Therapeutical and Prophylactic Effect of Some Bulgarian Mineral Waters on Chronic Vocational Intoxication

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In recent years many global ecological problems arose. The pollution of air, water and soil and flora and fauna intoxication with heavy metals, radionuclides and other toxic substances in vast regions and countries are questions up for discussions. Now plumbic aerosols and compounds endanger not only factory workers but the inhabitants of some industry areas and big cities as well because of motor transport. A very important problem is the danger from intoxication with radionuclides on the background of the increased global radioactivity, especially in the countries affected by Chernobyl Atomic Power Station break down.

Air, soil and water contamination necessitates timely effective sanitary, therapeutical and prophylactic deeds for protecting people's health and working capacity. In that way mineral waters Bulgaria is highly gifted with can play a very important role. The most widely used mineral waters in Bulgaria are the weak-mineralized waters having detoxic, hypoosmotic and washing effect on tissues and organs and causing by diuresis increased elimination of incorporated toxic substances (5). These waters have very good taste, better than normal water and are pleasantly accepted. Weak mineralized waters satisfy man's physiological needs without danger of overdosing. All that gives possibility for large-scale prophylaxis.

Besides weak-mineralized waters Bulgaria have enough mineral waters having specific effect on some toxic ingredients. In this respect pretty valuable are the sulphide-hydrogen sulphide mineral waters applied on chronic plumbic intoxications (2). The sulphide component combines with plumbus in human organism in the less toxic polysulphide compounds and eliminates with urine. If the mineral water is weak-mineralized one at the same time it combines the washing and diuretic effect of that water too.

Hydrocarbonate mineral waters are very important for therapy and prophylaxis of intoxications. They are very fit for alkalinizing of organism if it is necessary. They are specially effective with natural radionuclides intoxication because uranium combines with hydrocarbonates as uranil-bicarbonate complex and is eliminated with urine. When urine acidity increases (pH below 6.5) uranium gets free of its bonds with bicarbonates, injures cell epithelium of kidney canals and causes nephrosis. That necessitates maintaining of urine alkalalescence on a certain level by larger quantities of bicarbonate (6,7).

Having in mind these and other theoretical therapeutical and prophylactic possibilities of
Fig. 1 Changes in Pb in urine/l in single and chronic experiment

Fig. 2 Content of U\(^{238}\), Pb\(^{210}\) and Pb\(^{210}\) in urine (single experiment)

Fig. 3 Changes of Po\(^{210}\) content in blood after treatment with mineral water

Fig. 4 Changes of Pb\(^{210}\) content in blood after treatment with mineral water
mineral waters in treatment of chronic vocational intoxications we have carried out investigations and the results are now especially necessary for prophylaxis of endangered contingents.

Decorporative and detoxic effect of weak-mineralized waters of Gorna Banya and Pancharevo, sulphide-hydrogen sulphide hydrocarbonate mineral waters of Birimirtzi and hydrocarbonate-sulphate water of Merichleri on 218 workers working in plumbic aerosols polluted surroundings has been studied compared with a control group of 29 persons who have not drunk mineral water at all.

The effect of weak-mineralized waters of Gorna Banya and Shipkovo and the sulphide-hydrogen sulphide water of Kyustendil (chemical composition according to 2) on 113 miners working in uranium mines, incorporated with natural radionucleides, has been studied too (3, 4).

The results show increased elimination of toxic substances: plumbus, uranium, polonium\(^{210}\), plumbus \(^{210}\) more clearly expressed after burdening with mineral water compared with normal water (Fig.1 and 2). An exception is Merichleri mineral water because of its high mineralization and alkalinizing effect specifying the stocking of plumbus.

After the treatment course of 20 or 30 days the excretion of toxic substances goes on according to the diuretic effect of mineral waters. As a result of their intense elimination decreasing of content of these substances in blood has been established (Fig.3 and 4) except plumbus and plumbus \(^{210}\) influenced by Birimirtzi and Kyustendil mineral waters. It has been interpreted with mobilization of depots and entry of plumbic sulphide compounds in blood after combining of plumbus with sulphide component of the mineral water.

On the background of decorporation has been observed a beneficial effect on subjective and objective astheno-neurological, gastroenterological and other clinical symptoms as well as on a range of functional parameters - capillaroscopy, clino-orthostatic test, dermographism; lab parameters - haemoglobin, erythrocytes, reticulocytes, DALK, SGOT, SGPT, \(\gamma\)-GTP, urea, creatinine, uric acid, cholesterol, total fats, \(\beta\)-lypoproteins, liver tests; immune status and reactivity parameters, etc. Considerable changes in the control group has not been observed.

In conclusion it is to said that tested mineral waters are effective therapeutical and prophylactic means for decorporation and detoxication of plumbus and radionucleides. They can be used for large-scale prophylaxis of endangered contingents. More they are physiologically necessary. Mineral waters with analogical physico-chemical characteristics from foreign countries can be applied for the same purposes too.

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