

Chinese Neurosurgical Journal Reports Rare Hematoma Following Cyst Formation After AVM Radiosurgery

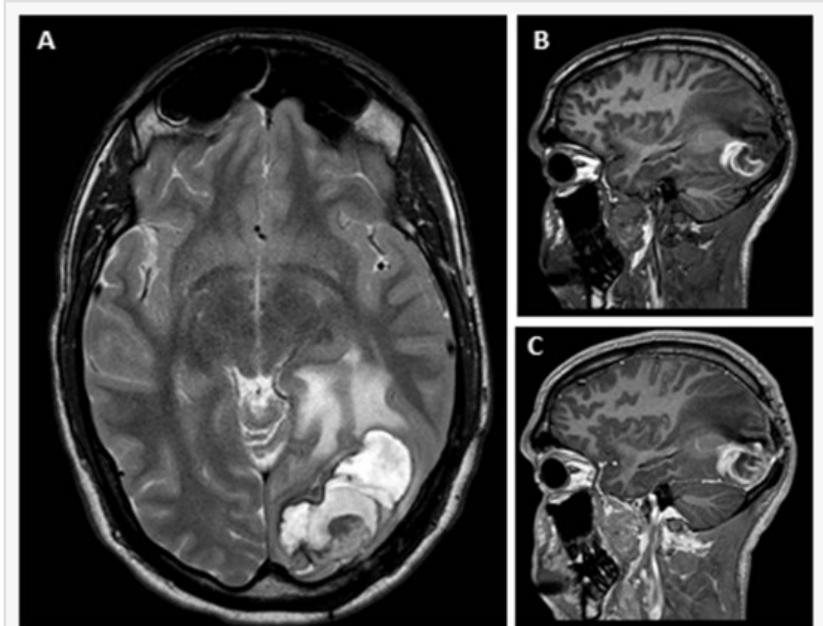
Researchers detailed a rare case linking delayed hematoma to cyst formation years after stereotactic radiosurgery for brain arteriovenous malformation

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[/EINPresswire.com/](https://www.einpresswire.com/) -- Arteriovenous malformation (AVM) is a vascular disorder in which blood vessels are abnormally formed, causing blood to bypass the usual network of capillaries and flow directly from arteries to veins through tangled and fragile vessels. This misdirection can deprive surrounding brain tissue of oxygen and result in complications such as headaches, seizures, or even life-threatening internal bleeding.

To treat AVMs, particularly those located in delicate or functionally important (eloquent) areas of the brain, stereotactic radiosurgery (SRS) has become a promising non-invasive option. SRS delivers highly focused radiation beams to targeted brain tissue, offering precision while minimizing damage to surrounding structures. Although this treatment approach has gained traction due to its effectiveness and low risk in the short term, the long-term complications—especially radiation-induced cyst formation (CF)—remain poorly understood.

To address this critical gap in clinical knowledge, a team of researchers led by Dr. Iñigo L. Sistiaga from University Hospital Cruces, Spain, has published a detailed case report describing a rare but serious delayed complication following SRS. The study, conducted in collaboration with Biocruces Bizkaia Health Research Institute and the University of the Basque Country, offers important insights into the possible progression from post-treatment cyst formation to a more dangerous condition known as chronic encapsulated expanding hematoma (CEEH). The report



Recurrence of chronic encapsulated hematoma following cyst formation after stereotactic radiosurgery for brain arteriovenous malformations: a case report

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The case involves a 28-year-old male who had undergone SRS for a brain AVM. A full ten years after treatment, the patient developed a cystic lesion—a fluid-filled sac within brain tissue—which initially caused no symptoms but slowly enlarged over time. Eventually, a surgical procedure was performed to drain the cyst. However, in the years that followed, the patient experienced a recurrence, this time presenting as a chronic encapsulated expanding hematoma (CEEH)—a rare condition in which a blood clot continues to grow within a fibrous capsule, exerting pressure on surrounding brain tissue. This development required a more invasive surgical procedure: lobectomy, or the removal of the affected portion of the brain. Upon further examination, the researchers discovered that the initial cyst had contained an angiomatous nodule—a small, benign mass composed of blood vessels—that had been overlooked during the first surgery. It is believed that this vascular nodule may have been the source of slow, ongoing bleeding, which ultimately led to the transformation of the cyst into a hematoma.

