

The Presence of Lyme and Related Tick Borne Diseases, COVID-19, and Simultaneous Occurrence of Lyme and Related Tick Borne Diseases Plus COVID-19 Infections in Tick Endemic Areas Presents a Newly Emerging, Confusing, and Deadlier Infectious Diseases Mix

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Received: April 23, 2021; **Published:** May 17, 2021

Quotation: "In areas that are endemic for Lyme and Related Tick Borne Diseases especially during tick season (early spring to late fall), physicians must now consider the possibility of three potential disease scenarios: a) COVID-19, b) Lyme and Related Tick Borne Diseases, c) simultaneous infection involving COVID-19 and Lyme and Related Tick Borne Diseases".

The treatment of Lyme and related tick borne infections is difficult [1]. The reason for this difficulty is due to the fact that Tick Borne Diseases are multipathogenic events [1].

This scenario is further compounded by the fact that Lyme and Related Tick Borne Diseases can cause immune dysfunction [1,2]. Thus, an immune system that is currently under stress is further weakened by the addition of both non-tick borne infections, additional opportunistic pathogens, and non-infectious diseases [3].

The arrival of a new respiratory viral pathogen, namely, Coronavirus COVID-19, in patients that have an overburdened immune that is dealing with Lyme and related tick borne infections are now in a more dangerous and deadlier situation [2,3].

Horowitz has noted that Lyme and related Tick Borne Diseases have ability to "mimic" a variety of commonplace illnesses such as: a) chronic fatigue syndrome, b) fibromyalgia, c) autoimmune diseases such as rheumatoid arthritis, Multiple Sclerosis, Lupus, Multiple Sclerosis, d) Alzheimer's Disease, e) Amyotrophic Lateral Sclerosis, f) brain fog, g) cognitive diseases, h) anxiety and i) depression [4].

Coronavirus COVID-19 has displayed hallmark symptoms as: a) fever, b) cough, c) fatigue, and shortness of breath, large vessel stroke [5]. The COVID-19 is able to infect other parts of the body as well [5]. The early investigations of Mao, *et al.* noted that this virus has been also shown to also cause variety of neurological manifestations such as: a) cerebrovascular diseases, b) cognition issues, c) brain fogs, d) impaired consciousness [6].

The literature notes that in many cases of COVID-19 involving Children there was neurological involvement without any of the hallmark classical respiratory symptoms [7,8].

There has recently arisen case scenarios manifesting lingering symptoms after their viral carriage test were negative (9,10). This group of individuals with lingering symptoms have been designated as "Long Haulers" [10].

Stone noted in an article in Lyme Disease News that even though Lyme Disease is caused by a bacterial agent called *Borrelia burgdorferi*, and COVID-19 is caused by a virus CoV-2, these two disease states shared similarities as relates to some of the symptoms [11].

Stone further noted that both these diseases are often seen to frequently start by manifesting flu-like symptoms such as fever, headache, and “general achiness and fatigue [11]. Lyme disease manifests additional diversities such as skin rash, and arthritis [11]. In addition, both COVID-19 and Lyme Disease have the ability to manifest symptoms that linger for many months, which have now been placed under the heading of “Long Haulers” [11]. Two common neurological disabilities seen in both Lyme Disease and COVID-19 are: a) “Brain Fog”, b) Cognitive impairment.

Thus, in areas that are endemic for Lyme and Related Tick Borne Diseases especially during tick season (early spring to late fall), physicians must now consider the possibility of three potential disease scenarios: a) COVID-19, b) Lyme and Related Tick Borne Diseases, c) simultaneous infection involving COVID-19 and Lyme and Related Tick Borne Diseases [11].

Acknowledgement

I would like to acknowledge the support given to me by the TBD Support Network Inc., Milford, Pennsylvania, USA.

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Volume 10 Issue 6 June 2021

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