Psychological Recovery in the Metabolic Syndrome in the Context of Antioxidant Therapy-Case Presentation

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Abstract

Representing a major medical issue, especially in industrialized countries, the metabolic syndrome (MetS) consists of a complex association of the most dangerous metabolic and cardiovascular risk factors according to the International Diabetes Federation: diabetes and prediabetes, abdominal obesity, high cholesterol and high blood pressure. The oxidative stress has as cause the existence of free radicals or radical-forming agents in higher concentrations than what it would be possible to cope with for the natural radical-blocking or scavenging systems. The effects of the antioxidant therapy in the metabolic syndrome and the psychological component involved are studied through a case presentation correlated, as well, with data from literature.

Keywords: *MetS, cardiovascular risk, antioxidant therapy, psychological.*

Introduction

1. DEFINITION AND DIAGNOSIS OF THE METABOLIC SYNDROME

Representing a major medical issue, especially in industrialized countries, the metabolic syndrome (MetS) consists of a complex association of the most dangerous metabolic and cardiovascular risc factors according to the International Diabetes Federation guidelines: diabetes and prediabetes, abdominal obesity, high

cholesterol and high blood pressure and is characterized by the 2013 Guide of the European Society of Cardiology (ESC guidelines) through a variable combination among visceral obesity and alterations of the glucose metabolism, lipid metabolism and blood pressure, having a higher prevalence within the middle aged and the elderly populations.[1] Proinflammatory and prothrombotic states have also been correlated with the MetS. The American Heart Association highlights the fact that diagnosing the metabolic syndrome involves three or more of the following: waist circumference over 40 inches in men, and over 35 inches in women, thus meaning abdominal obesity, triglyceride level of 150 mg/dl of blood (mg/dL) or higher, HDL cholesterol – less than 40 mg/dL in men or less than 50 mg/dL in women, systolic blood pressure over or equal to 130 mm Hg or diastolic blood pressure over or equal to 85 mm Hg, fasting glucose over or equal to100 mg/dL.[2]

2. ENVIRONMENTAL AND ENDOGENOUS RISK FACTORS FOR THE METS IN THE CONTEXT OF THE OXIDATIVE STRESS

The oxidative stress has as cause the existence of free radicals or radical-forming agents in higher concentrations than what it would be possible to cope with for the natural radical-blocking or scavenging systems. The oxidative stress can have both external and internal causes of appearance. The exogenous sources include cigarette smoking, air pollution, dietary habits, UV radiation, heat exposure, certain drugs like antibiotics, exposure to chemical substances like toxic metal nanoparticles or pesticides, that have become unavoidable in today's modern society, whereas the endogenous sources consist of alterations of certain specific genes and antioxidant enzymes, the hyperactivation of macrophages, immunosupression, disorders of the lipid and protein metabolisms.[3]

Therefore, as external trigger factors, both cigarette smoke and environmental pollution play a central position in developing the oxidative stress, causing as well, high rates of morbidity and mortality, according to epidemiological studies. The main mechanism through which the oxidative stress develops and effects healthy components of the organism is the production of reactive oxygen species (ROS) that also damages the cell - DNA, RNA, and

[1] K. George Alberti, P. Zimmet and Jonathan Shaw, "Metabolic syndrome – A new world-wide definition. A Consensus Statement from the International Diabetes Federation," *Diabetic Medicine* 23(5) (2006): 469-80; Carmen Ginghina, Călin Cosmin and Cornelia Călinescu, *Compendiu de ghiduri ESC prescurtate* (Bucharest: Media Med Publicis, 2013).

[2] http://www.heart.org/HEARTORG/, website of the American Heart Association.

[3] Rebecca Hutcheson and Petra Rocic, "The Metabolic Syndrome, Oxidative Stress, Environment, and Cardiovascular Disease: The Great Exploration," *Experimental Diabetes Research* 2012 (2012).

proteins, contributing as well to the process of ageing. Regarding the endogenous sources, the genetic component plays an important role in the development of the oxidative stress endogenously both through direct transmission of altered genes and diverse complex processes of gene alteration.[4]

