



## A wellness program for cardiac surgery improves clinical outcomes



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### ARTICLE INFO

#### Article history:

Received 8 April 2013

Received in revised form 14 August 2013

Accepted 27 August 2013

#### Keywords:

Cardiology

Wellness

Integrative medicine

Public health

Omega 3 fatty acids

Coenzyme Q<sub>10</sub>

Bleeding risk

Cardiac surgery

### ABSTRACT

**Objective:** To evaluate the efficacy of an Integrative Cardiac Wellness Program (ICWP) for cardiothoracic surgery patients on postoperative recovery, bleeding risk, satisfaction and participation in rehabilitation programs.

**Design:** An open label study whereby ICWP participants were compared to a historical control group that received usual care at the same hospital.

**Methods:** Patients enrolled at pre-admission clinics took metabolic supplements (CoQ<sub>10</sub>, magnesium orotate, alpha lipoic acid, omega 3 fatty acids) three times daily from enrolment until surgery and for 4 weeks afterwards. Between postoperative days 3–7, patients received individualised health education from a naturopath followed by a phone call post-discharge. The control group consisted of elective cardiothoracic patients receiving usual care prior to the ICWP commencing. Data was collected from medical records, a survey and interviews.

**Results:** Data from 922 patients were analysed. ICWP participants ( $n = 337$ ) were well matched with controls ( $n = 585$ ) for age, gender and history of hypertension, hypercholesterolaemia, diabetes and smoking.

Multivariate analysis found that CABG ICWP patients had a relative reduction of 42% for postoperative inotrope (cardiac stimulants) support compared to controls ( $p < 0.001$ ). Similarly, the ICWP valve surgery patients had 40% relative reduction in the incidence of postoperative inotrope support compared to controls ( $p = 0.02$ ).

There was no significant difference between the treatment and control groups in the incidence of serious bleeding events, defined as return to theatre due to haemorrhage or blood transfusion requirements.

ICWP patients gave positive feedback of their experience and there was a 46% increase in attendance at rehabilitation programs compared to controls ( $p = 0.033$ ).

**Conclusions:** The ICWP is safe, improves postoperative heart function, is well accepted by patients and has long-term patient benefits by improving attendance at rehabilitation.

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## 1. Background

Cardiovascular disease is the most prevalent illness in the western world, with an increased incidence amongst the older age group. As a result, large numbers of patients present for cardiac surgery, especially older adults. Unfortunately advanced age is

associated with an increased risk of surgical complications and mortality [1]. Accordingly, there is an urgent need to establish safe strategies to reduce intra-operative and postoperative complications and improve both immediate and long-term post-surgery outcomes.

Increasingly, the role of preoperative management is being explored as a means of reducing post-surgery complications and improving outcomes. Metabolic therapy is one such approach. Current metabolic therapies such as antioxidants, energy substrates and polyunsaturated fatty acids are being used to decrease the oxidative stress caused during surgical interventions, to

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enhance cellular energy production and enhance recovery [2–6]. We have developed the Integrative Cardiac Wellness Program (ICWP) at The Alfred Hospital (Melbourne, Australia) which utilises a metabolic therapy component together with ward-based, individualised health promotion delivered by naturopaths. The ICWP is offered to all elective coronary artery bypass graft (CABG) and valve surgery patients consecutively coming through the hospital preadmission clinic (i.e., not inpatients or emergency patients) as an adjunct to standard pharmaceutical and surgical care.

The original metabolic intervention comprised oral supplementation with coenzyme Q<sub>10</sub>, alpha lipoic acid, selenium, magnesium orotate and omega 3 fatty acids. In a double blind, randomised controlled trial we previously showed that elective CABG patients receiving metabolic therapy before surgery had reduced cardiac damage, shortened length of hospital stay, and showed a trend towards a reduction in the incidence of postoperative atrial fibrillation (AF) [2].

This study reports on an audit of an existing trial and aims to determine whether the ICWP improved postoperative recovery of CABG and valve surgery patients without increasing the incidence of serious bleeding events. We also assessed whether the ICWP increased participation in rehabilitation programs, was feasible to deliver in a public hospital and was well accepted by patients.

## 2. Methods

This study is a clinical audit of a pre-existing Integrative Cardiac Wellness Program offered to consecutive elective cardiothoracic surgical patients attending preadmission clinics at The Alfred Hospital between September 2008 and August 2011. Eligibility criteria were: elective surgery, able to give informed consent, and not allergic to any ingredient in the metabolic supplements.