The authors propose that cyst formation (CF) and chronic encapsulated expanding hematoma (CEEH) may not be unrelated or coincidental complications, but rather part of a pathological continuum. This hypothesis suggests that an untreated or incompletely treated cyst, especially one containing vascular structures, may progress to a more serious condition like CEEH over time.

The findings also challenge existing surgical treatment strategies for managing late-onset cysts, particularly those that exhibit contrast-enhancing nodules—areas that light up on MRI when contrast dye is used, indicating abnormal or active tissue. In many cases, cyst drainage alone may seem sufficient, but this case suggests that such an approach could allow underlying causes—like angiomatous nodules—to go untreated, increasing the risk of recurrence.

“What appears to be a harmless cyst might, in fact, be the early stage of a more serious complication,” says Dr. Sistiaga, “If a contrast-enhancing nodule is seen, aggressive surgical removal might be the only resort to prevent a more dangerous recurrence.”

Beyond surgical technique, the authors also emphasize the importance of long-term follow-up for patients who have undergone SRS. In this case, post-treatment imaging had initially shown complete resolution of the AVM. However, more subtle radiation-induced changes were already visible as early as five years after radiosurgery—changes that could have served as early warning signs. These findings reinforce the importance of not relying solely on angiographic resolution to declare treatment success.

“According to literature, estimated incidence of CF after SRS surgery is only under 5%, while CEEH is even rarer. However, when combined, these complications may affect up to 7% of the total treated patients” notes Dr. Sistiaga.

The authors suggest that both diagnostic vigilance and surgical decision-making must be updated in light of these findings. Greater awareness of the potential for late complications, combined with a more aggressive surgical approach when warranted, could help prevent the progression from a relatively benign cyst to a more damaging hematoma.

As SRS becomes increasingly adopted worldwide for treating AVMs, this case serves as a timely reminder that long-term patient monitoring, comprehensive imaging, and complete resection of all abnormal vascular tissue are critical to minimizing future risks.

In summary, the case adds valuable evidence to the evolving understanding of radiation-induced complications in AVM treatment and underscores the need to refine both clinical protocols and surgeon awareness to improve patient outcomes over the long term.

Reference

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About the University

University Hospital Cruces, part of Osakidetza's Euzkadi Euzkadi Enkarterri Cruces OSI, is a major healthcare center in the Basque Country. It serves as a reference for specialized care, including organ transplants, burns, pediatrics, and neurological and ocular procedures. With 847 beds and 33 operating rooms, the hospital performs over 31,000 surgeries, handles 191,000 emergencies, and conducts 887,000 outpatient visits annually. Around 4,600 births take place each year. Over 6,000 skilled professionals and advanced technology support its mission to provide high-quality care across the Basque healthcare system and neighboring regions.

Website: <https://www.osakidetza.euskadi.eus/osi-ezkerraldea-enkarterri-cruces-hospital-universitario-presentacion/webosk00-ezencon/es/>

About Dr. Iñigo Sistiaga from University Hospital Cruces

Dr. Iñigo Sistiaga, MD, is a Neurosurgical Oncology and Radiosurgery Fellow at Northwell Health, North Shore University Hospital. He completed a Skull Base and Microneurosurgery Research Fellowship at Weill Cornell Medical College and a Neurosurgery Residency at University Hospital Cruces in Spain. Specializing in brain tumors, his focus includes connectomics, stereotactic radiosurgery, and minimally invasive techniques. With over 35 publications and active roles in clinical trials, Dr. Sistiaga bridges European and U.S. neurosurgical approaches to advance neuro-oncology and is committed to expanding access to innovative neurosurgical care.

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