Effects of intraperitoneally administered vitamin C on antioxidative defense mechanism in rats with diabetes induced by streptozotocin

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Received: 28 April / Accepted: 29 September 2000

Abstract. We determined the effects of intraperitoneally administered vitamin C on the lipid peroxidation (as thiobarbituric acid-reactive substances, TBARS) and vitamin C and E levels and reduced glutathione (GSH) and glutathione peroxidase (GSH-Px) activity in the plasma, red blood cells (RBC), liver, and muscle of rats in relation to oxidative damage associated with diabetes induced by streptozotocin (STZ). One group was used as control and a second as diabetic. A third group received 30 mg vitamin C i.p. every other day. On day 4 after the injection of vitamin C, animals in the second and third groups were made diabetic by i.p. injection of STZ and administered vitamin C for 21 consecutive days, and we determined TBARS, vitamin E, and GSH levels and GSH-Px activities in plasma, RBC, liver, and muscle samples. Vitamin E levels in the plasma and liver were significantly higher (P<0.05) in the control group than in the diabetic group. Also, TBARS levels in the plasma, RBC, liver, and muscle samples were significantly lower (P<0.05) in controls than in the diabetic group. The TBARS levels in the RBC, liver, and muscle samples of the vitamin C group were significantly lower (P<0.05, P<0.01, and P<0.001, respectively). However, GSH-Px and GSH activities in RBC, liver, and muscle and vitamin C levels in liver were not significantly different between control and diabetic groups. Vitamin E levels in plasma (P<0.05, P<0.01) and liver (P<0.001), vitamin C levels in liver (P<0.001), and GSH (P<0.01) and GSH-Px activities in RBC (P<0.05, P<0.01) were significantly higher in the vitamin C group than both the control and diabetic groups. These results indicate that vitamin C has significant protective effects on the blood, liver, and muscle of rats against oxidative damage in diabetes.

Keywords: Vitamin C – Diabetes – Lipid peroxidation – Free radicals – Liver

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The abstract of this study was presented in 1999 in Physiological Research (Praha) 48, Suppl. 1