



## Patient Resource: Intravenous Vitamin C (IVC)



### What is IVC?

High doses of vitamin C are administered via an intravenous (IV) drip. The IV route allows much higher concentrations of vitamin C to circulate in the blood than is possible to achieve by taking oral vitamin C supplements, as the body cannot absorb very much vitamin C when it is taken by mouth.

### What is IVC used for?

IVC is most commonly used in cancer care as it may:

- Support quality of life
- Reduce cancer-treatment related symptoms including fatigue, nausea, and lack of appetite
- Improve treatment outcomes or slow cancer progression

IVC is not used as a cure for cancer. IVC should not be considered an alternative for chemotherapy or other cancer treatments.

### Does IVC work?

Over a dozen small clinical trials of IVC have been performed in people with cancer, and several other studies known as observational studies and case reports have been published. The research is still considered preliminary as most studies have been small and didn't include a "placebo" group. Most studies have used IVC for people receiving chemotherapy, and a few have studied it with radiation therapy, or on its own.

Results from these studies demonstrate that IVC is generally safe and well tolerated, with minimal and mild side effects. Many but not all studies have found benefit for quality of life or symptom management alongside cancer treatments such as chemotherapy. Symptoms that have been improved with IVC include fatigue, pain, nausea, and appetite loss. There is promising early research for IVC used along with standard treatments on cancer outcomes including tumor response and survival in some types of cancer. In particular there may be benefit for cancer outcomes in patients with advanced pancreatic and ovarian cancers based on a few small studies. More research is needed.

IVC is still considered an experimental treatment meaning we are not yet certain if it will help people live longer or live better, but there is enough early research to suggest it may provide benefit that it is reasonable for some people with cancer to consider.

### Disclaimer

The OICC has prepared this monograph, as part of a series of monographs, to share a review of the research literature related to common therapies and products used within integrative cancer care. The monograph is a summary of research and neither advocates for nor against the use of a particular therapy. Every effort is made to ensure the information included in this monograph is accurate at the time it is published. Prior to using a new therapy or product, always consult a licensed health care provider. The information in this monograph should not be interpreted as medical advice.



## **Patient Resource: Intravenous Vitamin C (IVC)**

### **How does IVC work?**

There are three main ways in which IVC is thought to exert its action. (1) Hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) generation creating oxidative stress; (2) Enzyme cofactor activities, and (3) Antioxidant and anti-inflammatory actions.

The generation of hydrogen peroxide has been considered the primary action of IVC. At the high doses achievable only through IV therapy, H<sub>2</sub>O<sub>2</sub> is produced which is toxic to cancer cells and non-toxic to healthy cells. Healthy cells contain enzymes to break down the H<sub>2</sub>O<sub>2</sub>, and also tend to have less H<sub>2</sub>O<sub>2</sub> around them due to differences in the environment around cancer cells versus healthy cells. This H<sub>2</sub>O<sub>2</sub> generation is often referred to as the “pro-oxidant” effect of high dose IVC.

Other ways vitamin C works is by its involvement in many reactions and structures in the body including collagen formation and enzyme reactions that may affect how cancer grows and spreads. Lastly, vitamin C may lower inflammation and oxidative stress in the body which can favourably impact cancer development and progression.

### **Is IVC safe?**

IVC has an excellent safety profile based on clinical trials and clinical experience from practitioners. However, like all therapies there are certain times where IVC may not be safe. IVC should not be administered to patients with kidney failure, or those with a deficiency of the G6PD enzyme. IVC should be used cautiously in people with a history of kidney stone formation, insulin-dependent diabetes, iron storage diseases, fluid overload conditions, or those on warfarin. Please contact your healthcare provider to discuss whether you are a good candidate for IVC therapy.

### **What are the side effects of IVC?**

Side effects are generally mild and uncommon in most patients. Side effects may include: thirst, dry mouth, increased urination, elevated blood pressure, diarrhea, nausea, fatigue, weakness, headache, dizziness, injection site discomfort and vein irritation, swelling, and loss of appetite. A full list of reported side effects can be found in our health care provider monograph.

### **What is the recommended dose, frequency, and length of use of IVC?**

The goal of IVC treatment is to achieve a level of vitamin C in the blood of approximately 20-22mM (350-400mg/dL). Patients at the OICC typically receive between 40g and 100g per infusion to achieve these levels. Data shows that doses up to 1.5g/kg of body weight are safe in a professionally-monitored environment.

Treatments are generally administered 1-3 times per week, and are typically administered for a few weeks to several months. Therapy may be continued longer-term depending on the individual's health, reasons for use, experience with the treatment, and discussion with their healthcare provider. Each treatment lasts between 1 and 3 hours, depending on the dose.

### **Where can I get more information?**

For more detailed information including references you can read the OICC's Healthcare professional IVC monograph which may be found on our website: [www.oicc.ca](http://www.oicc.ca). You can also consult with a health care provider such as a naturopathic doctor, medical doctor, or nurse practitioner who is experienced in the use of IVC.

### **Disclaimer**

The OICC has prepared this monograph, as part of a series of monographs, to share a review of the research literature related to common therapies and products used within integrative cancer care. The monograph is a summary of research and neither advocates for nor against the use of a particular therapy. Every effort is made to ensure the information included in this monograph is accurate at the time it is published. Prior to using a new therapy or product, always consult a licensed health care provider. The information in this monograph should not be interpreted as medical advice.