The Last Frontier in Cancer Care: Treating Disease When It Spreads to the Brain

By Julie Grisham, **Friday, February 16, 2018**

Neurosurgeon Viviane Tabar says it's possible to control cancer in many parts of the body but it's still a challenge when disease spreads to the brain.

Summary

As cancer is increasingly being brought under control in other parts of the body, there is a growing focus on treating tumors that spread to the brain.

Metastatic brain cancer gets far less attention in the media than **primary brain tumors**, despite being at least ten times more common. Metastatic brain cancer

occurs when tumors spread from other parts of the body to the brain. It was once considered an end stage of the disease. Doctors' main focus was making patients comfortable. But increasingly, metastatic brain cancer is being treated aggressively, with the goal of eliminating it. Memorial Sloan Kettering doctors and scientists are leading the charge to find new and innovative ways to treat this type of brain cancer.

"There used to be this feeling of therapeutic nihilism about metastatic brain cancer. Once cancer spread there, everyone assumed not much could be done," says **Adrienne Boire**, a neuro-oncologist who also leads a lab in MSK's **Human Oncology and Pathogenesis Program**. "Unfortunately, many doctors in the community still feel that way. But as a physician-scientist at the best cancer hospital in the country, I can't just stand by. At MSK, we are making use of all the amazing resources we have to be able to understand and address this very complex problem."

> Metastatic brain tumors are at least ten times more common than primary brain cancers.

"Treating metastatic brain tumors is slowly turning into the last frontier in cancer care," adds physician-scientist **Viviane Tabar**, Chair of MSK's Department of Neurosurgery. "We often see people whose cancer is very well controlled in other parts of their body but who are still struggling with poorly controlled brain metastases."

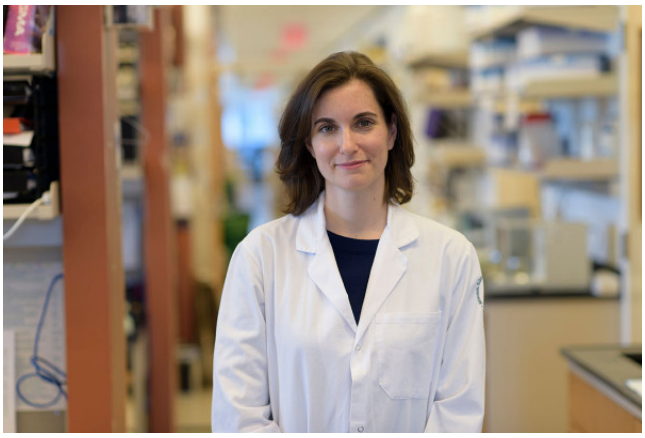
The **symptoms of brain metastases** and their impact can be severe. They may include headaches, nausea, weakness, seizures, and problems walking, speaking, and seeing.

An Increasing Problem in Cancer Care

"From a surgeon's perspective, we are treating these tumors with a higher frequency than ever before, now that people have better options for medical treatment of their primary disease," Dr. Tabar says.

There are no data to show that metastatic brain tumors are becoming more common, but there's a general sense in the field that they are. One reason could be that better imaging techniques are more likely to detect tumors that have moved there. Another common opinion is that doctors are getting better at treating cancer

in other locations so people are living longer and tumors have more time to grow in the brain.



"As a physician-scientist at the best cancer hospital in the country, I can't just stand by," says Adrienne Boire.

Targeted drugs and other new therapies — such as EGFR and checkpoint inhibitors for **lung cancer** and HER2 inhibitors and hormone therapies for **breast cancer** — often are very effective at keeping cancer in check where it began. They can also work well in other organs where cancer has spread. But these therapies are less effective on tumors in the brain. This is due, in part, to what is called the blood-brain barrier. This barrier may make it harder for these drugs to reach the brain.

In addition, metastatic brain tumors usually are genetically very different from the original tumors. This is because cancer cells change as they grow and spread throughout the body.

Identifying Variations in Tumor Biology

Because of these genetic differences, new approaches are needed to treat metastatic brain tumors. "We're in a strange spot," Dr. Boire says. "We know what the tumor used to be — a breast tumor, for example, or a melanoma tumor. And based on imaging, we know where it is. But we don't know all the changes it's gone through to get to where it is. That can be a challenge to figure out."

