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Research Article

Interference of Independent Risk Factors Important Integral Part of Ocular Blood Perfusion in Latent Glaucoma and Efficient Treatment

Edward Ath. Skoufis*, Nikolaos Michalopoulos and Nikolaos Varvagiannis

Ophthalmology Department, Diagnostic and Therapeutic center of Athens "Hygeia", Greece

***Corresponding Author**: Edward Ath. Skoufis, Ophthalmology Department, Diagnostic and Therapeutic center of Athens "Hygeia", Greece.

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Abstract

Purpose: To investigate the relation between vascular dysregulation, lifestyle and ocular blood perfusion in glaucoma, focusing on the individual risk factors.

Method: In retrospective meta-analysis included 96 consecutive patients, mean age 59,8 ± 8,7, mean baseline IOP 24,1 ± 2,3 mmHg in follow up, 2008 – 2010, divided in: Control Group 31 patients with POAG, without evident vascular disorders and Vascular Dysregulation Group 65 patient, 52 with POAG, 13 PPG. VDRG classified in two subgroups: VDRG1: 22 patients with extra ocular vascular disorders. VDRG2: 43 patients with extra ocular vascular disorders and "uncontrollable lifestyle". A baseline glaucoma examination performed.

Results: OBF reduced from CG to VDRG1 26,4%, VD2G2 35,2% and OPP decreased respectively 30,1%, 35,9%, reflected further reduction in MD -3,65 ± 3,2dB. OBF displayed a strong correlation with OPP and MD (r = 0, 461, p = 0, 0089), P < 0.01. PA was variable showed a significant association with OPP (R2 = 0, 06, p = 0,0009) in contrast to CCT (p = 0,652). Our therapy reconfirmed that: DORZOLAMIDE TIMOLOL PF and LATANORPOST reached a target IOP reduction 30,5% from baseline with significantly OBF improved 34,5% and OPP increased 27,6%. With added therapy NILVADIPIN 60mgr, GINKGO BILOBA 150mgr, VISIONACE PLUS, had a further improved 3, 7% (P < 0,01). It was benefit of lifestyle: aerobic exercise, healthful diet and psychoanalysis.

Conclusions: The polymorphism of the vascular factor and lifestyle require an interdisciplinary approach and careful observation. The medical treatment strategy must be adhered to the individual risk factors. We have to play an active role in patients' lifestyle education and individual risk factors modifiable.

Keywords: *Vascular Dysregulation; Ocular Blood Perfusion; Ocular Blood Flow; Ocular Vascular Disorders; Lifestyle; Neuroprotection; Capable Treatment*

Abbreviations

VDR: Vascular Dysregulation; VDRG: Vascular Dysregulation Group; CG: Control Group; OBP: Ocular Blood Perfusion; OBFA: Ocular Blood Flow Analyser; PA: Pulse Amplitude, OPP: Ocular Perfusion Pressure; POAG: Primary Open-Angle Glaucoma; PPG: Preperimetric Glaucoma, RNFL: Retinal Nerve Fibre Layer; SAS: Sleep Apnea Syndrome

Introduction

The glaucoma updates challenged the misconception that "glaucoma is well- defined condition "suggested a new therapeutics concepts [1]. Investigations of vascular theory in Glaucoma etiology [2-4], changed the treatment strategy. Multiple independent risk factors have been shown to be responsible for glaucoma progress.

Purpose

To investigate the relation between vascular dysregulation (VDR), extrinsic risk factors- "spice" lifestyle and ocular blood perfusion (OBP) in glaucoma, focusing on the individual risk factors, evaluating the treatment efficiency.

Method

In retrospective meta-analysis, in a prospective, randomized, crossover study included 96 consecutive patients, mean age 59,8 ± 8,7, mean baseline IOP 24,1 ± 2,3 mmHg, in follow up 2010 – 2015, divided in: a-Control Group (CG) 31 patients with POAG, without evident vascular disorders and vascular dysregulation, b- Vascular dysregulation group (VDRG) 65 patients, 52 with POAG, 13 with pre-perimetric glaucoma (PPG). We detected first time glaucoma in a specific number of internal patients with vascular disorders, interfered with vascular dysregulation: Systemic hypertension (with nocturnal dips) and myocardial infarction 18, cerebral ischemia + transient ischemic attack (TIA)15, anemia and hemodynamic crisis 10, sleep apnea syndrome (SAS) 9, migraine and hypotension 7, M. Raynaud and Vasospastic syndrome 6. The exclusion criteria: No myopia and hyperopia > 4.0 D, no previous ocular surgery.

VDRG classified in two subgroups: VDRG1: 22 patients with extra ocular vascular disorders.

VDRG2: 43 patients with extra ocular vascular disorders and "uncontrollable lifestyle": distressed personality, obesity, malnutrition, no fitness, sedentary life, sleepless, smoking, alcohol and caffeine consumption. A baseline glaucoma examination performed, included pulsatile monitoring ocular blood flow analyzer (OBFA) and PA (PARADIGM), ocular perfusion pressure (OPP) calculated according to the formula, OCT-SLO (OTI), SAP-HUMPHREY, CCT and interdisciplinary cooperation. The ROC were between 0,610 - 0,660, in SAP MD – 5,75 ± 4,30dB. The hemodynamics parameters and IOP were assessed in all patients at baseline. Results were statistical evaluated using T-test and linear regressions.

