Innovations in Ovarian Cancer Research

A newly formed innovations group is studying the disease from multiple angles.

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Ovarian cancer is a growing area of research at the University of Colorado Cancer Center. A newly formed Ovarian Cancer Innovations Group, envisioned by Saketh Guntupalli, MD, and led by Kian Behbakht, MD, MBA, is taking a multipronged approach to studying the disease.

“The first prong is looking to determine biomarkers that can be used for early detection,” says CU Cancer Center member Benjamin Bitler, PhD, an associate professor of reproductive sciences and the D. Thomas and Kay L. Dunton Endowed Chair in Ovarian Cancer Research. “For that effort, we’re leveraging one of the unique resources we have at the CU Cancer Center, which is a gynecologic tumor and fluid bank. This bank has been in existence for more than 15 years, and we have over 1,300 patients on it. This database allows us to ask questions about prevention and early detection in a very translational and real way.”

As part of the biomarker study, members of the ovarian cancer research group are developing a symptoms screening that looks at common ovarian cancer symptoms — including bloating, increased abdominal size, urinary tract symptoms, and abdominal pain—to identify individuals most likely to have the disease.

“That’s going to narrow down the number of women who are moved forward to the actual screening test,” says Behbakht, professor of gynecologic oncology and the Emily McClintock Addlesperger Endowed Chair in Ovarian Cancer, who is leading the symptoms screening effort.

“The problem we have in ovarian cancer is that it is a rare but very deadly cancer,” he says. “When the cancer is rare, the chances of a misdiagnosis are higher. This symptom screen helps narrow down the number of people so that the chances of cancer are more common in that group, and the screening test will perform better.”

Researching recurrence

Another focus for the ovarian research group is developing an algorithm to better predict disease recurrence, which is frequent in patients with ovarian cancer.

“The natural course of this disease is that most patients are initially diagnosed at a very late stage—typically stage 3 or 4,” Bitler says. “That’s why the prevention and detection piece is so critical. But a major consequence of that is that patients commonly develop recurrent disease, or have their disease return, within two to three years. We are using machine learning to look at patient tumors from our tumor bank, as well as current patients, to see how chemotherapy remodels the tumor microenvironment. We are looking for patterns that would predict disease recurrence.”

Metastasis, or cancer spread, is a big problem in ovarian cancer as well, and Guntupalli is looking at a novel way to prevent it. His research looks at how the inhibition of fat cells and fat synthesis may prevent the cancer from spreading to other parts of the body.

“We have a pending grant to combine standard chemotherapy with a commonly used drug to treat patients with high lipids,” says Guntupalli, professor and division director of gynecologic oncology and the Karen M. Jennison Endowed Chair in Gynecologic Oncology. “There’s some good data that shows that adding that drug makes chemotherapy work better.”

Investigating the tumor microenvironment

Members of the Ovarian Cancer Innovations Group also are looking closely at the tumor immune microenvironment in ovarian cancer—not just the tumor cells, but the tumor ecosystem that includes tumor cells, immune cells, endothelial cells, blood vessels, lymphatic vessels, and fibroblasts—in hopes of improving the effectiveness of immunotherapy in this type of cancer.

“There’s still a lot to be known about the biology that drives ovarian cancer,” Bitler says. “Immunotherapy has changed the face of most cancer types, including lung cancer and melanoma, but ovarian cancer has lagged behind. We haven’t been able to employ immunotherapy as effectively in ovarian cancer as we have in other cancer types. That’s partly due to the tumor immune microenvironment in ovarian cancer, which we think is so immune suppressed that immunotherapy can’t overcome it.”

Moving in the right direction

It all adds up to a major CU Cancer Center effort that looks to build on the cutting-edge ovarian cancer research that already has been performed by Guntupalli, Behbakht, Bitler, and others over the past decade.

“We’re moving in the right direction in the research space,” Bitler says. “There’s reason for patients to be hopeful in the future that we’re going to have better targeted therapies, better outcomes, better quality of life. This innovations group is going to be one of those catalysts that drives change in how we interface with not only the patient, but the community and the caretakers.”

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