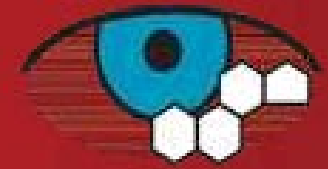


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Role of Diuretics as a Risk Factor for Posterior Vitreous Detachment

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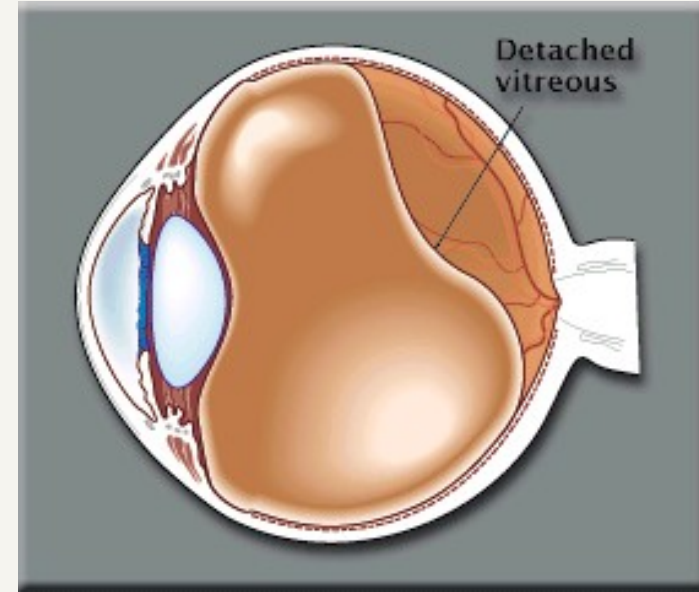
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BACKGROUND

Risk factors for PVD:

- Increasing age [Hayreh and Jonas, 2004]
- Increased bulbar axial length (myopia) [Morita, 1995]
- Female gender [Chuo, 2006]
- Pan-retinal photocoagulation [Sebag, 1990]
- Cataract surgery [Mirshahi, 2009]
- High intake of vitamin B6 [Chuo, 2006]
- Diabetic ketoacidosis [Chang, 1977]



PURPOSE

Although dehydration is a known predisposing condition for posterior vitreous detachment (PVD), no literature data are available on the effect of systemic therapies that act on hydro-saline metabolism such as cardiovascular drugs, with particular regard to diuretics.

The purpose of this investigation was to verify whether diuretic agents are a risk factor for PVD development.

METHODS

- A retrospective cross-sectional study was conducted.
- The clinical records of 300 consecutive patients suffering from high blood pressure who needed an eye examination were reviewed.
- INCLUSION CRITERIA:
 - antihypertensive treatment for over 3 years
 - All patients should be undergone to a complete ophthalmologic examination, including visual acuity test, slit lamp biomicroscopy, ophthalmoscopy (binocular and additional +90 diopter lens observation)
- Clinical data were gathered by means of a questionnaire

QUESTIONNAIRE

STUDIO PROGETTO DPV

Identificativo
 età _____ sesso M F
 gruppo DPV Senza colliriani
 con minimo colliriani
 con membrana apertivica

Età di insorgenza del DPV
 Anamnesi fisiologica
 fumo _____ (approx n. sigarette)
 Attività fisica sedentaria
 moderata
 intensa (sport)
 Scarsa
 sudorazione normale
 abbondante
 Ingestione di liquidi _____ (approx in L)

Anamnesi patologica
 ipertensione No _____ (diagnosi)
 ipotensione No _____ (diagnosi)
 diabete No _____ (diagnosi)
 patologia renali No _____ (diagnosi)
 Patologia cardiaca No _____ (diagnosi)
 Patologia reumatica e osteo articolare No _____ (diagnosi)
 Patologia endocrina No _____ (diagnosi)
 Patologia neuropsichiatrica No _____ (diagnosi)
 Altre patologie No _____ (diagnosi)
 _____ (diagnosi)
 _____ (diagnosi)
 _____ (diagnosi)

