

Critical and Difficult Aspects of Neuroinfectious Illnesses in the Practicing of Infectious Disease Physicians

Katie Bryan*

Department of Neurology, Columbia University Irving Medical Center, New York, United States

Abstract

The Centers for Disease Control and Prevention and the Infectious Disease Society launched the Emerging Infections Network (EIN), which allows infectious disease specialists to submit clinical case questions and is used to track novel infectious disorders. We discuss the prevalence and characteristics of neuroinfectious disease-related inquiries. The Critical and Difficult Aspects of Neuroinfectious Illnesses in the Practicing of Infectious Disease Physicians are discussed here.

Keywords: Neuroinfectious diseases; Neurology; Neurological system; Autoimmune

Introduction

Millions of individuals globally might be affected by infectious disorders on the neurological system. For instance, in 2016, 3 million individuals were diagnosed with meningitis, and 300,000 people passed away from the illness. The subject of neuroinfectious disorders is quickly developing as a result of the identification of novel infections, an increase in the use of immunosuppressive medication, better diagnostics, and current developments in infectious and autoimmune neurology.

A 1992 landmark study by the Institute of Medicine addressed the severe threat posed to civilization by new infectious diseases. In this study, infectious epidemics and pandemics were emphasised, and the infectious disease community was urged to take action to lessen this hazard. The Emerging Infections Network (EIN), a cooperative initiative between the Centers for Disease Control and Prevention (CDC) and the Infectious Diseases Society of America (IDSA) to detect and monitor novel infectious illnesses and syndromes, was established in 1997 as a response. It presently includes more than 2570 infectious disease doctors and members of the international and domestic public health community. Physicians who specialise in infectious diseases and members of the public health community are the two member types on the EIN listserv. All IDSA or Pediatric Infectious Diseases Society members who regularly visit patients are considered infectious diseases physicians [1]. These physician members work in a range of facilities, such as the Veterans' Affairs and Department of Defense hospital systems, city/county public hospitals, no-university teaching hospitals, community hospitals, and university hospitals. With a tiny number of foreign members, the majority of members practise in the United States. Members of the public health community include veterinarians, microbiologists, epidemiologists, and pharmacists who work for the federal, state, or local public health departments, such as the Centers for Disease Control and Prevention (CDC), National Institutes of Health (NIH), and US Food and Drug Administration (FDA). An important component of this network is a private, moderated listserv where doctors and public health professionals, such as researchers from the CDC, FDA, NIH, and the Centers for Disease Control and Prevention (CDC), can post queries about difficult clinical problems, from diagnostic conundrums to management queries. A moderator checks each message sent to the listserv for appropriateness, edits, and the removal of patient identities. Once a day (only Monday through Friday) via the listserv platform, posts are then compiled into a thread with the proper title and thread category (e.g., clinical, epi, infection

prevention, CDC update, FDA recall, etc.) and disclaimer appended [2]. Other EIN members provide solutions to the situation when the investigation is made public. In order to notify its members and monitor antimicrobial medications, the FDA's Center for Drug Evaluation and Research/Drug Shortage group joined the listserv recently. The average number of total different listserv conversations has been steady over the previous decade at roughly 200 questions every year, with a total number of answers for all subjects ranging from 760 to 976 per year. The frequency and nature of questions pertaining to instances of neuroinfectious illness discussed by infectious disease doctors on the EIN listserv are described in this paper. Our objectives were to characterise recurring themes and unresolved questions in order to outline future opportunities for research and education in this complex field, including the range of inquiries, the pathogens most frequently discussed, the populations most frequently affected, and finally the populations most frequently affected. The EIN listserv is a discussion platform for novel or atypical clinical occurrences as well as clinical aspects of emerging infectious diseases. Nevertheless, no information on neuroinfectious illnesses has been provided. The enormous number of clinical inquiries devoted to infections affecting the central and peripheral nervous systems is evidence of the significance and difficulty of neuroinfectious disorders in the practise of infectious disease specialists, according to our results. It is noteworthy that this data's analysis allows for the identification of research and educational goals that might help doctors in the diagnosis and treatment of these difficult illnesses [3].

