The physiological understanding of Coenzyme Q10 treatment in patients undergoing cardiac surgery: could an antioxidant reduce the incidence of reperfusion arrhythmia?

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Introduction: Reperfusion arrhythmia, as part of myocardial injury, during cardiac operation has long been investigated. Oxygen free radicals, identified in re-oxygenated myocardium, are believed to play a significant role in reperfusion injury. Reactive oxygen intermediates arrhythmogenic oscillation in membrane potential. Coenzyme Q10, a lipid-soluble antioxidant, inhibiting lipid peroxidation in biological membranes and supplying ATP cell production, that is necessary as the basic energy sources for the organism. This mechanism explains the role of CoQ10 in membrane stabilization and metabolite essential depletion prevention, which further induces the incidence of reperfusion arrhythmia.

Methods: The aim of this study is to determine the effect of coenzyme Q10 treatment in reducing reperfusion arrhythmia among patients undergoing cardiac surgery. We searched Pubmed database using the following keywords: Coenzyme Q10, CoQ10, Ubiquinone, Heart Surgery, Cardiac Surgery, Arrhythmia, and Reperfusion Injury. Articles were then systematically collected, assessed, and analyzed for this review. Two good quality clinical studies met our inclusion criteria with total of 70 patients for analysis.

Result: Both studies showed pre-cardiac surgery adjunctive treatment using Coenzyme Q10 were significantly associated with good outcome. Patients undertaking Coenzyme Q10 were less likely to have reperfusion arrhythmia [OR (95% CI) 0.03 (0.00-0.16); p<0.0001].

Conclusion: These conclude that coenzyme Q10 could reduce the incidence of reperfusion arrhythmia in patients undergoing cardiac surgery.