Case report

Case of ehrlichiosis induced Guillain-Barre Syndrome in a 71 year-old female

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C O M M E N T A R Y

Guillain-Barre Syndrome (GBS) is a rare autoimmune demyelinating polyradiculoneuropathy that causes an ascending paralysis and flaccid weakness. Tick paralysis is a mimic of GBS as symptoms include generalized weakness and paralysis. However, symptom onset and timing as well as lab findings can distinguish between them. We present a case of a 71-year-old female who complained of generalized weakness and dizziness starting three weeks prior to admission. During that time, she had fevers and chills and a questionable insect bite. Her lab values indicated thrombocytopenia and elevated liver enzymes. PCR titers were positive for ehrlichiosis and she was started on doxycycline then discharged. She returned over a week later with worsening symptoms despite treatment. There was concern she may have had Heartland or Bourbon virus but titers were negative. Her neurological exam showed numbness and areflexia in her lower extremities which progressed since her first encounter. She was given IVIG and her symptoms improved and recovered slowly. Although ehrlichiosis is not a common cause for GBS, the pathogenesis is like Lyme disease or Campylobacter jejuni. This patient had clinical symptoms that were like tick-borne illness yet as her disease progressed, it illustrated the need for an expanded differential diagnosis. There is very little literature about ehrlichia inducing GBS. It is important to keep a broad differential as sometimes common syndromes do not always come from common pathogens and with the COVID-19 pandemic having similar results, we are learning new things that may potentially be new standards in medical education.
Treatment for GBS includes intravenous immunoglobulin (IVIG) therapy or plasma exchange [1]. IVIG provides immunomodulating action and can be given at a dose of 2 gm/kg over 5 days. Plasma exchange removes any of the pathogenic modulators that triggered the GBS. Both forms of therapy have been equally efficacious but the use of steroids does not provide any benefit compared to placebo [3]. If done early, 85% of patients recover independent ambulation [3].

Case

A healthy, active 71-year-old female with no significant past medical history presented with dizziness and generalized weakness. She moved from California to Northwest Arkansas two months prior and she denied having any visitors since the move. She was active and walked for 2 miles daily with her husband regularly prior to this admission. For three weeks, she had significant abdominal pain. She was tested for COVID-19 and her PCR was negative. CT head and MRI brain were negative for any acute processes. MRI cervical spine found mild stenosis in C5 and C7. She did have a notable insect bite on her left arm but she denied knowing if it was a tick bite. Labs were notable for thrombocytopenia with platelets at 105k (150–450k) and elevated liver enzymes with AST 125 (40) and ALT 95 (40) but as high as 260 and 204, respectively after 3 days. Lumbar puncture found low count of 1 WBC, it being lymphocytic dominant and protein of 37.7. She was hypoxic but had good oxygen saturation on 2 L of supplemental oxygen and she denied respiratory symptoms. To assess for tick-borne related illness, a tick-borne panel was done checking titers and PCR for Rocky Mountain Spotted Fever (RMSF) IgG and IgM, ehrlichia caffeinosis and ewingii, babesia microti and duncani anaplasma phagocytophilum, Lyme antibody and IgG in CNS as well as HSV-1 and −2 PCR, influenza A and B via PCR, mononucleosis, West Nile Virus PCR, cryptococcal antigen in CSF and campylobacter antigen. Final result was positive for Ehrlichia chaffeensis. She was started on doxycycline and after she clinically improved, she was discharged home on hospital day 4.

She completed a 12-day course of doxycycline, however she returned to the ED 8 days after discharge with complaints of generalized weakness and tingling sensation. Repeat COVID-19 PCR was ordered and it was again negative, 10 days after her first assessment. She was hyponatremic with a sodium of 125 and complained of diarrhea. Initial differential for her symptoms was thought to be related to her hyponatremia for which she was given normal saline and responded well to it. She had an unsteady gait and required a walker to ambulate. She stated her numbness on her right side improved after finishing the doxycycline, but she continued to have tingling in her feet. During this admission, she also had difficulty urinating and required straight Foley catheterization. Neurology and Infectious Disease were consulted. Infectious disease pursued stoolcultures for Campylobacter jejuni infection but the mechanism of action between these infections and ehrlichiosis is not different. The body will elicit an immune response which causes a cross-reaction thus attacking the peripheral nervous system. In addition, Lyme disease is a regional infection, predominantly seen in the Northeastern United States. Many patients in the Arkansas, Missouri, Kansas region are worked up for Lyme Disease if they have a suspicion for tick-borne disease but it is not as common compared to Ehrlichia or Rocky Mountain Spotted Fever.

There are disorders that may mimic GBS like tick-paralysis, HIV, and West Nile Virus which have similar clinical manifestations. Tick paralysis is induced by neurotoxin in the tick’s salivary glands. Symptoms include ascending paralysis which would occur over hours to days. Deep tendon reflexes would be diminished or absent and if the tick is not removed, the paralysis would continue and it will affect the cranial nerves [6]. GBS and tick-paralysis rarely presents with fever or pain. Both may affect the cranial nerves but GBS affects III, IV, VI, VII [6]. To distinguish them apart, pupillary dilation is seen with tick paralysis and the CSF would show pleocytosis in West Nile Virus or HIV rather than albuminocytologic dissociation [2]. With GBS, the onset of ascending paralysis is slower compared to tick-paralysis.
Although ehrlichiosis is not pathognomonic for Guillain-Barre, it is important to not rule out as a cause. With the COVID-19 outbreak, there have been reported cases of GBS induced by COVID. It too can cause an immune response to the nervous system. It is essential as in any other case that a proper history and physical is performed to elucidate the underlying cause. With her being new to Northwest Arkansas and her hiking history, it makes sense that she developed ehrlichia and less likely lyme disease. Her timeline of systems and lab findings did correlate with ehrlichia but also Guillain-barre, especially the CSF findings. So although it does not follow the classic “textbook” criteria, looking at the case as a whole makes the diagnosis. As clinicians across the nation deal with the current pandemic of the novel COVID-19 virus and learning the variable symptoms, there may be more cases of COVID-19 induced GBS or other AIDP disorders and may eventually be part of our regular textbook learning in the future.

Conflict of interest

The authors declare there is no conflict of interests regarding the publication of this paper.

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