Malignant Glioma Development after Radiotherapy for Remnant Meningioma

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INTRODUCTION

Radiotherapy and radiosurgery have represented very important therapeutic instruments for treating various intra- and extracranial pathologies. Although they are not entirely free of immediate and long-term side effects, they have been extensively employed worldwide.
Among the other long-term complications of radiation therapy, such as radionecrosis, development of a secondary tumor in the cranial region previously irradiated for therapeutic purposes is the most unusual.
We present two cases of glioblastoma following the treatment of benign brain tumor.

CASE 1

Case 1
A 42-year–old female was diagnosed as meningioma on left clinoid region and underwent craniotomy at other institution with radiotherapy of 50Gy for remnant lesion on year of 2001. She was checked regularly with brain imaging for 5 years with free of tumor, however lost follow-up after that.
She visited our institute with headache after 8 years of radiotherapy and revealed new mass lesion on the same site of previous meningioma surgery. Craniotomy was performed and diagnosed as glioblastoma. We performed adjuvant chemotherapy with temozolomide without radiotherapy.

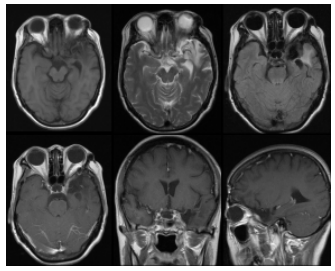

Fig.1
Post-radiation 5 years follow-up MRI showed no evidence of tumor recurrence nor newly tumor development.

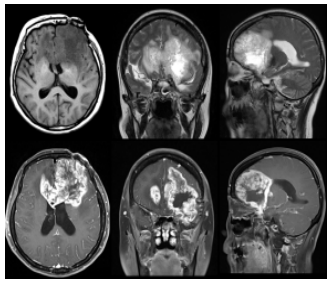

Fig.2
Post-radiation 8 years follow-up MRI showed huge enhancing mass noted mainly in left frontal lobe with extension to contra-lateral frontal lobe through the corpus callosum

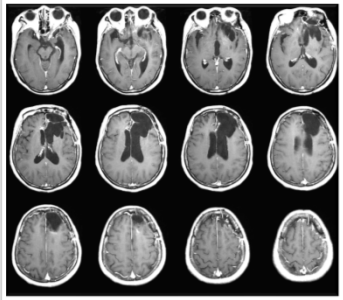

Fig. 3
MRI after the surgery and third cycle of TMZ showed remarkable disappearance of remnant glioblastoma

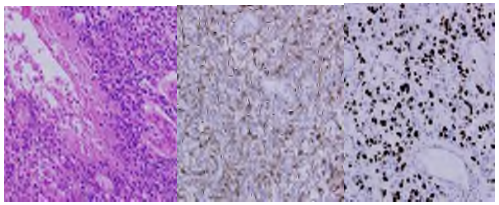

Fig.4 Pathologic finding showed typical hyperchromatic, pleomorphic tumor cell with necrosis by H&E with GFAP positve. Also showed high proliferation index by Ki-67

CASE II

Case 2
A 41-year-old female was diagnosed as pituitary adenoma and performed surgery for tumor removal. The mass was removed incompletely due to hard consistency of its nature. After 3 years later, stereotactic radiotherapy was done with 3150cGy / 9 fractionation. The tumor was gradually shrinked after radiation. After 9 years of radiation, new enhancing lesion was detected on right basal ganglia on regular follow up MRI. Mass size was 34 mm by 25mm by 25mm. Biopsy performed and showed glioblastoma.

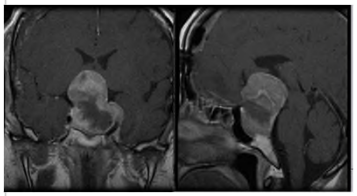

Fig.5
Post-operative MRI showed remnant lesion of pituitary adenoma.

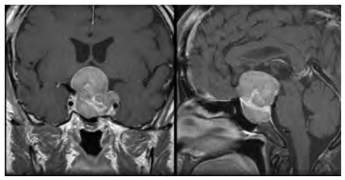

Fig.6
Before stereotactic radiotherapy MRI

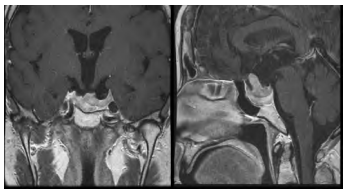

Fig.7
Post-radiation 6 years follow-up MRI showed decresing pituitary mass.

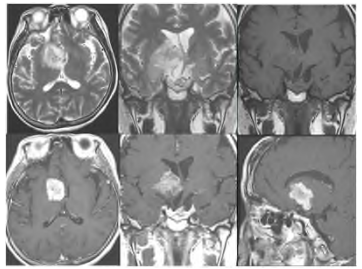

Fig.8
Post-radiation 8 years follow-up MRI showed round enhancing mass lesion on right basal ganglia.

DISCUSSION

To be considered as radiation-induced, the secondary tumor must originate in the previously irradiated region. There must be a sufficient latency time from irradiation to the onset of the post-radiation tumor, and this latency period is measured in years, not in months. The histotype of the tumor must be different from the primary one. The patient must not suffer from pathologies favoring the developing of tumors; such as von Recklinghousen's disease, Li–Fraumeni's disease, tuberous sclerosis, xeroderma pigmentosum, or retinoblastoma.
In the literature, The average latency time for the development of radiation-induced glioma ranges from 6 to 17 years in the literature [1-4]. Salvati et al.[3] analyzed a series of 650 glioblastoma: they estimated 6 cases (1.3%) of glioblastoma were radiation-associated.

CONCLUSION

This case fulfilled the accepted criteria for radiation-induced neoplasms of the central nervous system, namely a second histologically-proven tumor different from the first lesion, located within the irradiated area with a long latent period.
In case of benign tumor, radiotherapy to the remnant lesion should be considered for late serious complication such as malignant glioma.