Spot-Freezing Breast Cancer Tumors

Individuals fighting metastatic breast cancer, where the disease has progressed to other areas of the body, may finally have another weapon in their arsenal: percutaneous cryoablation. The cancer treatment could potentially be used as a last line of defense to halt individual spots of remaining metastatic disease by freezing and destroying tumors, say researchers presenting a study at the Society of Interventional Radiology's 37th Annual Scientific Meeting.

"Breast cancer is the most common cancer in women, causing one million new cases and killing 370,000 people worldwide each year, and approximately 10,000 to 15,000 cases of stage IV breast cancer occur in the United States annually," said Peter J. Littrup, M.D., director of imaging core and radiology research at the Karmanos Cancer Institute. "If you envision cancer treatment as a three-legged stool: you have radiation therapy, surgery and chemotherapy. When you get to the point of metastatic disease, you end up managing people whose treatments have failed. We are introducing the fourth leg on the stool of cancer care: tumor ablation."

"Stage IV metastatic breast cancer means tumors have spread widely from the primary tumors in the breasts to other tissues of the body. This stage of disease is currently viewed as incurable and associated with a low rate of survival. While less than five percent of those are initially diagnosed with metastases, an estimated 25 to 40 percent will develop these additional tumors, which are notoriously difficult to wipe out, even with multiple forms and repeated rounds of treatment," said Littrup. "At this point, treatments are considered palliative—with the intent to keep metastases at bay while hopefully providing individuals more time and improved quality of life, rather than a complete cure. But after mastectomy, radiation and chemotherapy, it is time to try something new," he added.

"Why should people have to keep changing from one expensive chemo drug to another when there are just a few remaining spots?," said Littrup. "Cryoablation could offer these individuals a new treatment option," he added.

Most commonly, these metastatic tumors take up residence in:

- The liver
- The lungs and pleura—a thin layer of tissue that wraps around the lungs
- The soft tissues
- The kidneys
- In the bone

Percutaneous cryoablation essentially comes in and cleans up single tumors that

persist after first and follow-up treatment. This interventional radiology procedure involves the use of tiny probes inserted with a catheter from a small cut in the skin and then guided to the tumors, at which point pressurized argon gas is introduced, turning the tumor into a ball of ice, effectively killing the cancerous tissue. Helium gas is then pumped in to help release the needle. This process is guided by medical imaging such as computed tomography or ultrasound, which capture the procedure by picking up the distinct densities between the normal tissues and frozen cancer tissue. The ice ball can be seen as a clearly defined darker mass, as it has a lower density than the surrounding tissue. This treatment could provide a valuable alternative to other spot-therapies because there is minimal damage to surrounding healthy tissues and the side effects and recovery time are dramatically reduced when compared to those of other therapies, said Littrup.

"Cryoablation as a targeted therapy is beneficial because it can significantly reduce discomfort and incidence of disease," said Littrup. "It's a much better option, we think, than surgery, especially since many metastatic patients are not candidates for surgery, and it may potentially lead to longer survival if it coincides with more data concerning primary metastases in other regions of the body," he said.

For the study, a total of eight people with nine tumors received percutaneous cryoablation procedures guided with CT, ultrasound or a combination of both methods. Six of the eight subjects had formerly undergone at least a single mastectomy prior to treatment with percutaneous cryoablation. The secondary tumors of these people were found in the liver, lung and kidney. There were no serious complications and all procedures were considered successful. All individual tumors remaining in the body were found and the local cancer did not recur. The median overall survival for those in the study was 46 months, and 25 percent survived past the five-year anniversary of treatment. Researchers conclude that percutaneous cryoablation could potentially be used as an effective alternative treatment for metastatic breast cancer, especially with the promising results they have had with many more patients suffering from other types of metastatic disease.

"This therapy provides a minimal rate of cancer recurrence and no major complications, making these ice balls ideal for targeting metastatic tumors that are limited in number and location," said Littrup. "This is a preliminary study, and at this point we're hoping that the evidence could be a stepping stone for a bigger study to look at more patients. If we can get more data that supports percutaneous cryoablation for metastatic breast cancer, it could be a huge finding," he added.

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