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Original Research Paper

Ophthalmology

HYPERHOMOCYSTEINEMIA LEADING TO IMPENDING CRVO: A CASE REPORT

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ABSTRACT We are reporting a case of unilateral impending CRVO in a 29 year old prisoner withno associated systemic risk factors.Laboratory tests including complete coagulation profile and thrombotic workup was found to be negative, except raised homocysteine level (49.9micromol/L). The patient was given vitamin supplements for hyperhomocysteinemia because Vitamin B12 and folic acid deficiency can lead to elevated levels of homocysteine. On review of literature hyperhomocysteinemia has been reported to be an important risk factor for CRVO in young patients and vitamin supplements help in quick recovery and preventing recurrence too.

KEYWORDS :- Venous occlusion, Homocysteine, Vitamin, Malnutrition.

INTRODUCTION

Retinal venous occlusion is second most common retinal vasculopathy causing blindness after diabetic retinopathy.The incidence of retinal vein occlusion varies in populationbased studies from 2 per thousand to 8 per thousandpersons. It typically affects old individuals (>65 year) with associated systemic risk factors such as hypertension, diabetes mellitus, open angle glaucoma, tilted optic nerve head, optic nerve head drusen etc.1Retinal vein occlusion is uncommon in young adults, under 40 years of age and occurs due to unusual causes such ashyperviscosity syndrome, collagen vascular disease, oral contraceptive pills, isotretinoin and malignant hypertension.2-5Hyperlipidemia and hyperhomocysteinemia are found to be significant risk factors for retinal vein occlusion in young adults.6-8When a young patient develops a central retinalvein occlusion, it is important to look for other unusual causes and obtain a detailed nutritionalhistory as Vitamin B12 and folic acid deficiency can lead to hyperhomocysteinemia.

CASE REPORT

A 29 year old presented with the complaint ofsudden onset of diminution of vision in his left eye for 5 days. There was no pain, redness and discharge. Thepatient had no previous systemic or ocular medical historyand did not use any medication.His best corrected VA was 6/6 OD and 6/9 OS. Hiscorrected intraocular pressure was 16 mm Hg OD and 18 mm Hg OS by Goldmann'sApplanation Tonometer (GAT). The range of ocular movements was full, and there was norelative afferent pupillary defect (RAPD). In both eyes, the anteriorsegments were normal. Fundus examination of right eye was essentially normal (Figure 1) however the left eye showed hyperemic disc with tortuous and dilated retinal vessels with numerous retinalhemorrhagesall over the fundus, more so in the periphery (Figure 2&3). ÓCT showed normal central macular thickness (CMT) with normal foveal contour in the both eyes. Hewas diagnosed withIImpending CRVO of young in the left eye.

The workup included a complete hemogram with hemoglobin of 9.4g/dl, MCV of 120 fl, TLC- 7400 mg/dl and platelet count- 1.8 lakhs/cumm. Lipid profile and coagulation tests were essentially normal. . Blood film showed a megaloblastic anaemia with nucleated red cells, macrocytosis and hypersegmented neutrophils. Absolute reticulocyte count was not raisedThe erythrocyte sedimentation rate (ESR) was normal (18 mm/h). Patient was found to be negative for serum rheumatic factor, serum antinuclearantibodies (ANA) and serum antineutrophil cytoplasmicantibodies (ANCA) . Serum homocysteine level was 49.9 μ mol/L,which was significantly higher than thenormal range of 6-15 μ mol/L. As patient was a prisoner and keeping malnutrition in point, serum Vitamin B12 and folate levels were ordered which were found to be significantly low (Serum folate: 1ng/ml, Vitamin B12: 54pg/ml).

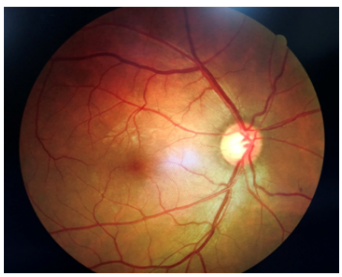

Figure 1: Fundus photo ofthe Right Eye

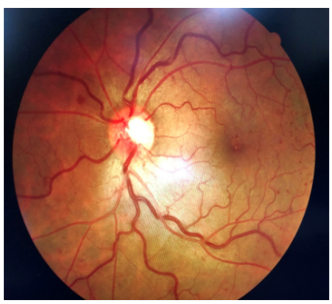

Figure 2: Fundus photo of Left Eye showing Hyperemic Disc with tortuous vessels with few doand blothemorrhages over post pole