3. THE IMPLICATIONS OF THE ANTIOXIDANT THERAPY IN THE METABOLIC SYNDROME AND ITS COMPONENTS:

a) The antioxidant treatment and the metabolic syndrome-general issues

Recently, antioxidants have been used in an extensive manner to overcome the effects of excess ROS in several pathologies. Some of the commonly used antioxidants are vitamins E and C, coenzyme Q 10, α-lipoic acid, lycopenes, and polyphenols. Vitamin E is most commonly found in the form of α-tocopherol, being most abundant in dark chocolate, nuts and berries, and also as a supplement. After the complete usage of vitamin E within the free radical reaction , it requires vitamin C or coenzyme Q to regenerate, studies often taking into consideration the effects of vitamin C and E together. Vitamin C is a powerful antioxidant by itself and can be found mainly in fruits, broccoli, bell peppers, and also as a supplement. α-Lipoic acid , being a powerful antioxidant, can recycle both vitamins E and C, repair oxidized proteins and directly scavenge ROS. Representing a class of antioxidants widely found in common foods, polyphenols are: catechins, anthocyanins, procyanidins, resveratrol, and curcumin.[5]

b) The antioxidant treatment and Obesity

Obesity, a central component of the MetS, produces within this complex pathology systematic oxidative stress. Its raised values accumulated within fat tissue represent the generator cause of the deregulation of adypocites with the development of the MetS, thus creating a vicious circle. Being an incipient factor for the development of the MetS , the raised values of oxidative stress accumulated in the fat tissue has to represent an important target for the instigation of new therapeutic methods.[6]

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[4] Hutcheson and Rocic, "The Metabolic Syndrome."

[5] Gladys Block, Marion Dietrich, Edward P. Norkus, Jason D. Morrow, Mark Hudes, Bette Caan and Lester Packer, "Factors Associated with Oxidative Stress in Human Populations," *American Journal of Epidemiology* 156, 3 (2002).

[6] *Ibidem.*

In a recent study on the antioxidant supplementation in the management of obesity[7] there are stated some major classes of antioxidants to be considered in the case of this pathology :vitamins and cofactors, polyphenoles and carotenoids. The vitamins and cofactors consist of: vitamins C and E, zinc, lipoic acid, l-carnitine, polyunsaturated fatty acids, coenzyme Q10. The polyphenols and carotenoids are as follows: procyanidins and cinnamon, catechins and green tea, chlorogenic acid green coffee extract, resveratrol, lycopene.[8]

c) The antioxidant therapy and hypertension in the metabolic syndrome

Representing another major component of the metabolic syndrome, hypertension is correlated in an individual manner with increased cardiovascular risk. The interconnection between high levels of free radicals and hypertension is still unclear-whether free radicals start the development of hypertension or vice-versa or both. The oxidative stress may produce hypertension through several mechanisms-quenching of the vasodilator nitric oxide by ROS, depletion of tetrahydrobiopterin, formation of vasoconstrictor lipid peroxidation products (F2-isoprostanes), vascular structural and functional alterations.

The possible causes of free radical production within vasculature include: NADPH-oxidase, nitric oxide synthase, cyclo-oxigenases. There are several studies indicating that exogenous angiotensin II has an important role in forming free radicals in hypertension. Evidence from several clinical studies on antioxidant supplementation for lowering blood pressure highlighted the uses of: vitamins E, C, beta-carotene, selenium, zinc and gluthatione.[9]

d) The implications of antioxidant therapy in diabetes mellitus

The antioxidant treatment strategy in the case of diabetes mellitus has as purpose the control of ROS production and the modulation of mitochondrial activity. According to Abdali et al.[10] some of the main classes of antioxidants used in the prevention and treatment of diabetes mellitus are: vitamins C and E, lipoic acid, zinc, selenium, l-carnitine, coenzyme Q10, procyanidine, resveratrol. Vitamins C and E are cofactors in the case of many enzymatic reactions and also antioxidants. The lipoic acid has been clinically tested as a food supplement,

[7] Daniyal Abdali, Sue E. Samson, A. Kumar Grover, "How Effective Are Antioxidant Supplements in Obesity and Diabetes?" *Medical Principles and Practice* 24, 3 (2015).

[8] Block *et al*., "Factors Associated with Oxidative Stress."

