# Paraneoplastic Anti-NMDAR Encephalitis: Mystery with an Ovarian Teratoma Twist

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Case: A 25-year-old woman with no medical history presented after a witnessed 30 second seizure. She reported 5 days of worsening headaches, fevers, and vomiting. Subsequently, her partner discovered her with a clenched jaw, eyes rolled back, and arms stiffened with jerking movements. The episode had self-terminated. She had another tonic-clonic seizure with EMS which was terminated following Versed and Ativan with no recall of these events. VNctate 5.9 and benzodiazepines on UDS. The neurological physical exam was unremarkable. EEG was negative. MRI brain showed bilateral temporal edema. Cerebrospinal fluid (CSF) studies were significant for normal glucose, increased protein, pleocytosis, and increased RBCs, raising suspicion for HSV encephalitis. The patient was started on broad-spectrum antibiotics, acyclovir, and a trial of steroids, which resulted in initial improvement in her neurological symptoms. However, one week later, she became encephalopathic and agitated with hysteric crying and laughing episodes. CSF cultures and HSV tests were negative. She was also later found to have significant autonomic instability, requiring ICU observation and intubation. Autoimmune differentials prompted a CT abdomen pelvis, revealing a right ovarian dermoid cyst. On surgical removal, it was confirmed to be an ovarian teratoma. Repeat autoimmune CSF studies tested positive for anti-NMDA receptor antibody (NMDAR), confirming a diagnosis of anti-NMDAR encephalitis. She was started on IVIG, steroids, cyclophosphamide and plasmapheresis with gradual improvement, but the patient remains to not be at baseline.

Discussion: Anti N-methyl D-aspartate receptor (NMDAR) encephalitis is the most common autoimmune encephalitis affecting young adults. It is characterized as a neuropsychiatric syndrome and presence of autoantibodies in the CSF. Generally, patients present with a viral-like prodrome, followed by disturbances in sleep, behavior, memory, and autonomic stability. Since 2007 researchers have investigated the association between anti-NMDAR encephalitis as a paraneoplastic syndrome secondary to ovarian teratomas. For example, one cohort study suggested that 38% of women diagnosed with anti-NMDAR encephalitis had a coexisting tumor with 94 of those tumors being an ovarian teratoma. It is believed that the immune response triggered by a teratoma, particularly antibodies against dysmorphic neural tissue within the tumor, may cross-react with NMDA receptors in the brain, leading to the onset of encephalitis. Therefore, a goal of early surgical resection should be prioritized given that the longer the exposure to the autoimmune effects of this paraneoplastic syndrome, the worse the prognosis and recovery period will be.