Clinician's Corner

Acute ataxia in a healthy 19-month-old girl

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CASE PRESENTATION

A 19-month-old (17 months corrected) girl presented to the emergency department during the winter with sudden onset of gait ataxia. One day before presentation, upon awaking from a nap, she began to stumble and fall when running. There was no history of gross behavioural/cognitive alteration, toxic ingestion, or prodromal/active infectious illness within the past month. Furthermore, there were no symptoms of episodic ataxia, seizures, hypotonia, dysmetria, nystagmus, or myoclonus. The child was born at 31 weeks gestational age from an uncomplicated twin pregnancy. After mild transient tachypnea of the newborn and slow growth, she remained in the neonatal

intensive care unit for 1 month. She was discharged without sequelae of prematurity.

On examination, the child's vital signs were normal and her interactions were age-appropriate. No meningism was present. Her cranial nerve assessment was normal, including vestibular function. There was no papilledema. Sensation, muscle tone, bulk, and power of all limbs were appropriate. Babinski's and crossed adductor signs were not elicited. Neither dysmetria nor truncal titubation was observed. Her gait was wide-based and characteristically ataxic. Brain magnetic resonance imaging was normal. Spinal fluid analysis was not performed.

CASE DIAGNOSIS: ACUTE CEREBELLAR ATAXIA TEMPORALLY ASSOCIATED WITH VARICELLA VACCINE

A self-limiting, isolated gait disturbance in a previously healthy child with normal brain imaging was consistent with the clinical syndrome of acute cerebellar ataxia (ACA). The lack of infectious signs and symptoms in the preceding month did not support an infectious-related aetiology. Of note, 9 days earlier, the patient received routine varicella vaccination. She demonstrated significant recovery of gait occurred within 1 week, with full return to neurological baseline within 2 weeks. Over the next 2 years, there was no recurrence of ataxia or development of motor, sensory, coordinative, or cognitive dysfunction. Although an infectious workup, such as viral and bacterial serology and CSF analysis, was not completed, the temporal association with vaccination, vital stability, and rapid resolution of ataxia was characteristic of the rare phenomenon of postvaricella vaccination ataxia.

Acute ataxia during childhood may result from an insult to the cerebellar, sensory, or vestibular systems. The differential diagnosis is broad (Table 1) (1). Postinfectious ACA is most common and characterized by rapid onset of truncal and gait disturbance after infection. Under 5 years of age, the incidence of postvaricella infection is approximately 5/100,000 infections (2). Thakker et al. determined that 71% of patients with acute ataxia assessed at a single neurological centre experienced postinfectious ACA (3). The authors also identified intoxication and opsoclonus myoclonus ataxia as the next most common diagnoses, each present in 10% of patients. A further 10% of

cases were deemed 'idiopathic' based on lack of precipitant or investigational abnormality.

Postinfectious ACA is a spontaneously-resolving condition with full recovery (4). Intoxication, which includes accidental ingestion or toxicity associated with prescription medication, is unlikely to result in long-term deficits with appropriate supportive care and medication adjustment. Opsoclonus myoclonus ataxia's correlation to malignancy, particularly neuroblastoma, should justify oncological workup in the absence of known precipitant, but the syndrome is not indicative of an emergent or imminent deterioration. Although most acute ataxia are not life-threatening, consideration of critical diagnoses is warranted. These may include infections such as acute cerebellitis and meningitis, vascular accidents including hemorrhage and ischemic stroke, and tumour-induced elevated intracranial pressure which are associated with higher mortality and/or functionally-debilitating outcomes. In such scenarios, acute ataxia may be the initial symptom in a cascade of neurological or systemic decline. Recognition of urgent clinical features, including papilledema, headache, nausea and vomiting, fever, and meningismus must motivate rapid ancillary investigation and/or empiric treatment.

Similar to postinfectious ACA, vaccine-related ACA is a relatively benign condition. Epidemiologically, this phenomenon is most well-described with the varicella vaccine, with which cases had a median onset at 13 days, with complete spontaneous recovery in the 70% of patients with sufficient follow-up (4). No varicella virus was detected in these patients, indicating that their cerebellar dysfunction was unrelated to active infection. The postulated mechanism is an inappropriate immune response with

Table 1. Differential diagnosis of acute ataxia in children

Acute cerebellar ataxia	Infectious/immune-mediated	Acute postinfectious cerebellar ataxia Acute postvaccination cerebellar ataxia Acute cerebellitis Acute disseminated encephalomyelitis Multiple sclerosis
	Paraneoplastic	Opsoclonus-myoclonus syndrome
	Traumatic	Postconcussion ataxia Traumatic vertebral dissection
	Vascular	Ischemic/hemorrhagic stroke
	First event intermittent ataxia	Inherited disorders of metabolism
	Intoxication	
	Episodic ataxia	
Acute vestibular ataxia	Migraine related	
	Acute unilateral vestibular dysfunction	
Acute sensory ataxia	Inflammatory	

Adapted from ref. (1).

formation of autoantibodies and production of viral-induced cytokines that exacerbate autoimmune injury. However, the progression from cellular dysregulation to clinically significant autoimmune ataxia, and the correlation with underlying autoimmune processes remains uncertain. Other infectious aetiologies may require consideration, as the causal link to the varicella vaccine has not been established. Nonetheless, when varicella vaccination is implicated in autoimmune reactions, it characteristically causes ataxia and other neurological symptoms, which has a reported rate of ACA of 0.15/100,000 doses. This, in the context of the incidence of varicella-associated ataxia of 5/100,000 infections, is an exceptionally rare phenomenon and supports routine vaccination to reduce the overall occurrence of ACA.

We report a case of ACA in a healthy 19-month-old girl after she received varicella vaccination—a rare temporal association. Her ataxia resolved spontaneously within 2 weeks, which is consistent with existing reports (4). Paediatricians must be cognizant of the differential for acute ataxia, and recognize that the increasing rate of varicella vaccination may also reduce the incidence of varicella infection and associated postinfectious ACA.

CLINICAL PEARLS

- ACA in children can result from multiple aetiologies. Varicella infection is a leading cause.
- ACA has been temporally associated with varicella vaccine. It presents several days after vaccination with rapid-onset of truncal or gait incoordination and complete resolution is usual. A causal link has not been established.

Varicella vaccination-associated ACA is a self-limiting event with exceptional rarity compared to the incidence of postvaricella infection ACA. Therefore, varicella immunization diminishes the occurrence of this neurological deficit and should continue to be encouraged.

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