

IMPORTANT STRESSFUL FACTORS FOR HEALTH STATUS OF ELDERLY PEOPLE IN THE NUCLEAR MEDICINE

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INTRODUCTION

Functional status of autonomic nervous system can be assessed by many methods:

- psychodiagnostic methods
- spectral analysis of the heart rate variability
- evaluation of adrenergic innervation of myocardium with 123I-metyliodbenzylguanidin (MIBG)

We have shown an importance of these methods in diagnostics of cardiovascular complications in patients with diabetes mellitus or students under stress. The aim of the study is to demonstrate the status and changed plasticity of autonomic nervous system in elderly people and its reaction for stressful factors.

METHODS

The total amount of 150 persons were divided in two groups (50 elderly people and 100 persons as a control group). All probands underwent the examination of spectral analysis of the heart rate variability. A stress and rest myocardial scintigraphy with 99m-Tc-tetrophosmin and examination of adrenergic innervation of myocardium with 123I-MIBG were performed in 15 people of the control group.

The mean age of group of elderly people was 72 years (65-75 years). There were no significant symptoms of any disease in this group. The spectral analysis of the heart rate variability was performed under rest and standard conditions as well as under stressful situation. The stressful factor was an arithmetic stress. The system VariaCardio TF4 for examination of spectral analysis of the heart rate variability was used. A stress and rest myocardial scintigraphy with 99m-Tc-tetrophosmin and examination of adrenergic innervation of myocardium with 123I-MIBG were performed in 15 people in this group.

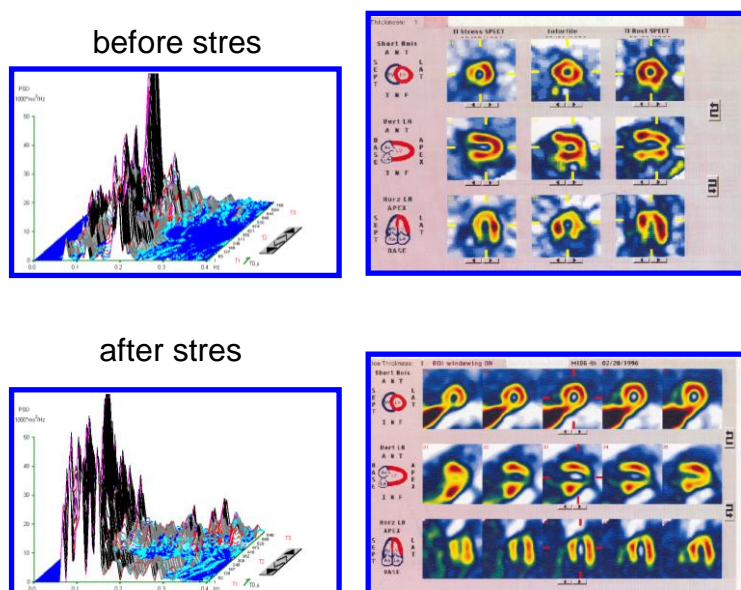


Image 1

Normal results by a man of 65 years
Examination of the spectral analysis of the heart rate variability before and during stressful situation
Image of myocardial perfusion 99mTc - Tetrophosmin and sympathetic innervation of myocardium with 123-I-MIBG

