The Use of Modafinil for the Treatment of Abulia in COVID-19 Ischemic Stroke: A Case Presentation

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Introduction

Abulia is a disorder of diminished motivation (DDM) which exists along a spectrum from apathy and akinetic mutism. It manifests as the reduction of speech and/or spontaneous activity. Abulia is thought to be a related to the frontal subcortical mesolimbic dopamine pathway (Figure 1), which may interact with the psychological phenomena of motivation. It has been described in both ischemic and hemorrhagic strokes, traumatic brain injury as well as other neurological conditions.

Case Presentation

A 55-year-old female with a history of diabetes and hypertension was admitted for shortness of breath, intubated for respiratory failure, and diagnosed with coronavirus 2019 infection.

One month later, the patient was extubated but had persistently poor arousal off sedation. Magnetic resonance imaging revealed bilateral multifocal acute infarcts (Figure 2). Patient was treated with amantadine for arousal but continued to have flat affect and decreased initiation.

Patient was eventually started on modafinil 50 mg daily. This was uptitrated to 200 mg daily with improvement of initiation, affect, and therapy participation. Two months after admission, the patient was discharged to acute inpatient rehabilitation.

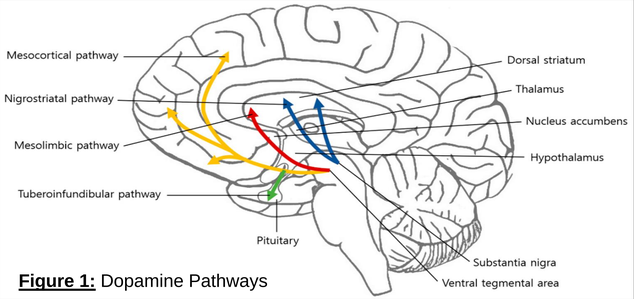

Figure 1: Dopamine Pathways

Drugs	Initial Dosage	End Dosage	Effect
Amantadine	100 mg qwk	200 mg qwk	Improved arousal
Trazodone	25 mg qhs	25 mg qhs	No effect
Escitalopram	5 mg qd	10 mg qd	No effect
Modafinil	50 mg qd	200 mg qd	Improved flat affect & initiation

Table 1: Sequence of Treatments

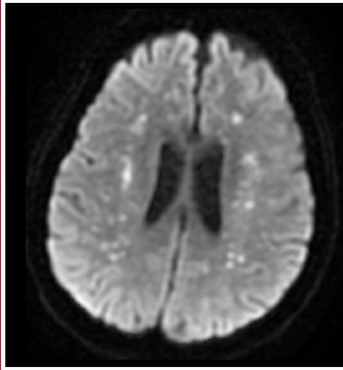

Figure 2: Axial MRI diffusion weighted images showing acute ischemic strokes - numerous scattered punctate foci of restricted diffusion primarily within the subcortical white matter of the bilateral cerebral hemispheres.

Discussion

The differential diagnosis for abulia in stroke includes aphasia, neglect, and depression. The latter occurs in approximately 30% of patients within days to years Abulia can occur in 30 % of stroke and can co-occur with depression in 50 % of cases

Dopaminergic agents can be used for the treatment of abulia. Serotonergic and cholinergic systems interact with the dopaminergic system, and agents affecting these neurotransmitters can also be used to treat DDM. Modafinil increases the release of dopamine and improves arousal. It may be helpful in the treatment of abulia.

Conclusion

This is the first reported case in the literature of abulia occurring after a COVID-19 ischemic stroke. DDM affects patients across multiple neurologic diagnoses including ischemic stroke. Physiatrists should be aware that modafinil, like other medications that affect dopamine, may have a role in the management of abulia.

References

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