

*abstract*

## **Neurological Adverse Effects of Intrathecal Methotrexate in Pediatric Cancer Patients: A Prospective Study from Islamabad, Pakistan**

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## Neurological Adverse Effects of Intrathecal Methotrexate in Pediatric Cancer Patients: A Prospective Study from Islamabad, Pakistan

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**Introduction:** Objective was to determine the neurological adverse effects of Intrathecal (IT) Methotrexate (MTX) in patients receiving treatment for childhood malignancy in a tertiary care hospital of Islamabad, Pakistan.

**Methodology:** We conducted a prospective study from January 2023 to December 2023 at the Pediatric Oncology Department of The Children's Hospital, Pakistan Institute of Medical Sciences (PIMS) Islamabad, Pakistan. 596 patients who received IT MTX for therapeutic or prophylactic purposes were enrolled. The study recorded minor and major neurological complications occurring within 3 days following administration of IT MTX. The minor complications include headaches, dizziness, or mild sensory disturbances, while major complications include serious neurological effects such as seizures, paralysis, or profound cognitive impairments.

**Results:** The mean age of the patients was  $5.37 \pm 2.502$  years. The majority of patients (69.0%) were male, while 31.0% were female. The most common diagnosis was Acute Lymphoblastic

Lymphoma (92.0%) followed by Non-Hodgkin Lymphoma (8.0%). Symptom onset was observed within 0-6 hours in 29.0% of patients, while 10.0% experienced symptom onset between 6-24 hours. However, 57.0% of patients reported no symptoms. The duration of symptoms varied, with 14.0% experiencing symptoms for < 6 hours, 12.0% for 24 hours, and 11.0% for > 3 days. No major adverse events, such as spinal fluid leakage, allergic reactions, seizures, or paralysis, were reported. Common side effects included weakness/tiredness (27.0%), vomiting (25.0%), headache (24.0%), back pain (19.0%), and fever (16.0%). Following symptom examination, 13.0% of patients required hospital admission, and 3.0% had treatment modifications due to missed doses of IT MTX.

**Conclusion:** We found no major neurotoxic events following IT MTX administration, but minor neurological effects were observed. Close monitoring and management of the neurotoxic potential of IT MTX are essential, particularly in pediatric patients receiving chemotherapy for therapeutic or prophylactic purposes.