



March 28, 2019

Dear patients, physicians, press representatives and the public,

The clinicians and researchers at the Ottawa Integrative Cancer Centre (OICC) have closely followed the media attention given to the use of intravenous vitamin C (IVC) therapy by patients with cancer. We are aware of Nathalie Prud'homme's petition containing more than 120,000 signatures in support of patients wishing to access IVC therapy in Quebec. We are also aware of the recent attention given to Olivier Bernard (le Pharmacien) and his articles questioning the benefit of IVC. While we are not in agreement with all of Mr Bernard's opinions, we are dismayed by and condemn all personal attacks and threats to anyone for expressing their opinion and perspectives on this subject. Rather, we welcome and encourage ongoing dialogue from all perspectives related to IVC therapy and its potential applications.

Through this open letter, we would like to offer our position and some context on the rationale, concerns and limitations of research regarding the use of IVC to help people better understand the issue. As a clinic that offers IVC therapy in select cases, we feel that we have the moral obligation to share this middle ground perspective that provides a balance between both sides of the debate.

Availability and Regulation:

Intravenous vitamin C is available for administration throughout much of Canada by any medical doctor or a specially licensed naturopathic doctor (ND). In five provinces, but not in Quebec, naturopathic doctors are regulated health care practitioners under provincial regulations, such as the Regulated Health Professions Act in Ontario. With appropriate training and licensing, NDs can be certified to administer intravenous therapies including IVC.

The OICC:

The OICC is an ND-led clinic located in Ottawa, promoting *integrative* cancer care including diet and exercise recommendations, acupuncture, massage therapy, yoga and other mind-body therapies, counseling, herbs, supplements and injectable therapies. These therapies are intended for use *in conjunction with* conventional cancer care and are *not* considered or portrayed as alternative cancer therapies. In this context, the OICC offers high dose IVC as an optional complementary therapy for patients with cancer where it may be indicated. In cases where no further conventional therapies are available, or where these therapies offer no meaningful benefit, IVC may also be used as a palliative strategy supporting quality of life.

Research and IVC:

Intravenous vitamin C is not a curative cancer therapy, nor is it a viable alternative to any conventional cancer therapy such as surgery, chemotherapy, or radiation. However, some studies indicate that high dose IVC may improve symptoms related to quality of life in cancer patients, such as fatigue^{1,2,3}. Vitamin C might also reduce side effects associated with chemotherapy^{1,4,5}. This is an effect worth investigating in larger studies as chemotherapy may be terminated early when patients are unable to tolerate side effects.

Phase 1 human trials indicate that IVC is well tolerated and appears to be safe^{6,7,8,9}. Unfortunately, much of the supportive research on the use of intravenous vitamin C to date has been in the context of case series^{10,11,12,13} or small, uncontrolled trials¹⁴. Multiple reviews consistently point out a lack of high quality clinical trials to support its beneficial effects^{15,16}. To date there has not been a large randomized double-blind controlled clinical trial on the use of intravenous vitamin C in cancer. Yet, there is a definite need for well-controlled clinical trials to determine whether the benefits reported in preclinical research, case studies, and uncontrolled trials have merit.

Anti-oxidant vs. pro-oxidant action:

Aside from a lack of published evidence, a major concern raised about the use of IVC in cancer care is its potential anti-oxidant action and interference with pro-oxidant chemotherapeutic agents. While this is an important consideration, the majority of preclinical research combining high dose vitamin C with chemotherapy actually suggests that vitamin C may *potentiate* the effects of various chemotherapy agents^{1,16} such as doxorubicin^{17,18,19,20,21}, and possibly radiotherapy^{22,23,24}. This evidence suggests that high dose vitamin C, as obtained with intravenous administration, may have a pro-oxidant effect by promoting oxidative stress^{16,25}. This effect is distinct from the anti-oxidant effects of lower doses of vitamin C obtained through diet or oral supplementation²⁵.

These preclinical studies do not provide sufficient information to conclude that vitamin C clearly enhances the actions of chemotherapy, but they do not demonstrate an interference between vitamin C and chemotherapy either. These preclinical observations made in cells and animals need to be evaluated in humans to determine if similar effects can be expected.

Use of IVC in patients with cancer:

Patients and the public should understand that vitamin C is not a cure for cancer, nor is it recommended as an alternative to conventional cancer therapy. Its main use is as an optional intervention to complement current cancer therapy and support quality of life for patients undergoing chemotherapy.

While we at the OICC acknowledge that there is a lack of high quality research supporting vitamin C's beneficial effects in cancer, we believe there is a rationale for its use and sufficient suggestion of safety from preclinical evidence. We believe it is

reasonable to offer this therapy to patients as an option where it may be indicated or possibly beneficial²⁶.

Patients have the right to autonomy in making health care decisions and may choose to pursue complementary health care practices if they so desire. The OICC honours this freedom of choice and aims to guide patients on the use of complementary therapies that may offer benefit in their particular situation, as well as to avoid therapies that may be harmful. Consideration of IVC therapy involves thorough discussion of the limitations of current research in order to ensure fully informed consent.

Conclusion:

We propose that both sides of the vitamin C debate in the media have merit. High quality research is lacking and not yet sufficient to warrant widespread adoption of IVC in cancer; consideration of its use is therefore recommended on a case-by-case basis until further research trials are available. Yet there is a reasonable rationale for its use in patients with cancer, and health care providers should not be reprimanded for helping patients to access this optional therapy safely and appropriately. We hope the information in this letter will support ongoing dialogue on the applications of IVC and consideration from all perspectives regarding its use.

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