[9] Block *et al*., "Factors Associated with Oxidative Stress"; Abdali, Samson and Grover, "How Effective Are Antioxidant Supplements"

[10] Abdali, Samson and Grover, "How Effective Are Antioxidant Supplements."

having benefits in both diabetes and obesity. L-carnitine found in red meat, dairy products, soy, nuts and seeds is involved in the conversion of free fatty acids into usable energy, lowering the oxidative stress, proven to to have benefits extensively in the case of type 2 diabetes. Coenzyme Q10 has an important role in the mitochondrial electron transport chain, essential for the production of energy. Procyanidine is found in aliments such as cinnamon, apple, cranberries, red beans, peanuts, almonds and has been studied as well for the improvement of diabetics' health. Resveratrol, apolyphenolic compound that is found in red grapes, berries, pomegranates, red wine has also been investigated for positive effects in diabetes.[11]

e) The antioxidant treatment and dyslipidemia

Characterised by elevated LDL-cholesterol and triglycerides and decreased level of HDL, dyslipidemia is also an often seen component of the MetS. The oxidative stress represents a consequence of dyslipidemia, as well, in the MetS. Exposing cells to high levels of fatty acids cause oxidative damage of mitochondrial DNA. The free fatty acids have a proapoptotic effect on various cells, fact that can be stopped by antioxidants and ROS scavengers like: alpha-tocopherol, alpha-lipoid acid, alpha-carnitine, Trolex – a potent antioxidant soluble water – derivate of tocopherol and fish oil.[12]

f) The interrelation between antioxidants insulin resistance

The insulin resistance is defined as an attenuated or inadequate response to a given quantity of insulin, associating pathologies such as: diabetes type 2, hypertension, metabolic syndrome, polycystic ovary syndrome, cardiovascular diseases, non-alcoholic fatty liver, breast cancer and acquired immune deficiency (AIDS). It has a genetic component, but can also be caused by acquired pathologies like: obesity, sedentary lifestyle, pregnancy and hormone excess. The antioxidants mainly used for treating insulin resistance are, according to several

[11] Block *et al*., "Factors Associated with Oxidative Stress."

[12] Block *et al*., "Factors Associated with Oxidative Stress"; Abdali, Samson, Grover, "How Effective Are Antioxidant Supplements"; Isaias Dichi, José Wander Breganó, Andréa Name Colado Simão, Rubens Cecchini, *Role of Oxidative Stress in Chronic Diseases* (U.S., CRC Press, 2014), 246-260.

clinical trials in which antioxidants were tested: alpha-lipoic acid, N-acetyl-cysteine, flavonols, glutathione, vitamins C, E.[13]

g) The effects of the antioxidants on atherosclerosis

Resulting from the imbalance between an exacerbation of reactive oxygen / nitrogen species and not enough antioxidant defences, the oxidative stress can also be analysed in the context of atherosclerosis, that is supposed to be a direct cause of endothelial dysfunction. There has been highlighted in several recent studies that the oxidative stress has a major contribution to the development of cardiovascular disease that often result in complications of atherosclerosis. The enzymes NADH/NADPH oxidases play the most important role in creating ROS in the vasculature and its reactivation contributes to positive changes in atherosclerosis. Several evidence lines attest the fact that there is a vicious circle between endothelial dysfunction and oxidative stress. The therapeutical classes of antioxidants used for treating atherosclerosis are mainly polyphenoles with their most important subclass: the flavonoids, the latter having effects on blood pressure reduction, platelet reactivity reduction, enzymatic modulation, endothelial function improvement and anti-inflammation. Some example of flavonoids would be: cocoa, red wine, tea, epigallocatechin gallate, resveratrol.[14]

4. PSYCHO-SOCIAL AND BIOETHICAL ASPECTS

The psycho-social intervention, through the doctor-social worker-psychotherapist relationship plays an important role in coping with all these negative psychological changes that appear in complex diseases such as the metabolic syndrome. Individualized or group therapy is indicated if the patient presents pathological psychological states like: anxiety, depression, panick attacks, confusion, that appear in the metabolic syndrome, both because the metabolic changes that take place, but also because of the often episodes of insomnia and poor quality of nocturnal sleep that could establish once with the obesity hypoventilation syndrome, regarding the case.[15] Once with the mentioned psychological issues, memory also gets deteriorated and in some cases the metabolic syndrome is associated with dementia. This later issue involves the

[13] Block *et al*., "Factors Associated with Oxidative Stress"; Abdali, Samson, Grover, "How Effective Are Antioxidant Supplements"; Joseph L. Evans, "Antioxidants: Do they have a role in the treatment of insulin resistance?" *The Indian Journal of Medical Research* 125 (2007), 355-372.

