

Effect of Combination Therapy on Cardiovascular Risk in the Pit Miners with Hypertension, Metabolic Syndrome and Depression

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ABSTRACT

Background: Higher cardiovascular (CV) morbidity and mortality in depressed patient has demonstrated repeatedly. **Aim:** Determine the degree of occurrence of hypertension, metabolic syndrome (MetS) and depression in the pit miners and the impact of the six-month holistic treatment of all CV risk factors and depression in the overall CV risk in miners with hypertension, MetS and depression. **Methods:** From 492 pit miners was taken smoking status, measured blood pressure, waist circumference and body mass index. Analysis was done using the concentration of sugar in blood, triglycerides, total cholesterol, HDL, LDL cholesterol and determined total CV risk. All respondents filled self-assessment Beck's depression scale. Prevalence MetS hypertension and depression were determined. Group of 67 patients with joint hypertension, MetS and depression that is treated six months with psychotropic and somatotropin medication, was singled out. After six months, the effect of therapy on the risk factors and total CV was assessed. **Results:** Among 492 miners 67 (13,61%) of them had hypertension, MetS and depression. After six months treatment, it showed statistically significant reduction in blood pressure ($p=0,0001$), waist circumference ($p=0,0001$), total ($p=0,002$), HDL ($p=0,007$) and LDL cholesterol ($p=0,003$), smoking ($p=0,002$), Beck's scale results ($p=0,007$) and reduction in total CV risk. **Conclusion:** After six month of combine therapy in respondents has led to reduced CV risk and level of all factors, except BMI and triglycerides.

Key words: hypertension, cardiovascular risk, metabolic syndrome, depression, risk factor.

1. INTRODUCTION

Depression is heavily included in prediction of cardiovascular diseases development (1). Psychosocial factors are included in etiology and progression of cardiovascular diseases for a long time (2). Earlier researches show that depression is large psychosocial predictor for development and progression of cardiovascular diseases (3). Certain study had proven importance of depression and metabolic syndrome as independent cardiovascular risk factors in women, suggesting that depression and metabolic syndrome increase cardiovascular risks mostly through independent relations (4). Risk for heart attack is 4 times larger in cases with depression in comparing to those without it, and in cases with evident sorrow in past two weeks the risk is two times larger in comparing to cases with lack of depression (5). People suffering from depression are being diagnosed with cardiovascular diseases significantly more often in comparing to general population and it is believed that cardiovascular diseases are

being diagnosed ten years after the first depression episode (6). Depression is identified as risk factor for insufficient cooperation in therapy, although proper mechanism through which depressive symptoms can have an influence on cooperation aren't clear and can be very complicated. Single study had proven that older patients with coronary disease combined with evident depression don't quite follow suggested measures (45%) in comparing to those without depression (69%) (7). Even though the most of patients with depression report to offices of primary health protection, there are certain evidences that depression often goes unnoticed and inadequately treated (8). Therefore, an objective approach is important in researches of depression because pessimism in depressive patients can result with an incorrect report on proper therapy usage among cases with progressive depression form (9). Influence of depression on comorbidity and outcome of other diseases can be decreased or eliminated with more intensive approach to depression treatment (10).

The aims of the work:

- Determination of presence and coexistence of hypertension, metabolic syndrome and depression in miners,
- Determination of presence of certain risk factors and total cardiovascular risk in miners with arterial hypertension along with metabolic syndrome and depression presence,
- Determination of holistic six month treatment of all cardiovascular risk factors and depression on total cardiovascular risk in miners with arterial hypertension along with metabolic syndrome and depression evident.

2. PATIENTS AND METHODS

Epidemiological and prospective research have been conducted in mine pit „Omazici“, Black Coal Mine Banovici. In the end of epidemiological testing 492 tested subjects were with complete documentation for our analysis. All tested cases were risk factors determined: height and body mass, waist circumference, body mass index and smoking status. Blood pressure values were taken along with laboratory analysis of sugar in blood, triglycerides, blood cholesterol, concentration of HDL and LDL cholesterol values. At the same time, all tested subjects completed Becks' scale for determination of anxiety level and depression that was used for determination of depression prevalence among tested subjects. Based on blood pressure values and according to guidelines of European Association for Hypertension, we have determined the prevalence of arterial hypertension among tested subjects in this coal mine department.

