

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

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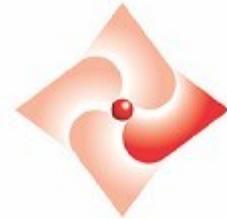
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## Background

### **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.

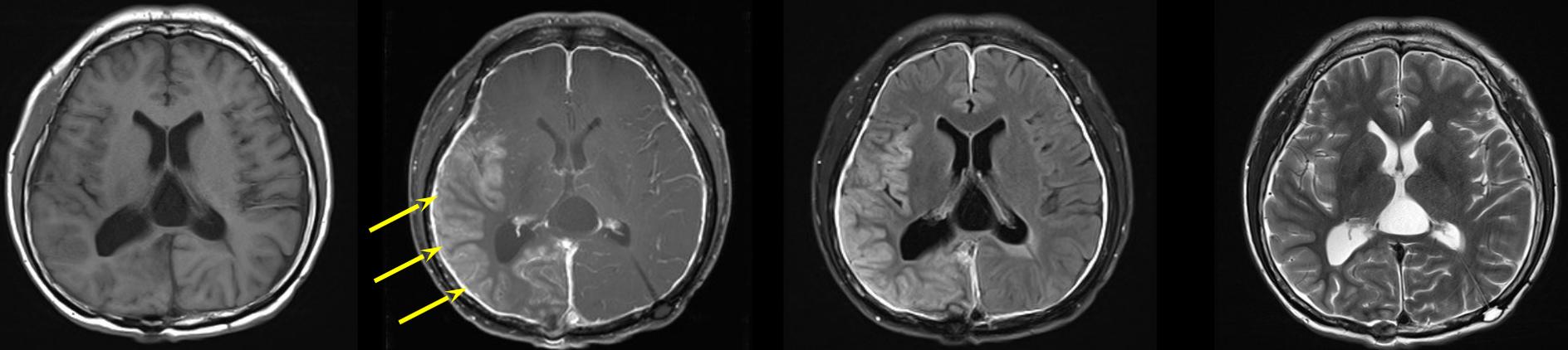
The exact mechanism of SMART syndrome: unknown.

Preliminary investigations suggested post-radiation neuronal dysfunction may be the underlying mechanism.<sup>1</sup>

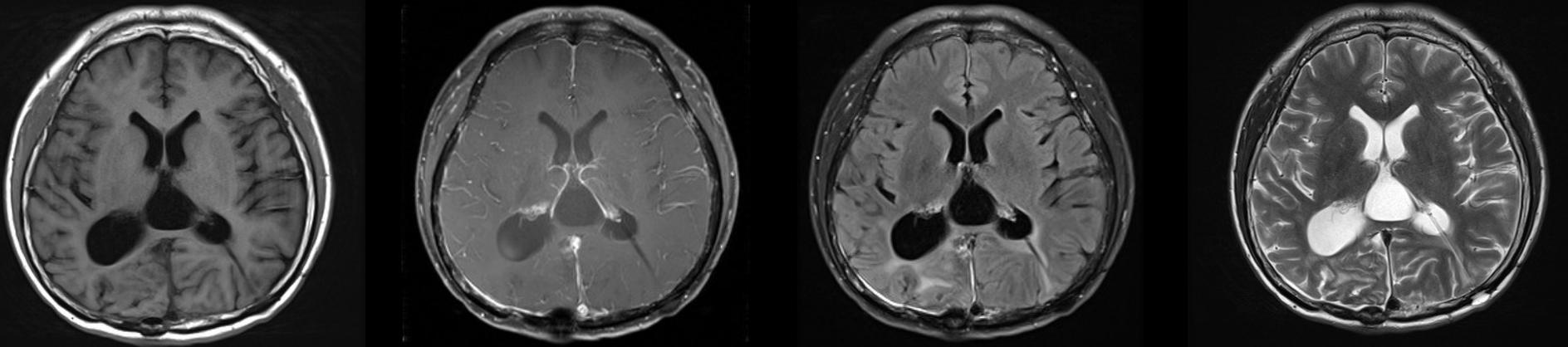
## Case illustration



- 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

	<b>SMART syndrome</b>	<b>Stroke</b>	<b>Recurrent tumour</b>
<b>Clinical features</b>	<ul style="list-style-type: none"> <li>- <b>History of brain irradiation for cancer</b></li> <li>- <b>Partial/complete reversal of symptoms</b></li> </ul>	<ul style="list-style-type: none"> <li>- <b>Cerebrovascular risk factors</b> such as atrial fibrillation, carotid stenosis, hypertension, hyperlipidaemia</li> <li>- <b>Acute symptoms</b></li> </ul>	<ul style="list-style-type: none"> <li>- <b>History of brain irradiation for cancer</b></li> <li>- <b>Progressive symptoms</b></li> </ul>
<b>Typical MRI features</b>	<ul style="list-style-type: none"> <li><b>Increased T2 hyperintensity and gyral enhancement</b> in the previously radiated area</li> </ul>	<ul style="list-style-type: none"> <li>- <b>Intravascular thrombus</b></li> <li>- <b>Vascular hyperintensity on FLAIR</b></li> <li>- <b>Vascular territory</b> in MRI finding</li> </ul>	<ul style="list-style-type: none"> <li>- <b>Well circumscribed lesion</b></li> <li>- <b>Increased perfusion</b> in the affected area</li> </ul>
<b>Short-term follow-up MRI</b>	<b>Partial/complete reversal</b> of MRI findings	<b>Persistence</b> of the abnormal signal	<b>Persistence</b> 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.<sup>2</sup>**
- **There is no proven method for treatment of SMART syndrome.<sup>3</sup> Some authors suggest steroid pulse therapy may provide speedy recovery from and diagnosis of SMART syndrome, and it should be considered before invasive investigations. <sup>4</sup>**

*~The End~*

### References:

<sup>1</sup> 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.

<sup>2</sup> 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

<sup>3</sup> 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.

<sup>4</sup> 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