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INFLUENCE OF CARDIOVASCULAR SYSTEM ON 24 HOUR OCULAR VOLUME CHANGES, MEASURED WITH CONTACT LENS SENSOR IN HEALTHY AND POAG SUBJECTS

Robert Wasilewicz[*1], Cezary Mazurek[2], Juliusz Pukacki[2]
[1]Wasilewicz-Eye Clinic, [2]Poznań Supercomputing and Networking Center, Poznań, Poland

Purpose
To investigate the influence of cardiovascular system (CVS), on ocular volume change biorhythms in healthy and primary open angle glaucoma (POAG) populations.

Methods
Time synchronized, 24 hours, continuous recordings of ocular volume changes and CVS functional parameters (blood pressure, heart rate, cardiac output, blood oxygen saturation) measurements, were performed with a contact lens sensor-based device (CLS, Sensimed Triggerfish®, Sensimed AG, Switzerland) and cuff-less CVS holter system (CVS, Somnotouch® NIBP, Somnomedics GmbH, Germany) . Interactions between CVS and CLS data were evaluated by comparing corresponding medians of CVS parameters to medians of CLS data acquired every minute. Correlations during wake and sleep time periods were then calculated using test.corr with a p-value > 0.05 for correlations rejection.

Results
16 subjects (8 healthy and 8 washed-out POAG) were included in the analysis. Mean age was 62+12 years, 10 females. In the wake period, 2 healthy subjects showed fair positive correlations between CLS and CVS, while no correlations was detected for the other subjects. In the same period, 4 POAG patients showed fair to good negative correlations between CLS and CVS data, while other 4 patients showed no correlations During the sleep time, 2 healthy subjects exhibited fair to good positive correlations between CLS and CVS data. In the same period, fair to strong negative correlations were detected for all 8 POAG. Only one patient showed a fair positive correlations between CLS and one of the CVS parameters (Table 1).

Image

Table 1: Correlations between CLS and CVS data
CO- cardiac output, SAP- systolic arterial pressure, DAP- diastolic arterial pressure, HR- heart rate, SpO2- blood oxygen saturation.

	AWAKE					SLEEP				
ID	CO	SAP	DAP	HR		CO	SAP	DAP	HR	SpO2
NORM1	0	0	0	0		0	0	0	0	0
NORM2	0,39	0,37	0,32	0,3		0	0	0	0	0
NORM3	0	0	0	0		0	0	0	0	0
NORM4	0	0	0	0		0	0	0	0	0
NORM5	0	0,42	0,42	0		0,43	0,59	0,54	0,41	0
NORM6	0	0	0	0		0	0	0	0	0
NORM7	0	0	0	0		0	0	0	0	0
NORM8	0	0	0	0		0	0,55	0,43	0	0
POAG1	0	-0,25	-0,33	0		-0,52	0	-0,29	-0,69	-0,35
POAG2	0	0	0	0		-0,35	-0,34	-0,26	-0,29	-0,24
POAG3	0	0	0	0		-0,52	-0,53	-0,49	0	-0,42
POAG4	-0,49	0	0	-0,51		-0,79	-0,81	-0,82	-0,8	-0,34
POAG5	-0,51	-0,28	-0,25	-0,39		-0,44	-0,66	-0,82	-0,44	0
POAG6	0	-0,35	0	0		-0,3	-0,33	0	0	0,35
POAG7	0	0	0	0		-0,66	-0,68	-0,66	-0,74	0
POAG8	0	0	0	0		-0,64	-0,74	-0,61	-0,5	0

Conclusions

Observed correlations between CLS and CVS data, are positive for healthy subjects and overall negative for POAG patients. Influence of CVS on ocular volume changes biorhythms measured with CLS seems to be disease dependent. This data brings new insights into the pathogenesis of glaucomatous neuropathy and may indicate a new potential diagnostic tool.

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