According to criteria of National Cholesterol Education Program, Third Adult Treatment Panel, NCEP-ATP III, we have determined prevalence of metabolic syndrome among tested subjects. Also, in both tested groups of miners the evaluation of depression evidence was evaluated according to Becks' scale. This particular epidemiological study evaluated the presence of hypertension, metabolic syndrome and depression among employees in department of mine pit „Omazici“, Black Coal Mine Banovici, as well as their mutual relation. We have extracted the group of workers with hypertension, metabolic syndrome and depression evident. According to Systematic Coronary Risk Evaluation (SCORE) scalar system, total 10-year cardiovascular risk was determined along with total number of risk factors for cardiovascular diseases in Black Coal Mine Banovici medical department.

All tested cases were treated for all risk factors along with depression by holistic approach. After conducted therapy, all tested subjects were tested on same risk factors again and total 10 year cardiovascular risk was evaluated by SCORE. Based on results, we have determined the influence of holistic therapy approach on risk factors as well as on total cardiovascular risk in tested group.

3. STATISTICAL ANALYSIS

Statistical methods in this research include descriptive statistics with display of central values and adequate measures of data dispersion as well as interference statistics. Collected processing was conducted in computer program statistical package for social sciences for windows, version 18.0 PASW–SPSS Inc. Chicago, IL, USA. Numerical data were displayed through central tendency measures and proper measures of dispersion. For testing of hypothesis between two groups, concept of independent samples, T-test and Mann-Whitney test was used

if distribution discrepancy was noticed. For testing of difference in repeated measurement, independent sample concept, binary T-test or Wilcoxon test was conducted depending on distribution of normality. For frequency analysis Hi-quadrant test was used. Results are displayed in tables and graphics. For statistical significance of “p” value, the usual significance level was chosen, “p<0,5”.

4. RESULTS

The study included 492 tested subjects, employed in mine pit of Black Coal Mine Banovici, all males in average life span of 41,89 (\pm 6,08) years. 43,90 % of tested subjects were with hypertension, 42,88% were with metabolic syndrome and 33,94% were with depression. 13,61% (67) of respondents had associated hypertension, metabolic syndrome and depression

After combined therapy in hypertensive miners with metabolic syndrome and depression, statistically significant differences in all observed factors were evident except for BMI values with decrease of total cardiovascular risk as well as significant improvement of psychological status measured by Becks' self evaluating depression scale (table 1)

	Initial measurement (n=67)	After 6-month treatment with samothrope and psychotrope medicines (n=62)	p-value
SBP (mmHg)	155 (145-200)	120 (120-150)	0.0001
DBP (mmHg)	100 (95-105)	80 (75-80)	0.0001
BMI(kg/m ²)	29.84 \pm 3.39	29.72 \pm 3.80	0.75
WC (cm)	105.90 \pm 9.37	98.95.3 \pm 9.62	0.0001
BS (mmol/l)	4.5 (4.0-15,6)	4.80 (4.50-5.10)	0.001
TGL (mmol/l)	1.79 (1.96-4.14)	2.27 (1.53-3.23)	0.06
TC (mmol/l)	6.08 \pm 1.23	5.37 \pm 1.24	0.002
HDL (mmol/l)	0.91 (0.79-1.12)	1.01 (0.90-1.18)	0.007
LDL (mmol/l)	3.66 \pm 1.06	3.22 \pm 1.11	0.003
Beck's score	17 (13-47)	15 (9-22)	0.007
CVR (SCORE)	2.0 (0-20)	1.0 (1.0-3.0)	0.002

Table 1. Risk factor values in hypertensive miners with MetS and depression before and after 6-month treatment with samothrope and psychotrope medicines. Legend: SBP- systolic blood pressure; DBP- diastolic blood pressure; BMI- body mass index; WC- Waist circumference; TC-total cholesterol; BS-blood sugar; LDL- low density lipoprotein; HDL- high density lipoprotein; TGL-triglycerides; CVR-cardiovascular risk.

The most frequent risk factor in the beginning of prospective part of study is increased value of BMI (95,92%) and increased concentration of triglycerides (91,04%). After 6-month treatment there has been a significant change in presence of almost all risk factors except for BMI (90,32%) and triglycerides (62,90%) (table 2).

