

Prevention of ischemia-induced cardiac sudden death by n-3 polyunsaturated fatty acids in dogs.

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The objective of this study was to obtain functional information associated with the prevention by n-3 polyunsaturated fatty acids (PUFA) of ischemia-induced fatal cardiac ventricular arrhythmias in the intact, conscious, exercising dog. Thirteen dogs susceptible to ischemia-induced ventricular fibrillation were prepared surgically by ligation of their anterior descending left coronary artery and placement of an inflatable cuff around their left circumflex artery. After 4 wk of recovery, exercise-plus-ischemia tests were performed without and then with an intravenous infusion of an emulsion of free n-3 PUFA just prior to occluding the left circumflex artery while the animals were running on a treadmill. One week later the exercise-plus-ischemia test was repeated but with a control infusion replacing the emulsion of n-3 PUFA. The infusion of the free n-3 PUFA in quantities of 1.0 to 10 g prevented ventricular fibrillation in 10 of the 13 dogs tested ($P < 0.005$), apparently without esterification of the PUFA into membrane phospholipids. The antiarrhythmic effect of the n-3 PUFA was associated with slowing of the heart rate, shortening of the QT-interval (electrical action potential duration), reduction of left ventricular systolic pressure, and prolongation of the electrocardiographic atrial-ventricular conduction time (P-R interval). These effects are comparable with those we have reported in studies with cultured neonatal rat cardiac myocytes.

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