To address this, MSK neurologists and pathologists are working together to develop liquid biopsies of the spinal fluid, which may contain DNA from brain tumors. This would allow them to run **MSK-IMPACT™**, a test that simultaneously screens for hundreds of genes that drive tumor growth. Doctors can use it to determine the best targeted therapy for a tumor without having to obtain a tissue biopsy from the brain. "This would really be a game changer," Dr. Boire notes.

Another tactic being studied by Dr. Boire and her colleagues, including **Sloan Kettering Institute** Director **Joan Massagué**, is finding drugs that target the microenvironment around the tumor, rather than the tumor itself. "There are many different kinds of cancer that can set up shop in the brain, which means it will be

unlikely that we find one treatment that's effective against all tumors," she explains. "But there's only one brain. Perhaps finding out how the brain responds to cancer holds the key to finding ways to treat brain metastasis."

A Different Kind of Brain Tumor and Treatment

In addition to being different from the tumors in which they originated, metastatic brain cancers are also very different from primary brain cancers. Surgically, however, that may make these tumors easier to treat. "Compared with tumors like glioblastoma, brain metastases tend to look very different from the surrounding brain tissue. It is simpler to determine their boundaries when removing them," Dr. Tabar explains. She adds that people who have surgery for brain metastases tend to recover very quickly. "Most patients can go home in only two or three days, and they usually do very well," she says.

In some cases, brain metastases can occur in critical areas of the brain, such as those that control movement or speech. In those circumstances, Dr. Tabar doesn't hesitate to use all of the surgical technology at her disposal. She might opt for brain mapping or keeping the patient awake during surgery. That way, she can "maximally protect their function," she says. "Our aggressive approach to brain metastasis is motivated by the often excellent outcomes of surgery and radiation, and their positive impact on quality of life. There's been enormous progress in systemic treatments, leading to improved survival."

Amy's Story

Discover how MSK experts helped Amy Mannarino when breast cancer spread to her brain.

Learn more

Many people with brain metastases have multiple tumors, not all of which can be removed with surgery. They are often treated with a combination of surgery and radiation. Several different types of radiation are available for people who require this treatment. These include **intensity-modulated radiation therapy**, which uses images from CT scans to focus high doses of radiation directly on the tumor; **image-guided radiation therapy**, which uses real-time imaging with a CT scan or x-rays during radiation therapy; and stereotactic radiosurgery, which can treat small tumors with a single high dose of radiation. These advanced technologies can focus the radiation beam at the specific area needing treatment while sparing the surrounding normal brain cells. Doctors at MSK avoid giving radiation to the entire brain to minimize side effects.

Radiation therapy and surgery are often combined for the same tumor, to minimize the chance it will regrow after surgery or if parts of it could not be removed. This may be the case if the tumor is in a key area of the brain or surrounding an important blood vessel. Radiation therapy may also be **combined with immunotherapy**.

A Multidisciplinary Team Focused on the Same Goal: The Individual

Another important contributor to MSK's ability to treat metastatic brain cancer is our expertise in supportive services. "Our experts in rehabilitation, physical therapy, and other specialties make sure that our patients are strong enough to tolerate treatment," Dr. Boire says. "We want to give everyone the best chance we can to have the best outcome possible after treatment is over." This also includes experts in epilepsy, who are able to treat the seizures that are often caused by brain tumors.

“Metastatic brain cancer is a huge problem in oncology, and it doesn’t get the amount of attention it deserves,” Dr. Tabar concludes. “For that reason, here at MSK we are beginning to talk about building a formal center specifically for brain metastases. Assembling a group of experts on both the clinical side and in the lab will enable us to offer a multidisciplinary approach to a growing number of people who could benefit from an aggressive approach toward controlling brain metastasis.”

Comments

> Commenting is disabled for this blog post.

Peter Quackenbush

Feb 20, 2018 • 6:53 PM
Wonderful news, advancing treatments but not the last frontier- the latest frontier.

Thank you

Vivian Monaco

May 17, 2018 • 3:21 AM
Dr. Grommes and Dr. Ng have been treating me for brain cancer for the past two years and I believe without their dedication I would not be here. I may not have quality of life, but I'm still here with my family. Thank God for them and for MSKCC.

Memorial Sloan Kettering

May 17, 2018 • 12:21 PM
Dear Vivian, we are glad to hear you’ve been happy with your treatment. We will share your kind words with your doctors. Best wishes to you.

PREVIOUS
< In the News

NEXT
Inspired by a Patient, a Doctor Finds Answers for a Devastating Cancer Complication >