In the beginning of retrospective study the most of tested subjects were with joined 7 and 6 risk factors and after treatment 4 and 3 risk factors. At the end of the study decrease of tested subjects number with 4 risk factors was evident in comparing to the beginning (figure 1).

Risk factors	Before therapy (n=67)	After 6-moth treatment (n=62)	
	N %	N	%
smoking	44 65,67%	37	59,60%
WC	44 65,67%	17	27,41%
BMI	64 95,92%	56	90,32%
BS	2 2,98%	6	9,67%
TC	50 74,62%	32	51,61%
Triglycerides	61 91,04%	39	62,90%
HDL	48 71,64%	29	46,77%
LDL	50 74,62%	25	40,32%
BP	67 100,0%	14	22,58%
depression	67 100,0%	37	59,67%

Table 2. The presence of risk factors before and after 6-moth treatment. Legend: N- number; BP- blood pressure; BMI-body mass index.WV-waist circumference ; TC-total cholesterol; BS-blood sugar; LDL low density lipoprotein; HDL- high density lipoprotein;

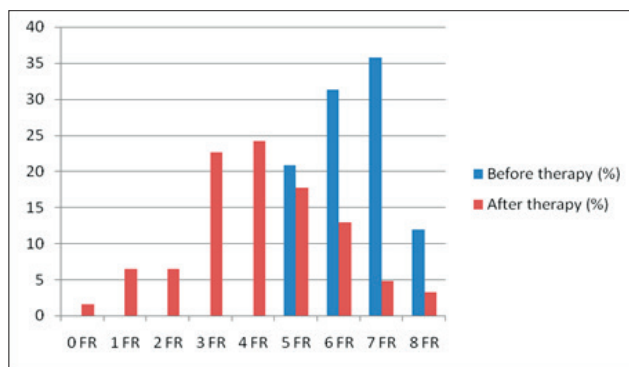


Figure 1. Jointment of risk factors (FR) in prospective study, before and after treatment

After conducted therapy among 62 tested subjects, 20 of them (32,25%) were with metabolic syndrome while in 42 (67,74%) of them the normalization of risk factors took place along with less explicit grouping of these factors. 15 tested subjects out of 20 were still with evident depression syndrome (75,00%) as well as 22 (52,38%) of those tested subjects who were without metabolic syndrome. Hypertension and metabolic syndrome are related to higher cardiovascular risk no regarding the presence of depression.

5. DISCUSSION

Depression is related to metabolic syndrome (11) and is growing problem in USA as well as important risk factor for cardiovascular diseases and lethal outcomes (12). PILS III (Pilsen Longitudinal Study III) have proven the fact that depressive disturbances were twice more often in those cases with metabolic syndrome evident in comparing to those without one.

In those subjects with high cardiovascular risk the connection of metabolic syndrome with depression and depressive symptoms was noticed but not with the anxiety regarding sex and overweight (13). According to results of one of studies 36% of tested subjects with depression were also with metabolic syndrome evident (14). According to Viinamäki prevalence of metabolic syndrome in men was in 49% and in women in 21% but men with metabolic syndrome were with higher degree of high depressive disturbance than in women (15).

However, Nord-Trondelag Health Study (HUNT 2) hadn't proven relation between anxiety and depression with metabolic

syndrome (16). Also, the research in Finland based on 32 years of monitoring of tested subjects didn't prove relation between metabolic syndrome and psychological stress (17). Our research proved the fact that metabolic syndrome is significantly present in those tested cases with depression (44,97%) in comparing to those cases without it (28,79%). In the end of 6-month treatment with combined psychotropic and somatotrope therapy of tested subjects with metabolic syndrome and depression, 20 (32,26%) of them were still with metabolic syndrome and 15 were with evident metabolic syndrome and depression (75,00% with metabolic syndrome or 24,19 of total number of tested cases).

