

—Photogravure—

## Brain White Matter Changes during Treatment of a Child for Acute Lymphoblastic Leukemia

Miho Maeda<sup>1</sup>, Jun Hayakawa<sup>1</sup>, Takahiro Ueda<sup>1</sup>, Makoto Migita<sup>1</sup>,  
Takeshi Asano<sup>1</sup>, Yoshitaka Fukunaga<sup>1</sup> and Yasuo Amano<sup>2</sup>

<sup>1</sup>Department of Pediatrics, Nippon Medical School

<sup>2</sup>Department of Radiology, Nippon Medical School

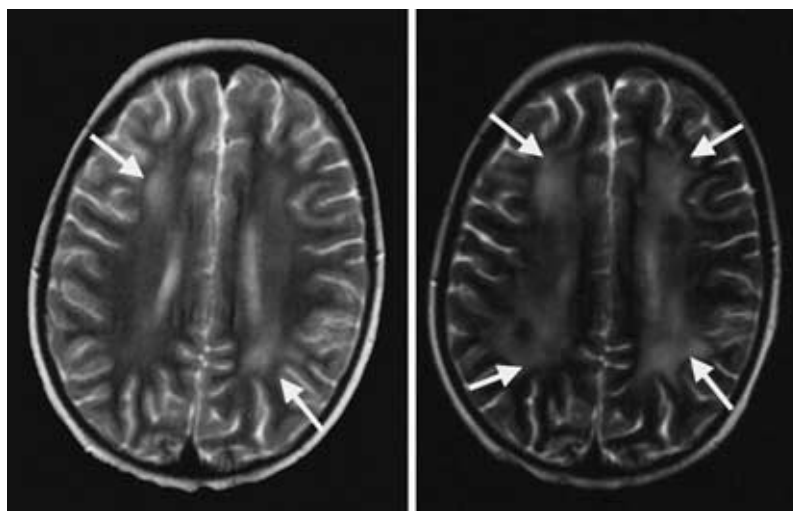


Fig. 1A

Fig. 1B

A 13-year old boy with acute lymphoblastic leukemia had bilateral paresis of the upper extremities and aphasia 1 week after high dose methotrexate and triple intrathecal therapy (methotrexate, cytarabin, hydrocortisone). The stroke-like neurological symptoms disappeared on the third day. T2-weighted magnetic resonance imaging showed hyperintensities of white matter on the second day. Despite resolution of the neurological symptoms, magnetic resonance images were still abnormal 3 years after the attack.

Methotrexate has been considered to be responsible for ischemic damage to oligodendroglial cells, resulting in demyelination. The changes are occasionally prolonged without persistent neurologic symptoms.

**Fig. 1A** Axial T2-weighted images obtained 2 days after stroke-like symptom appeared. Hyperintensities are visible on a bilateral plane view of the deep parietal white matter (**arrows**).

**Fig. 1B** Axial T2-weighted images obtained after 1 month were more intense than those soon after the attack (**arrows**).

**Fig. 2A** Axial T2-weighted images obtained 1 year after initial presentation showed bilateral hyperintensities in white matter of the brain (**arrows**).

**Fig. 2B** Axial FLAIR images obtained after 1 year showed bilateral hyperintensities in the white matter of the brain (**arrows**).

**Fig. 2C** Coronal FLAIR images obtained after 1 year showed bilateral hyperintensities in the white matter of the brain (**arrows**).

**Fig. 3A** Axial-T2 weighted images obtained 3 years later showed persistent bilateral hyperintensities in the white matter of the brain (**arrows**).

**Fig. 3B** Axial FLAIR images obtained 3 years later showed bilateral hyperintensities in the white matter of the brain (**arrows**).

