Abstract

Free Radic Biol Med. 1999 Mar;26(5-6):609-19.

Alcohol-induced pancreatic oxidative stress: protection by phospholipid repletion.

Aleynik SI, Leo MA, Aleynik MK, Lieber CS.

Section of Liver Disease & Nutrition and Alcohol Research Center, Bronx VA Medical Center and Mt. Sinai School of Medicine, New York, NY 10468, USA.

OBJECTIVE: Oxidative stress is considered to be a forerunner of pancreatitis. Since we had found polyenylphosphatidylcholine, a mixture of polyunsaturated phosphatidylcholines extracted from soybeans, to protect against hepatic oxidative stress, we now tested its effects on the pancreas.

METHODS: Sprague-Dawley rats were pair-fed for two months nutritionally adequate liquid diet containing ethanol (36% of energy) or isocaloric carbohydrate, with either polyenylphosphatidylcholine (3 g/1000 kcal) or safflower oil, with or without 5 g/1000 kcal carbonyl iron. Parameters of oxidative stress (F2-isoprostanes, 4-hydroxynonenal, reduced glutathione), ubiquinol-10, ubiquinol-9 and vitamin E, as well as phosphatidylcholine species, were assessed by GC/MS and/or HPLC.

RESULTS: Alcohol feeding increased pancreatic 4-hydroxynonenal three-fold, F2-isoprostanes and ubiquinol-9 by more than 70%, whereas it decreased total phospholipids, several phosphatidylcholine species, ubiquinol-10 and glutathione, especially in iron fed rats. Polyenylphosphatidylcholine prevented the rise in 4-hydroxynonenal and F2-isoprostanes, the decrease in dilinoleoylphosphatidylcholine and oleoyllinoleoylphosphatidylcholine and opposed the alcohol-induced decrease of glutathione; alpha-tocopherol remained unchanged. Iron had no significant effect except for decreasing ubiquinol-10 in the pancreas and increasing aminotransferases in the plasma.

CONCLUSIONS: Thus, the alcohol-induced oxidative stress in the pancreas was shown to be prevented by polyenylphosphatidylcholine which may act, in part, by correcting the depletion of several phosphatidylcholine species.

PMID: 10218649