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Original Article

Influence of Geopathic Stress Zone on Heart Rate Variability Parameters

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ABSTRACT

Background and Aim: Geopathic stress (GS) is the effect of detrimental earth radiation and electro-magnetic radiation on the health of human body. The aim of this study is to evaluate the effect of the geopathic stress on heart rate variability (HRV) parameters in healthy human subjects. **Methods:** The time and frequency domain HRV analyses were performed to assess the changes in sympathovagal balance in group of 60 healthy volunteers with normal electrocardiogram (ECG). Sixty volunteers we-re selected for the study with no history of illness (40 healthy men volunteers, 20 healthy women volunteers). By using the apparatus Rayocomp PS-10 (German, Rayonex), Geopathic stress zone were measured. The time and frequency domain HRV analyses were performed before and after 60 min stay of volunteers in Geopathic stress zone. **Results:** During 60 min stay on the GS zone, the time domain parameters such as standard deviation (SD, ms) of all normal sinus RR intervals were significantly decreased. Then frequency domain parameters such as very low frequency (VLF, ms^2), low frequency (LF, ms), and the LF-HF ratio were significantly increased. **Conclusion:** The study indicated that the stay of healthy human in the GS zone may influence heart rate variability and change the sympathovagal balance.

Key words: Geopathic stress, Heart rate variability, Geopathic stress zone, Electrocardiogram, Geopathic radiation.

INTRODUCTION

Geopathic stress (GS) is the effect of detrimental earth radiation and electromagnetic radiation on the health of human body.[1-2] The earth has a natural magnetic field formed by the rotation of the earth. This rotation creates electrical currents in the molten iron found within the earth's core, thereby producing a magnetic field. In addition to this magnetic field, the earth's core also produces a range of electromagnetic radiation. One type of electromagnetic radiation produced is an ultra-high frequency radiation typically referred to as geopathic radiation. Geopathic radiation filters out from the core of the earth and occurs in varying intensities at the surface of the earth. These varying intensities are caused by disturbances under the surface of the earth. These disturbances (including geological faults, underground ore masses, underground water, and mineral deposits, among others) reflect, refract, and/or diffuse the geopathic radiation as it travels through the earth and thereby concentrate the geopathic radiation at certain areas on the surface of the earth.

Studies have shown that the geopathic stress zone, especially in a location where a person spends a significant amount of time, produces illnesses and disorders including arthritis, cancer, and sleep disturbances.[3-8] Geopathic stress can contribute to a vast array of other illnesses by interfering with the immune system and the production of growth hormones which rebuild the body during sleep.[3] These studies, several of which have been funded by European governments, at least to the existence of geopathic radiation and document evidence of the illnesses that this radiation induces. Usually the homeostasis of an organism is accomplished by function of the nervous system, endocrine system and immune system. In addition, the autonomic nerve system carry out important role in maintenance of the homeostasis.[9] Therefore, it is possible that geopathic stress by geopathic radiation may influence the autonomic tone, thus modifying the functioning of circulatory system. The aim of the present study was to determine the influence of the geopathic stress zone on heart rate variability parameters in healthy human subjects.

MATERIALS AND METHODS

Subjects

Experimental procedures were approved by the Institute Ethics Committee. Volunteers were recruited from staff and students within the university. The study included 60 subjects (40 male, 20 female) with age ranging from 20–39 years. The subjects were healthy and did not suffer from any

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known illnesses or take medication. Written informed consent was obtained from each subject before participating in the study.

Selection of Geopathic Stress Zone

Geopathic stress zones were identified with the help of the apparatus Rayocomp PS-10 (German, Rayonex).

Heart Rate Variability (HRV)

Our investigation was performed in a semi-darkened, temperature-controlled quiet laboratory at room temperature (21°C). Before the experiment, participants had rested in a laboratory room in a sitting posture for about 20 min. All subjects underwent a three-lead ECG Holter recording (HolCARD 24W System, Aspel S.A., Poland). The program automatically detected and labeled each QRS complex with a precise determination of fiducial points for QRS complexes. Records were performed for 10 min in similar conditions: before and after 60 min stay in GS zone.

