

SMART syndrome mimicking glioblastoma recurrence 6 years after surgical excision and radiotherapy: A Case Report

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Background

Stroke-like migraine attacks after radiation therapy (SMART) syndrome

- a rare, reversible syndrome that occurs in patients having received radiotherapy for intracranial neoplasms.
- occurs quite a few years after intracranial irradiation.
- patients typically present with headache, seizures, or other focal neurological deficits mimicking disease recurrence or sub-acute stroke.

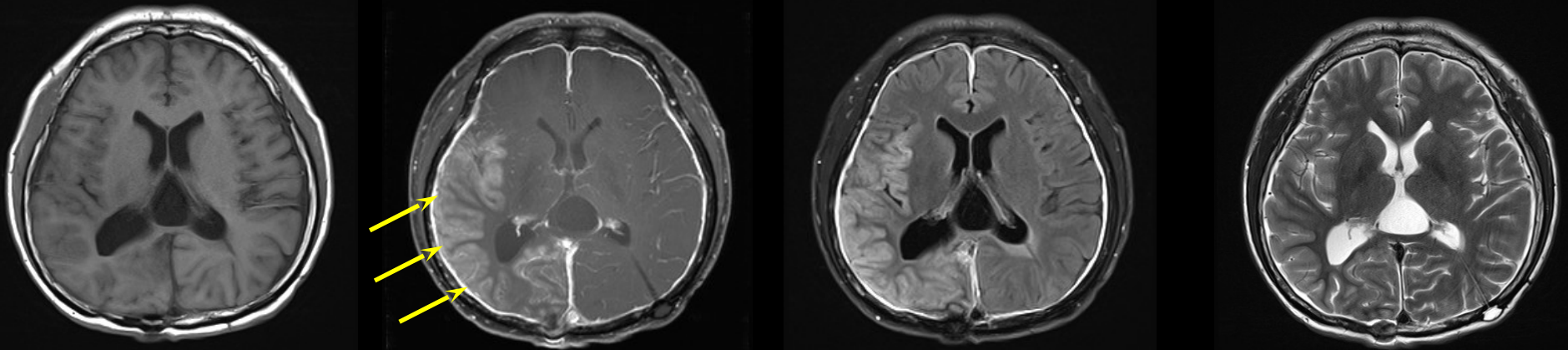
The exact mechanism of SMART syndrome: unknown.

Preliminary investigations suggested post-radiation neuronal dysfunction may be the underlying mechanism.¹

