

Analysis of Etiologies of Aseptic Meningitis Within a Nation-Wide Hospital Network

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Introduction

Aseptic meningitis can be caused by an array of microorganisms, both bacterial and non-bacterial, as well as non-infectious conditions. There are limited diagnostic tools for diagnosing certain types of aseptic meningitis, therefore knowing the differential causes of aseptic meningitis, and their relative percentages may assist in diagnosis. Review of the literature reveals that there are no recent studies of etiologies of aseptic meningitis in the United States (US).

Methods

Data was collected from January 2016 to December 2019 on all patients diagnosed with meningitis. CSF PCR studies, and CSF antibody tests were then selected for inclusion

Organism	Number of Tests Performed	Positive Tests	Positive Rate
Enterovirus	639	62	9.7%
Varicella zoster	672	36	5.4%
Herpes simplex virus 2	989	49	5.0%
West Nile Virus	848	38	4.5%
Cryptococcus neoformans	1298	27	2.1%

Table 1: Percentage of positive CSF tests (positive tests/tests ordered)

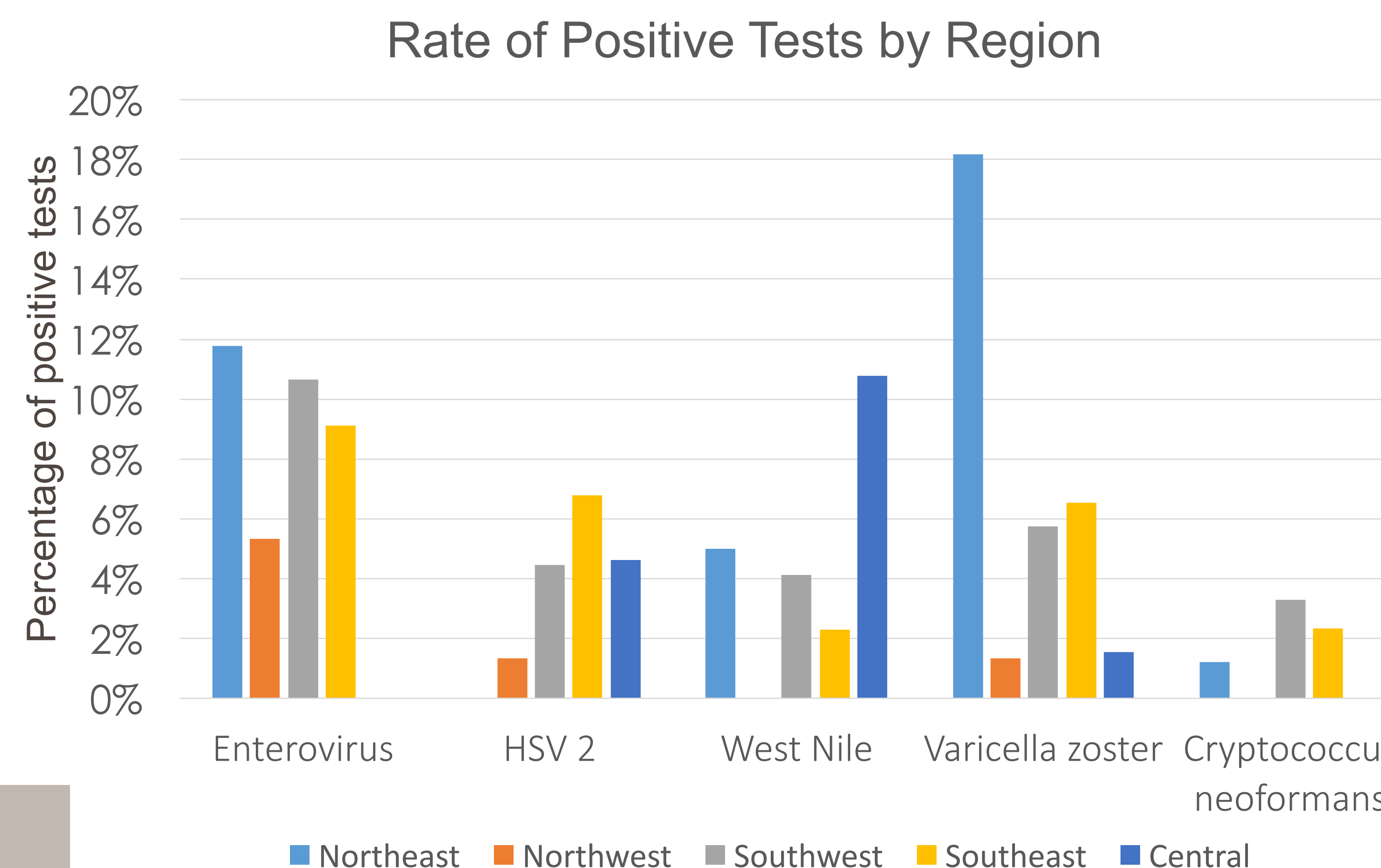


Figure 1: Percentage of positive CSF tests in each region

Organism	HIV	Transplant
Cryptococcus neoformans	8	
Epstein Barr virus	4	1
BK virus	1	
Toxoplasmosis	2	
Varicella zoster	4	1

Table 2: Lists the number of HIV patients and transplant patients that had positive CSF PCR/serologies

Results

Total number of encounters were 3,149 hospitalizations. Total number of individual labs analyzed was 10,613, and of these 262 etiologies were identified. 23.6% (62) of cases were due to enterovirus, 18.7% (49) due to HSV 2, 14.5% (38) due to West Nile virus, 13.7% (36) due to VZV, 10.5% (27) due to Cryptococcus. Additionally, we analyzed the rate of positive test results by region. Nationally, 9.7% of tests ordered for enterovirus were positive. In contrast, 0.5% of tests ordered for HSV 1 were positive.

Conclusion

Approximately 40% of aseptic meningitis population had treatable etiologies. A third of the Cryptococcus meningitis population had HIV. Furthermore, enteroviruses had the majority of cases within the US, which are similar to studies done in other parts of the world.