

Beneficial effects of chronic administration of dietary omega-3 polyunsaturated fatty acids in dogs with renal insufficiency.

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Dietary supplementation with polyunsaturated fatty acids (PUFA) alters the course of experimental renal disease in rats. However, chronic renal disease in other laboratory animals and in human beings frequently responds differently to experimental manipulations. We investigated the effects of variations in dietary PUFA composition on the chronic course of induced renal disease in dogs. Two months after 15/16 nephrectomy, dogs were randomly divided into three groups of seven animals each. For the next 20 months, each group of dogs was fed a low-fat basal diet supplemented with one of three sources of lipid to achieve a final concentration of 15% added fat. Fat sources provided omega-3 PUFA (menhaden fish oil, group FO), omega-6 PUFA (safflower oil, group SO), or saturated fatty acids (beef tallow, group BT). Throughout the dietary trial, the magnitude of proteinuria and the plasma concentrations of creatinine, cholesterol, and triglyceride were lower in group FO. The mean overall glomerular filtration rate was 0.89 ± 0.18 ml/min per kilogram of body weight in group SO, a value that was significantly less ($p < 0.05$) than the corresponding values for groups BT and FO (1.21 ± 0.18 and 1.43 ± 0.20 ml/min/kg, respectively). Renal interstitial fibrosis also was significantly elevated in group SO. The extents of mesangial matrix expansion, glomerulosclerosis, and renal interstitial cellular infiltrate were similar in groups BT and SO, but lower ($p < 0.05$) in group FO. We conclude that supplementation with omega-6 PUFA enhanced renal injury; supplementation with omega-3 PUFA was renoprotective.

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