RACGP
Royal Australian College of General Practitioners

First do no harm: A guide to choosing wisely in general practice

For GPs – Vitamin C infusions

The use of vitamin C infusions as a treatment.

RACGP position

- There is no evidence to support the use of vitamin C infusions.
- While high-dose vitamin C infusions have been proposed as part of treatment for various conditions (for example, cancer, COVID-19, sepsis and herpes zoster infection and cardio protection before percutaneous coronary intervention), these should only be conducted under the governance of a well-conducted clinical trial with ethics approval.

Traffic lights

RED

Do not take this action

- Do not administer vitamin C infusions in general practice settings, unless part of a properly administered clinical trial with human ethics committee approval.

ORANGE

Under specified circumstances, take this action

- If a patient has questions about vitamin C infusions as a treatment:

  - discuss the patient's diet, explain the importance of good nutrition and encourage them to have an adequate dietary intake of vitamin C

  - discuss their health beliefs and explain the lack of high-quality evidence for infusion therapy.

GREEN

Take this action

- If a patient is particularly interested in having vitamin C infusions, explain to them that vitamin C infusions can interact with some treatment regimens, and encourage them to talk about this with their non-GP specialists, including their oncologist if they are a cancer patient.

Patient harms and risks

Renal stones

Ascorbic acid is metabolised to oxalic acid, which can form calcium oxalate crystals, particularly in patients with renal dysfunction.[1,2]

Worsening kidney function

Renal failure after vitamin C treatment has been reported in patients with pre-existing renal disorders.[3]

Haemolysis in people with glucose-6-phosphate dehydrogenase (G6PD) deficiency

People with G6PD deficiency should not receive vitamin C infusions because high doses of intravenous vitamin C can result in significant haemolysis of red blood cells.[1,4,5]

Iron overload in patients with haemochromatosis

Studies show that high-dose vitamin C increases the absorption of iron, which could worsen iron-induced tissue damage in those with haemochromatosis.[4]

Drug interactions that may lead to lowering the efficacy of bortezomib

As vitamin C can interact with the drug bortezomib (used as first-line treatment for multiple myeloma) and reduce the drug's efficacy, it should not be administered with bortezomib.[4,6]

Overview

Vitamin C, also known as ascorbic acid, is an essential water-soluble nutrient that acts as an antioxidant and a free radical scavenger.[4] Because of these properties, some researchers believe that it could be used as a treatment for cancer, sepsis, herpes zoster infection, COVID-19 and for cardio protection prior to percutaneous coronary intervention.

Although results of studies in the 1970s reported that treatment with megadoses of oral vitamin C improved quality of life and survival rate of people with cancer,[7–9] these results were not demonstrated in subsequent double-blinded randomised trials.[8,10,11] More recent studies focusing on intravenous administration of vitamin C[12] and – significantly – a 2021 systematic review of vitamin C and cancer treatment have all demonstrated that these treatments do not deliver any important clinical benefit for tumour or disease progression.[13]

In addition, current evidence does not support the use of high-dose vitamin C in patients with COVID-19,[14] or herpes zoster.[15]

Alternatives – what can I do for the patient?

- Discuss with the patient what they think high-dose vitamin C will do for them, and based on their specific situation or concern, discuss other evidence-based treatments and supports that are appropriate.
- Encourage patients with cancer to discuss evidence-based treatments with their oncologist.

Resources

- The RACGP, *First do no harm*: A guide to choosing wisely in general practice, Vitamin C infusions patient resource
- Chapman K, Vitamin pills' role in recovering from cancer, The Conversation
- National Cancer Institute (US), Intravenous vitamin C (PDQ®) – Patient version
- Therapeutic Goods Administration, No evidence to support intravenous high-dose vitamin C in the management of COVID-19
- Fowler AA, Truwit JD, Hite RD, et al. Effect of vitamin C infusion on organ failure and biomarkers of inflammation and vascular injury in patients with sepsis and severe acute respiratory failure: The CITRIS-ALI randomized clinical trial

- Hoppe C, Freuding M, Büntzel J, Münstedt K, Hübner J. Clinical efficacy and safety of oral and intravenous vitamin C use in patients with malignant diseases
- National Cancer Institute (US), Intravenous high-dose vitamin C in cancer therapy
- National Cancer Institute (US), Intravenous vitamin C (PDQ®) – Health professional version

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We acknowledge the Traditional Custodians of the lands and seas on which we work and live, and pay our respects to Elders, past, present and future.

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