Intravenous vitamin C may boost chemo's cancer-fighting power

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Lab study found it also left healthy cells unharmed, but experts say more research needed.

(HealthDay)—Large doses of intravenous vitamin C have the potential to boost chemotherapy's ability to kill cancer cells, according to new laboratory research involving human cells and mice.

Vitamin C delivered directly to human and mouse ovarian cancer cells helped kill off those cells while leaving normal cells unharmed, University of Kansas researchers report.

"In cell tissue and animal models of cancer, we saw when you add IV vitamin C it seems to augment the killing effect of chemotherapy drugs on cancer cells," said study co-author Dr. Jeanne Drisko, director of integrative medicine at the University of Kansas Medical Center.

In follow-up human trials, a handful of cervical cancer patients given intravenous vitamin C along with their chemotherapy reported fewer toxic side effects from their cancer treatment, according to the study published in the Feb. 5 issue of *Science Translational Medicine*.

"In those patients, we didn't see any ill effects and we noticed they had fewer effects from the chemotherapy," Drisko said. "It seemed to be protecting the healthy cells while killing the cancer cells."

Intravenous vitamin C has been considered an integrative medical therapy for cancer since the 1970s, Drisko noted.

But vitamin C's cancer-killing potential hasn't been taken seriously by mainstream medicine ever since clinical trials performed by the Mayo Clinic with oral vitamin C in the late 1970s and early 1980s found no anti-cancer effects, she explained.

Researchers have since argued that those trials were flawed because vitamin C taken orally is absorbed by the gut and excreted by the kidneys before its levels can build up in the bloodstream.

But it's been hard to attract funding for further research. There's no reason for pharmaceutical companies to fund vitamin C research, and federal officials have been uninterested in plowing research dollars into the effort since the Mayo research was published, Drisko said.

This latest investigation began with researchers exposing human ovarian cancer cells to vitamin C in the lab. They found that the cells suffered DNA damage and died off, while normal cells were left unharmed.

The researchers then tested vitamin C on mice with induced ovarian cancer. The vitamin appeared to help chemotherapy drugs either inhibit the growth of tumors or help shrink them.

Finally, the team conducted a pilot phase clinical trial involving 27 patients with stage III or stage IV ovarian cancer.

The patients who received intravenous vitamin C along with their chemotherapy reported less toxicity of the brain, bone marrow and major organs, the investigators found.

These patients also appeared to add nearly 8.75 months to the time before their disease relapsed and progressed, compared with people who only received chemotherapy. The researchers did note that the study was not designed to test the statistical significance of that finding.

Vitamin C in the bloodstream helps kill cancer cells because it chemically converts into hydrogen peroxide when it interacts with tumors, Drisko said.

"If you can get your blood levels of vitamin C very high, it gets driven into the space around the cancer cells," she explained. "In that space, it's converted into hydrogen peroxide. It's very similar to what our white blood cells do. They create hydrogen peroxide to fight infection."

Dr. Stephanie Bernik, chief of surgical oncology at Lenox Hill Hospital in New York City, said intravenous vitamin C therapy is not unheard of among cancer doctors.

"I've had patients come in and say they were doing vitamin C intravenous therapy," Bernik said. "I always tell them we don't know enough to know whether it is good or bad."

This new research raises interesting possibilities, but until larger clinical trials are conducted Bernik says her advice to patients will not change.

"You have to do a bigger study with patients and look at outcomes. You also have to make sure these treatments don't interfere with the treatments we're giving currently," she said. "There may be some efficacy in what they're doing. It just needs to be proven. This is just the start of more studies looking at this in-depth."

Dr. Michael Seiden, chief medical officer for The US Oncology Network, agreed.

"It is important to emphasize that many vitamin therapies have shown interesting results when applied to cancer cells in test tubes yet, to date, these approaches typically are not effective and occasionally prove harmful in human studies," he said. "At this time, there is still no evidence that high-dose vitamin C should be part of the treatment for women with ovarian cancer."

While she agreed that larger trials need to be conducted, Drisko was not as hesitant.

"It's safe. It's inexpensive. There's a plausible mechanism we're investigating for why it works," she said. "We should be using this in patients, rather than dragging our feet and worrying about using it at all."

More information: Visit the U.S. National Cancer Institute for more on vitamin C and cancer.

Research paper: "High-Dose Parenteral Ascorbate Enhanced Chemosensitivity of Ovarian Cancer and Reduced Toxicity of Chemotherapy," by Y. Ma et al. *Science Translational Medicine*, 2014.