FP91

The burden of radiation induced cerebral cavernous malformations on Pediatric Oncology

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Therapeutic irradiation of the brain and spinal cord (cranio-spinal, whole brain, local field, focused, brachytherapy) plays a role in the delayed genesis of a vascular entity mimicking a cavernous malformation (CM), one of the four types of cerebral angiomas. This post irradiation "de novo" CM generally occurs in children and young adults treated for a great variety of intracranial tumors (medulloblastoma in particular) and blood malignancies, mainly in early childhood owing to the deleterious effects of irradiation on the developing nervous system. The complex pathogenesis of postirradiation CMs ranges between direct de novo induction and triggering of a preexistent,albeit occult, vascular lesion, facilitated in particular by the influence of vascular growth factors. We report our experience between 1985 and 2012 with 25 cases of postirradiation CMs occurring after cranio/spinal.whole brain (9 cases), local field (14) focused (1) and intracavitary (1) radiation, performed in childhood for brain tumors in 19 cases, cavernous angioma in 1 and lymphoma/leukemia in 5. The time interval between irradiation and the detection of the CM varied from 3 to 24 years (mean 9,2y) and the mean age at diagnosis of the CM was 19.5y. Three pts had multiple CMs developing at different times after initial irradiation and one had induction also of a different lesion (meningioma). Ten patients presented with acute symptoms due to hemorrhage (headache, vomiting, focal signs), five with seizures and 10 were asymptomatic when the lesion was detected. Seven patients were operated on (two after recurrent bleeding) and 18 are undergoing radiological and clinical monitoring, without evidence of evolution during the observation period at a mean of 7.2 y. The initial bad reputation of postattinic CMs has been mitigated by recent reviews and our own experience: surgical resection is recommended only in clinically aggressive malformations with hemorrhagic course and growth propensity.