

Queen's researcher leads study on using selenium to aid recovery from cardiac surgery

May 18 2016

Queen's University researcher Daren Heyland is leading a study that aims to reduce the risk of complications and improves recovery of cardiac surgery patients. The "SodiUm SeleniTe Administration IN Cardiac Surgery" (SUSTAIN) study will test the effect of high-dose selenium on patient recovery, as well as on the occurrence of post-surgical complications such as infections or other quality of life concerns.

"Expensive, high-tech drugs or other treatments are not always the best options," says Dr. Heyland. "We aim to show that a simple, inexpensive, naturally occurring substance can affect health and health outcomes of [patients](#) undergoing a serious, potentially life-limiting operation."

Over one million patients annually undergo cardiac surgery worldwide. Despite substantial advances in technology and treatment, between 15 and 20 per cent of cardiac surgery patients experience complications, while approximately three to four per cent die following the procedure. With an growing population of elderly cardiac patients, many of whom suffer from multiple health issues, there is concern these rates could increase.

A trace element commonly found in seafood or organ meat, selenium helps the body regulate thyroid hormones and supports immune system function. Selenium also serves as an antioxidant, helping to prevent cell

damage. Dr. Heyland and his co-investigators hypothesize that high dose supplementation around the time of cardiac surgery will offset an observed decline in selenium levels and help patients recover.

"As a sub-specialist providing cardiac surgical [critical care](#), I am especially thrilled with this trial focusing on critical illness in the cardiac surgical patient. Cardiac surgical critical care is a distinct niche of critical care medicine," says Dr. Bernard McDonald, co-principal investigator of the study and Medical Director of the Cardiac Surgical Unit at the University of Ottawa Heart Institute. "While there have been large trials undertaken in cardiac surgery, this is one of the first to specifically focus on the major morbidity of the critical illness events and use of life-sustaining therapies in this setting. "

The study will consist of 1400 randomized patients in Canada and Germany. Patients selected to participate will receive a 2000 microgram intravenous dose of selenium or a placebo prior to cardiac surgery, a second dose immediately after surgery upon arrival in the Intensive Care Unit (ICU), and a daily dose continuing until death, discharge from the ICU, or for a maximum of 10 days.

Dr. Heyland is conducting this study in conjunction with colleagues in Germany who originally proposed the concept of using selenium to treat patients undergoing cardiac surgery. Dr. Christian Stoppe, a critical care physician at the Department of Intensive Care Medicine, RWTH Aachen University in Germany and co-principal investigator on this trial, has provided first evidence about the key role of selenium in cardiac surgery patients. In a previous study, he showed a significant decrease of selenium levels in cardiac [surgery patients](#), as well as its association with the development of organ dysfunctions.

"Although we, as clinicians, are aware of this commonly observed problem, the knowledge about the underlying mechanisms and protective

strategies is sparse," says Dr. Stoppe. "Our previous research has led us to test whether [selenium](#) supplementation can compensate for this significant depletion during [cardiac surgery](#); enhancing the body's own defence mechanisms."

The study is being supported by a four-year, \$2.98 million grant from a non-profit research foundation, while a pilot study was carried out with support from the Canadian Institutes of Health Research (CIHR). The coordinating center for the multicenter trial is the Clinical Evaluation Research Unit at the Kingston General Hospital. For more information on the study protocol, please visit the Clinical Evaluation Research Unit - Critical Care Nutrition website or [ClinicalTrials.gov](#).

Provided by Queen's University

Citation: Queen's researcher leads study on using selenium to aid recovery from cardiac surgery (2016, May 18) retrieved 25 April 2024 from <https://medicalxpress.com/news/2016-05-queen-selenium-aid-recovery-cardiac.html>

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