Canterbury Medical Research Foundation

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Intravenous Vitamin C and Severe Sepsis Outcomes – A randomised controlled trial

My area of research interest is the role of nutrients in human health and disease. I am particularly interested in the role that vitamin C plays in the prevention and treatment of acute and chronic diseases, such as cancer and severe infection. I have chosen this field because I hope to make a difference to peoples' lives. When I used to carry out laboratory-based research I felt too removed from the people we were meant to be helping. I now work more directly with people and find it significantly more rewarding. I particularly enjoy getting feedback from my study participants telling me they feel so much better.

I spent three years carrying out a Postdoctoral Fellowship at the Linus Pauling Institute at Oregon State University in the United States (this was funded by the American Heart Association). It was there that I first started researching the antioxidant and health effects of vitamin C in cardiovascular disease.

When people get a very serious infection, their immune system can go haywire and lose control in its efforts to fight the infection. As a result, important organ systems, such as the heart and blood circulation, start shutting down and up to half of these people may die. Because of the disease processes going on inside these people, they use increased amounts of important vitamins, such as vitamin C. My first CMRF-funded study has shown that seriously-ill people in the Christchurch Hospital Intensive Care Unit (ICU) have very low vitamin C levels, despite receiving more than recommended intakes. For my upcoming CMRF (and HRC) funded study, we plan to enrol 40 patients in Christchurch Hospital ICU who have serious infections and treat them with (or without) intravenous vitamin C to determine if it helps improve their short-term and long-term health-related outcomes.

From my research, I hope to demonstrate to clinicians that additional vitamin C in infectious disease patients can increase their survival and improve their health-related outcomes.

I also hope to uncover some of the mechanisms of action by which vitamin C is working in these very sick people. If the study indicates that vitamin C administration can help save the lives of critically-ill patients, I would like to see it introduced into ICU treatment in hospitals throughout New Zealand.

There are many challenges with running human intervention studies. It can be difficult to obtain ethical approval to carry out clinical studies in unconscious people because they cannot provide informed consent, so participating in the study has to be in their best interests.

Another common difficulty with clinical studies is managing to recruit sufficient numbers of people to carry out a successful study. Human studies can also be limited in the amount and types of samples that can be collected for analysis of biomarkers. Finally, a major challenge is translation of the research findings into clinical practice, this may take decades.

Vitamin C has numerous important functions in the body. Currently the vitamin C levels of critically-ill patients are not routinely monitored and my current research has indicated that their levels are very low. Administering vitamin C to these patients will help support their normal body functions, including immune function, and may improve their survival.

The inclusion of vitamin C would be part of a health management plan. Vitamin C can be used alongside other drugs routinely administered to critically ill patients and may even decrease the need for administration of some drugs.

This is the first time that this research will be carried out in NZ. If we can prove that vitamin C administration helps save the lives of critically ill patients, it could potentially be introduced into ICU treatment in hospitals throughout New Zealand. One of the research groups in the United States has introduced intravenous vitamin C administration as routine practice in their ICU.

In the future, I would like to be an established biomedical researcher carrying out clinical trials in different patient groups, with more national and international collaborations, all with the view to improving patients' outcomes and quality of life.

I would not have been able to do this research without funding from the Canterbury Medical Research Foundation. Please continue to support the CMRF as medical research really does save lives.

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