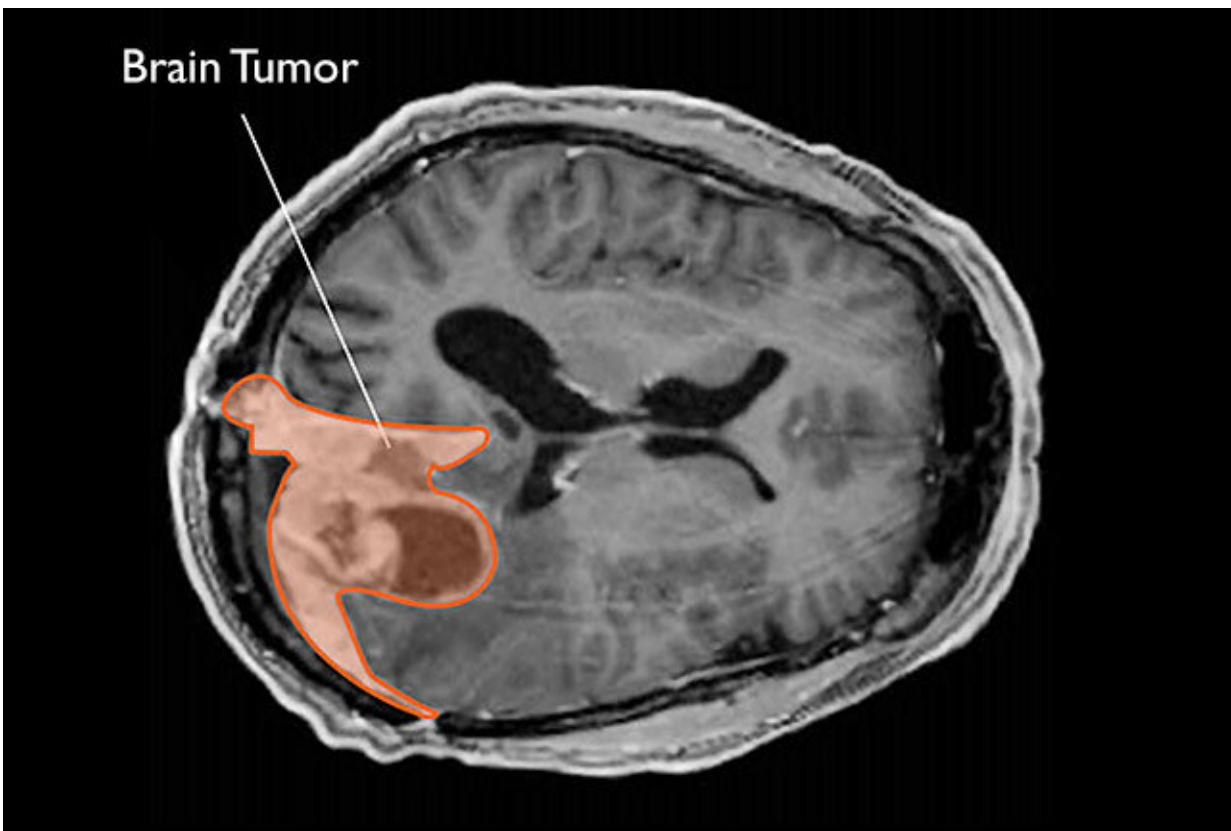


Research sheds light on link between meningiomas and seizures

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Meningiomas are graded by microscopic appearance, rate of growth and tendency to invade other tissues. Credit: National Cancer Institute

Meningiomas are the most common type of primary brain tumor. Found in the meninges— or the tissue that surrounds the brain and spinal cord,

meningiomas are often benign. However, some can behave more aggressively and recur. These tumors can affect critical neurovascular structures, such as arteries and cranial nerves, impacting patients' neurological function and quality of life.

Some patients with meningiomas can even suffer from seizures because the [tumor](#) can affect electrical activity, which is unusual since these tumors do not occur within the brain.

Yale School of Medicine associate professor of neurosurgery and chief of neurosurgical oncology, Dr. Jennifer Moliterno, sought to better understand the significance of seizures in meningioma patients and the potential role of the genetic mutations in these tumors.

In a study published in the *Journal of Neurosurgery* in 2020, Dr. Moliterno and her research team looked at 394 patients who had meningiomas surgically removed at Yale New Haven Hospital and correlated their [clinical outcomes](#) with their underlying tumor [genomic profiles](#).

Seventeen percent of the cohort of meningioma patients presented with seizures before [surgery](#). Through analysis, the team found that these patients were more likely to have edema (swelling in the brain) and a higher-grade tumor at diagnosis. They were also likely to experience a shorter time before tumor regrowth. What's more, these patients had an underlying somatic NF2 mutation within the tumor, which was an abnormality that Dr. Moliterno and her team had previously found correlated with more aggressive [meningioma](#) behavior in other studies. However, the researchers found that the NF2 mutation also led to edema and higher-grade tumors, leading to seizures.

Taken together, "we concluded that patients with meningiomas who present with preoperative seizures may indeed suffer from a more

potentially aggressive molecular entity and associated challenging clinical course," says Dr. Moliterno. "The seizures at presentation in this tumor population can be a sign to the treating physician to treat the patient more aggressively."

Dr. Moliterno says this information helps clinicians more accurately predict which patients may benefit from a more aggressive approach to surgery and careful monitoring for regrowth after the procedure or even the use of radiation following surgery.

The study also looked at how many patients experienced seizures after surgery. Fortunately, 83 percent of those who had seizures before surgery no longer had them after their tumor was removed. Seizures continuing after surgery were also correlated with the tumors growing back, underscoring the need for these patients to be closely monitored for a more aggressive clinical course.

This recent study complements another manuscript published by the Moliterno group in the journal *Neuro-Oncology* in 2020. In that study, Dr. Moliterno and her team looked at 469 surgically treated meningiomas and assessed their outcomes at the two-year mark. They compared these outcomes with genomic mutations to see if there were any clinically significant correlations.

The team found that some tumors with certain genomic [mutations](#), including NF2, grew back at an average rate of 22 times higher than others. This could partially explain why certain lower grade meningiomas can behave more similarly to high-grade ones if they both have the NF2 mutation. This growing body of genomic analysis could help clinicians characterize tumors with greater accuracy in the future.

"We have found that the underlying genomic driver mutation can have significant clinical implications based on the correlative work we have

done," says Dr. Moliterno. "We are fortunate to perform whole exome sequencing at Yale on every tumor we remove, and for those without access to this sophisticated technique, we are providing important clinical clues to help improve patient care and the management of a very common brain tumor."

More information: Trisha P. Gupte et al, Clinical and genomic factors associated with seizures in meningiomas, *Journal of Neurosurgery* (2020). [DOI: 10.3171/2020.7.JNS201042](https://doi.org/10.3171/2020.7.JNS201042)

Mark W Youngblood et al, Associations of meningioma molecular subgroup and tumor recurrence, *Neuro-Oncology* (2020). [DOI: 10.1093/neuonc/noaa226](https://doi.org/10.1093/neuonc/noaa226)

Provided by Yale University

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