Pediatric Oncology Abstract Categories

Survivorship and Late side effects
PP 36

SECONDARY BRAIN TUMORS IN THE SURVIVORS OF CHILDHOOD LEUKEMIA

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Long term survivors of leukemia increasingly experience late effects many years after treatment. Secondary malignant neoplasms (SMNs) after ALL treatment are AML, myelodysplastic syndrome, lymphomas, CNS tumors, carcinomas and sarcomas. In the literature, CNS tumors, either meningioma or non-meningioma tumors constitute 21.5% of the SMNs in a large pediatric leukemia series. The latent period is median 15 years for meningioma and 8 years for other CNS tumors. Here in, we report three leukemia survivors of whom two developed meningiomas and one glioblastoma multiforme in the long-term period. A 3-year-old girl with T-cell ALL was treated by ALL BFM-95 protocol between 2017-2019. She also received 12 Gy of prophylactic cranial irradiation before maintenance treatment. In April 2019, at the age of 22, she developed headache, vomiting and blurred vision. CT and MRI scans revealed an extraaxial mass in the right frontal region which was compressing lateral ventricle. She, then, underwent a total excision of the tumor. The pathology was atypical meningioma (grade II). No further therapy was given. A 3-year-old with T-cell ALL was given ALL IC-BFM 2002 protocol between 2010-2012. He also received 12 Gy of prophylactic cranial irradiation before maintenance treatment. The patient remained disease-free until June 2017 when he presented with generalized tonic-clonic seizures. His MRI scan showed an intraaxial lesion in the right frontal region. He underwent a biopsy that revealed an anaplastic astrocytoma. He was started cranial irradiation and temozolomide treatment. In the follow-up, the tumor progressed and the patient deceased. A 3-year-old girl with AML-M2 was treated by AML-BFM-98 protocol between 2005-2007. Before maintenance treatment she was given prophylactic cranial irradiation as 18 Gy. In 2020, she developed headache and somnolance at the age of 19. She, therefore, underwent a cranial MRI scanning that demonstrated a frontal mass. She was operated and the mass was removed totally. The pathology was grade I meningioma. She was given no further treatment. The incidence of secondary brain tumors in ALL is higher than that in AML. The exact causative mechanism is uncertain, however irradiation itself or genetic predisposition may be responsible for the pathogenesis of these type of tumors. In our two meningioma cases, there was no clinical signs of neurofibromatosis as an underlying genetic predisposition to secondary cancer. Histopathologically, gliomas are more common tumors than meningiomas in ALL survivors. More cases of high-grade gliomas were reported than low-grade gliomas in this population. WHO grade-I meningiomas are also frequent subtypes in ALL survivors.. In a large series of AML-BFM-87 and AML-BFM-93 treatment protocols, the authors reported only one case without histology detail. The cases presented here have highlighted the importance of long-term follow-up of leukemia survivors in terms of development of secondary cranial neoplasms.

https://doi.org/10.1016/j.htct.2023.09.086