Ischemia-Reperfusion Liver Injury: Effect of a Nutritional Approach with K-17.22 on Endogenous Hepatic Antioxidant System

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In the present study we tested a natural compound, i.e. K-17.22, which is endowed by antioxidant properties and transaminases-lowering effect in HCV patients, on free radicals-related liver damage by ischemia/reperfusion injury. Wistar rats were put on a 2-week supplementation with either A) standard diet or B) standard diet added with 30mg of K-17.22 (Yojyo-Henshiko: K-17.22, Kyotsu Inc., Tokyo, Japan).

A classical ischemia/reperfusion liver model was prepared and after 60 min of reperfusion, hepatic tissue blood flow was measured and the rats were sacrificed. Sham-operated rats were used as controls. A separate survival study was done as well. The following parameters were checked: liver tissue peroxides, SOD, Catalase, glutathione metabolism, hepatic tissue blood flow by H2 clearance method and radicals-trapping ability of K-17.22 by ESR.

As compared to controls, after 60 min of reperfusion, B group rats showed a significantly lower MDA level ($p<0.05$) with an overall impairment of the liver antioxidant defense system ($p<0.001$). All these parameters were less affected in the B group ($p<0.05$). In particular, GSH and GSH-Px reverted to normal level with a significantly lower GPT level ($p<0.05$). However, K-17.22 didn't show any direct free radicals-trapping ability either on superoxide nor on hydroxyl radical generation systems. Ischemia-reperfusion phenomenon brought about a nearly 40% drop of the liver blood flow in the standard diet-fed rats ($p<0.001$ vs sham-operated).

Pre-treatment with K-17.22 enabled a recovery of such haemodynamic parameter ($p<0.05$ vs untreated group). One-week survival study showed that, in the absence of any treatment, only 20% of rats survived after liver ischemia while B group rats yielded a 45% survival rate ($p<0.05$). Even using a severe liver damage model as the present one, the present nutritional approach seems to offer some noteworthy boosting ability on the endogenous free radicals scavengers array which is unrelated to its direct in vitro action. These findings might prove to be of clinical relevance in further studies.