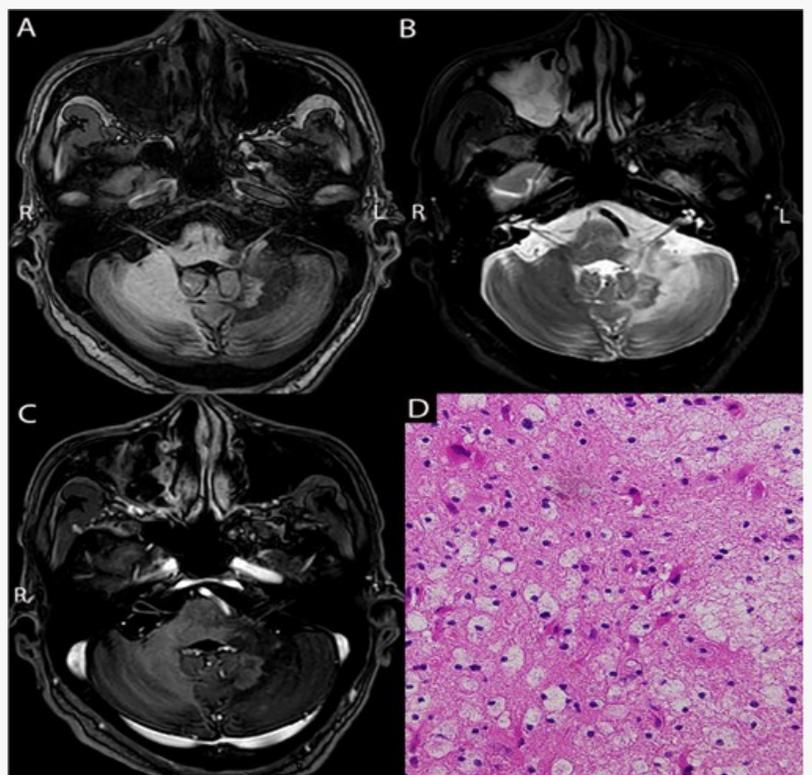


Chinese Neurosurgical Journal Study Explores Diagnostic Role of Brain Biopsy in Leukemia with CNS Involvement

Researchers analyzed the diagnostic value of stereotactic brain biopsy in patients with leukemia presenting central nervous system lesions

BEIJING, BEIJING, CHINA, January 9, 2026 /EINPresswire.com/ -- Leukemia, a blood cancer originating in the bone marrow, occurs when genetic mutations cause hematopoietic stem cells—precursors of blood cells—to develop abnormally. In some cases, these immature blood cells infiltrate the central nervous system (CNS), which includes the brain and spinal cord. This condition, known as leukemia complicated by CNS lesions (LCL), encompasses both CNS leukemia (CNSL) and secondary CNS lesions caused by leukemia therapy, such as infections or neuroinflammatory damage. Due to overlapping symptoms and imaging findings, accurately diagnosing different types of LCL remains a clinical challenge.



MRI analysis showed abnormal and mixed patchy signals while the pathological analysis revealed abundant fungal hyphae which could be observed between cells. The use of stereotactic intracranial lesion biopsy for pathological analysis can expedite the diag

To improve understanding of the clinical and pathological features of LCL and minimize misdiagnosis, a team of researchers led by Dr. Yaming Wang from the Department of Neurosurgery, Xuanwu Hospital Capital Medical University, China have conducted a retrospective study by collecting the medical data of 22 patients with LCL between April 2003 and December 2023. Their findings were published online in the [Chinese Neurosurgical Journal](#) on 19 March, 2025.

In this study, the researchers aimed to investigate the magnetic resonance imaging (MRI) and pathological characteristics of patients with LCL. Through bone marrow aspiration, they identified 14 cases of acute lymphoblastic leukemia (ALL), one case of chronic lymphoblastic leukemia, six cases of acute myeloid leukemia (AML), and one case of chronic myelomonocytic leukemia (CMML).

