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IMPACT OF THE SOCIO-PROFESSIONAL STRESS ON THE ELECTROCARDIOGRAPHICAL ABNORMALITIES OF CORONARY PATIENTS

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ABSTRACT:

Introduction. Nowadays, stress generated during work has a significant importance in cardiac patients. This stress category is a major cardiovascular risk factor, equivalent with smoking.

Objectives. The study has followed the influence of negative requests at work on the evolution of the coronary artery disease in employees with higher education. Evaluating the socio-professional stress level has fit the patients in a high risk for an acute coronary event, sustained cardiological therapy, psychological counselling and psychiatric drug therapy (where necessary).

Methods. Cardiological evaluation has followed, for one year, 102 patients (81 women, 41 men) with higher education, previously diagnosed with coronary heart disease, aged 30 to 64 years. Clinical exam was performed monthly; the electrocardiogram was recorded at rest, 15 minutes after sustained socio-professional stress and, subsequently, each month. The transthoracic echocardiography was performed with a Fukuda Denshi UF 850-XTD echograph, studying the ventricular parietal motility, upon admission in the study and then quarterly. In order to quantify the level of stress at the workplace, we used the psychiatric exam and the Karasek's questionnaire, upon inclusion in the study and then every three months.

Results. An impressive percentage of the patients (81 %) presented abnormalities on the electrocardiogram recorded 15 minutes after sustained socio-professional stress, at the beginning of the study. These abnormalities were higher and longer (60 % of the patients) than those recorded during the exercise test performed before inclusion in the study. The combined intervention of cardiological and psychiatric therapy and psychotherapy lead to electrocardiographic improvement (at 78 % of the patients who had these problems at the beginning of the study) and psychiatric amelioration (80 %).

Conclusions. The presented study, as other studies in the specialty literature, proves the fact that socio-professional stress continues to be a major cardiovascular risk factor.

Keywords: *Ischemic heart disease, echocardiography, medication, psychotherapy*

REZUMAT:

Introducere. În prezent, se acordă o importanță deosebită stresului generat în timpul exercitării profesiei, la pacienții cu afecțiuni cardiovasculare. Această categorie de stres reprezintă un factor de risc major cardiovascular, echivalent cu statusul de fumător.

Obiective. Studiul a urmărit intervenția solicitărilor negative la locul de muncă asupra evoluției afecțării coronariene la salariații cu studii superioare. Aprecierea nivelului de stres socio-profesional a permis încadrarea pacienților la un risc crescut pentru eveniment coronarian acut, terapie cardiologică susținută, consiliere psihologică și terapie medicamentoasă psihiatrică (acolo unde a fost necesară).

Metode. Evaluarea cardiologică a cuprins urmărirea, timp de un an, a 102 pacienți (81 femei și 41 bărbați) cu studii superioare, cunoscuți cu afectare coronariană, cu vârste între 30 și 64 de ani. Examinarea clinică s-a efectuat lunar; electrocardiograma a fost înregistrată în repaus, la 15 minute după stres socio-profesional susținut și ulterior, lunar. Pentru ecocardiografia transtoracică, s-a utilizat un ecograf Fukuda Denshi UF 850-XTD, urmărind cinetica parietală ventriculară la includerea în studiu și apoi trimestrial. Cuantificarea stresului de la locul de muncă s-a realizat cu ajutorul examenului psihiatric și a chestionarului Karasek, la includerea în studiu și ulterior, la trei luni.

Rezultate. Un procent impresionant de pacienți (81 %) a prezentat modificări pe electrocardiograma înregistrată la 15 minute după stres socio-profesional susținut, la includerea în studiu. Aceste modificări au fost mai ample și mai prelungite (60 % dintre pacienți) decât cele remarcate în timpul testării de efort efectuate anterior includerii în studiu. Intervenția combinată a terapiei cardiologice, psihiatrice și a psihoterapiei a permis ameliorare electrocardiografică (la 78 % dintre pacienții care au avut aceste probleme la includerea în studiu) și psihiatrică (la 80 %).

Concluzii. Studiul prezentat, asemenea altor studii din literatura de specialitate, dovedește faptul că stresul socio-profesional continuă să fie un factor major de risc cardiovascular.

Cuvinte-cheie: *boala ischemică miocardică, ecocardiografia, medicație, psihoterapie*

INTRODUCTION

The increased prevalence of ischemic heart disease, during the past few decades, with occurrences in young people, has determined a higher interest in deciphering its complex etiopathogenesis. The devastating impact of this disease was diminished by interventions in regards to diet, physical exercise, correct drug administration and recommendations for interventional or surgical therapy. In spite of these, a high percentage of morbidity and mortality through ischemic heart disease remains, especially in young and middle-aged adults. Many authors have observed that socio-professional stress increases 2.7 times the risk of heart attack (1) and 3 times the global cardiovascular risk (2). Thus, the spectrum of a new major cardiovascular risk factor was configured: *work stress*.

This observation entails the multidisciplinary approach of coronary heart disease (cardiologists, psychiatrists, psychologists and sociologists). The anxiety at the work place can generate an increased risk of coronary heart disease (3). This psychical discomfort is remarked by coronary patients in relation to their work place, due to individual features of emotional intelligence of the patients and the entourage. Lack or diminishing of interpersonal communication at work lead to medical consequences. Coronary patients are especially susceptible for acute cardiovascular events (severe arrhythmias, heart attack, stroke), at work, after socio-professional stress.

