receiving fish oils experienced post-operative AF, compared with 33.3% of patients who were not taking the supplement. In addition, length of stay in hospital was significantly reduced by one day. Except for a single case of allergy, no adverse effects were observed.

**BLEEDING RISK**

Omega-3 EFAs have demonstrated multiple pharmacological effects and it is the sum of these effects that produces significant patient outcomes. Proposed mechanisms to account for the cardioprotective action include reduced blood pressure and/or heart rate, antiarrhythmic activity, reduced triglyceride concentrations, plaque stabilisation and anti-platelet activity.

A search through Medline reveals several case reports where bleeding episodes are attributed to fish oil ingestion. In each case, the person affected was elderly and also taking warfarin. In one case, an elderly man took high-dose omega-3 EFAs (6g/day) with both aspirin and warfarin, and developed a subdural haematoma after a minor fall. In another case, a 67-year-old woman took warfarin for one-and-a-half years who doubled her fish-oil dose from 1,000 to 2,000mg/d, causing an associated elevation in INR from 2.8 to 4.3 within one month. A third case was of a 65-year-old male who had taken warfarin for six months and was then recommended trazodone and fish oils, causing his INR to rise to 8.06.

Although these case reports would lead us to believe EFAs interact with warfarin and increase the risk of bleeding, several intervention studies came to a different conclusion. One randomised study of 511 patients taking either aspirin (300mg/d) or warfarin (INR aimed at 2.5–4.2) demonstrated that a dose of 4g/day of fish oils did not increase the number of bleeding episodes, bleeding time or any parameters of coagulation and fibrinolysis. A smaller placebo controlled study, by Bender et al, of patients receiving chronic warfarin therapy found fish oils doses of 3–6 g/d produced no statistically significant difference in INRs between the placebo lead-in and treatment period within each group. There was also no difference in INRs between groups.

Most recently, Harris examined 19 clinical studies that used doses of fish oils, varying from 1g/day to 21g/day, in patients undergoing major vascular surgery (coronary artery bypass grafting, endarterectomy) or femoral artery puncture for either diagnostic cardiac catheterisation, or percutaneous transluminal coronary angioplasty.

Of note, in 16 studies patients took aspirin, and in three studies patients took heparin. The review concluded that the risk for bleeding was virtually non-existent. Frequent comments accompanying the studies were: ‘no difference in clinically significant bleeding noted’ or ‘no patient suffered from bleeding complications’. The same conclusion was reached in a 2008 review that stated no published studies have reported clinically significant bleeding episodes among patients treated with antiplatelet drugs and fish oils (3–7g/day).

Overall, when we consider the body of evidence available regarding omega-3 EFAs, it is clear that the benefits for cardio-protection far outweigh the risk of bleeding. This not only applies to patients taking aspirin, but also those patients about to undergo coronary artery bypass surgery or percutaneous transluminal coronary angioplasty.

While the evidence suggests fish oils in low-to-moderate doses do not increase bleeding risk with warfarin, caution should still apply to patients taking high doses.

References available on request.