Anamnesi specialistica
 miopia No _____ (diagnosi)
 Astigmatismo No _____ (diagnosi)
 Distacco retina pigmentato No _____ (diagnosi)
 Occlusioni vascolari No _____ (diagnosi)
 Scure retiniche No [laser si no]
 Intervento di cataratta No _____ (diagnosi)
 Glaucoma No _____ (diagnosi)
 beta bloccanti
 CAJ Topici
 CAJ SISTEMICI
 PG
 Adrenergici
 Pilocarpina
 chirurgia
 Patologia cervice No _____ (diagnosi)

TRATTAMENTI FARMACOLOGICI

antipertensivi No _____ (quali)
 diuretici No _____ (quali)
 anestetici/anti depressivi No _____ (quali)
 Altri neurologici No _____ (quali)
 gastroenterici No _____ (quali)
 cardiocostanti No _____ (quali)
 Antiinfiammatori/analgesici No _____ (quali)
 antipiretici No _____ (quali)
 altri No _____ (quali)
 No _____ (quali)
 No _____ (quali)
 No _____ (quali)
 No _____ (quali)
 No _____ (quali)
 No _____ (quali)

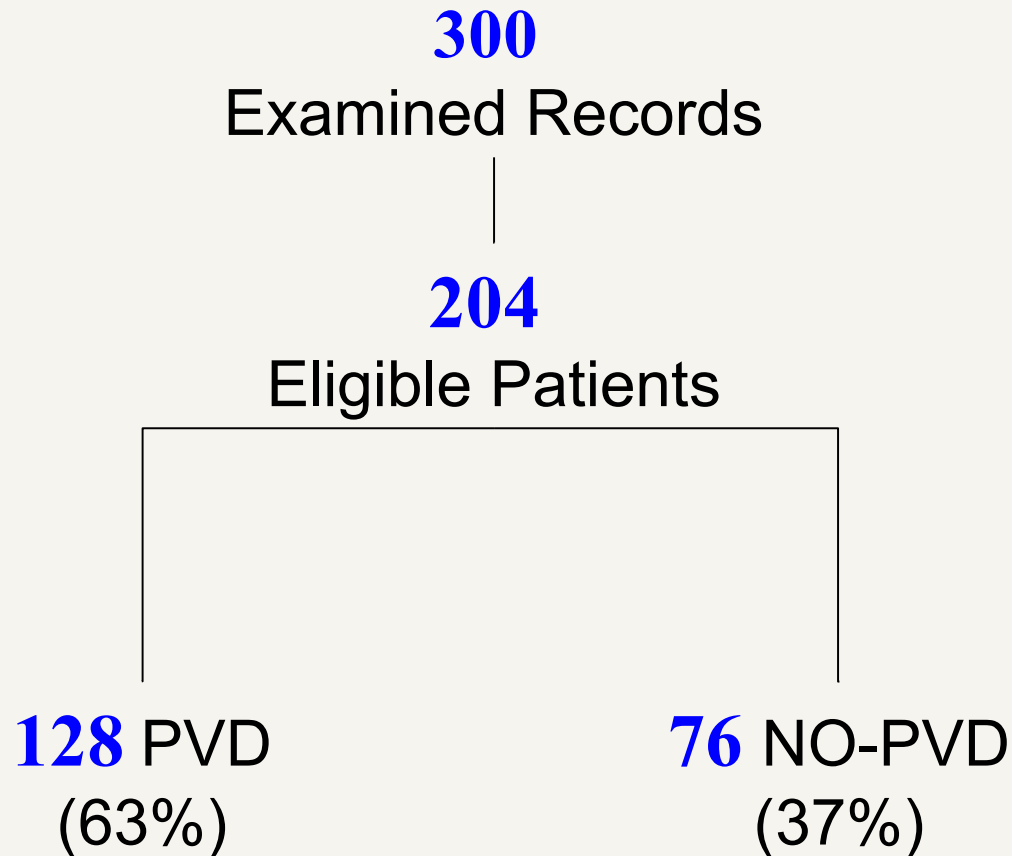
EXCLUSION CRITERIA

- Alcoholism
- Kidney diseases
- Neuroendocrine diseases
- Retinal detachment
- Osmotic therapies
- Significant refractive errors (not higher than 2 diopters as a spherical equivalent).
- Previous ocular surgery
- Previous uveitis.
- Predisposing habits to dehydration
 - poor daily water intake
 - sauna
 - Turkish bath
 - endurance sports