ANS – AGE CATEGORIES

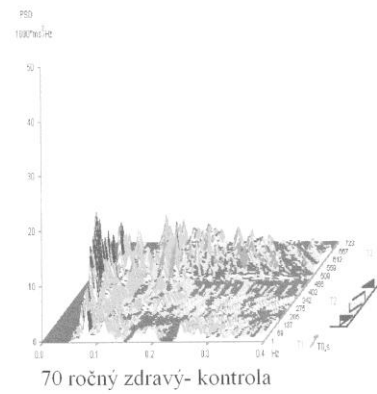
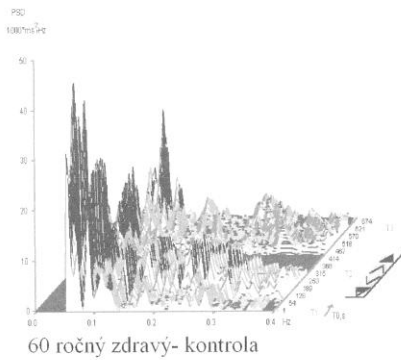
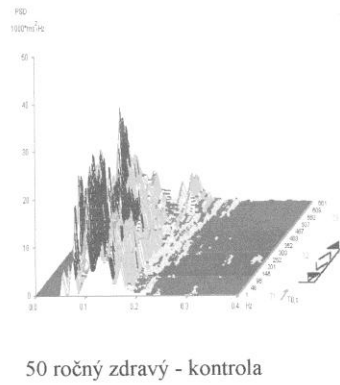
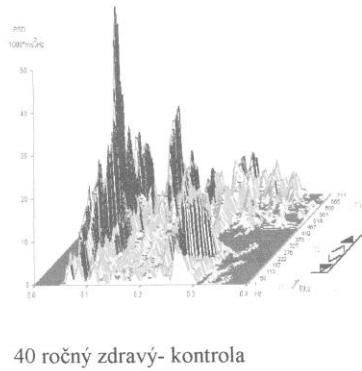
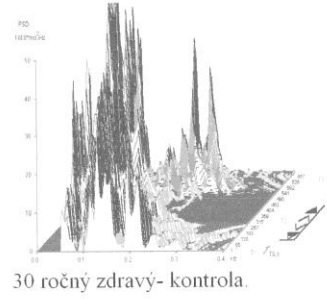
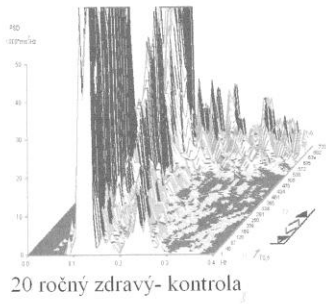
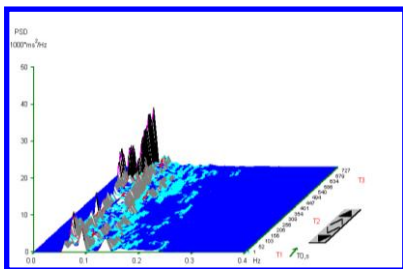


Image 2 The spectral analysis of the heart rate variability finding according the age

before stres



after stres

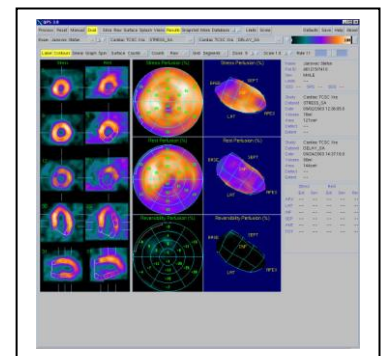
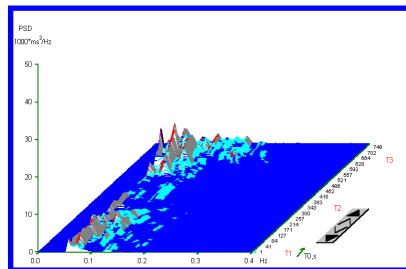
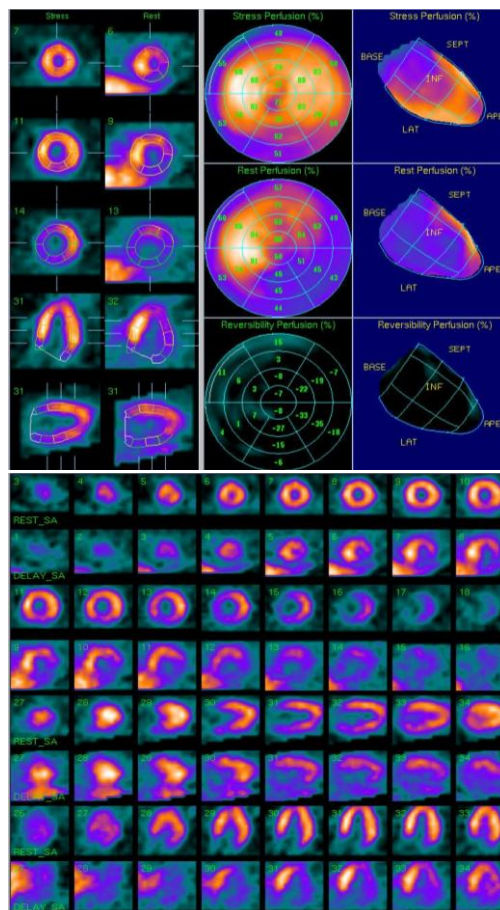
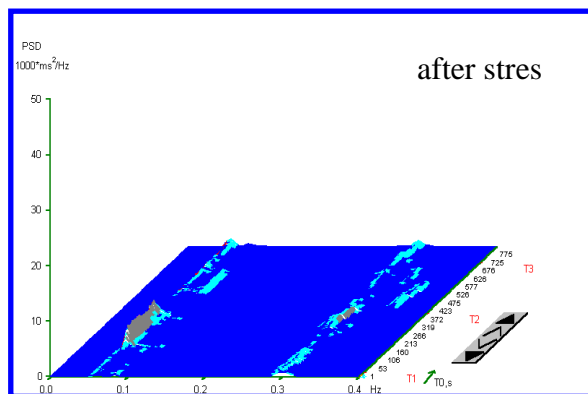
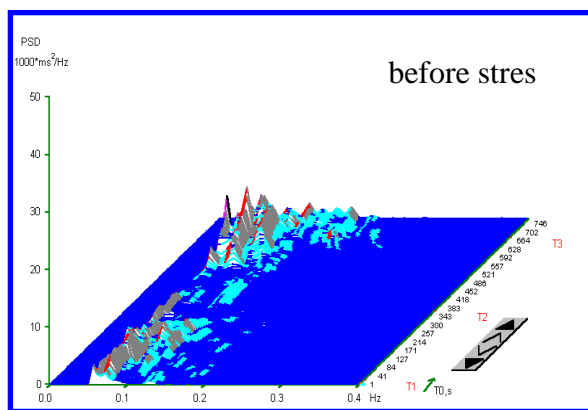