First, the investigations show how difficult it is to diagnose CNS illnesses when there is immunosuppression. Immunosuppression-related neurological problems are more prevalent than ever. Up to 50% of patients with rheumatologic disorders have neurologic symptoms, and around one-third of patients with solid organ transplants experience neurologic problems. Many of these manifestations have

***Corresponding author:** Katie Bryan, Department of Neurology, Columbia University Irving Medical Center, New York, United States, E-mail: Katie_b@hotmail.com

Received: 24-Apr-2023, Manuscript No. JNID-23-91730; **Editor assigned:** 26-Apr-2023, PreQC No. JNID-23-91730(PQ); **Reviewed:** 10-May-2023, QC No. JNID-23-91730; **Revised:** 16-May-2023, Manuscript No. JNID-23-91730(R); **Published:** 23-May-2023, DOI: 10.4172/2314-7326.1000441

Citation: Bryan K (2023) Critical and Difficult Aspects of Neuroinfectious Illnesses in the Practicing of Infectious Disease Physicians. J Neuroinfect Dis 14: 441.

Copyright: © 2023 Bryan K. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

been linked to immunosuppression rather than the underlying disease. Because they may simultaneously be at risk for CNS infections caused by immunosuppressive medications, central nervous system (CNS) involvement of their malignancy, and, more recently, neurologic immune-related adverse events caused by novel immunotherapies, patients with malignancies are even more difficult to diagnose. This difficulty is anticipated to increase as the arsenal of immunomodulatory drugs expands. The difficulties of expanded pathogen testing with diagnostic panels targeted at neuroinfectious diseases is further highlighted by the EIN listserv. There were 2 enquiries linked to HHV6 before the approval of the Bio fire Film Array Meningitis Encephalitis PCR panel; both patients were tested for HHV6 because to their immunosuppressed condition and a strong clinical suspicion. Nevertheless, two enquiries that were submitted following the panel's approval concerned immunocompetent individuals in whom there was only a very slight clinical indication of HHV6 infection. Both of these instances were treated with antiviral medications after the panel's affirmative findings in these 2 cases were made public. Several follow-ups indicated that these two outcomes were probably clinically inconsequential and may have been connected to the incorporation of the HHV6 genome into the chromosome. A multiplex PCR panel's accessibility has enhanced pathogen detection, but there is also worry about overuse in individuals with low clinical suspicion for CNS infections. With the availability of more sophisticated diagnostics, such as next-generation sequencing, specialised training may be necessary to correctly interpret test results in the suitable clinical context [4].

Investigations involving individuals who had neurologic symptoms but no obvious viral aetiology were also of interest. The differential diagnosis took a wide variety of noninfectious neurologic aetiologies into account. The prevalence of autoimmune encephalitis, which currently accounts for 20% to 30% of all instances of encephalitis, is rising. This awareness was reflected in the fact that several enquiries suggested that probable differential diagnoses for anti-NMDA, post infectious, and para neoplastic encephalitis. Specialists in viral diseases may benefit from specialised training to recognise these processes given the wide variety of neurologic illnesses encountered. Neurology and neuroinfectious illnesses are not currently covered in the Accreditation Council for Graduate Medical Education (ACGME) curriculum requirements for infectious disease fellowships. The curriculum requirements for internal medicine residencies do call for exposure to neurology as part of the training, but they do not define the kind or duration of contact. Training in infectious illnesses would undoubtedly be advantageous for neurologists as well. Currently, the ACGME only demands "adequate exposure to faculty with special expertise in infectious illnesses" as part of the neurology residency programme; infectious disease-specific training is not necessary. Just 10 non-ACGME recognised fellowships specifically focused on neuroinfectious illnesses existed as of July 2019. Although there may be extra advantage in creating collaborative training opportunities for neurologists and infectious disease doctors, efforts are being made to standardise fellowship curriculum for neurologists desiring training in neuroinfectious illnesses [5-8]. Each inquiry's data was collected using an uniform database, which research team members had access to. We categorise enquiries based on whether the post requested assistance with a diagnostic approach, interpreting data, generating a differential diagnosis, or making management decisions. The diagnostic method was defined as the diagnostic technique used to detect a pathology, which included testing and imaging; result interpretation was defined as the understanding of a test or imaging result; and management option was defined as the treatment of a specific illness or condition.

A number of questions were split into two or more categories [9-15]. Furthermore, we recorded whether cases involved specific patient populations (such as immunocompromised patients, paediatric cases, and pregnant women) or known exposures (such as exposure to a specific animal species, patients with recent surgery/instrumentation, patients from developing countries, or those who had recently travelled abroad). We also collected pathogen kind (virus, bacterium, fungus, parasite, and unknown), pathogen specificity (if available), and final syndromic or specific diagnosis (if mentioned in the article). If the final diagnosis was not specified in the post or clinical findings were inadequate to establish a diagnosis, the inquiry was classified as unclear diagnosis. Moreover, based on post-survey responses, questions on whether clinical treatment had altered were categorised. Finally, the data was reviewed by the same study team members as well as two neuroinfectious disease-trained neurology attending doctors for recurring questions and themes.

