The Role of Levetiracetam in Post-Stroke Dyskinesias

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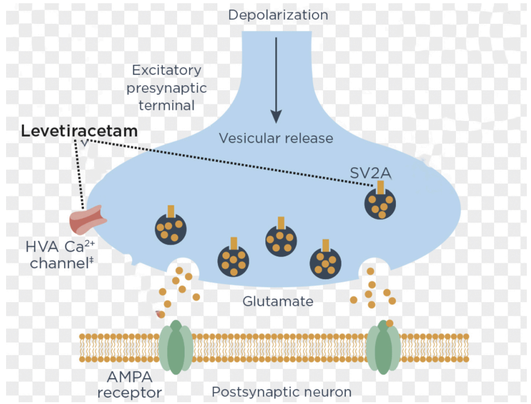
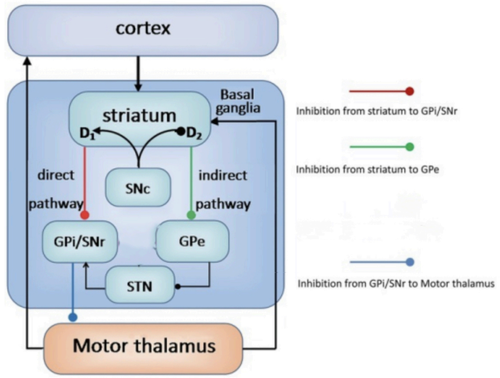
Case Diagnosis:

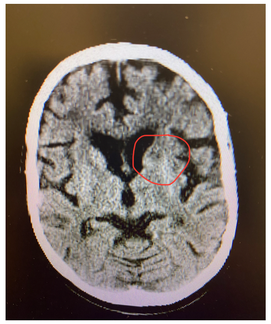
Post stroke movement disorders encompass a phenomenon often noted to present variably with hypo- or hyperkinetic movements. The hypokinetic movements can be identified as parkinsonism while the hyperkinetic movements can be further classified as being dystonic, choreiform, or tremor-like. Specifically, post stroke dyskinesias are a general term for hyperkinetic involuntary movements that occur after a cerebrovascular event. These movement disorders can either appear concurrently with the stroke, or later in a delayed fashion. Although the incidence of post stroke movement disorders is rare, the most effective pharmacological therapy used to date are typical and atypical antipsychotics. Although very effective, they can often present with side effects that are deemed too intolerable for patients.

Description:

We present an 88 year old female with a past medical history of heart failure, mechanical valve replacement, TIA and atrial fibrillation who was admitted for a fall with right sided weakness. CTA head showed stenosis and occlusion of the left MCA and severe luminal narrowing of the left ICA. The patient was given TPA and a thrombectomy was performed on the left ICA. The patient's repeat CT head showed a new left caudate head lucency concerning for an acute infarct. After her medical course was stable, she was transferred to our acute rehabilitation unit. Despite the patient's improving right upper extremity strength, with muscle grade of 4/5 throughout, her rehabilitation course was significant for choreoathetosis on her right hand, 3 weeks after her stroke. This caused her much distress and severely limited her participation in therapy. Routine labs with thyroid function test were normal. Repeat CT head was also done and showed stability. EEG did not show any active seizures. The patient was started on low dose levetiracetam (250mg daily) with significant reduction in her involuntary hand movement a few days after her treatment. Her initial occupational therapy evaluation was severely limited due to her symptoms. Even so, after the initiation of levetiracetam she was able to significantly participate in therapy and was discharged at a level of supervision for grooming and moderate assist for upper body dressing.







Discussion:

Our patient, developed choreoathetosis which are involuntary motor movements that present as a combination of chorea (irregular rapid movements) and athetosis (irregular, slow writhing movements). Post stroke movement disorders are relatively uncommon, with an estimated prevalence rate of about 1-4% across the population. However infrequent, post stroke dyskinesias can occur if they involve the motor cortex, basal ganglia and/or cerebellum. The basal ganglia is often affected in these cases due to involvement of the small vessels located in the middle or posterior cerebral artery territories which supply it. If the underlying etiology damages the basal ganglia, the striatum is the most likely structure affected, as was seen in our patient. With inhibition of the indirect pathway, the thalamus is subsequently uninhibited. This results in excitation of the motor cortex and movements that would normally be inhibited by the indirect pathway.

Discussion (continued):

The pharmacological management usually consists of typical or atypical antipsychotics which serve as D2 antagonists, thereby disinhibiting the indirect pathway and suppressing the motor cortex from producing involuntary movements. Although very effective, the antipsychotics can produce side effects such as tardive dyskinesia, acute dystonia, and parkinsonian features that would make the medication intolerable for the patients. There have been case reports of levetiracetam improving symptoms of post stroke dyskinesias. Although the mechanism is not fully understood, levetiracetam is thought to enhance GABAergic neurotransmission while also acting on the synaptic vesicle protein (SV2A) thereby inhibiting the release of the neurotransmitter, glutamate. It is thus thought to reduce the amount of abnormal synchronous firing within the basal ganglia, thereby aiding in the suppression of these involuntary movements. In addition to post stroke dyskinesias, levetiracetam has also been shown to be potentially effective in the treatment of other movement disorders such as tardive dyskinesia, paroxysmal kinesigenic dyskinesia, and dyskinesias caused by dopamine replacement therapy. The most common side effects of levetiracetam which include dizziness, drowsiness, and headaches are much more tolerable and less serious than that of antipsychotics. Our patient tolerated the use of levetiracetam with significant improvement seen on her right hand a few days after introducing the medication, which relieved her distress and made it much easier for her to participate in therapy.

Conclusion:

We presented a case of levetiracetam significantly improving a patient with post stroke dyskinesia. Although more research is needed, our case report shows the possible benefits and advantage levetiracetam can have in this patient population, as this is a well tolerated medication without the significant side effects seen in antipsychotics.

References:

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