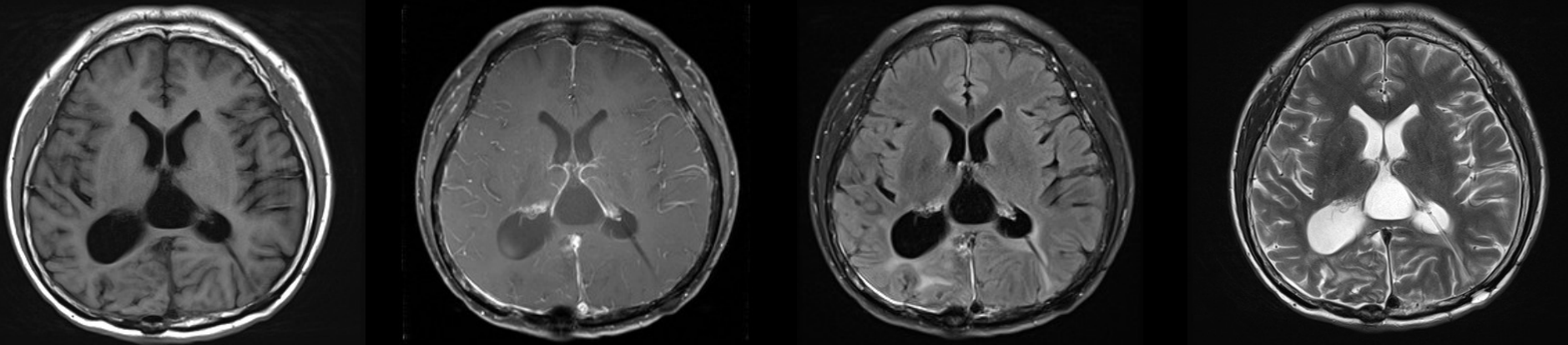
Case illustration



- 35-year-old gentleman, table tennis coach
- Admitted to our unit with malignant and vascular right parieto-occipital tumour in MRI presenting with left sided headache in 2014.
- **Craniotomy and excision of brain tumour in 2014.**
 - Pathology: **glioblastoma multiforme**, negative for MGMT.
- Gliolan fluorescence guided excision 2 weeks after the first operation due to residual tumor in post-operative MRI.
- Post-operative chemoradiotherapy and adjuvant temozolomide were completed in 2015.
- **Patient survived till today 6 years after the operation at the age of 41, and worked as a table tennis coach still.**
- **He presented to us in May 2020 with headache, fever and transient left upper limb weakness. His symptoms resolved in weeks, and he was able still to work.**



MRI in May 2020 - gyriform enhancement pattern over right cerebrum, worrisome of tumour recurrence



MRI in Aug 2020 - resolved abnormal gyriform signal change and swelling in the right cerebrum, **no tumour recurrence**

Discussion

	SMART syndrome	Stroke	Recurrent tumour
Clinical features	<ul style="list-style-type: none"> - History of brain irradiation for cancer - Partial/complete reversal of symptoms 	<ul style="list-style-type: none"> - Cerebrovascular risk factors such as atrial fibrillation, carotid stenosis, hypertension, hyperlipidaemia - Acute symptoms 	<ul style="list-style-type: none"> - History of brain irradiation for cancer - Progressive symptoms
Typical MRI features	<ul style="list-style-type: none"> Increased T2 hyperintensity and gyral enhancement in the previously radiated area 	<ul style="list-style-type: none"> - Intravascular thrombus - Vascular hyperintensity on FLAIR - Vascular territory in MRI finding 	<ul style="list-style-type: none"> - Well circumscribed lesion - Increased perfusion in the affected area
Short-term follow-up MRI	Partial/complete reversal of MRI findings	Persistence of the abnormal signal	Persistence of the abnormal signal

Conclusion

- The occurrence of SMART syndrome as a rare delayed complication of brain tumour irradiation **may be potentially misdiagnosed as tumour recurrence or stroke.**
- Given its self-limiting nature, **early recognition of this syndrome is paramount.**
- It has a **favourable response to conservative treatment with complete or partial reversal of their radiological findings within months.**
- **Proper recognition of this syndrome can prevent invasive diagnostic techniques such as brain biopsy or vascular imaging.²**
- **There is no proven method for treatment of SMART syndrome.³ Some authors suggest steroid pulse therapy may provide speedy recovery from and diagnosis of SMART syndrome, and it should be considered before invasive investigations. ⁴**

~The End~

References:

¹ Farid K, Meissner WG, Samier-Foubert A, et al. Normal cerebrovascular reactivity in Stroke-like Migraine Attacks after Radiation Therapy syndrome. Clin Nucl Med. 2010 Aug;35(8):583-5. doi: 10.1097/RLU.0b013e3181e4db6f. PMID: 20631504.

² Daniel April, MD,1 Neil Lall, MD,2 Andrew Steven, MD1. Stroke-Like Migraine Attacks After Radiation Therapy Syndrome. Ochsner Journal 20:6–9, 2020 DOI: 10.31486/toj.19.0090

³ Zheng Q, Yang L, Tan LM, Qin LX, Wang CY, Zhang HN. Stroke-like Migraine Attacks after Radiation Therapy Syndrome. Chin Med J 2015;128:2097-101.

⁴ Wenting Jia, Ryuta Saito, Masayuki Kanamori, Naoya Iwabuchi, Masaki Iwasaki, Teiji Tominaga. SMART (stroke-like migraine attacks after radiation therapy) syndrome responded to steroid pulse therapy: Report of a case and review of the literature. eNeurologicalSci 12 (2018) 1–4