[14] Block *et al*., "Factors Associated with Oxidative Stress"; Dichi, José Wander Breganó, Andréa Name Colado Simão, Rubens Cecchini, *Role of Oxidative Stress in Chronic Diseases*, 137-160.

[15] Scott D. Mendelson, *Metabolic Syndrome and Psychiatric Illness: Interactions, Pathophysiology* (London: Academic Press, 2008).

inability to perform simple tasks, difficulty with finding the names for familiar objects, changes of mood, loss of social integration, changes in personality.[16] Confidentiality plays a major part in the pluri-inter-disciplinary relationship mentioned. Patients with such complex both clinical and psychological frameworks are vulnerable persons that might want to maintain certain discretion in the relationship with their families, friends and acquaintances. They become vulnerable within society, as well, both by direct discrimination and personal stigmatization. In what matters clinical psychology, the code of ethics establishes in two sections: the general principles specific to the profession of psychotherapist and the ethical standards involved by it. The general principles to be followed by psychotherapists are : beneficence and nonmaleficence , fidelity and responsibility, integrity, justice, respect for people's rights and dignity.[17]

Material and Method

We present the case of a 72-year old woman, associate professor, admitted in the Vth Medical and Geriatric-Gerontology Clinic of the Universitary Clinical Hospital of the *Romanian Railroad Company*, Iași, Romania for: persistent headaches, phosphenes, tinnitus, non-proceeded by nausea vomiting and retrosternal pain, solicitating specialized clinical and biological examination and reevaluation of her treatment scheme. Her medical records revealed her past medical history and observations upon the administration of drugs and therapies in her last submissions in the clinic.

Results

There is stated in her family history the presence of hypertension and diabetes type II in the case of the patient's father, deceased at 56 years old and of MetS in the case of her elderly sister. From the history of present illness we found that she had been having repeated episodes of hypertension in the last three years, once with the development of the metabolic syndrome. Her social history revealed personal social status-associate professor in a postgraduate sanitary school, with poor social relations she had been having lately since the onset of disease. There was also mentioned the fact that she was divorced, living together with her two daughters, one of them being also divorced and consumer of alcohol (information

[16] *Ibidem*.

[17] Mendelson, *Metabolic Syndrome and Psychiatric Illness*; *Ethical Principles of Psychologists and Code of Conduct*, accessed on June 19, 2015, www.apa.org/ethics.

stated in the parallel anamnesis files). There was also mentioned in the parallel sheets the fact that her relationship with her daughters is not very satisfying for her and that is what usually raises her blood pressure (maximal values between 170/100mmHg-180/110mmHg), creating her anger and frustration. As habits, she was a chronic smoker in most of her adult life, presently smoking only around 10 cigarettes per day. She occasionally consumes alcohol (2 glasses/week or at special occasions), doesn't do much physical activity, with a diet high in fats and sugar, mentions no sexual activity. In the parallel anamnesis files there were also specified the environmental conditions in which she had been spending most of her daily activity-an industrial area where the sanitary school was located with chemical and physical pollution coming from fabrics and traffic.

Within the physical examination more useful medical data were gathered about the patient's pathology in order to orientate the diagnosis: weight of 100 Kg, height=1,67cm, BMI=35,9 and waist circumference=101 cm (indicators for obesity class II), generally altered state, afebrile , the presence of ronflant rales on both pulmonary areas in the case of the respiratory system clinical investigation, tachyarrhythmic cardiac noises, in spaces III-IV, left parasternal, without irradiation, arterial blood pressure of 170/100mmHg.

The paraclinical investigations were correlated with the anamnesis and physical examination in order to state the final diagnosis of metabolic syndrome. Her EKG in parallel with the ecocardiographic findings revealed left ventricular hypertrophy. The hepatic echocardiography revealed steatotic lesions and the laboratory investigations highlighted a dyslipidemic syndrome with triglycerides =187 mg/dl and a hepatic cytolysis syndrome (SGOT=121 IU/L, SGPT=180 IU/L), affections that often appear in the metabolic syndrome. Blood glucose level was increased, the fasting blood sugar being 130mg/dl. The tryglicerides level was 170mg/dl, total cholesterol was 242 mg /dl, LDL-cholesterol =160mg/dl, VLDL-cholesterol=162 mg/dl, HDL-cholesterol=44mg/dl, thus being indicated insulin resistance and the risk for atherosclerosis.

