

ICCN Poster Presentations

Nutrition and cardiovascular disease

Clinical studies on the innocuousness of chitosan and its short-chain derivative generated by enzymatic hydrolysis

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Chitosan is a cationic polysaccharide produced by partial or total deacetylation of chitin from crustacean shells. Due to its beneficial activity on lipid disorders, chitosan is seriously considered as a potential ingredient of functional foods. Chitosan forms of intermediate molecular weight have been shown to be more effective than high molecular weight forms in lowering plasma cholesterol in a number of animal studies. We have used a proprietary procedure to generate chitosan forms of specific molecular weights by enzymatic hydrolysis and have developed a procedure of recovery of the hydrolysate that is fully compatible with applications to human diets. Here, we present the results of a 3-month clinical study of the innocuousness of 1.6, 2.4 and 3.2 g/day, respectively, of chitosan added as a supplement to the unrestricted diet of female and male volunteers. Two types of chitosan differing by their molecular weight, 30 kDa (Libracol™) and 250 kDa, were used. A placebo group was also included in our study. Monitoring of a series of physiological, biochemical and clinical tests was used to assess the effects. Results showed that there were no untoward effects of either form of chitosan on the neurological, cardio-vascular, respiratory, urinary, hepatic, digestive and circulatory systems. Some minor discomforts were observed such as belching and some cases of bloating. However, the ingestion of chitosan did not cause any major digestive problems. There were no changes in a series of clinical and biochemical tests. The plasma levels of the lipo- and water-soluble vitamins were not affected. The diet supplement of chitosan (2.4 and 3.2 g/day) was associated with a significant decrease in plasma cholesterol levels (Student's *t*-test for paired data) in the cohort of subjects. The plasma cholesterol levels returned to their initial values one month after terminating chitosan ingestion.

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Marine n-3 fatty acids and ventricular arrhythmias in patients with implantable cardioverter defibrillators

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Background: Dietary n-3 polyunsaturated fatty acids (PUFA) derived from fish may reduce the incidence of sudden cardiac death (SCD) probably due to an antiarrhythmic effect. However, such an effect of n-3 PUFA has only been sparsely investigated in humans.

Methods and Results: We included 98 patients with ischemic heart disease and treated with an implantable cardioverter defibrillator due to a previous serious arrhythmic event. The number of recorded and treated ventricular fibrillation (VF) and ventricular tachycardia (VT) events were assessed during a 12 month period and related to the concentration of marine n-3 PUFA in serum phospholipids. Patients with more than one arrhythmic event had significantly lower n-3 PUFA levels compared to patients without arrhythmias (mean 7.1 % vs 9.2 %, $p < 0.01$). Dividing the patients into quintiles according to their n-3 PUFA level those with the lowest content of n-3 PUFA had more ventricular arrhythmias than patients with the highest concentration of n-3 PUFA (mean 1.3 event vs 0.2 event, $p < 0.05$). In line with this, 33% of the patients in the two lowest n-3 PUFA quintiles developed arrhythmias compared to 18 % in the other quintiles ($p < 0.05$).

Conclusion: Patients with a low content of n-3 PUFA in the blood had a significantly higher incidence of malignant ventricular arrhythmias compared to patients with high blood levels of n-3 PUFA. The data suggest that the protection offered by n-3 PUFA on SCD observed in previous studies is caused by a direct antiarrhythmic effect of n-3 PUFA.