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Commentary

Physicians in Areas Endemic for Lyme and Related Tick Borne Diseases Must Distinguish Tick Paralysis from Guillain Barre Syndrome during the Current COVID-19 Pandemic

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Quotation: "In areas endemic for Lyme and Related Tick Borne Diseases, Tick paralysis should be first ruled out in a diagnosis involving "acute ataxia with ascending flaccid paralysis" This is especially warranted in cases involving children".

Tick paralysis

In areas that are endemic for Lyme and related Tick Borne Diseases, there occurs a type of tick related paralysis that could have lethal consequences [1]. This paralysis is mostly commonly associated with tick borne Rocky Mountain spotted fever [1]. The tick species that are associated with this paralysis are: a) Rocky Mountain wood tick, b) American dog tick, c) the Lone Star tick, d) the Eastern black-legged tick, and the Western black-legged tick [1].

Tick paralysis is caused by the exposure to a neurotoxin that is released by tick salivary glands during a tick bite [2]. Tick paralysis symptoms start to appear after the tick has attached itself to the victim [2]. The initial hallmark symptoms that are most noted are: a) the appearance of numbness and tingling sensations b) the reduction or absence of reflexes, c) the appearance nonspecific viral like symptoms with the presence of malaise and weakness [1,2]. This initial phase is then followed by an inability to sit up and walk without the assistance of another individual (this is an ataxia associated with an inability to coordinate the movement of muscles) [1,2]. The literature also notes that the direction of this Tick paralysis begins in the lower extremities and subsequently moves in an upward direction. During this process muscle function is lost [1]. Tick paralysis can affect the functions of musculature that are linked to respiration with the end result being that the victim of tick paralysis has difficulty in breathing [2].

An important point for physicians treating a case of tick paralysis to remember is that the tick associated paralysis can become a life threatening event if the tick is not immediately extracted from the site of bite because failure to do so will lead to the movement of the paralysis up the truck of the body [1,2]. It must be remembered that it is the neurotoxins that are released in the tick saliva at the time of the tick bite that are responsible for the tick associated paralysis [1,2].

Thus, in areas that are endemic for Lyme and Related Tick Borne Infections, physicians must always first rule out a possible case of Tick Paralysis especially when the physician observes the patient to be manifesting a "sudden onset of ataxia and ascending paralysis" [2].

It is only by the prompt and immediate removal of the tick from the anatomy (i.e. scalp, hairline, ear canals, pubic regions) of the victim that can prevent the dangerous and deadly consequences of respiratory related difficulties [2]. The literature does state that up to six percent of the cases of tick related paralysis can result in a fatal outcome [1]. If the correct diagnosis of a possible case of tick paralysis

has been made, and timely actions are taken vis a vis tick removal, then there can occur a full neurological recovery in a brief period (i.e. 1 to 2 days) [1].

Guillain Barre syndrome

The Guillain Barre Syndrome is associated with a muscular weakness that is coupled with rapid onset [2]. This syndrome is due to the action of the immune system which brings about damage to the peripheral nervous system [3]. In the initial phase of this syndrome there occurs alterations in sensation with pain occurring in the area of back which is accompanied with a weakness in the musculature [3]. The sensations of pain often starts in lower extremities (i.e. feet, hands) and subsequently spreads to upper anatomy (i.e. arms, upper body). The onset of Guillain Barre Syndrome symptoms can often develop in a time interval of a few hours to a period of a few weeks [3]. In the acute phase of the Guillain Barre Syndrome, some of the victims can manifest breathing disorders associated with the muscles linked with breathing [3]. In this scenario it may be necessary for the victim to be given mechanical ventilation. In other scenarios the victims can manifest alternations in autonomic nervous system function which in turn leads to cardiac abnormalities (i.e. heart rate, blood pressure) [3].

The exact cause of Guillain Barre Syndrome is still largely unknown, however, it has been classified as an autoimmune disorder, in the individual's immune system that attacks and causes myelin sheath damage [3]. Most frequently this syndrome is associated with an infectious process (i.e. *Camplyobacter jejuni*, Cytomegalovirus, Epstein Barr Virus, Varicella zoster, *Mycoplasma pneumoniae*, Dengue fever, Hepatitis E Virus, COVID-19), b) surgery and c) vaccination [3-5].

Diagnosis of Guillain Barre Syndrome is associated with clinical signs and symptomatology in which other potential agents must first be ruled out [3]. Additional testing for Guillain Barre Syndrome involves nerve conduction studies and examination of Cerebrospinal fluid [3].

Treatment of patients with Guillain Barre Syndrome often involves prompt intervention with intravenous immunoglobulins or plasmapheresis and additionally, further supportive treatments [3].

The recovery process can take weeks to years, and roughly one third of the victims sustaining permanent weakness [1,3]. Death has been seen to occur in 7.5% of the victims of Guillain Barre Syndrome [3]. It has been further noted that both sexes were found to have similar rates of Guillain Barre [3].

Tick paralysis vs Guillain Barre syndrome

The literature notes that the paralysis associated with tick bites had the ability to be a "potentially lethal envenoming" event, which occurred in areas endemic for the presence of tick borne pathogens [6]. Sadly, Tick Paralysis has been frequently misdiagnosed as being a case of Guillain Barre Syndrome [1,2,6]. Cases of Tick Paralysis misdiagnosed as Guillain Barre Syndrome have led to unnecessary treatment regimens involving the use of plasmapheresis [1,2,6].

In many cases in which misdiagnosis had occurred, the presence of ticks were overlooked, which had often led to a more serious case of Tick Paralysis because of the delay in the removal of the tick [6].

In areas endemic for Lyme and Related Tick Borne Diseases, Tick Paralysis should be first ruled out in a diagnosis involving "acute ataxia with ascending flaccid paralysis" This is especially warranted in cases involving children [6].

An important point for physicians treating a case of tick paralysis to remember is that the tick associated paralysis can become a life threatening if the tick is not immediately extracted from the site of the tick bite. The failure to rapidly remove a tick from the site of the tick bite, will lead to the movement of the paralysis up the truck of the body [1,2]. It must be remembered that it is the neurotoxins that are released in the tick saliva at the time of the tick bite that are responsible for the tick associated paralysis [1,2].

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