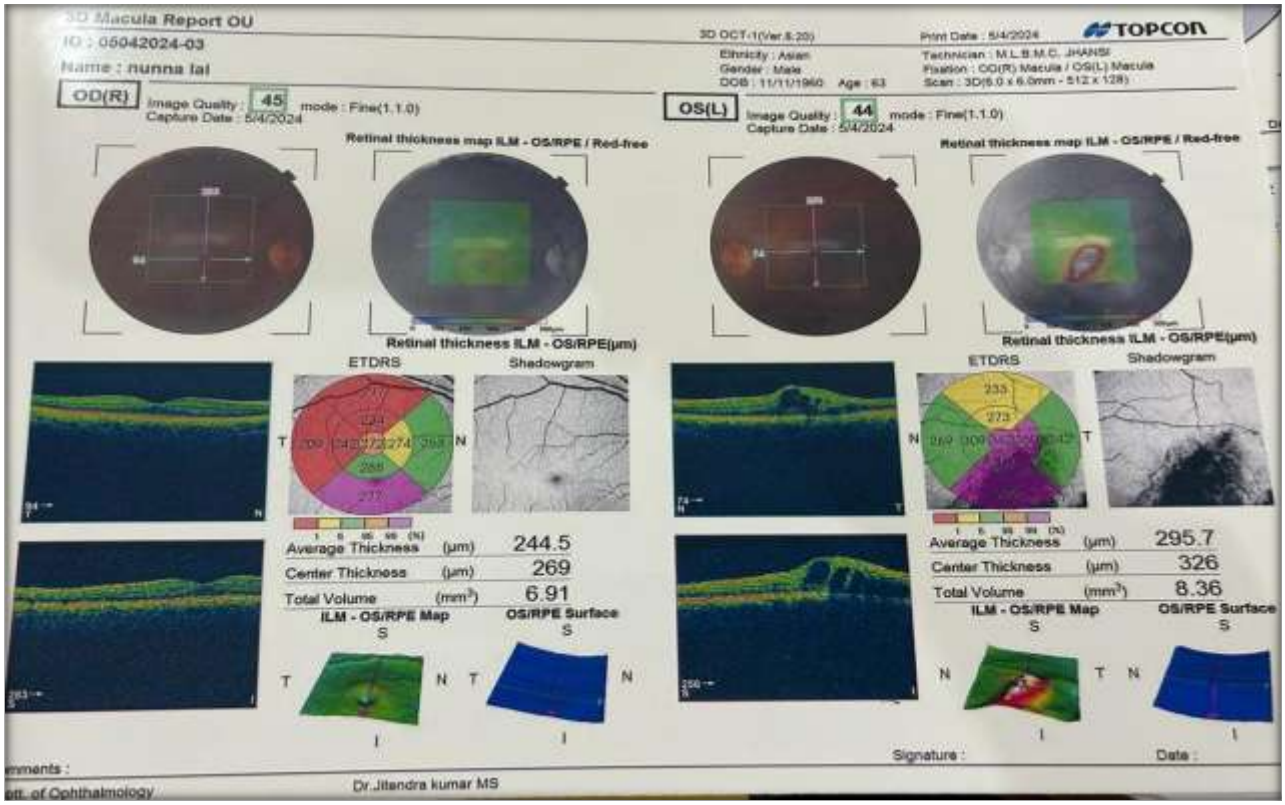
Waldenstrom's macroglobulinemia and anticardiolipin syndrome are two clotting function abnormalities that can occasionally result in BRVO.[11]

Clinical Profile:

Major BRVO often affects the sector of the visual field that corresponds to the affected portion of the retina. It can however be asymptomatic or cause visual blurring. Normal peripheral vision always coexists with a central visual disturbance in macular BRVO.

