Cerebral Microbleeds Associated with Critical Illness

Kuei-Hong Kuo[1,2], Yuan-Bin Yu[1,3], Tzu-Hsien Lai[1,4]

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A 40-year-old man with B-cell acute lymphoblastic leukemia (ALL) in first complete remission under consolidation high-dose cytarabine presented with fever and dyspnea. Chest X ray and computed tomography (CT) confirmed the diagnosis of pneumonia. Septic shock and respiratory failure followed. He received endotracheal intubation with mechanical ventilation support and was transferred to intensive care unit (ICU). Because of consciousness change and negative brain CT, lumbar puncture was done. Cerebrospinal fluid examination showed basically normal findings with white blood cell count (WBC) of only 1/μl (normal range: ≤5/μl). The peripheral WBC count was 3710/μl on the same day. Brain magnetic resonance imaging (MRI) did not reveal significant structural brain lesions that could be responsible for his consciousness disturbance (Figure 1). Unexpectedly, it showed many tiny black dots at gray and white matter junction, corpus callosum, and internal capsule on T2*-weighted imaging, compatible with cerebral microbleeds (CMBs). The patient gradually recovered and endotracheal tube was removed. Three weeks after lumbar puncture, the CSF sample sent to Taiwan Centers for Disease Control reported positive result for herpes simplex virus (HSV) type 1. The patient stayed in the hospital for almost 2 months and was discharged with total recovery of consciousness and cognitive function.

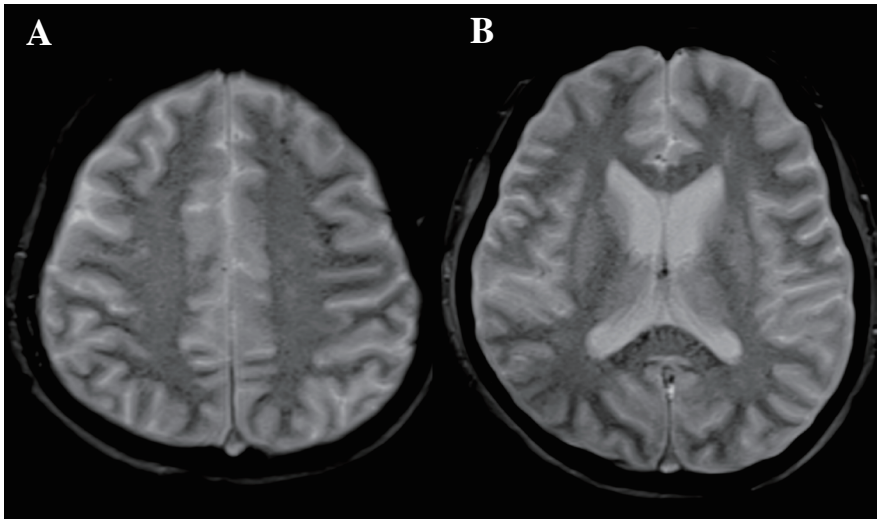

Figure 1. The T2*-weighted imaging shows tiny black dots at gray and white matter junction, corpus callosum, and internal capsule, compatible with cerebral microbleeds (CMBs).

From the [1]School of Medicine, National Yang-Ming University, Taipei, Taiwan; [2]Division of Medical Image, Department of Radiology; [3]Division of Oncology and Hematology, Department of Medicine & [4]Department of Neurology, Far Eastern Memorial Hospital, New Taipei, Taiwan.

Correspondence to: Tzu-Hsien Lai, MD. Department of Neurology, Far Eastern Memorial Hospital, New Taipei 220, Taiwan.
e-mail: laitzuhsien@gmail.com

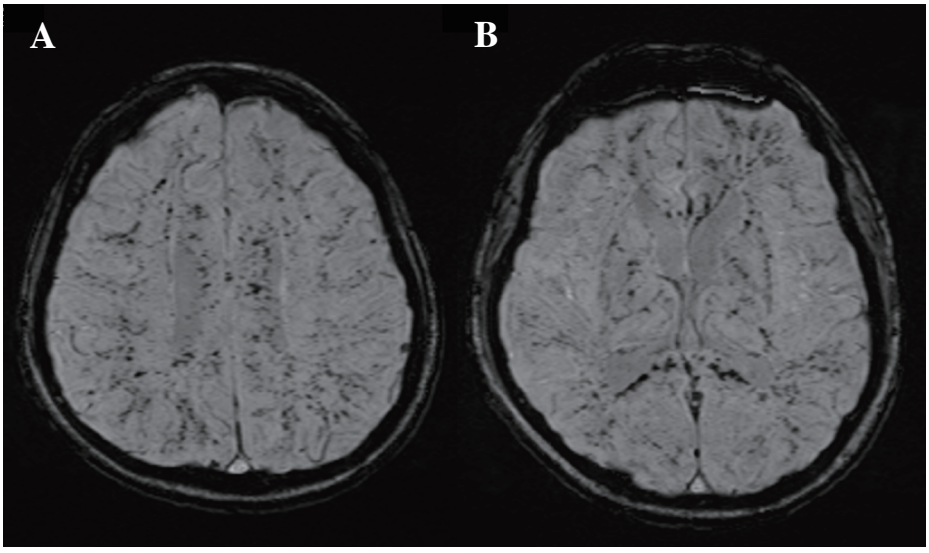

Figure 2. Susceptibility weighted imaging followed up 3 months later reveals even more extensive CMBs as compared with Figure 1, probably due to the more sensitive method being used.

Follow up brain MRI with susceptibility weighted imaging showed persistent CMBs. (Figure 2).

In this report, we described a patient with underlying disease of B-cell ALL who was admitted to ICU for pneumonia, septic shock and respiratory failure. Accidentally, critical illness-associated cerebral CMBs were found[1]. Along with the advances of neuroimaging, CMBs, also known as petechial hemorrhage, are more and more commonly seen. The most important etiology is small vessel disease such as hypertensive vasculopathy and cerebral amyloid antipathy while several less common causes such as diffuse axonal injury have been well documented[2]. A diagnostic clue of CMBs is the distribution pattern. For example, patients with hypertensive vasculopathy have microbleeds mainly in the basal ganglia and thalami while patients have cerebral amyloid angiopathy have cortical microbleeds sparing deep gray matter and brainstem[2].

Critical illness-associated CMBs is a condition recently characterized in 2017[1]. The microbleeds predominate in the juxtacortical white matter and corpus callosum while sparing deep and periventricular white matter, cortex, basal ganglia and thalami[1]. Typically these patients have respiratory failure that mandates mechanical ventilation in a clinical setting of ICU. The pathogenesis and clinical implication of the condition remain unclear. In this patient, the similar medical history of respiratory failure and pattern of CMBs were compatible with the diagnosis. Other causes of CMBs were excluded either due to lack of the related history (e.g. hypertension, head injury, young age of onset) or related image findings (e.g. lobar hemorrhage in cerebral amyloid angiopathy).

REFERENCE

1. Fanou EM, Coutinho JM, Shannon P, et al. Critical Illness-Associated Cerebral Microbleeds. Stroke 2017;48:1085–1087.
2. Renard D. Cerebral microbleeds: a magnetic resonance imaging review of common and less common causes. Eur J Neurol 2018;25:441–450.