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P60 - Analysis of erythrocyte elements in chronic hepatitis C patients treated with interferon and ribavirin by in-air microPIXE

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Chronic hepatitis C (CHC) patients treated with pegylated-interferon and ribavirin (Peg-IFN+RBV) and telaprevir (Peg-IFN+RBV+TPV) are frequently associated with anemia, whereas the precise mechanism of anemia is not determined. This study is aimed to analyze the elemental changes in erythrocytes to investigate the pathogenesis of anemia caused by combination of Peg-IFN and anti-viral drugs.

Subjects and Methods: Thirteen CHC patients (3 cases without IFN therapy, 7 cases treated with Peg-IFN+RBV, 3 cases treated with Peg-IFN+RBV+TPV) and 4 healthy controls were enrolled in this study. Whole blood was collected via peripheral vein, and the sample for PIXE analysis was prepared according to our method (T. Nagamine, et al. IJPIXE 22, p 249-258, 2012). Elemental levels in erythrocytes were determined by the method of Iwata et al. Elemental distributions of erythrocytes were analyzed by in-air microPIXE at JAEA-Takasaki, Japan.

Results: 1. Elemental map of erythrocytes

The shape of erythrocyte, so-called the donut-like, fitted well with the counterplots of Cl, S, and K dots in healthy controls. Erythrocyte shape became blurred in Peg-IFN+RBV and Peg-IFN+RBV+TPV cases. In Peg-IFN+RBV cases, Cl, S, and K dots aggregated modularly. These elements tended to diffuse spreading over the erythrocytes in Peg-IFN+RBV+TPV cases. In addition, Na dots were apparently detected in Peg-IFN+RBV+TPV cases compared to Peg-IFN+RBV cases and healthy controls. Fe dots were distributed granularly dividing into 3-4 peace in normal erythrocytes, and Fe dots were not changed by Peg-IFN+RBV or Peg-IFN+RBV+TPV.

2. Elemental levels in erythrocytes

HCV cases without IFN showed increased levels of Ca, Fe and Cu and decreased level of Zn in erythrocytes compared with healthy controls. Peg-IFN+RBV cases showed increased level of Zn and decreased level of Ca compared with controls. Every element tended to increase in Peg-IFN+RBV+TPV cases.

In conclusion, the elemental distributions in erythrocytes were changed in CHC patients received Peg-IFN+RBV. In addition, erythrocytes elements were altered by Peg-IFN+RBV+TPV, suggesting that the pathogenesis of anemia was different between Peg-IFN+RBV therapy and Peg-IFN+RBV+TPV therapy.

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