Research letter

Red wines countering the metabolic syndrome

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Abstract: Aim is to evaluate effectiveness of red wines as a part of medical rehabilitation in coronary heart disease (CHD) patients with metabolic syndrome (MS).

Material and Methods — Analysis of effectiveness of table dry red wine “Cabernet” (DW) and liquor red wine “Cahors” (LW) as parts of the spa resort treatment, was carried out in group of 119 patients with CHD (36 patients with MS).

Results — In patients without MS in main group (with wine consumption) the domain dynamics demonstrate more beneficial changes in comparison with control group. In patients with MS in main group (with wine consumption) the domain dynamics demonstrate no more beneficial changes in comparison with control group.

Conclusion — The moderate consumption of red wines can be recommended to patients with coronary heart disease rather as a preventive measure to developing metabolic syndrome.

Keywords: metabolic syndrome, medical rehabilitation, red wine.

Cite as Mizin VL, Iezhov VV, Severin NA, Yalaneckyy YA. Red wines countering the metabolic syndrome. Russian Open Medical Journal 2018; 7: e0414.

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Material and Methods

Analysis of effectiveness of red wines as part of spa resort treatment was carried out in group of 119 patients with CHD (36 patients with MS). All patients received individual spa resort treatment, which involves the use of all necessary medical factors and pharmaceuticals (climatic- and spa-therapy, remedial gymnastics, massage, baths, physiotherapy, supporting medication, etc.). Characteristics of treatment program in all four groups were not significantly different (except for the wine consumption).

Main characteristics of table dry red wine “Cabernet” (DW), produced by classical technology from red grape of Cabernet-Sauvignon variety, and liquor red wine “Cahors” (LW), produced by classical technology from couple of red grape of Cabernet-Sauvignon and Saperavi varieties, are: alcohol content (% by volume) is 10.6 and 10.0 accordingly; sugar (mass concentration based on invert, g/l) is 0.0 and 160.0 accordingly; titrated acids (mass concentration in terms of tartaric acid, g/l) is 8.3 and 6.8 accordingly; total phenolic compounds (mass concentration, mg/l) is 1717.0 and 2080.0 accordingly; including anthocyanin (mass concentration, mg/l) is 255.0 and 162.0 accordingly. Reception of wine was carried out once a day in the afternoon. Daily doses in core groups were 200 ml of DW (consist of 21.2 ml of ethanol and 343.4 mg of total phenolic compound) and 100 ml of LW (consist of 16.0 ml of ethanol and 164.2 mg of total phenolic compound).

Methods of investigation included an assessment of functional state of the leading physiological systems by 20 domains of International Classification of Functioning, Disability and Health (ICF) [10, 11]. All the objective, laboratory and functional investigations were conducted by standard procedures. The estimation of the ICF domain values was carried out according to the procedure [12].

All studies were performed twice, with fixation of the results (M±m) before and after the treatment. At the same time, we also evaluated domain value dynamics Δ as: Δ = (domain value at initial state of treatment) – (domain value at the end of treatment) and pair correlation coefficient (r) of Δ with course dose of wine components. The statistics significance of Δ and r were estimated at p<0.050 or less.
Table 1. The ICF domain value dynamics (Δ) and pair correlation coefficient with component of consumed wine (r) that indicate influence of red wine in CHD patients with or without associated MS

| ICF domains                  | ICF domain value dynamics, Δ (in points) and pair correlation coefficient with component of consumed wine, r | Patients with MS | Core group 1A (n=14) | Control group 1B (n=22) | Patients without MS | Core group 2A (n=38) | Control group 2B (n=45) |
|-----------------------------|-----------------------------------------------------------------------------------------------------------|------------------|---------------------|-------------------------|---------------------|---------------------|-------------------------|
|                             |                                                                                                          | Δ                | r                   | Δ                      | r                   | Δ                   | r                       |
|                             |                                                                                                          | 1                | 2                   | 3                      | 4                   | 5                   | 6                       | 7                       |
|                             |                                                                                                          | b2401 Dizziness  | 1.00±0.14*§         | 0.68±0.12*             | 0.79±0.07**§         | E, r=0.329         | 0.53±0.10*             |                        |
|                             |                                                                                                          | b280 Sensation of pain | 0.82±0.13*          | 0.93±0.10*$§         | 0.99±0.06*§         | W, r=0.490         | 0.65±0.06**§         |                        |
|                             |                                                                                                          | b28010 Pain in head and neck | 1.00±0.14*$§       | 0.93±0.14*             | 0.60±0.10*$§         | E, r=0.280         | 0.53±0.11*§           |                        |
|                             |                                                                                                          | b28011 Pain in chest – heartache | 0.64±0.16*          | 0.93±0.11*             | 1.02±0.11*          | W, r=0.516         | 0.81±0.09*           |                        |
|                             |                                                                                                          | b410 Heart rate  | 0.21±0.08           | 0.00±0.00              | 0.00±0.03            | E, r=0.380         | 0.00±0.08              |                        |
|                             |                                                                                                          | b4110 Blood pressure functions | 1.04±0.19*          | 0.17±0.23*             | 0.48±0.09*$§         | W, r=0.790         | 0.88±0.15*           |                        |
|                             |                                                                                                          | b4301 Haematological system | -0.03±0.17          | -0.06±0.07             | 0.15±0.07            | E, r=0.030         | -0.03±0.10            |                        |
|                             |                                                                                                          | b4303 Clotting functions | -0.14±0.27          | -0.12±0.18             | -0.30±0.13           | W, r=0.030         | -0.07±0.20            |                        |
|                             |                                                                                                          | b4550 General physical endurance | 0.35±0.13           | 0.25±0.11              | 0.39±0.08            | W, r=0.290         | 0.45±0.13             |                        |
|                             |                                                                                                          | b4551 Aerobic capacity | -0.12±0.29           | 0.25±0.21              | 0.39±0.14            | W, r=0.290         | 0.45±0.13             |                        |
|                             |                                                                                                          | b4552 Fatiguability | 0.92±0.12*          | 0.93±0.06*             | 0.89±0.09*           | W, r=0.328         | 0.75±0.09*            |                        |
|                             |                                                                                                          | b540 General metabolic functions | 0.31±0.29*          | 0.45±0.20              | 0.86±0.21*           | W, r=0.328         | 0.20±0.08             |                        |
|                             |                                                                                                          | b5403 Fat metabolism | 0.32±0.28           | 0.28±0.14              | 0.11±0.14*           | W, r=0.328         | 0.27±0.11             |                        |
|                             |                                                                                                          | b5408 General metabolic functions, other specified – MS | 1.57±0.38*$§       | 1.06±0.23*             | 0.02±0.025           | W, r=0.328         | 0.06±0.04*            |                        |
|                             |                                                                                                          | d2408 Handling stress and other physiological demands, other specified | 0.17±0.15           | 0.52±0.21              | 0.20±0.10            | A, r=0.316         | 0.57±0.16*            |                        |
|                             |                                                                                                          | All controlled domains | 0.42±0.06*          | 0.38±0.03*             | 0.31±0.03*           | W, r=0.338         | 0.29±0.03*            |                        |