Ethics approval was granted by The Alfred (164/13) and Monash University (CF13/1093 – 2013000521) Human Research Ethics committees. Hospital records were accessed to collect information about patients' biochemical measures, recovery from surgery and safety of the intervention. The post-surgery outcomes collected were 24 h serum troponin I, inotrope requirements, low-output state, atrial fibrillation (AF), hospital length of stay (LOS), blood loss, total blood loss, incidence of return to theatre due to bleeding and blood transfusion requirements. AF was defined as "new onset of atrial fibrillation or flutter requiring treatment." Total postoperative LOS in hospital (days) was determined using the day of surgery and discharge dates.

The results of the ICWP participants were compared to elective cardiothoracic patients that had received usual care within the same hospital during the immediate period preceding the study, November 2005 to August 2008.

During the first 6 months, feasibility and acceptance was assessed through interviews with hospital staff and naturopaths. Patient satisfaction was assessed for a sub-group of patients during this period using a modified version of the Client Satisfaction Questionnaire-8 (CSQ-8). This survey was delivered by a research assistant and completed by patients during their post-discharge follow-up appointment with their cardiac surgeon at The Alfred Hospital. At the end of the study period, twelve ICWP participants were randomly selected to provide general feedback.

To evaluate whether the ICWP increased participation in cardiac rehabilitation programs, a random sample of patients during the 4–6 weeks prior to introducing the program was compared to the attendance rate during a 4–6 week period during the first 2 months of the program.

## 2.1. The ICWP intervention

The ICWP intervention consisted of three components: oral metabolic therapy, a postoperative ward visit and a 2 week post-discharge follow up phone call.

### 2.1.1. Metabolic therapy

This comprised of two oral preparations which patients began taking on the day of enrolment and continued until 4 weeks after surgery. Each supplement was taken at a dose of one capsule three times daily and supplied free-of-charge by FIT Biocellulars Ltd. (Table 1). Phone calls were made to participants 2 weeks after enrolment to promote compliance with the treatment and answer enquiries about the program.

### 2.1.2. Postoperative ward visit

Between days 3 and 6 post-surgery, patients received a 10–20 min bedside visit by a naturopath who discussed health enhancement approaches relevant to the individual patient and their living situation. This included a discussion about the patient's diet and methods of modifying it towards the Mediterranean diet, importance of stress management, physical activity and attendance at cardiac rehabilitation. Patients were also asked about their emotional state and feelings about surgery, enabling a more in depth discussion to unfold about personal meaning and wellbeing.

### 2.1.3. Follow up phone call

Two weeks after discharge, patients received a phone call to check compliance with metabolic therapy and encourage and confirm attendance at cardiac rehabilitation sessions. The phone call provided another opportunity to collect patient feedback about the ICWP.

## 3. Statistical analysis

Baseline comparisons were performed using Chi-square tests for equal proportions and reported as percentage (*n*). Continuously normally distributed variables were compared using Student *t*-tests and reported as mean (standard deviation), whilst non-parametrically distributed variables were compared using Wilcoxon Rank Sum tests and reported as medians (interquartile range). To ensure that observed results were not due to baseline imbalances, multivariate analysis was performed for binomial outcomes using logistic regression with results reported as odds ratios (95% confidence intervals). All continuous outcomes (hospital length of stay, troponin, blood drainage in the first 4 h and total blood loss) were found to be well approximated by log-normal distributions so multivariate comparisons between treatment groups were performed using log-transformed generalised linear modelling with results reported as ratios (95% confidence intervals). All multivariate models were adjusted for the following

**Table 1**  
Components of metabolic therapy.

Composition	Total daily dosage (mg)
Supplement 1 (Cardionutrients <sup>®</sup> )	
Coenzyme Q <sub>10</sub>	225
R,S-alpha lipoic acid	225
Magnesium orotate	1500
Equiv. magnesium	96
D-Alpha-tocopherol	10.08
Supplement 2 (UltraClean-EPA/DHA Plus <sup>®</sup> )	
Concentrated omega-3 triglycerides-fish	3000
Equiv. eicosapentaenoic acid (EPA)	900
Equiv. docosahexaenoic acid (DHA)	600

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