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Dystonia and its Neurophysiology

Kenneth Bensalem*

Faculty of Neuroscience, University of Kentucky, Lexington, Kentucky, USA

Description

Dystonia is a movement disorder that involves aberrant postures of the trunk, neck, face, arms, and legs, as well as continuous muscle contractions and repetitive twisting movements. Dystonia is caused by the involuntary contraction of agonist and antagonist muscles at the same time, with undesired muscular contractions overflowing into neighbouring muscles.

Dystonic movements can be slow or fast, change with different activities or postures, and in advanced cases, become fixed. Tremor is a common occurrence. Abnormal postures that occur during voluntary activity and are occasionally task-specific are referred to as action dystonia. Despite the fact that gene mutations and other reasons are becoming more widely recognized, the majority of people have primary dystonia with no identifiable cause.

Although pathogenesis-targeted treatment is still elusive, current symptomatic treatment options for some kinds of dystonia are quite effective in lowering discomfort, alleviating involuntary movements, correcting aberrant posture, preventing contractures, and increasing function and quality of life [1-3].

Classification

When dystonia occurs in infancy or early adulthood, it frequently goes from focal limb dystonia to the severe generalised type, whereas dystonia that begins after the age of 25 usually involves craniocervical muscles, is usually localised or segmental, and is rarely progressive[2,3]. Four Primary dystonia, secondary dystonia, dystonia-plus syndromes, and paroxysmal dystonia are some of the etiological classifications.

Primary dystonia: Primary dystonias, by definition, are characterised by the absence of additional neurologic abnormalities, with the exception of tremor and, in rare cases, myoclonus, and have no known aetiology, with the exception of genetic alterations that have been detected in certain cases.

Primary generalized torsion dystonia: Primary generalised torsion dystonia is a disabling, progressive condition that usually starts in childhood and is connected to numerous hereditary loci. A guanine–adenine–guanine (GAG) deletion in the torsin A gene (DYT1 locus) causes the loss of glutamate in torsin A, a brain protein of uncertain function with maximum concentrations in the substantia nigari.

Primary focal dystonia: Adults are almost invariably affected by primary focal dystonia, which might affect the neck, face, or arm, but not the leg. With the exception of writer's cramp, it usually starts in midlife or later and is more common in women. The condition usually advances for one to two years before becoming stable, though it can sometimes expand to neighbouring muscle groups and become segmental.

Treatment

Dopaminergic drugs: This kind of dystonia is caused by mutations in the GTP cyclohydrolase 1 gene on chromosome 14 or anomalies in tyrosine hydroxylase or sepiapterin reductase. It has a childhood onset, parkinsonian characteristics, gait and postural problems, diurnal fluctuation, and autosomal dominant inheritance. GTP cyclohydrolase 1 regulates the synthesis of tetrahydrobiopterin, a cofactor for tyrosine hydroxylase, the rate-limiting enzyme in dopamine synthesis[4,5].

Anticholinergic drugs: Anticholinergic medications like trihexyphenidyl are effective in treating generalised and segmental dystonia. Anticholinergic medicines can be well tolerated if the dose is started low and gradually increased. Pyridostigmine, a peripherally acting anticholinesterase, and pilocarpine eye drops are frequently used to alleviate at least some of the peripheral side effects, such as urine retention and blurred vision.

Antidopaminergic drugs: Tetrabenazine, a dopamine depleting medication, has shown to be effective in some dystonia patients, notably those with tardive dystonia. Tetrabenazine, a vesicular monoamine transporter inhibitor, differs from other antidopaminergic medicines in that it does not produce tardive dyskinesia, albeit it can cause a temporary acute dystonic reaction[4,5].

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Conflict of Interest

The authors reported no potential conflict of interest.

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***Address for Correspondence:** Kenneth Bensalem, Faculty of Neuroscience, University of Kentucky, Lexington, Kentucky, USA; E-mail: bensalemkenneth@us.edu.my*

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