Results

Our outcomes suggest that OBF reduced from CG to VDRG1 26,4%, VD2G2 35,2% and OPP decreased respectively 30,1%, 35,9%, reflected further reduction in MD -3,65 ± 3,2dB OBF displayed a strong correlation with OPP and MD (r = 0, 461, p = 0, 0089), P < 0.01. PA was variable showed a significant association with OPP (R2 = 0, 06, p = 0, 0009) in contrast to CCT (p = 0,652). A high correlation observed between PA, MD and inferior RNFL quadrant thickness (r = 0,590, p = 0, 0088), P < 0,01. At the VDRG2 identified further reduction to OBF – 8, 9%, PA – 10, 1%, OPP – 5, 6% compared to VD2G1 (P < 0,05). The OBF and OPP fluctuation, incorporated in glaucoma management, expressed the defective autoregulation. We observed interaction reflected between risk factors (P < 0,01). The OCT and OBF analyzer indicated true structural changes preceding the appearance of functional changes [5,6]. Our selective therapy reconfirmed that: DORZOLAMIDE TIMOLOL (COSOPT) PF fixed combination and LATANORPOST reached a target IOP reduction 30,5% from baseline with significantly OBF improved 34,5% and OPP increased 27,6%. COSOPT augments ocular tension reduction and reduces the amount of time required for blood pass through the superior retinal vasculature [7,8]. With added therapy NILVADIPIN 60mgr, GINKGO BILOBA 150mgr, VISIONACE PLUS (with Omega 3 fat), NEUROZAN (with Q10+Arginin) had a further improved 3, 7% (P < 0,01). The best switch therapy especially in the PA improvement was DORZOLAMIDE and BRIMONIDIN with 23,5%. There were no significant statistical difference with other drugs impact in IOP effect but were not the same in ocular blood perfusion influence (P = 0,01). It was benefit of lifestyle the "fitness schema choice" that we are suggested to the patients with VDRG2: intensive activity, regularly aerobic physical exercise, healthful low fat balanced diet (diatrophy) and psychoanalytic therapy, as an significant innovative part of complex alternative therapy for neuroprotection [9]. We observed that the improvement of OBF, PA and OPP reflected in all patients to VDRG2 without significant fluctuations (P = 0,01), with changes to the patient's lifestyle, in a new active life.

Discussion

Glaucoma is multifactorial disease [8,10,11], it is a "iceberg" [5] associated with visual impairment and alterations of life quality [10,12]. It is an optic neuropathy [2,3,13,14] characterized by optic nerve damage resulting from retinal ganglion cells loss- apoptosis,

caused by a number of different vascular disorders. A major risk factor in Glaucoma is intraocular pressure [12], but it is not the only one. The ocular blood flow is an other significant factor related with interference of multiple extrinsic and intrinsic risk factors to vascular dysregulation compounded in a "vicious cycle" [5]. A important factor found to be blood flow fluctuation and dysregulation. Blood flow of choroidal vessels (major part of OBF), is modulated by local mechanisms described as autoregulation [3,4,14]. With consensus has defined clinical relevance that lower diastolic blood pressure, systemic vascular dysregulation related with reduction ocular perfusion or with unstable of OBF [4]. Multiple independent risk factors, has been shown to be responsible for glaucoma progress. Polymorphism and interaction of the co-related vascular factor require an integrative interdisciplinary approach and careful observation [1]. Epigenetic modifications "orchestrated" by environmental factors, neurovascular imbalance and lifestyle can drive individual predisposition represented crossroads between different mechanisms of Glaucoma evolution. Co-regulation is a new approach in the etiopathogenetics Glaucoma treatment [15]. With our experience and renovated strategy, we are going to have the multimodal, complex-schema therapy: with antiglaucoma selective fixed combination or switch therapy combined with antioxidant neuroprotective agents and fitness therapy addition. We tried to find different solutions co beneficiary of improving ocular blood flow or providing neuroprotection, getting an optimal and precious result. It will be interesting that is other visionary novel approaches to the contemporary glaucoma management, changing traditional principles.

Conclusions

The important effect of vascular dysregulation and uncontrollable lifestyle, on the relative risk to glaucoma progression, related to unstable ocular blood flow perfusion and abnormal autoregulation. The polymorphism and interaction of the co-related vascular factor and "spicy" lifestyle require an integrative, interdisciplinary cooperation and careful observation. The medical treatment strategy must be adhered to the individual risk factors. Our selective multimodal therapy with CATS, Ca^{2+} antagonists, antioxidants were very effective especially on the neuroprotection and haemodynamics parameters improvements, without fluctuations. We have to play an active role to Glaucoma patient care, in patients' lifestyle education and individual risk factors modifiable, improved the life quality. Interference of multiple risk factors to vascular dysregulation promote complex, future therapeutic strategic vision.

Conflict of Interest

Don't have any financial or conflict of interest.

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