

Diabetes drug metformin holds promise for cancer treatment and prevention

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Metformin 500mg tablets. Credit: public domain

Use of Metformin - commonly used as the front-line treatment for type 2 diabetes - improves survival for some breast cancer patients, and shows promise as a treatment for patients diagnosed with endometrial hyperplasia, according to the results of two new studies presented by researchers from the Perelman School of Medicine at the University of Pennsylvania at the American Society of Clinical Oncology (ASCO) Annual Meeting.

In one study (abstract 1569), the first to examine the effect of metformin on survival rates for breast cancer patients, researchers examined clinical outcomes for 1,215 patients who were diagnosed and underwent surgical treatment for breast cancer between 1997 and 2013. Ninety-seven patients examined reported using metformin before their diagnosis, and 97 reported use of the drug after diagnosis.

Results of the study showed that patients who used metformin before being diagnosed with breast cancer were more than twice as likely to die than patients who never used the drug, while patients who began using metformin after their cancer diagnosis were almost 50 percent more likely to survive than non-users.

"Using metformin as a cancer prevention strategy has been controversial and results have been inconsistent, but our analysis reveals that use of the drug is time-dependent, which may explain the disparity. While use of the drug may have a survival benefit for some breast cancer patients, those who developed breast cancer while already using Metformin may have more aggressive cancer subtypes," said lead author Yun Rose Li, MD, PhD, a clinical research fellow in the division of Endocrine and Oncologic Surgery at the Perelman School of Medicine at the University of Pennsylvania, who will present the results. "Our study also illustrates the complex interaction between underlying metabolic risks and breast cancer outcomes, and underscore the importance of a multi-system approach to cancer treatment."

Additional results of the study showed that patients who used metformin were more likely to be over the age of 50 at diagnosis and to be African-American. While tumor size and disease progression were similar across all groups, the patients who began using the drug after their diagnosis were more likely to have ER/PR positive tumors while the patients who used it prior to their diagnosis had higher rates of Her2+ and Triple Negative tumors.

Since this work is among the first to examine the effects of long-standing metformin use in the context of when patients start using it as it relates to breast cancer diagnosis, the authors say that further investigations are necessary to examine the impact of metformin use on cancer recurrence. Nonetheless, the authors say there is compelling biological evidence suggesting that the differences observed in breast cancer tumor markers may be due to mechanistic differences in cancer initiation in patients who develop cancer while taking metformin.

The results will be presented at the Cancer Prevention, Genetics, and Epidemiology poster session on Monday, June 6.

In the second study (abstract 5592), researchers examined the effectiveness of using metformin as a treatment for women newly diagnosed with endometrial hyperplasia, a condition that occurs when there is a hormonally related unbalanced overgrowth of the uterine lining. If left untreated, patients are at a significantly higher risk of developing uterine cancer.

Eighteen participants were enrolled in a multi-institutional trial and treated with metformin for three months. Results showed 56 percent of patients responded to treatment, defined as complete resolution of the hyperplasia. The effect was seen especially in women with simple hyperplasia without additional complications or irregularities.

Typically, women with endometrial hyperplasia are treated with progesterone-based therapies via depot injections, intrauterine devices, or oral medications. Progesterone works by counteracting the effects of estrogen and thinning the uterine lining. While effective in up to 80 percent of cases, progesterone therapies have been shown to cause significant side effects such as weight gain, mood changes, and gastrointestinal distress. Hysterectomy (surgical removal of the uterus) is also an alternative therapy for women who are post-menopausal, or have completed child-bearing.

"The results of our study may present an alternative treatment for particular forms of endometrial hyperplasia, in contrast to standard progesterone-based therapies or hysterectomy," said Emily Ko, MD, MSCR, an assistant professor of Obstetrics and Gynecology at the Perelman School of Medicine at the University of Pennsylvania, and lead author of the study. "Future prospective studies may better identify women for which metformin may be most beneficial, as well as the most effective dosing regimens."

The results will be presented at the Gynecologic Cancer poster session on Monday, June 6.

Provided by University of Pennsylvania School of Medicine

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