

Cyst formation

Enhanced nodular lesion on magnetic resonance imaging and chronic encapsulated expanding haematoma associated with [cyst formation](#) may have common aetiopathology caused by late radiation effects, mainly consisting of dilated capillary vessels with wall damage. Massive protein exudation from such damaged capillary vessels is important in cyst development ¹⁾.

Case series

2016

Thirty-five patients with 37 AVMs were included. AVMs were irradiated 16.6 ± 3.5 years prior with AVM obliteration proven 13 ± 4 years prior. All patients underwent recent MRI examinations, including application of gadolinium-based contrast.

In one case, post-irradiative [cyst formation](#) with mass effect and signs of hemorrhage requiring surgery was found. ²⁾.

2000

Patients were treated with a second craniotomy for tumor resection and placement of [carmustine wafers](#). After implantation, the first patient did well for 6 weeks, then developed lethargy, headaches, and vomiting. CT scan showed a large cyst at the craniotomy site; this required reoperation for drainage. The second patient had a seizure, deterioration of mental status, and progressive hemiparesis 10 days after wafer implantation. CT scan again showed that a large cyst had formed in the area of the previous surgery; she also required reoperation. In each case, minimal tumor and no evidence of infection were found. Within a few more weeks, each patient succumbed to progressive disease.

The hypodense, roughly spherical cysts clearly demonstrated clinically significant mass effect, and required reoperation despite treatment with high-dose corticosteroids. Neurosurgeons should be alert to the possibility of tumor bed cyst formation in patients treated with interstitial BCNU wafers ³⁾.

1981

Eight cases of cerebral cyst formation among 50 patients (= 16%) with malignant [supratentorial gliomas](#) treated by [surgery](#), megavoltage radiation, and multiple-agent [chemotherapy](#) are reported. Five of them developed signs of intracranial hypertension or progressive neurological deficit, while in three patients cerebral cysts were detected by CT without clinical deterioration. At operation or autopsy, or both, the large fluid-filled, smooth-walled cysts were lined by glio-mesenchymal scar tissue with no or little tumour recurrence in five, while three patients showed large recurrent tumour masses associated with necrosis and cyst formation. Clinical signs or CT evidence, or both, of cerebral cysts developed 4 to 12 months (average 10 months) after the first craniotomy, and 3 to 9 months after termination of radiotherapy, usually after the second to fourth course of polychemotherapy. The cystic cavities which are attributed to increased necrosis and other effects of radiation and cytostatic

treatment, may mimic tumour progression or recurrence, and cerebral abscess, but are usually recognized by CT. Surgical treatment produced transient clinical improvement in 5 patients, but usually did not prevent the fatal outcome of the disease, which in these patients occurred 3 weeks to 6 months after surgical treatment of cyst formation, their life span ranging from 9 to 22 months. The pathogenesis and clinical problems related to cerebral cysts arising following multimodality treatment of malignant brain tumours are discussed

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1)

Shuto T, Yagishita S, Matsunaga S. Pathological characteristics of cyst formation following Gamma knife radiosurgery for arteriovenous malformation. *Acta Neurochir (Wien)*. 2014 Dec 13. [Epub ahead of print] PubMed PMID: 25503297.

2)

Malikova H, Koubska E, Vojtech Z, Weichet J, Syrucek M, Sroubek J, Rulseh A, Liscak R. Late morphological changes after radiosurgery of brain arteriovenous malformations: an MRI study. *Acta Neurochir (Wien)*. 2016 Sep;158(9):1683-90. doi: 10.1007/s00701-016-2876-3. Epub 2016 Jul 1. PubMed PMID: 27368701; PubMed Central PMCID: PMC4980423.

3)

Engelhard HH. Tumor bed cyst formation after BCNU wafer implantation: report of two cases. *Surg Neurol*. 2000 Mar;53(3):220-4. PubMed PMID: 10773252.

4)

Volc D, Jellinger K, Flament H, Böck F, Klumair J. Cerebral space-occupying cysts following radiation and chemotherapy of malignant gliomas. *Acta Neurochir (Wien)*. 1981;57(3-4):177-93. PubMed PMID: 6269367.

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