Correspondence to Miho Maeda, Department of Pediatrics, Nippon Medical School, 1-1-5 Sendagi, Bunkyo-ku, Tokyo 113-8603, Japan

E-mail: maeda@nms.ac.jp

Journal Website (<http://www.nms.ac.jp/jnms/>)

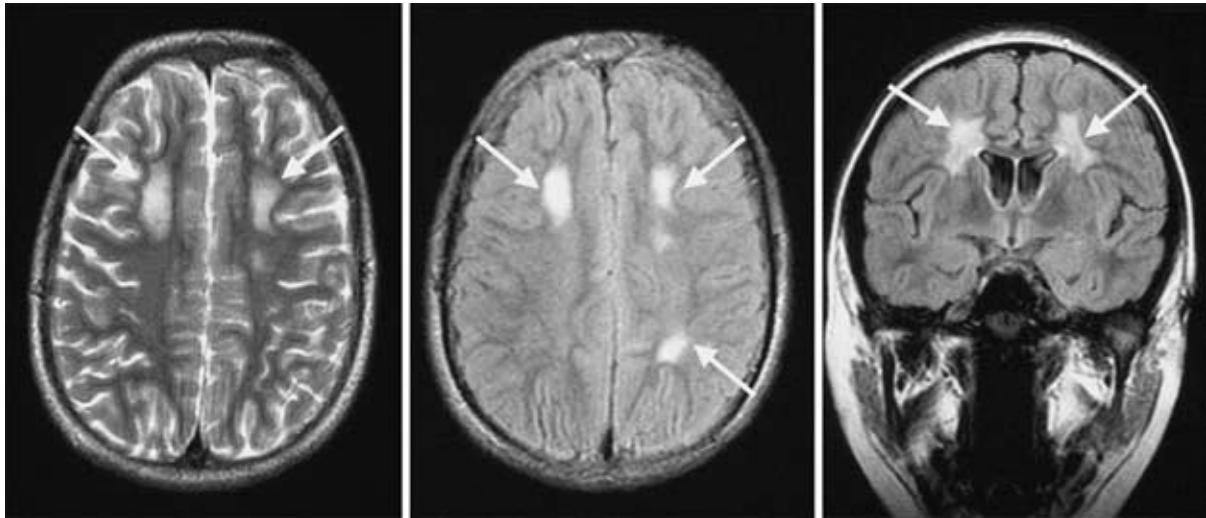


Fig. 2A

Fig. 2B

Fig. 2C

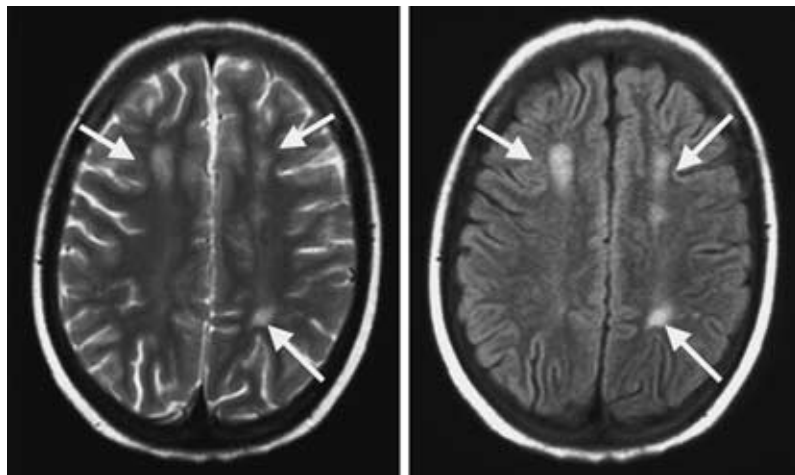


Fig. 3A

Fig. 3B

**References**

1. Levy AS, Meyers P, Kellick MR, Gorlick R, Tong W, Bertino JR: Acute stroke-like encephalopathy associated with high-dose methotrexate impurities. *Pediatr Hematol Oncol* 2000; 22: 360-362.
2. Rubnitz JE, Rellong MV, Harrison PL, Sandlund JT, Ribeiro RC, Rivera GK, Thompson SJ, Evans WE, Pui C-H: Transient leukoencephalopathy following high-dose methotrexate treatment in childhood acute lymphoblastic leukemia. *Leukemia* 1998; 12: 1176-1181.