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Title
Acute Toxic Leukoencephalopathy Following Fentanyl Overdose: A Case Report

Authors
Katerina Havlik, Alexandra Chenowith, Matthew Bankert, Christine Yunjae Wang, Sarah A. Eby, Mariam Keramati, Jordan Wickstrom

Case Diagnosis
32-year-old male with acute toxic leukoencephalopathy following fentanyl overdose

Case Description
Patient presented with altered mental status, generalized weakness, and psychosis two weeks following hospitalization for fentanyl overdose. Toxicology screen was negative. Magnetic resonance imaging of the brain demonstrated diffuse symmetric restricted diffusion in peri- and supra-ventricular white matter tracts consistent with acute toxic leukoencephalopathy (ATL). Due to worsening mentation, the patient was intubated and admitted to intensive care. After a month-long hospitalization, they were transferred to an inpatient rehabilitation facility (IRF). Initial physical and occupational therapy evaluations demonstrated moderate-to-maximum assistance with activities of daily living (ADLs) and mobility, with severe impairments in coordination and balance. Speech-language pathology assessment detected substantial cognitive deficits, evidenced by an initial score of 57 on the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS). Patient underwent an interdisciplinary treatment program and was discharged home 16 days later.

Setting
Traumatic brain injury IRF within tertiary care hospital; outpatient PM&R clinic

Results
RBANS demonstrated improvement in memory and attention throughout the patient’s stay and post-discharge; scores increased from 0.2nd to 6th percentile. At discharge, therapy evaluations showed independence with mobility and ADLs, with residual mild cognitive deficits. Follow-up at 1, 3, and 12 months post-discharge demonstrated sustained improvements in cognition, attention, coordination and balance.

Discussion
ATL is a rare demyelinating disorder which often portends poor outcomes. Given this condition's reversibility, this case highlights the importance of timely diagnosis and access to neurocognitive rehabilitation. Critically, this patient's substance abuse

history did not preclude him from receiving appropriate care. While initial treatment is supportive, long-term recovery requires dedicated, individualized rehabilitation.

Conclusions

An interdisciplinary team was crucial to establishing the diagnosis and developing a successful treatment plan. Though ATL is gaining recognition, its prevalence among individuals with substance use disorder remains unclear. Recovery depends on access to initial support and long-term rehabilitation.