The Time domain analysis parameters are as follows: mRR (mean RR interval of the sinus rhythm in ms), SD (standard deviation of all normal sinus RR intervals in ms), CV (coefficient of variation, SD/mRR). The following frequency domain variables were computed: ultra-low frequency (ULF) power from 0 to 0.0033 Hz, very low frequency (VLF) power from 0.0033 Hz to 0.04 Hz, low frequency (LF) power from 0.04 Hz to 0.15 Hz, high frequency (HF) power from 0.15 Hz to 0.4 Hz, and LF-HF ratio, ULF-VLF ratio, Ic index [(VLF+ULF)/LF] were also calculated. The Fast-Fourier transform method was used to evaluate the power spectral density of the RR series. The time and frequency domain measures of heart rate variability were analyzed by methods recommended by the Task Force of the European Society of Cardiology.

Statistical Analysis of Data

All data were expressed as mean±SD. Inter-group differences were compared through two-tailed independent sample *t*-test using SPSS 10.0 statistical software. Differences were considered statistically significant at a probability level equal to or less than 0.05.

RESULTS

HRV Parameters in Non-Geopathic Stress (NGS) Zone

We observed gender difference in HRV parameters in non-geopathic stress (NGS) zone. As shown in the Table 1, there was a tendency to decrease in mRR in women, but it wasn't statistically significant.

And the frequency domain parameters of HRV in the men and women were observed in NGS zone (Table 2). There was no significant difference in frequency domain parameters between men and women. And also there was no significant difference in L/F, K/P, Ic parameters between men and women (Table 3).

Influence of Geopathic Stress on HRV

Time domain analysis and frequency domain analysis of HRV after 1 hr stay of volunteers at NGS zone and GS zone was shown in Table 4 and 5. Time domain analysis and frequency domain analysis of HRV

Table 1: Time domain indices of heart rate variability (HRV) of healthy subjects in non -geopathic stress (NGS) zone.

Groups	No. of subjects	mRR (ms)	SD (ms)	CV
Men	22	856.69±56.51	48.22±4.41	5.47±0.47
Women	20	827.43±44.12	45.99±3.88	5.25±0.47

Values were expressed as mean±SD.

Table 2: Frequency domain indices of heart rate variability (HRV) of healthy subjects in non-geopathic stress (NGS) zone.

Groups	No. of subjects	ULF (ms^2)	VLF (ms^2)	LF (ms^2)	HF (ms^2)
Men	22	223.86±48.26	157.45±34.45	385.87±58.11	299.81±72.89
Women	20	213.95±54.78	149.97±35.04	380.62±58.21	288.16±65.35

Values were expressed as mean±SD.

Table 3: Spectral power indices of healthy subjects in non-geopathic stress (NGS) zone.

Groups	No. of subjects	LF/HF	U/V	I_c
Men	22	1.32±0.17	1.49±0.47	1.01±0.23
Women	20	1.35±0.15	1.35±0.16	1.00±0.24

Values were expressed as mean±SD.

Table 4: Time domain indices of heart rate variability (HRV) of healthy subjects in geopathic stress (GS) zone.

Groups		mRR	SD CV	
Control (n=20)	Before	849.93±53.65	47.45±3.82	5.46±0.47
	After	844.36±54.19	45.38±5.04	5.25±0.49
Study (n=20)	Before	847.98±53.69	47.14±3.61	5.36±0.48
	After	842.51±53.89	43.43±5.24*	5.14±0.48

Values were expressed as mean±SD (n=20). *P<0.05 was considered as statistically significant. * P<0.05 versus before a stay

analyzed before and after 1 hr stay in NGS zone (control group) and GS zone (study group).

As shown in the Table 4, there were no statistically significant changes in control group before and after 1 hr stay in the NGS zone. But in the study group, the SD was decreased after 1 hr stay in the GS zone.

And the analysis of the frequency domain parameters of HRV in the study group demonstrated that VLF and LF parameters were significantly increased after 1 hr stay of healthy subjects in the GS zone in comparison with before 1 hr stay. LF-HF ratio was also significantly increased in study group after 1 hr stay in GS zone in comparison with before 1 hr stay (Table 6).

DISCUSSION

Geometric stress is as a result of certain natural or spontaneous potentials generated in the sub-surface due to movement of groundwater and its mechanical friction as it flows through fissures, faults, joints and lineaments etc. GS has been found to be the common factor in countless serious and minor illnesses, notably those conditions where the immune system is severely compromised.[10] Several study evaluated the effect of GS on human body and found a poor well-being,[11] change in body voltage, skin resistance,[12] affected blood sedimentation, blood pressure, blood circulation, heartbeat, breathing, skin resistance, and electrical conductivity of muscle points[13] in GS zones as compared to non-stress zone. The aim of our study was to estimate the influence of the GS on HRV in healthy human subjects.

