

Delaying the first spinal tap may lower risk of pediatric leukemia relapse

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Starting chemotherapy several days before the first lumbar puncture for diagnosis and treatment of acute lymphoblastic leukemia (ALL) may reduce the risk of central nervous system (CNS) relapse in children, according to a study from St. Jude Children's Research Hospital and collaborators in China. The findings appear online today in the journal *Blood*.

The research focused on how [clinical care](#), including availability of total intravenous anesthesia and the diagnostic tool [flow cytometry](#), may influence the risk of CNS [relapse](#).

"This study identified factors to help us predict and better manage the risk of CNS relapse that will be useful for treating ALL patients worldwide, in both resource-rich and resource-limited countries," said corresponding author Ching-Hon Pui, M.D., chair of the St. Jude Department of Oncology. Pui pioneered pediatric ALL treatment that has achieved 94% [long-term survival](#) for St. Jude patients without brain irradiation.

Improved survival, but relapse risk remains

The study is the largest yet of pediatric ALL. The analysis included 7,640 children and adolescents enrolled in a clinical trial conducted at 20 hospitals and medical centers in China.

The treatment protocol was adapted from recent St. Jude clinical trials. Patients were treated in settings that were widely different in available technology and clinical resources. For example, just three of the 20 medical centers offered total intravenous anesthesia for children undergoing [spinal taps](#), and only two had flow cytometry to diagnose leukemia cells in cerebrospinal fluid.

The five-year, overall survival rate was 91% for study patients, and the cancer-free survival rate was 80%, a dramatic improvement from previous clinical trials in China. But 1.9% of patients relapsed in the CNS alone, and in another 2.7% of patients the relapse included the CNS.

CNS relapse risk reduction

Increasing the number of pediatric ALL patients worldwide who become long-term survivors requires identifying those at risk for CNS relapse and preventing it, along with improving their quality of life, Pui said.

The factors associated with CNS relapse are:

- **Treatment timing:** Patients in this study began dexamethasone treatment several days before their first lumbar puncture for intrathecal therapy. This upfront treatment reduced leukemic cells in the blood and central nervous system, which lowered the risk of introducing cancer cells into the cerebrospinal fluid during later spinal taps.
- **Total intravenous anesthesia:** Studies have shown total intravenous anesthesia reduced the risk of bleeding during spinal taps (traumatic lumbar punctures) and optimized drug delivery during intrathecal therapy. In

this study, central nervous system relapse was lower in patients who received total intravenous anesthesia for spinal taps to deliver intrathecal therapy.

- Flow cytometry: Compared with conventional microscopic examination, flow cytometry analysis allows more accurate diagnosis of the presence of leukemic cells in the cerebrospinal fluid. The test was associated with reduced CNS relapse, but flow cytometry is not widely available in the U.S. or other countries. Flow cytometry was available in only two of the 20 facilities in this study.

More information: Jingyan Tang et al. Prognostic Factors for CNS Control in Children with Acute Lymphoblastic Leukemia Treated Without Cranial Irradiation, *Blood* (2021). DOI: [10.1182/blood.2020010438](https://doi.org/10.1182/blood.2020010438)

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