CCNM | Patterson Institute for Integrative Oncology Research

Dichloroacetate (DCA) in Cancer Care: Patient Resource

What is DCA?

Dichloroacetate (DCA) is a medication which is sometimes used "off-label" for cancer. This means the drug is not approved for use in cancer. DCA has been used in medicine for other conditions, mostly for rare mitochondrial diseases.

What is DCA used for?

DCA has been prescribed to reduce tumour size, stabilize disease, improve survival, and reduce cancer related symptoms. DCA is an experimental treatment. DCA should not be considered an alternative to chemotherapy or other approved cancer treatments.

Does DCA work?

Only a handful of small studies and case reports have looked at DCA as a treatment for cancer. Some clinical trials reported reduction or stability in tumour size with the use of DCA, but not all patients responded to the treatment. The only randomized controlled trial was in patients with advanced head and neck cancer. This study found that although more people treated with DCA responded well to their cancer treatment (I.e., tumors shrunk), there was no difference in how long people lived compared to people who did not receive DCA. Several case reports demonstrated tumor shrinking and long-term survival in patients with advanced cancer, which is encouraging. However, larger studies are needed to confirm these findings. Cancers that have been studied in clinical trials include brain cancers, head and neck cancers, lung cancer, multiple myeloma, and mixed advanced cancers. Case reports have been published for leukemia, non-Hodgkin's lymphoma, colon cancer, stomach cancer, melanoma, angiosarcoma, neuroendocrine pancreatic cancer, kidney cancer, and thyroid cancer.

DCA should not be used as a replacement for other better studied and more effective cancer treatments. It may be considered after discussion with your healthcare provider when other treatment options have failed, or options are limited.

How does DCA work?

In the context of cancer, DCA is believed to work by changing how cancer cells produce energy, also known as cellular metabolism. Cancer cells have different metabolism than healthy cells; they primarily use sugar to produce energy without using oxygen, a process called glycolysis. This process creates lactic acid as a by-product which benefits cancer cell growth. DCA is thought to change metabolism back to the usual process where oxygen and sugar together are used to produce energy, and no lactic acid is produced. DCA does this by

inhibiting an enzyme called pyruvate dehydrogenase kinase. In doing this, DCA may promote cancer cell death.

Is DCA safe?

DCA is generally safe, but there are times when DCA should not be used. It should not be used in pregnant or lactating women. DCA should be used cautiously in people with liver disease or when taking medications that may damage the liver. It should be used cautiously with other medications that have neurological effects such as benzodiazepines. Theoretically, the use of DCA could increase the risk of tumor lysis syndrome in people undergoing other cancer treatments due to increased cancer cell death.

What are the side effects of DCA?

The most common side effect is peripheral neuropathy (tingling and numbness of the toes primarily). This goes away when DCA is stopped. Other side effects reported in clinical trials include fatigue, confusion, memory loss, sedation, tremors, gait abnormalities, central neuropathy, hallucination, agitation, depression, fever, diarrhea, heartburn, nausea, liver enzyme elevation, thrombocytopenia (low platelets), and low calcium. Side effects are generally mild, but occasionally severe side effects have been reported.

How is DCA used?

DCA can be given as an oral pill or injected intravenously (IV; into a vein). When given as a pill it is usually taken twice a day at doses ranging from 10-50mg/kg daily, with 6.25-12.5mg/kg being most common. When given IV it is usually given once weekly with similar dosing to oral. In studies and case reports DCA has been used from a few weeks to several years based on how the patient tolerates the treatment and the effects.

Where can I get more information?

For more detailed information including references you can read the companion healthcare professional version on the CCNM research website. You can also consult with a health care provider such as a medical doctor or nurse practitioner who is experienced in the use of DCA.

Disclaimer:

This monograph provides a summary of available evidence 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 nor should it replace the advice of a qualified health care provider.