In previous research in same coal mine that covered factors of cardiovascular risk among normotensive and hypertensive miners, apart from depression, the most of tested subjects with hypertension (46,25%) were with 4 risk factors and in normotensive group with the largest number of tested subjects, (33,75%) were with 1 risk factor evident (18). Depressive symptoms are related to number of metabolic syndrome components in policemen, especially in males (19). This fact confirms our research in which most of miners with depression, hypertension and metabolic syndrome (35,82%) were with 7 risk factors, 31,34% were with 6 risk factors and 11,94% were with 8 joined risk factors evident. After 6 – month combined therapy, decreased level of depression occurred in regrouping of other risk factors where ¼ of miners were with 4 and 3 joined risk factors (22,58%) and only 4,83% were with 7 joined risk factors. Our research confirmed that miners with depression are older, usually smokers, with higher blood pressure and presence of all other cardiovascular risk factors except the waist values along with the tendency for grouping of these risk factors in comparing to other miners without depression. We can conclude the existence of statistically significant difference in cardiovascular risk among tested subjects with and without depression. After prospective research during which tested subjects were treated with combined psychotropic and somatotropic therapy, statistically significant decrease of cardiovascular risk occurred (p=0,0002). Some researches point to larger effectiveness of psychotropic and somatotrope medicine therapy according to all parameters – arterial pressure, metabolism carbohydrates and lipids parameters and level of affective disturbance (20). In following study Tsygankov had also proven that the aimed pressure value was achieved in 79,5% tested subjects in combined coaxil antidepressive therapy and in 65,7% of tested cases in monotherapy during which somatotrope monotherapy in most of controlled patients failed to deliver achievement in psychopathological disturbances recovery among tested subjects (21).

Previous researches in this field have confirmed that the standard and somathrope treatment of arterial hypertension in patients with coronary disease and depression wasn't effective enough and combination of such treatment with antidepressive therapy significantly improves psychological status and therapy effectiveness of basic cardiological diseases (22).

In hypertensive patients with anxiodepressive disturbance hypertensive therapy in combination with antidepressive turned out to be more efficient in regulation of these disorders (23). In our tested group, significantly statistical difference was noted in level of high blood pressure after combined therapy treatment (p=0,0001). After combined therapy treatment 77,42% of our tested subjects achieved aimed values of blood pressure.

Results of certain researches don't actually prove relation between levels of triglycerides and depressive symptoms but they prove the existence of significant relation between cholesterol level and depression (24). Results of our research prove the fact that triglycerides are significantly more evident among miners with depression, even in 65,8%. Also, our research noted statistically significant increase of triglycerides value ($p=0,01$) from the beginning (1.79 (1.96 – 4.14) mmol/l) to the end (2.27 (1.53 – 4.23) mmol/l) of prospective part of study, even though increased level of triglycerides in the beginning of research was evident in 91,04% and in the end in 62,90% of miners. Usage of antidepressive medicines during 12 weeks by tested subjects with metabolic syndrome and depression have decreased depression but also influenced decrease of BMI, waist values, level of blood pressure and improvement of glucose metabolism without registering of changes in cholesterol and triglycerides level (25). After our six month holistic treatment of miners with combination of somatotropic and psychotropic medicines, statistically significant difference in level of all monitored parameters was achieved except in BMI values. Only triglycerides value noted level increase and in the end of research triglycerides level was higher in the beginning of research, even though the number of miners with higher triglycerides level was decreased after therapy (in the beginning of research was 91,04% and 62,9% of them were with higher level of triglycerides in the end of research).

Relation between high comorbidity of depression with sudden coronary death or other cardiovascular events in cases with over 80 years of life was researched in Italy. After 4,6 and 12 months of treatment with antidepressives decrease of cardiovascular episodes was evident (-75%, -83% and -60%), what proves existence of correlation between level of effectiveness and coronary function (26). Our research also confirmed statistically significant ($p=0,002$) fall of cardiovascular risk after conduction of combined therapy.

6. CONCLUSION

Arterial hypertension, metabolic syndrome and depression have high prevalence among pit miners in Black Coal Mine Banovici what results with increase of total cardiovascular risk. In those groups. Consumption of combined psychotropic and somatotropic therapy in risk factors treatment during six month period has decreased depression but also waist values, blood pressure values and concentration of total, HDL and LDL cholesterol and sugar in blood in tested subjects with arterial hypertension and MS with depression. Changes in BMI values wasn't evident but increase in triglycerides level in blood was evident.

Conflict of interest: NONE DECLARED.

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