The treatment scheme consisted of a complex antioxidant therapy: 1. allopathic treatment: metformin 1 tablet/day – in the morning for treating diabetes, enalapril maleate – 1 tablet of 40 mg/day for hypertension, atorvastatine –1 tablet – 10 mg/day for lowering high cholesterol levels; 2. hypolipidic and hypoproteic diet of a Mediterranean type; 3. alimentary supplements: Zeolit 3 capsules/day, Chlorella 2 capsules/day, Glutathione 2 capsules /day, Coenzime Q10 1 capsule/ day, Vitamax 1 capsules /day; 4. exercise programme with walks for half an hour every day after dinner.

The patient followed the recommended treatment scheme addressed to the metabolic syndrome, also with antioxidant effect. But once with the onset of several depressive-anxious manifestations the patient decided to ask for supplementary support to a specialized psychotherapist. After following a few sessions of psychotherapy and discussing about her medical and social issues, the patient decides to improve her former prescribed treatment scheme with some diverse methods from alternative medicine: massage therapy – lymphatic and reflexive massage 2 times/week, homeopathic treatment – Ignatia 15 CH (5 granules/day for 2 weeks alterning with 3 days/week, another 3 weeks for growing self-esteem and treating anxiety and Sedatif PC 2 comprimates/day) and phytotherapy with antioxidant herbal mixes of basil tea, rosemary tea, jasmine tea – 1 little spoon of each in 2 liters of water/day. She also started a new fibrate therapy that would activate receptors that affect triglycerides and HDL-cholesterol.

Her evolution was favorable. After respecting both the medical prescription and using antioxidants from alternative medicine, at a 90 day-follow up she had lost 5 Kg and the laboratory investigations improved. The triglyceride level reduced by 10 %, the HDL-cholesterol value increased by 10 %, while LDL-cholesterol decreased by 15 % and blood pressure got to 160/90mm Hg. She also reduced consideratively smoking to only 3 cigarettes per day.

Discussion

As external triggers for the metabolic syndrome, the patient investigated had been exposed to several exogenous risk factors like smoking (10 cigarettes/day), abundant environmental pollution-chemical (hydrocarbon pollution coming from both traffic and fabrics in the area where she was teaching) and physical (UV radiation, heat), a non-specific diet with the gradual development of her pathology. Regarding the genetic involvement in the metabolic syndrome, the patient investigated had predisposition for the development of MetS on her father's side that had both hypertension and diabetes and her elderly sister that developed metabolic syndrome, as well. No genetic readings were effectuated to see the gene alterations that appear in the metabolic syndrome.

Reactive oxygen species (ROS) are a byproduct of the normal metabolism of oxygen and have important roles in cell signalling and homeostasis. An imbalance between ROS production and the cellular antioxidant defense system leads to oxidative stress. Environmental factors and genetic interactions play key roles in oxidative stress mediated pathologies. In the cardiovascular diseases and obesity,

disorders strongly related to each other; the oxidative stress plays a fundamental role. There is evidence of the key role played by protein and protein kinase C (PKC) in these pathologies by their intracellular regulation of redox balance and oxidative stress levels. According to Rebecca Hutcheson *et al.*[18] the increased oxidative stress that appears in conditions of short exposure to air pollution-aromatic hydrocarbon and metal nanoparticles, with the penetration of the alveolar walls and activation of alveolar macrophages and NAD(P)H, mitochondrial oxidases and xanthine oxidases.[19] The ROS generated by polluted air initiates the increasing of oxidants and dicreasing of antioxidants, the response to nanoparticles exposure consisting in cellular destruction. The oxidative stress has as effect as well the giving of inflammatory mediators off that have negative impact on endothelial cells, especially, this being a trigger event for the development of several cardiovascular diseases.[20]