Image 3 Results by a man of 68 years



Examination of the spectral analysis of the heart rate variability before and during stressful situation- image of incipient cardiac autonomic neuropathy

Image 4 Results by a man of 72 years

Examination of the spectral analysis of the heart rate variability before and during stressful situation- image of developed cardiac autonomic neuropathy

Parametres SA						
	normal f. (n = 15)		incip.KAN (n = 20)		devel.CAN (n = 15)	
	rest	stress	rest	stress	rest	stress
Power LF (ms ²)	525	872*	256	271	83	85
Power HF (ms ²)	589	616	110	42	20	6
PSD LF (ms ² /Hz)	10 470	27 355*	2691	5011*	366	380
PSD HF (ms ² /Hz)	11 120	11465	850	847	100	95
MSSD (ms ²)	800	2 918	312	124	235	180
SD-štand. Dev. (ms)	72	73	44	38	19	19

* p < 0,05 (normal f. = normal finding, KAN = cardiac autonomic neuropathy)

Image 5 Average values of SA by elderly people in some stages of cardiac autonomic neuropathy

RESULTS

With an increasing age these change can be observed: there is decrease in spectral power of both autonomic subsystems, decrease of baroreceptor activity, the LF/HF ratio is accentuated, what is a sign for dominance of symphatetic nervous subsystem. The plasticity of ANS is reduced.

15 elderly people in the age of 65-70 had similar findings as a control group, so we appreciate the result as normal one. 20 probands in the age of 68-74 had incipient cardiac autonomic dysregulation without clinical features of the disease. 15 elderly people in the age of 67-76 had developed cardiac autonomic dysregulation without clinical features of the disease. Their stress reaction is without increase of sympathetic and parasympathetic systems, there is a dominance of sympathicus and there is only little RR variability. In 13 patients with changed HRV and developed cardiac autonomic dysregulation were changed findings by 123I-MIBG scintigraphy of myocardium. These changes were present by in both regional and global evaluation.

CONCLUSION

Examination of the spectral analysis of the heart rate variability revealed cardiac autonomic dysregulation as an asymptomatic change of autonomic nervous system.. Reduction of the plasticity of ANS with an increased age was confirmed. Also was the correlation of examination of the spectral analysis of the heart rate variability and adrenergic innervation of the myocardium confirmed. These finding allow early complex preventive interventions and increase the quality of life in elderly people.

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