A typical funduscopic examination includes dilated tortuous veins, cotton wool spots, hard exudates, retinal edema, flame hemorrhages, and dot and blot hemorrhages. In a traditional BRVO, intraretinal bleeding is distributed in a wedge shape and is more widespread if the occlusion is ischemic.While patients with major BRVO present with a peripheral field defect corresponding to the damaged retinal quadrant, individuals with macular BRVO present with a central field defect. Intraretinal hemorrhages in patients with chronic BRVO are absorbed, and as a result, retinal vascular anomalies arise in the BRVO distribution. Capillary nonperfusion, collateral development, microaneuryms, sclerosed veins, and telangiectatic vasculature are among the alterations that follow.





What causes BRVO's visual decline?
Macular edema
Macular ischemia
Hemorrhage over the fovea
Neovascularization of the retina or the optic disc resulting in vitreous hemorrhage
Vitreomacular traction /epitretinal membrane
Combination of tractional and rhegmatogenous retinal detachment/rhegmatogenous retinal detachment/tractional retinal detachment

Clinical examination under a slit light and fundoscopy in artificial mydriasis are the basis for the diagnosis. For the visual forecast of the future, VA is crucial. Retinal non-perfusion zones in the occlusion region are frequently caused by BRVO. [12]

Diagnostic Procedures:

Fluorescein angiography (FA)

The degree of nonperfusion, macular ischemia, macular edema, and leakage in patients with BRVO can all be described using FA.Delays in filling the blocked retinal vein with varied levels of capillary nonperfusion are the hallmark FA for BRVO.

Optical coherence tomography (OCT)

Cystoid macular edema, intraretinal hyperreflectivity from hemorrhages, shadowing from edema and hemorrhages, and occasionally subretinal fluid are characteristics of BRVO on OCT . Intraretinal hemorrhages have less of an impact on OCT pictures than FA. The intersection of photoreceptors' inner and outer segments (IS and OS) is represented by the third high reflectance band. For visual acuity, this band—also known as the ellipsoid zone—has predictive relevance. Poor visual acuity is correlated with disruption or disappearance of the ellipsoid zone following macular edema resolution, which is a sign of photoreceptor cell death or disarray .[13]

Treatment :

The goal of BRVO treatment is to address the issues that lead to vision loss, such as neovascularization, macular ischemia, and macular edema.

BRVO cannot be prevented or managed with anticoagulant medication. Anticoagulants may exacerbate intraretinal hemorrhage that occurs during the acute phase since they are linked to systemic problems. Anticoagulant medication is therefore not advised. [14]

Laser Photocoagulation:

The two main adverse effects of BRVO are chronic macular edema in eyes with intact perifoveal retinal capillary perfusion and infrequently, iris neovascularization. Photocoagulation therapy, which involves applying a laser to the fundus, is taken into consideration for both conditions. If the perifoveal retinal capillaries are intact, photocoagulation for macular edema associated with BRVO is typically helpful in eyes with vision in the 20/40 to 20/200 range. Compared to untreated eyes (37%), treated eyes have a higher chance of gaining two lines of visual acuity (65%). [15]

Throughout a leaking area, laser photocoagulation is administered in a grid pattern; however, it does not extend beyond the major vascular arcades peripherally or to the margin of the capillary-free zone. Grid lasers should have a duration of 0.1 seconds, a spot size of 100 µm in diameter, and enough power to create a medium-white burn.

Steroid Treatment

The largest trial comparing the safety and effectiveness of intravitreal triamcinolone against grid laser in the treatment of macular edema is the SCORE-BRVO study. [16]

Intravitreal triamcinolone is not advised as a first-line treatment for macular edema brought on by BRVO, according to the study's findings. It is used as a second-line treatment or as an adjuvant to laser or anti-VEGF medicines.

The GENEVA research tested Ozurdex, a dexamethasone implant, for macular edema in CRVO and BRVO patients. A 22-gauge custom injector is used to administer the implant, which releases dexamethasone gradually over a period of one to three months, peaking at sixty days.
The use of a sham treatment in the control group instead of laser treatment limits the study.[17]

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