A survey made by the Third National Health and Nutrition Examination, mentioned in *Diabetes* medical journal in 2003, compares several antioxidants in the case of participants with and without metabolic syndrome, in the context of exogenous risk factors: vitamins A, C, and E in matters of circulating concentrations; retinyl esters; five carotenoids; and selenium. The study showed that there were lower concentrations of retinyl esters, vitamin C, and carotenoids in the case of patients with metabolic syndrome, comparatively with the ones without the pathology.[21] Excluding diabetes of the framework, there was similar result, still. Patients with metabolic syndrome were also consuming less fruits and vegetables than the other group. The explanation for these results is that in the metabolic syndrome, patients do not have enough concentrations of necessary antioxidants, fact which increases the risk for associated diabetes and cardiovascular pathologies. In diabetes mellitus the oxidative stress reduces the up-take of glucose at muscular and lipid levels and decreases insulin secretion from Beta pancreatic cells. The high level of oxidative stress indicates the pathophysiology of hypertension and atherosclerosis, directly affecting the vascular walls. Recently, there has been defined in several studies the involvement

[18] Hutcheson and Rocic, "The Metabolic Syndrome."
[19] Block *et al*., "Factors Associated with Oxidative Stress."
[20] Block *et al*., "Factors Associated with Oxidative Stress."
[21] Earl S. Ford, Ali H. Mokdad, Wayne H. Giles and David W. Brown, "The Metabolic Syndrome and Antioxidant Concentrations-Findings From the Third National Health and Nutrition Examination Survey," *Diabetes* 52, 9, September 2003.

of the individual components of the metabolic syndrome, taken separately, in creating oxidative stress.[22]

In the presented case, the patient was not involved in any physical exercising program and wasn't doing much physical activity, before her visit to the psychotherapist and doctor's recommendations by changing her lifestyle, having a diet high in fats and sugars, mentioning no sexual activity. According to World Heart Federation , diets high in sugars, saturated and transfats, low fibre foods and high-sugar drinks contribute to non-communicable diseases (NCDs) and other health issues.[23] According to updated studies from literature, weight loss (10% of body weight) by moderate diet and moderate-intensity physical exercise in metabolic syndrome has been shown improvement of markers of oxidative stress.[24] Opposingly, data from a 21-day residential diet and exercise program in overweight or obese patients showed a decrease in oxidative stress and improvement in other cardiovascular risk factors related to metabolic syndrome before the loss of weight, even.[25] This effect could have been mediated by a reduction in oxidative stress through an improvement in endothelial function and nitric oxide (NO) production or up regulation of antioxidant defenses, in the context of physical exercise.[26]

The interrelation between the antioxidant therapy, metabolic syndrome and its individual components: obesity, diabetes mellitus, hypertension, dyslipidemia, insulin resistance, atherosclerosis has been studied in literature in both intervention studies and clinical trials showing the importance and necessity of lowering the antioxidative stress and chronic inflammation at cellular and biomolecular level, with the purpose of preventing ageing, heart disease, cancer, immune deficiencies and improving the overall health. Our study showed the benefic impact of several antioxidant medication used for treating some of the major pathologies involved in the development of the MetS: metformin (for diabetes), angiotensin converting enzyme inhibitors (ACE inhibitor) (for regulating blood pressure), enalapril maleate (for hypertension) in association with several antioxidant supplements: Clorella, Zeolit, glutathione, coenzyme Q10, vitamins on a relatively short period of time (90 days). Our results are similar to the ones found by Rebecca Hutcheson

[22] Hutcheson and Rocic, "The Metabolic Syndrome"; Block et al., "Factors Associated with Oxidative Stress"; Ford et al., "The Metabolic Syndrome and Antioxidant Concentrations."
[23] "Unhealthy Diet," accessed on June 16, 2015, www.worldheart.org.
[24] Hutcheson and Rocic, "The Metabolic Syndrome."
[25] Block *et al*., "Factors Associated with Oxidative Stress."
[26] Block *et al*., "Factors Associated with Oxidative Stress."

et al.[27] who also identified that the benefits of lowering the oxidative stress at a cardiovascular level within the metabolic syndrome can be also sustained by even the effects that specific drugs used for the treatment of MetS and its components have: metformin, statins, ACE inhibitors, angiotensin II receptor blocker (ARBs). These pharmacological agents that were found to have beneficial cardiovascular effects, independently of their initial function: glycemic control (metformin), lipid lowering (statins), regulation of arterial blood pressure (ACE inhibitors and ARBs).[28]

We also showed that methods of alternative medicine like homeopathic antioxidant treatment in combination with phitotherapic therapy and massage therapy can have positive effects in case of patients with metabolic syndrome with a psychological component as well (in this case, the depression and anxiety disorders). Hollander *et al*.[29] also accepted alternative medicine methods of treatment in the metabolic syndrome, as ways to reduce oxidative stress and rehabilitate patients with this pathology.