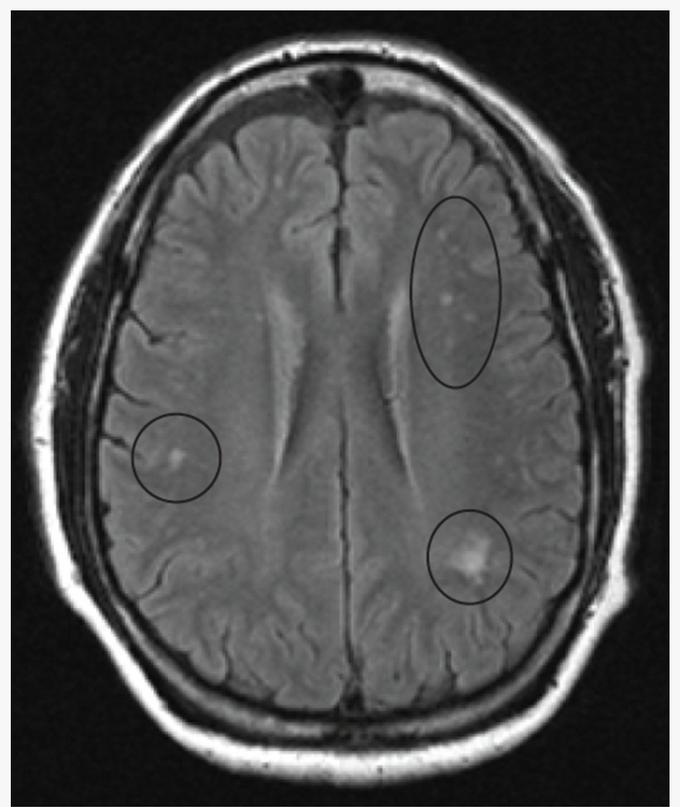
Explaining the challenges of conventional diagnostic techniques, Dr. Wang notes, "Cerebrospinal fluid (CSF) morphological examination has high specificity but limited sensitivity, which may lead to false-negative results. Additionally, flow cytometry has improved diagnostic accuracy, but its use is restricted due to limited antibody availability in CSF and is not yet widely implemented".

The clinical presentation among patients varied widely. Some experienced non-specific symptoms such as headache, vomiting, and limb convulsions, while others showed localized neurological deficits, including blurred vision and limb weakness. Using stereotactic intracranial lesion biopsy, the team found that 13 patients had CNS leukemia (CNSL), while the remaining nine had CNS secondary lesions related to leukemia treatment. These included five cases of CNS infection and four cases of neurodegenerative conditions.

In eight patients, the clinical diagnosis did not align with the biopsy findings. "In one case, the clinical diagnosis pointed to a neurodegenerative disorder, but the biopsy revealed a fungal brain abscess," explains Dr. Wang. He further adds, "This highlights the limitations of relying solely on clinical or imaging data for diagnosis."

The researchers also observed that imaging techniques such as cranial CT and MRI lacked sufficient specificity for identifying CNSL. Variability in CSF analysis and overlapping imaging features contributed to misdiagnoses, which in some reports may reach up to 75%. CNSL can be mistaken for a range of conditions, including meningitis, stroke, demyelinating disease, infection, or even Bálint syndrome.

To enhance early and accurate diagnosis, the researchers recommend stereotactic intracranial



Despite advancements in clinical imaging technologies, the accurate and timely diagnosis of central nervous system lesions (CNSL) remain challenging. Stereotactic intracranial lesion biopsy offers a minimally invasive, safe, and feasible method for diagnosis.

lesion biopsy combined with intraoperative histopathological examination. "This biopsy method is minimally invasive, safe, and highly accurate," says Dr. Wang. "It enables clinicians to precisely identify CNS lesions and guide appropriate treatment."

This study underscores the critical role of stereotactic biopsy in differentiating CNS lesions in leukemia patients and improving clinical outcomes through timely intervention.

Reference

Titles of original papers: The utility of stereotactic biopsy of intracranial lesions in the diagnosis of leukemia complicated by central nervous system lesions

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About the University:

Xuanwu Hospital of Capital Medical University was established in 1958 as a premier teaching and research hospital in Beijing, China. Renowned for its specialization in neurology, neurosurgery, and geriatric medicine, it offers a dynamic environment for clinical care, medical education, and scientific discovery. As the First Clinical Medical College of Capital Medical University, it plays a central role in training future healthcare professionals and advancing neurological research. With state-of-the-art facilities, multidisciplinary departments, and a strong commitment to innovation and patient-centered care, Xuanwu Hospital continues to shape the future of neuroscience and geriatric health in China and beyond.

About the author:

Dr. Yaming Wang is a senior neurosurgeon and professor at Xuanwu Hospital, Capital Medical University, Beijing, with extensive expertise in intracranial tumor surgery and minimally invasive neurosurgical techniques. He earned his doctorate in neurosurgery from Tiantan Hospital and has over 30 years of clinical and academic experience. Dr. Wang specializes in microsurgical treatment of craniopharyngiomas, stereotactic biopsies, and robotic-assisted brain surgeries. He has contributed to numerous national and regional research projects, authored technical monographs, and received multiple honors, including the PLA Medical Achievement Award. His work continues to advance precision neurosurgery and clinical innovation in neurological care across China.

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