

# **Levamisole induced Multifocal Inflammatory Leukoencephalopathy- Clinical Characteristics, Outcome, and Impact of Treatment in 31 Patients.**

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**Background.** Levamisole (LEV) has been used as an immuno-modulating medication in patients with recurrent aphthous ulceration and as an adjuvant agent for chemotherapy. LEV with or without 5-Fluorouracil (5-FU) could induce multifocal inflammatory leukoencephalopathy (MIL). Herein, we report 7 patients with MIL whose neurological deficits improved after plasmapheresis, which has not been reported to be effective for MIL before. In addition, we reviewed the literature, highlighting key aspects of the diagnosis, clinical manifestations, and the treatment.

**Patients and Methods.** We identified 31 patients (7 from our institute and 24 from MEDLINE) with LEV-related MIL, and reviewed the demographics, clinical presentations, image studies, pathological findings, and dosages of LEV and 5FU of the 31 patients. .

**Results.** Among the 31 patients, 20 were female, and their mean age was 56.5 years with LEV-related MIL. Twenty-one cases (67.7%) had been treated with a combination of 5-FU and LEV, and 10 with LEV alone. The elapsed time for development of MIL was later in patients who took both LEV and 5-FU than in patients treated with LEV alone ( $11.7 \pm 3.7$ , vs.  $4 \pm 2.5$  days,  $p < 0.001$ ). Colon cancer (67.7%) was the most common disease with LEV administration. Gait ataxia was presented in 20 (64.5%) patients, and dysphagia was noted in 16 (51.6%) patients. Imaging studies revealed periventricular enhancement in 13 (41.9%) patients with supra-tentorial lesions in 17 (54.8%). Cerebro-spinal fluid studies showed lymphocytic pleocytosis in 10/21 (47.6%) patients. Twenty-seven patients revealed clinical and imaging improvement after initial steroid or immunoglobulin treatment.

**Conclusion.** Early diagnosis and discontinuous administration of LEV is important for good recovery in most cases. Treatment with corticosteroids and/or intravenous immunoglobulin may be needed for this serious inflammatory encephalopathy. We also noticed that plasmapheresis may be an alternative regimen for patients with steroid-resistance.

**Key words:** Levamisole, Fluorouracil, multifocal inflammatory leukoencephalopathy,