

Improvement of Hemorheological Abnormalities in Alcoholics by an Oral Antioxidant

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ABSTRACT

Background/Aims: It has been shown that alcohol impairs erythrocyte (red blood cell) membrane fluidity and lipid composition. The aim of this study was to test the effect of a novel acid-resistant antioxidant on the hemorrheology in alcoholics. **Methodology:** Thirty alcoholics (25 males, 5 females; mean age: 42 years; range: 31-54; 150g ethanol/day for 3-5 years) were enrolled into the study. Patients were randomly and double-blindly allocated into 2 groups which were given, for a 2 week period, 18g/day of Immun'Age (obtained from biofermentation of carica papaya, pennisetum purpureum, sechium edule, Osato Res. Foundation, Gifu, Japan) dissolved in 5mL of water at bedtime and 3 hours prior to examination. Placebo consisted of flavored sugar. Healthy teetotalers served as control. On the examination day, blood samples were taken for testing: routine tests, plasma glutathione, ascorbic acid, selenium, plasma lipid hydroperoxides and alpha-tocopherol. Erythrocytes were separated and tested for red blood cell malonyldialdehyde and glutathione content. The hemorrheological studies were as follows: blood and plasma viscosity, whole blood filterability, red blood cell membrane fluidity by electron spin resonance, red blood cell aggregation index by photometric rheoscopy and red blood cell deformability by ektacytometry.

Results: As compared to healthy controls, alcoholics on placebo treatment showed no change of plasma viscosity but a significantly higher red blood cell malonyldialdehyde, blood viscosity ($P<0.05$) and lower plasma glutathione, whole blood filterability and red blood cell fluidity ($P<0.01$). No relationship appeared between biochemical tests and red blood cell membrane fluidity. Immun'Age group showed a significant recovery to control values of either blood viscosity and whole blood filterability ($P<0.01$) and a partial, although significant, improvement of red blood cell membrane fluidity, red blood cell malonyldialdehyde and plasma glutathione ($P<0.05$). As compared to healthy control, red blood cell aggregation decreased in alcoholics ($P<0.05$) and was not affected by Immun'Age. However, Immun'Age significantly improved the reduced red blood cell deformability ($P<0.05$ vs. alcoholics) and this parameter correlated with red blood cell malonyldialdehyde ($r: 0.62, P<0.05$).

Conclusions: These preliminary data suggest that an effective antioxidant supplementation is able to improve the hemorrheology in alcoholics either by directly affecting the ethanol-related lipoperoxidation and xanthine oxidase system activation and/or by modifying red blood cell membrane characteristics.

KEY WORDS:

Hemorheology;
Erythrocytes;
Natural oral
antioxidant;
Lipoperoxidation

ABBREVIATIONS:

Red Blood Cell (RBC); Immun'Age (FPP); Glutathione (GSH); Malonyldialdehyde (MDA); High-Performance Liquid Chromatography (HPLC); Packed-Cell Volume (PCV); Elongation Indexes (EI); Pascal (Pa); Aspartate Amino-transferase (AST); Alanine Amino-transferase (ALT); yGlutamyltrans-