STATISTICS

- Odds Ratio calculated by means of contingency tables (χ^2 test)
- Logistic multiple regression
- Significance level: $P < 0.05$
- P given 2-tailed

STUDY POPULATION



DEMOGRAPHICS

	PVD group	NO-DPV group	P
N. (*)	128	76	-
Gender, M/F	54/74	33/43	ns
Age, years(SD)	67.6 (11.2)	66.8 (11.0)	ns
Duration of treatment, years(SD)	10.8 (5.5)	13.6 (10.1)	ns
Number of drugs (SD)	1.52 (1.17)	1.66 (0.95)	ns

(*) all caucasians

RESULTS: Odds Ratios

factors	PVD	No-PVD	OR	95% CI	P
Diabetes	12% (16/128)	5% (4/76)	2.5	0.76 to 9.5	ns
Argon laser	9% (11/128)	1% (1/76)	7.0	0.91 to 42.5	0.07
Glaucoma	32% (41/128)	24% (18/76)	1.5	0,75 to 3,05	ns
Furosemide	31% (40/128)	5% (4/76)	8.2	2.6 to 28.3	<0.001
Alpha-blockers	5% (6/128)	10% (8/76)	0.4	0.12 to 1.4	ns
ACE inhibitors	28% (36/128)	39% (30/76)	0.6	0.31 to 1.14	ns
Sartans	37% (48/128)	29% (22/76)	1.5	0.76 to 2.84	ns
Ca ⁺⁺ channel blockers	12% (16/128)	29% (22/76)	0.3	0.16 to 0.76	0.006
Beta-blockers	19% (21/128)	24% (18/76)	0.6	0.29 to 1.35	ns
Nitrates	4% (5/128)	0% (0/76)	-	-	ns

RESULTS: logistic multiple regression

factors	r	95% CI	P<0.05
diabetes	0.17	-0.039 to 0.386	no
Argon laser	0.27	-0.003 to 0.534	no
Glaucoma	0.09	-0,048 to 0,228	no
Diuretics	0.24	0,105 to 0,374	yes
Other anti-hypertensives	-0.42	-0,595 to -0,245	yes

RESULTS: logistic multiple regression

factors	r	95% CI	P<0.05
Furosemide	0,33	0,171 to 0,489	yes
Thiazides	-0,11	-0.283 to 0.049	no
Alpha-blockers	-0,21	-0,471 to 0,045	no
ACE inhibitors	-0,14	-0,297 to 0,004	no
Sartans	0,02	-0,125 to 0.169	no
Ca ⁺⁺ channel blockers	-0,24	-0,412 to -0,077	yes
Nitrates	0,32	-0.989 to 0.741	no
Beta-blockers	-0,09	-0,265 to 0,068	no

CONCLUSIONS

- Furosemide, that is one of the most effective agents in increasing urine volume, showed a strong association (**OR = 8.2; 95%CI: 2.6 to 28.3**) and could be considered a relevant risk factor for developing PVD.
- Therefore, in patients at risk of PVD or retinal detachment or other posterior retina diseases, particular attention should be focused on the choice of anti-hypertensive therapy, avoiding the use of furosemide unless absolutely necessary

CONCLUSIONS

The protective effect (**OR = 0.3; 95%CI: 0.16 to 0.76**) of Ca^{++} channel blockers can be matter of speculation:

- It could be merely a bias of the study, due to the lack of furosemide assumption by those patients,
or
- It could be attributed to the hydro-retentive effect of this class of drugs (*Dibona et al, Renal tubular site of action of Felodipine. J Pharmacol Exp Therap 1984*).

CONCLUSIONS

The recommendations coming from these results are two:

- since furosemide is a widely prescribed diuretic, cardiologists and general practitioners should consider also the risk of PVD along with its other undesirable effects, before of prescribing furosemide to their patients.
- the risk/benefit ratio of furosemide, contraindications and precautions for the use might be revised, whether further data confirm this finding.