



BRIEF REPORT

OPSOCLONUS MYOCLONUS

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ABSTRACT

Opsoclonus myoclonus is a rare autoimmune condition characterized by cerebellar degeneration. It occurs most often as a paraneoplastic syndrome when a cancer remote to the brain induces cerebellar dysfunction that is unrelated to metastases. Half of all cases occur in children with a neuroblastoma. Most adults with opsoclonus myoclonus have neoplastic, infectious, metabolic, or idiopathic etiologies. Signs of cerebellar dysfunction noted at presentation include opsoclonus, myoclonus and ataxia, hence the name “dancing eyes, dancing feet syndrome.” Opsoclonus is characterized by rapid, involuntary eye movements that are dysrhythmic and uncoordinated.

Neuronal damage is induced by antibodies usually related to the primary pathology. Treatment targets the etiology and also employs steroids, plasmapheresis, immunosuppressive agents, or other anti-inflammatory therapies. Children with opsoclonus myoclonus resulting from a neuroblastoma often retain neurological sequelae. Adult cases of opsoclonus myoclonus with idiopathic or infectious etiologies have a more favorable prognosis than those with neoplastic origins.

CLINICAL VIGNETTE

A 49-year-old white man presented in a distressed state with severe disabling OM following a tonsillectomy, two months after the diagnosis of squamous cell carcinoma of the tonsil.¹ He was unable to walk, read, feed himself, speak clearly, or

maintain visual fixation. Post-operative treatment included radiotherapy, chemotherapy, and immunoglobulin infusions. After several months, he regained the ability to walk, read, talk, and return to work, but he retained some cerebellar dysfunction.

DISCUSSION

Opsoclonus myoclonus (OM) is a rare autoimmune condition characterized by cerebellar nuclei degeneration. Unrelated to metastases, it occurs most often as a paraneoplastic syndrome caused by a cancer usually remote to the central nervous system.^{1–6} Neoplastic cells produce substances that are toxic to cerebellar neurons. This systemic, neurological illness presents clinically with opsoclonus, myoclonus, and ataxia often well before its primary etiology is identified.

Opsoclonus is identified by bizarre, involuntary horizontal and vertical eye movements that are rapid, but neither rhythmic nor coordinated.¹ Myoclonus refers to sudden, quick jerks of a muscle or muscle group. Thus, OM is a severely compromising disease characterized by the term *dancing eyes, dancing feet syndrome*. It exhibits cerebellar signs of dyspraxia, dysarthria, and dysphagia, along with hypotonia, lethargy, and malaise.^{1–6}

Half of all OM cases occur in children with a neuroblastoma, with onset often before four years of age.² Among adults, 50 percent have idiopathic or infectious etiologies.⁶ Cases resulting from infection are usually acute in onset; however, the autoimmune response is not very

specific to various pathogens, the focus of infection, or presence of blood-borne sepsis. Other causes include cancers and sometimes intoxications or metabolic abnormalities.^{4,5} Approximately 20 percent of adult paraneoplastic presentations are associated with lung or breast cancers, but other tumors can result in OM and onset may be gradual.³

Cerebellar nuclei are occasional targets of inflammatory injury in many autoimmune reactions and paraneoplastic disorders. In OM, symptoms develop when intracellular and surface-binding IgG3 antibodies in serum and cerebrospinal fluid (CSF) specifically bind to and damage inhibitory Purkinje cells and granular neurons in the dorsal vermis of the cerebellum.^{1,7-11} However, the exact mechanism is not entirely clear, because some cases may remain negative for autoantibodies and exhibit normal IgG3 concentrations.^{9,12} The antibody types vary widely.

The physical examination can clinically identify OM. Patients with OM should immediately undergo a complete evaluation for cancer and infection. Abnormal immunoglobulin analyses and other laboratory findings may be nonspecific since there are no diagnostic biomarkers for paraneoplastic OM. Blood or CSF analyses may assist in identifying an infectious etiology. While they neither diagnose nor exclude a paraneoplastic or autoimmune etiology, CSF studies often document paraneoplastic antibodies, mild increases in proteins, and a lymphocytic pleocytosis consistent with inflammatory changes. Some institutions offer assessments to identify the B lymphocytes that produce the offending antibodies.

The most important treatment is directed at the etiology, for example, providing aggressive intervention for cancer or infection. Supportive or symptomatic measures are prescribed when indicated. In addition to eliminating the etiology, administering immune modulating therapies like steroids, immunoglobulins,

adrenocorticotrophic hormone, plasmapheresis, or immunosuppressive agents may reduce inflammation.¹³⁻¹⁵ Rituximab and ofatumumab are two monoclonal B-cell antibodies reported as helpful in children when added to other immunotherapies.^{16,17} Clonazepam might diminish some of the movement disturbances.²

Children with OM secondary to a neuroblastoma usually retain chronic, disabling developmental dysfunction with cognitive and neurological sequelae.¹² Chronicity is primarily determined by the severity of the initial pathology, which is proportional to the degree of autoimmune dysfunction.^{18,19} Other factors in determining prognosis are the age of onset, cancer type and stage, degree and timing of neurological involvement, degree of tumor eradication, treatment effectiveness, and the number of tumor or infection-induced OM recurrences. At all ages, the prognosis is more favorable in OM of infectious or idiopathic origins.⁴ Recovery can be protracted over many months.

The extent of recovery in adult paraneoplastic patients is variable and depends on the time until diagnosis, the cancer prognosis, and the degree of neurological damage. Cancer-derived OM may not improve significantly even when the neoplasia is in remission or eliminated. Residual symptoms may serve as a clue to incomplete cancer treatment.²⁰ Recurrences are reported.²¹ Due to illness severity, OM support groups for patients and families can be helpful.¹

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