The etiopathogenesis of these cardiovascular complications is linked to the release of increased amounts of catecholamines and cortisol, during stress. Arrhythmias are initiated by the excess of catecholamines, which stimulate the ectopic focus located in the ischemic myocardium.

Heart attacks, after socio-professional stress, are determined by increased oxygen intake of the myocardium, provoked by catecholamine-induced tachycardia. Stroke in coronary patients is

determined by high blood pressure, provoked by cortisol and catecholamines. Psychosocial stress is an independent factor for the occurrence and aggravation of the coronary heart disease (4).

METHODS

The presented study included 102 patients, previously diagnosed with ischemic heart disease. The study group was mainly composed of women (81 patients). Patients were between 30 and 64 year old, employed, with higher education. Patients with economy studies were predominant (43 patients); with medical studies, there were 29 patients; teachers: 26; engineering studies: 4 patients. Current smokers were excluded from the study. Ischemic heart disease was diagnosed before inclusion in the study, by clinical exam, electrocardiogram at rest (and exercise test if the rest electrocardiogram was normal or equivocal) and echocardiography.

For 14 patients, a coronarography was performed, in order to complete the diagnosis. 5 patients underwent interventional myocardium revascularization, with coronary stenting. At the beginning of the study, all of the 102 patients were stable in regards to coronary disease. The patients who suggested, clinically or electrocardiographically, evolution towards coronary acute syndrome, were excluded. Each month, a clinical and electrocardiographic exam was performed on all patients.

An electrocardiogram was recorded for all patients, after 15 minutes of sustained socio-professional stress (fast rhythm at the workplace, increased responsibilities, and conflicts).

The electrocardiogram was performed with standard leads as well as posterior and right leads. At the beginning of the study, the biochemical (glycemia, creatinine, ionogram, transaminases, lipidogram, uric acid, creatinine clearance, urine exam) and hematological parameters were evaluated. These were repeated after 6 and 12 months. Transthoracic echocardiography was performed using a Fukuda Denshi UF 850-XTD echograph, observing the ventricular parietal motility. This examination was performed at the beginning of the study and quarterly.

Detailed psychiatric exam included Karasek's questionnaire. The 26 questions allowed evaluating the degree of autonomy at the workplace and the psycho-emotional impact of professional requests (5). The psychiatric evaluation was performed every 3 months. Patients benefited of cardiological therapy (betablockers, converting enzyme inhibitors or sartans, antiplatelet agents, statins). Psychotherapy and / or anxiolytic medication were applied on patients having medical recommendation.

RESULTS

83 patients (a significant percentage: 81 %) presented either augmentation of the ischemo-lesional abnormalities on the electrocardiogram recorded 15 minutes after sustained socio-professional stress, or occurrence of recent abnormalities. The topographic distribution of these abnormalities is presented in table I.

Area	Percentage
Anterior	30 %
Antero-lateral	16 %
Inferior	10 %
Infero-lateral	17 %
Inferior and posterior	8 %
Inferior and right	5 %
Anterior and inferior	14 %

Tab. I. *Topographic distribution of the electrocardiographical abnormalities after socio-professional stress*

The socio-professional factors that precipitated the electrocardiographical abnormalities were overloaded responsibilities and conflicts at work. Table II presents the professional distribution of the patients with electrocardiographical abnormalities after socio-professional stress.

Professional studies	Percentage
Economics	28 %
Medical	35 %
Teachers	24 %
Engineering	13 %

Tab. II. *Professional distribution of the patients with electrocardiographical abnormalities after socio-professional stress*

It is to be noted that 60 % of these patients had ampler and longer ischemo-lesional abnormalities than what was recorded at the exercise test of the same patient, performed before inclusion in the study. This result warns, as do other studies, about the particular danger of socio-professional stress on coronary heart disease; the aggressiveness of mental stress on a potentially lethal disease is higher than that observed after physical exercise. After 12 months, the cardiological evaluation has shown an electrocardiographical improvement at 78 % of the 83 patients who had ischemo-lesional abnormalities, 15 minutes after sustained socio-professional stress (an electrocardiogram was recorded for each patient, 15 minutes after the end of a stressful work day, each month). From a psychiatric point of view, at the end of the study, an improvement of the emotional status was observed, at 80 % of the 83 patients who had electrocardiographical abnormalities after socio-professional stress.

This percentage of patients had better results at Karasek's questionnaire, suggesting a good socio-professional and psycho-emotional insertion at work. We had two patients who changed their work place for cardiological reasons and five patients who moved to another institution for psycho-emotional reasons. This change of the workplace has lead, for all seven patients, to an improvement of their medical condition.

CONCLUSIONS

Sustained socio-professional stress has become a major cardiovascular risk factor. The correct approach of patients who already suffer of ischemic heart disease, employed at a stressful workplace, requires professionalism and collaboration between medical fields. For a small number of patients, changing workplaces becomes vital. For the future, we propose to extend the study into the prevention area, trying to identify persons at risk of developing ischemic heart disease due to sustained socio-professional stress at their workplace.

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The authors declare that they have no potential conflicts of interest to disclose.

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