

Dangerous glucose-hungry cervical tumors can be detected using PET scans

Early detection of any problem is vital and nuclear technology helps immensely.

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Cervical cancers that take up a lot of blood sugar, or glucose, are more resistant to treatment than those that are less glucose-hungry, according to research at Washington University School of Medicine in St. Louis. The researchers also found that the high glucose-uptake tumors can be identified with PET scans, which are already routinely used to determine tumor size and lymph node involvement in cervical cancer patients.

PET scans monitor the amount of a radioactive glucose tracer absorbed by cells, so the brightness of the image reveals how much glucose a tumor takes up. The results of the research team's analysis indicate that PET scans can be used to better determine prognosis in cervical cancer patients.

"Cervical tumors vary more in their glucose uptake than other kinds of cancer, making glucose uptake a very useful indicator for cervical cancers," says Perry W. Grigsby, M.D., a radiation oncologist with the Siteman Cancer Center at Washington University School of Medicine and Barnes-Jewish Hospital. "We found that the tumors with higher uptake were associated with lower survival rates and lower disease-free survival rates."

In a report published in the April issue of *Gynecological Oncology*, the researchers summarized their findings for 96 cervical cancer patients who underwent PET scans before radiation and chemotherapy were initiated.

Analysis showed that 71 percent of patients whose tumors had a glucose uptake value below the median value of 10.2 survived five years without a recurrence of their disease. In contrast, 52 percent of those whose glucose uptake measured above 10.2 went for five years without a recurrence.

Since submitting their findings, the team has continued their investigation with additional patients, who now number near 250. The trend of lower five-year disease-free survival with higher tumor glucose uptake has been born out in the additional patients.

Further, the continuing study has clearly demonstrated that the overall (disease-free and disease-recurring) five-year survival rate was lower in the group of patients whose tumor glucose uptake was above the median of 10.2.

"Our clinical experience has taught us that standard therapy, which includes both chemotherapy with cisplatin and radiation treatments, doesn't seem to be able to cure these cancers if their glucose metabolism is high," says Grigsby, professor of radiation oncology, of nuclear medicine and of obstetrics and gynecology. "We don't yet know what therapy will be more effective in these cases. For the time being, we're closely watching the response of the tumor to treatment and surgically removing the tumor and surrounding tissue when necessary."

To improve treatment options in the future, Grigsby is initiating a study to uncover the cellular mechanisms that are altered in tumors that uptake a lot of glucose.

"I've looked at the proteins that transport glucose into tumor cells, and I haven't seen any significant differences between the glucose transporters in tumors with high glucose uptake and those with low glucose uptake," Grigsby says. "So we're taking a different approach.

We're going to biopsy tumors over the course of treatment. Then we'll look for which genes change activity during treatment. If we can find predictable changes, they may lead us to better treatments for the more-resistant cervical tumors."