Data of Δ presented as mean with standard deviation (M±SD); r, pair correlation coefficient with components of consumed wine; ICF, International Classification of Functioning, Disability and Health; MS, metabolic syndrome; * , statistically significant (p<0.05) difference of domain values before and after treatment, i.e., significant Δ of domain; & & , statistically significant (p<0.05) difference between the means in two groups with the same notation (between $ and $, between & and &), between § and §. W, significant (p<0.05) pair correlation coefficient with wine course dose (drinks); E, significant (p<0.05) pair correlation coefficient with ethanol course dose (ml); PC, significant (p<0.05) pair correlation coefficient with total polyphenol compound course dose (mg); A, significant (p<0.05) pair correlation coefficient with anthocyanin course dose (mg).

Results and Discussion

The mean values of domains had the similar level at initial state in all groups of patients. The data that are indicate influence of wine are presented in Table 1.

The medical rehabilitation in both core groups of patients with CHD is characterized by high efficiency, which is in agreement with the data obtained earlier on beneficial effect of the Cabernet-Sauvignon alcohol free concentrate [9]. We have shown that patients without MS have the better rehabilitation prognosis for a complex of controlled ICF domains. Influence of wine on functional state in core group 1A (patients with MS) demonstrated the same beneficial trend than in control group 1B (3 beneficial effects versus 3 harmful). In core group 2A (patients without MS) we can see another picture – 11 beneficial effects of red wines versus 3 harmful effects.

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The significant negative dynamics of b4303 "Clotting functions" in patients without MS (in the main group 2A) and the tendency to negative dynamics of this function in patients with MS (in the main group 1A) could be formally evaluated as undesirable effect of the wine. But the analysis showed that a decrease in the prothrombin index, which led to negative dynamics of b4303 "Clotting functions" in patients with CHD is more likely to be sought and can’t be assessed as an undesirable result of the wine influence.

Under the influence of red wines, the cholesterol level in patients with MS significantly decreased from 5.89 (±0.36) to 4.50 (±0.33). In patients without MS, under the influence of red wines, a decrease in the level of cholesterol from 5.30 (±0.22) to 5.16 (±0.25) was also noted, but that dynamics is not statistically reliable. In patients with MS, the significant positive dynamics of b540 "General metabolic functions" and the b5408 "General metabolic functions, other specified – MS" were noted only when LW was used, whereas this effect was not observed with DW. Our data is in good accordance with clinical data on the normalization of the profile of blood lipids under the influence of red wine [13-16].

In patients without MS a positive correlation of the dynamics of b540 “General metabolic functions” with the course doses of red wine (r=0.328) and ethanol (r=0.283) were found. Mild to moderate alcohol consumption (15-20 ml of ethanol daily), especially wine, is associated with a lower prevalence of MS, but the relative contribution of wine’s alcohol and polyphenol components to beneficial effect is unclear [3].

Our data indicate rather a prophylactic than therapeutic effect of red wine in relation to MS. It is the prophylactic effect on the development of MS components that is in good agreement with meta-analysis data indicating the predominantly preventive effect of such an important component of wine on development of cardiovascular diseases [17].

The investigated effects of red wines in CHD patients with MS and of white wines in hypertensive patients with MS [5] are in good accordance to beneficial reputation of Mediterranean diet rich in wine.

Conclusion

The positive effects of polyphenols indicate that red wines consumption is more preferable than strong alcoholic beverages consumption. The moderate consumption of red wines can be recommended to patients with CHD, as a preventive measure to developing MS. The clinical significance of these findings needs further investigation.

Conflict of interest

The authors declare no conflict of interest. This study is designed as a range of joint research work of above mentioned author’s affiliation institutions and in no way was supported by any sponsors.

Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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ISSN 2304-3415, Russian Open Medical Journal 2018; Volume 7. Issue 4. Article CID e0414

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