In our research, the time and frequency domain indices of HRV were performed to assess the changes in sympathovagal balance in the healthy subjects with normal electrocardiogram (ECG) at rest. And in the research, apparatus Raycomp ps-10 (German, Rayonex) was utilized in locating GS zone. There was not any significant difference in the time

Table 5: Frequency domain indices of heart rate variability (HRV) of healthy subjects in geopathic stress (GS) zone.

Groups		ULF	VLF	LF	HF
Control (n=20)	Before	213.97±35.04	161.03±34.01	380.62±58.21	288.16±65.35
	After	216.88±40.52	165.62±35.04	388.38±61.49	294.36±60.82
Study (n=20)	Before	215.97±35.15	159.89±33.81	378.49±58.36	287.53±66.09
	After	211.49±40.88	181.91±34.86*	417.64±55.49*	299.84±61.28

Values were expressed as mean±SD (n=20). *P<0.05 was considered as statistically significant. * P<0.05 versus before staying in GSzone.

Table 6: Changes of spectral power indices of healthy subjects in geopathic stress (GS) zone.

Groups		LF/HF	U/V	Ic
Control (n=20)	Before	1.34±0.16	1.44±0.27	1.25±0.28
	After	1.41±0.12	1.37±0.29	1.11±0.27
Study (n=20)	Before	1.39±0.17	1.46±0.21	1.37±0.23
	After	1.48±0.12*	1.44±0.19	1.31±0.28

Values were expressed as mean±SD (n=20). *P<0.05 was considered as statistically significant. * P<0.05 versus before staying.

and frequency domain indices of HRV between men and women in NGS zone. But LF, LF-HF ratio parameters were increased significantly, when the subjects stayed in the GS zone for 1 hr. LF is a marker reflecting sympathetic activity and the LF-HF ratio is considered to mirror sympathovagal balance or reflect the sympathetic modulations.[14,15] As a result, it was shown that the tone of the sympathetic system measured indirectly by analysis of heart rate variability was increased for 1 hr stay in the GS zone and the GS may change the sympathovagal balance in healthy subjects. In the study group, the SD was decreased after 1 hr stay in the GS zone. SD represents joint sympathetic and parasympathetic modulation of heart rate.[16] In the other studies, SD was observed as parasympathetic function index.[17-20] If the decrease of SD was associated with changes in LF, LF-HF ratio, there seem to be some influence by decrease of parasympathetic function.

In our experiments, ULF did not change significantly, but VLF increased in study group after 1 hr stay in GS zone. The increase in very low frequency in 1 hr stay of the subjects could be related to sympathetic activation as VLF is very much dependent on sympathetic tone.[21] However, the physiologic interpretation of VLF oscillations is still a subject of debate.[22,23] Different physiological mechanisms for VLF have been proposed: physical activity, thermoregulation, renin-angiotensin-aldosterone system, slow respiratory patterns and parasympathetic mechanisms.[24-26]

By means of joint biophysical and geological–geophysical investigations, it was established that changes in biological systems can be affected by anomalous characteristics of geophysical fields, geo-chemical anomalies, active tectonic structures (faults) connected with zones of higher permeability and stresses of Earth's crust, and other factors. Within such zones, living organisms undergo a stress action, which led to the appearance of different functional diseases decreasing the resistance of the body to diseases.[27,28] Our investigation results show that geopathic stress can influence HRV of the human and change the sympathovagal balance.

CONCLUSION

When healthy subjects were stayed for 1h in the GS zone, SD of HRV parameters was decreased and LF, LF-HF, VLF parameters were increased indicating increased sympathetic activity.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

ABBREVIATIONS

GS: Geopathic Stress; **HRV:** Heart Rate Variability; **ECG:** Electrocardiogram; **ULF:** Ultra Low Frequency; **VLF:** Very Low Frequency; **LF:** Low Frequency; **mRR:** Mean RR Interval of The Sinus Rhythm; **SD:** Standard Deviation of all Normal Sinus RR Intervals; **NGS:** Non-Geopathic Stress.

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