Defending the brain

Tumors may be on the rise, but there are more treatments in the doctor's arsenal

» The specialist: Dr. Isabelle M. Germano on brain tumors

Originally from Turin, Italy, Germano is a professor of neurosurgery and the director of Mount Sinai brain tumor program.

» The big story:

Sen. Ted Kennedy drew national attention last month when he underwent an operation for a brain tumor. Questions about the possible effects of cell phone use have also kept brain cancer in the news. Germano, a neurosurgeon who studies brain tumors, offers a primer on detection and treatment.

» Who's at risk:

"A brain tumor is a mass of cells that grows and multiplies uncontrollably," explains Germano. There are two kinds of brain tumors: primary, which originate in the brain and stay there, and metastatic, which originate elsewhere and spread to the brain. "Both of these tumors have the potential to take over the brain if not treated," Germano says.

Smokers have a much higher risk of developing metastatic brain tumors, because lung cancer often spreads to the brain. The numbers are staggering: 10% to 15% of lung cancer patients will develop brain cancer.

Exposure to environmental dangers like excessive radiation is likely to put people at a higher risk, as well. [People can be exposed to excessive radiation by working around X-rays or living near a disaster area like Chernobyl.] This connection isn't 100% proven," says Germano, "but it's a strong possibility." While some scientists suspect that cell phone use could be dangerous, as yet no study has found that it increases risk.

For people between 25 and 39 years old, brain tumors are the second-leading cause of death from cancer. Over the past 20 years, there has been an increase in brain tumors. At the same time, "We have better ways to diagnose brain tumors, so it's hard to say whether the increase in (reported) brain tumors is due to that," says Germano.

» Signs and symptoms:

Tumors can occur anywhere in the brain. Different areas control movement, speech, balance and hormones, explains Germano, who notes: "Depending on where a tumor occurs in the brain, it can have different effects on you."

Common symptoms include headaches (which can be persistent or come and go), seizures, a stroke-like syndrome, difficulty with balance, vision changes, personality changes, confusion and altered mental status.

These warning signs may not be consistent. "Sometimes the symptoms aren't there on a daily basis," says Germano. "Maybe you feel off one day of the week, and then a month goes by before it happens again." Often family and friends may notice these changes before even the patient does.

» Traditional treatment:

Diagnosis has two steps: a neurological examination and an MRI scan. In the neurological exam, the doctor looks at the cranial nerves, the movement of and sensation in the arms and legs, orientation, deep tendon reflexes and cognitive function like speech and memory. The standard treatments for brain tumors include surgery, radiation and chemotherapy. "All three can be used individually or in combination," says Germano.

Treating brain tumors takes a team of experts — neurosurgeons, neurologists, radiation-therapy physicians, radiologists and oncologists — who work together to tailor treatment for each patient.

The next step after diagnosis is getting a biopsy, a surgical procedure that allows doctors to determine what kind of tumor you have by inserting a needle into the brain. Depending on the diagnosis, some patients go into treatment immediately, while others can wait and have their tumor closely monitored for any sign of growth.

"Typically we proceed with treatment if there's a sign that the tumor is growing, presenting symptoms or is an aggressive tumor," says Germano.

One of the most frequent treatments is resection, surgery that removes the tumor. The operation takes from two to eight hours, depending on the location. (For instance, "a tumor at the base of the skull is much harder to resect than a tumor on the top," says Germano.)

After surgery, the patient can go into radiation, chemotherapy or some combination of both, if necessary. For an aggressively malignant brain tumor, radiation lasts about five weeks; chemotherapy is often given simultaneously. Another common treatment is radiosurgery (also called "gamma knife"), an intense form of radiation that takes only one day.

» Research breakthroughs:

Over the past decade, doctors have made tremendous strides in both detecting and treating brain tumors. In her lab, Germano is attempting a new tactic that aims to just deliver substances to attack the tumor, but to deli genes.

"The gene is a trait that allows the cell to manufacture a certain compound," says Germano. "What we can conceivably do is change the DNA of the tumor cells." One option is using viruses to carry genetic material into the brain; another is using animal stem cells. "We're using animal stem cells to carry genes into the brain that kill the tumor and not the other brain cells," says Germano.

» Questions for your doctor:

The most important question is, "Does your institute have a multidisciplinary team to diagnose and treat brain tumors?" It takes many more than one person to create the best treatment strategy for an individual patient's needs.

A related question to ask the doctor is, "Will you discuss this with your tumor board?" Germano emphasizes this point because multiple physicians should look at the scan and weigh in with ideas.

"There's not just one way to treat brain tumors, so ask "What are the possibilities for treating this?" There are more than 120 varieties of brain tumors, and there are several options for responding to a particular tumor."