In the presented case, psychotherapy had a decisive role in helping the patient understand the importance of her pathology and the associated psychological disorders like anxiety, depression, panic attacks, becoming able to follow correctly her treatment scheme with positive results: growth of self esteem and coping with various implications of the disease. The role of the psychotherapy is therefore to reintegrate the patient in society, by discussing more about how they see their own personal pathology in changes of behavior, analyzing together the entire psychological framework and coming with solutions. The existent psychotherapies are verbal-individual, action-based on psychotherapies, corporal psychotherapies, group psychotherapies, conscience level-psychotherapies. The psychotherapist needs to develop practical wisdom, thing which engages: the ability of correctly rationing and knowing the way in which the world functions, the capacity of having attention and moral perceit, the capacity of autoreflection, the existence of a practical imagination and emotional intelligence.[30] There are also risk factors like transfer, countertransference and dependence in

[27] Hutcheson and Rocic, "The Metabolic Syndrome."
[28] Block *et al*., "Factors Associated with Oxidative Stress."
[29] Jason Hollander and Jeffrey I. Mechanick, "Complementary and alternative medicine and the management of the metabolic syndrome," *Journal of the American Diet Association* 108(3) (2008): 495-509.
[30] Hamidreza Roohafza Masoumeh Sadeghi, Mohammad Talaei, Pourmoghaddas Zahra and Nizal Sarrafzadegan, "Psychological Status and Quality of Life in relation to the Metabolic Syndrome: Isfahan Cohort Study," *International Journal of Endocrinology* 2012 (2012).

psychotherapy, but there are special techniques to avoid these aspects, taking into account also the ethical limits, as to respect the patient's autonomy based on moral and emotional-cognitive development. A short analysis of the main five concepts used in psychotherapy such as the etiological concept, the health concept, the therapeutical concept, the temporal perspective and the role of the psychotherapist, show us the necessity of an actualized deontology in the field of psychosocial intervention.[31] Recent studies have shown that depression connected with stress, inflammation and anxiety leads to cardiac pathophysiology like: arrhythmias, heart failure, ischemic heart disease. According to Hamidreza Roohafza *et al*.[32] in a study about the psychological status and life quality in MetS, it is also highlighted the relationship of depression, anxiety and psychological distress with the metabolic disease, taking into consideration, as well, the poor socio-economic situation and demographic changes.

Conclusions

In conclusion, maintaining adequate antioxidant status may provide a useful approach in attenuating ROS – mediated cell injury and dysfunction observed in some inflammatory / autoimmune disorders and chronic pathophysiological oxidative stress factors. In the case of patients with metabolic syndrome-a constellation of individual pathologies, both external and endogenous risk factors play a major role in the development of the oxidative stress and its control through antioxidant therapy is a matter of improving the quality of life and prolonging the life span. The complex classes of antioxidants used for the treatment of the metabolic syndrome consisting not only in the drugs used for treating the individual components of the metabolic syndrome, but also in natural extracts, vitamins and minerals that could be obtained from the field of alternative medicine are still to be investigated and developed more in the near future. Additionally, patients with metabolic syndrome understand more about how to respect their medical prescriptions and recommendations by visits to the personal psychotherapist. The use of psychotherapy is seen not only at a mental and spiritual level, but also at a physical one. Through psychotherapy, patients learn how to cope with their own disease, improve their state of health, solve personal

[31] John Rawls, "Justice as Fairness: Political not Metaphysical," *Philosophy and Public Affairs* 14 (Summer 1985): 223-251; American Psychological Association Inc., *Ethical Principles in the Conduct of Research with Human Participants* (Washington, DC: APA, 1973), 76.
[32] Roohafza *et al*., "Psychological Status and Quality of Life."

conflicts, modify their vision upon life, self control and stress control, promoting the self-actualizing, self-development, authenticity and spontaneity. The psychotherapist has the role and purpose to create an empathic meeting, a dialogue of acceptance, concentration and role-playing. Through understanding personal matters and short therapies focused on communication, the patient reflects upon personal issues and is willing to collaborate more for problem solving.

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