Clinician's Corner

Toddler with Ptosis: Now You See It, Now You Don't

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CLINICAL PRESENTATION

A 19-month-old boy was admitted to the hospital with a 2-month history of bilateral ptosis, episodic drifting eye movements and changes in gait. The ptosis was initially right sided but subsequently progressed to involve the left eye as well. One month prior a diagnosis of periorbital cellulitis was made and treatment was commenced with erythromycin ophthalmic ointment. On further questioning, it was noted that the eyelid abnormalities were more prominent later in the day when he also had increased irritability and difficulty with swallowing liquids. The child's birth and past medical history were unremarkable.

Upon examination by the resident in the morning following admission, there was left-sided ptosis without pupillary or extraocular abnormalities. There were intermittent eye movement abnormalities resembling strabismus. Examination at different time points in the day was remarkable for ptosis involving the other eye as well. Aside from ptosis, physical examination was unremarkable as was the neurological examination including cognition, other cranial nerves, sensation and deep tendon reflexes. The child's gait appeared to be unsteady secondary to ptosis.

DIAGNOSIS: MYASTHENIA GRAVIS (MG)

Serum analysis for Acetylcholine Receptor (AChR) antibody showed an elevated level of 2.6 nmol/L (normal 0.0 to 0.4 nmol/L) confirming diagnosis of MG. Differential diagnosis of ptosis in a child includes local pathology such as infection of the eyelid, diseases involving the eyelid muscles (congenital myopathy, muscular dystrophy, MG, botulism) and neurological conditions such as Horner's syndrome or third cranial nerve palsy. Congenital ptosis, the most common cause for ptosis in newborns, is due to poor development of the levator palpebrae muscle.

There are several forms of MG that may occur in children: transient, congenital and autoimmune ('juvenile') types.

Transient neonatal type is caused by transfer of antibodies to the baby from an affected mother; congenital forms of MG is caused by genetic defects in presynaptic, synaptic basal lamina and postsynaptic components of the neuromuscular junction; autoimmune ('juvenile') MG is similar in pathology to that of adult MG but has earlier presentations ranging from 4 months to 25 years of age (1).

Acquired MG is an autoimmune disorder characterized by presence of antibodies that block AChRs on the postsynaptic membrane of neuromuscular junctions. Acetylcholine is synthesized in motor nerve terminals, stored in vesicles and released when there is an action potential. Released acetylcholine then binds AChRs on the postsynaptic membrane, causing influx of cations, mainly sodium, which ultimately leads to muscle contraction. In MG, the defect is in the number of available AChRs in the postsynaptic membrane. When there are less AChRs available, there is less influx of cations, resulting in muscle inaction. Furthermore, the amount of acetylcholine released by the nerve terminal declines with repeated activity, which accounts for the fatigability toward the evening (2).

Symptoms of autoimmune MG include weakness in ocular, bulbar, limb and respiratory muscles, the last of which is a medical emergency. The diurnal variability of symptoms—with worsening as the day progresses—is a key clinical feature and should be actively sought in any child who presents with ptosis and/or diplopia. Children and parents may note 'sad' facial expression, difficulty with chewing or swallowing, changes in voice and difficulty with tasks such as sustained upward gaze or raising their arms overhead. Cogan lid twitch is common in myasthenic ptosis; it is provoked by having the patient look down for a short period then quickly return gaze to primary position. The examiner will note temporary retraction and twitching of the upper lid before it settles down into ptosis again. In addition to ptosis, there may be weakness of muscles that coordinate eye movements, especially the medial rectus. There may also be

weakness of the proximal muscles of the limb girdle but normal deep tendon reflexes—an important distinguishing feature from other neuromuscular disorders. Another salient feature is the preservation of pupillary size and response to light, which distinguishes MG from third cranial nerve palsy and Horner's syndrome. Children with third cranial nerve palsy have marked ptosis, with a dilated pupil on the affected side and weakness of ocular muscles supplied by the third cranial nerve causing weakness of adduction (medial rectus) and eyeball elevation (superior rectus). On the other hand, children and infants with Horner's syndrome have miosis and mild ptosis with no involvement of ocular muscles.

Definitive diagnosis of autoimmune MG is established by testing for AchR antibodies which has a sensitivity of 80.7% and a specificity of 100%; false negatives are not unusual (1). Electrophysiological testing may be required when serological diagnosis is not possible (1).

Management for juvenile MG is similar to that of adult MG, which includes anticholinesterase medications, steroids, plasma exchange, immunosuppressants and thymectomy, though not necessarily in that order (3). In cases where respiratory muscles are weakened ventilator support may be required.

CLINICAL PEARLS

1. Extraocular muscle weakness and ptosis are common initial presentations of MG in children.
2. Children with MG typically have fluctuation in muscle weakness that worsens with activity and exercise and is most prominent toward the end of the day.
3. Ptosis in a child may be the manifestation of a muscle disorder, Horner's syndrome or nerve palsy. A thorough history and physical exam can help guide differential and appropriate selective testing.

References

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