1. Discussion

In the realm of infectious illnesses, this study highlights the major difficulties in diagnosing and treating neuroinfectious disorders. It also emphasises the use of carefully curated forums to direct the handling of challenging situations, particularly those that mirror infectious illnesses. Lastly, in order to address these challenges, the EIN listserv may help in recommending topics for research and training.

Conclusion

In conclusion, this retrospective study highlights the value of forums like the EIN in directing areas of priority and highlights the significant and growing challenges associated with the care of patients with neuroinfectious diseases in the practise of infectious disease physicians. It also identifies priorities for research and training in the field.

Acknowledgement

Not applicable.

Conflict of Interest

Author declares no conflict of interest.

References

1. John CC, Carabin H, Montano SM (2015) Global research priorities for infections that affect the nervous system. *Nature* 527:178-186.
2. Nath A (2017) Grand challenges in neuroinfectious diseases. *Front Neurol* 8:480.
3. Somand D, Meurer W (2009) Central nervous system infections. *Emerg Med Clin North Am* 27:89-100.
4. Wilson MR, Sample HA, Zorn KC, Arevalo S, Yu G, et al. (2019) Clinical met genomic sequencing for diagnosis of meningitis and encephalitis. *N Engl J Med* 380:2327-2340.
5. Johnson TP, Nath A (2018) Neurological syndromes driven by post infectious processes or unrecognized persistent infections. *Curr Opin Neurol* 31:318-324.
6. Glaser CAC, Glaser A, Honarmand S, Anderson L J, Schnurr D P, et al. (2006) Beyond viruses: clinical profiles and etiologies associated with encephalitis. *Clin Infect Dis* 43:1565 -1577.
7. Granerod J, Ambrose Helen E, Davies Nicholas WS, Clewley Jonathan P, Walsh Amanda L, et al. (2010) Causes of encephalitis and differences in their clinical presentations in England: a multicentre, population-based prospective study. *Lancet Infect Dis* 10:835-844.
8. Granerod J, Simon Cousen, Nicholas WS, Davies, Natasha S, et al. (2013)

- New estimates of incidence of encephalitis in England. *Emerg Infect Dis* 19:9.
9. Jmor F, Hedley CA Emsley, Marc Fischer, Tom Solomon, Penny Lewthwaite (2008) The incidence of acute encephalitis syndrome in Western industrialised and tropical countries. *Virol J* 5:134.
 10. Ho Dang Trung N, Nghia Ho Dang Trung, Tu Le Thi Phuong, Marcel Wolbers, Hoang Nguyen Van Minh, et al. (2012) Aetiologies of central nervous system infection in Viet Nam: a prospective provincial hospital-based descriptive surveillance study. *PLoS One* 7:37825.
 11. Giri A, Amit A, Samir K, Abhilasha K, Sabina D, et al. (2013) Aetiologies of central nervous system infections in adults in Kathmandu, Nepal: a prospective hospital-based study. *Sci Rep* 3:2382.
 12. Bastos MS, Natália L, Felipe GN, Rossicléia LM, Wornei S Brag, et al. (2014) Detection of Herpesvirus, Enterovirus, and Arbovirus infection in patients with suspected central nervous system viral infection in the Western Brazilian Amazon. *J Med Virol* 86: 1522-1527.
 13. Srey VH, Helene S, Sivuth Ong, Mony M, Chantham Y, et al. (2002) Etiology of encephalitis syndrome among hospitalized children and adults in Takeo, Cambodia, 1999-2000. *Am J Trop Med Hyg* 66:200-207.
 14. Weber T, Frye S , Bodemer M , Otto M , Luke W, et al. (1996) Clinical implications of nucleic acid amplification methods for the diagnosis of viral infections of the nervous system. *J Neurovirol* 2:175-190.
 15. Rathore SK, Dwibedi B , Kar Sk, Dixit S, Sabat J, et al. (2014) Viral aetiology and clinico-epidemiological features of acute encephalitis syndrome in eastern India. *Epidemiol Infect* 142:2512-2514.