Figure 3: Fundus photo of Left Eye showing multiple hemorrhages in peripheral retina

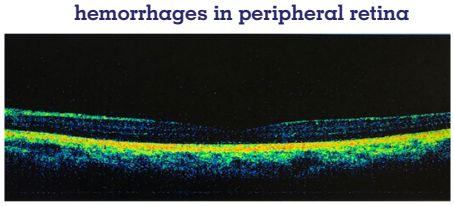

Figure 4: OCT picture of Left Eye

Oral multivitamins were given to the patient to control serum homocysteine level. Visual acuity improved to 6/6 at 2 month follow-up and thehomocysteine level also returned to normal i.e. 13 μ mol/L.The retinal haemorrhages also reduced significantly. IOP was 16mm Hg by GAT and there was no evidence of NVI/NVE/NVA.

DISCUSSION

CRVO is increasingly being recognized in younger patientsand elevated serum homocysteine is a potential risk factor forthe disease. Mild to moderate elevation of plasma Hcys(homocysteine) is reportedas a risk factor for atherosclerosis in the coronary, cerebral,and retinal vasculature.9The cause of HHcys(hyperhomocysteinemia) is varied. Severe HHcys is due torare genetic defects resulting in deficiencies of the enzymescystathionine b-synthase (CBS) and methyltetrahydrofolatereductase (MTHR). Mild HHcys is due to impairment in theenzymes in a transmethylation pathway associated with orwithout nutritional deficiencies such as B12 and folate.All circulating Hcys is primarily derived from dietarymethionine, which acts as a methyl group donor in the formof S-adenosyl methionine. On donating the methyl group itforms S-adenosylHcys which is then converted to Hcys.Hcys is a sulfur-containing nonprotein amino acid that iseither metabolized to cystathionine by the transsulfurationpathway, requiring B6, or it is converted back to methionineby B12 and folate, requiring transmethylation.10

The possibility of direct cytotoxic effect of Hcys and Hcysthiolactone in the retinal vascular endothelial cells has alsobeen reported in a case report by Polosheket al.11 There are various mechanisms reported regardingendothelial dysfunction by homocysteine. These include decreased bioavailability of nitric oxide, altered expression ofvarious thrombotic factors, mitogenic effect on arterialsmooth muscle cells12 and expression of acute stress- relatedgenes.13. Albumin, fibronectin, transthyretin,annexin II, and factor V have now been identified as molecular targets for Hcys.14 Metabolic conversion ofHcys to a chemically reactive metabolite, Hcys-thiolactoneis suggested to contribute to Hcys toxicity in humans(Hcys-thiolactone hypothesis) leading to endothelialdysfunction.15

There have been a few reports of CRVO with elevated plasmahomocysteine. De Bruijne et al describeda high prevalence of hyperhomocysteinemia in a seriesof 22 patients with venous occlusive disease. Fourteenpatients had an elevated plasma homocysteine, either fasting or following methionine loading.16 Similarly,Moghimi et alfound significantly elevated homocysteine in acute CRVOin the Iranian population compared to controls (p=0.005),supporting the necessity of screening.17

An inverse relation is reported between both redcellfolate and serum vitamin B12 levels withhyperhomocysteinemia.18-20 Folic acid administered alone orwith pyridoxine, even to subjects without folate deficiency,can reduce homocysteine concentrations.21 Homocysteine Lowering Trialist's Collaboration also demonstrated the role of 6 week intake of folate and B12 0.5 mg each, in reducingplasma homocysteine by 25% and 7%, respectively.22.23 Thus,it is assumed that by reducing their levels, we can shortenthe course of CRVO with complete resolution and can alsoprevent further vascular morbidities.

Our case thus illustrates an interesting presentation of unilateral impending CRVO in a young prisoner, wherehyperhomocystenemia was found to be the only risk factor. Hyperhomocysteinemia in this patient was secondary to Vitamin B12 and folate deficiency. Our case also highlights tip of iceberg of malnutrition in prisoners which can lead to significant morbidity. Treatment of hyperhomocysteinemia with multivitamins resulted in an excellent outcome.

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