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THE BIOFIRE® FILMARRAY® MENINGITIS/ENCEPHALITIS (ME) PANEL

INTRODUCTION

Central nervous system (CNS) infections have a high morbidity and mortality. Early detection of the offending pathogen and directed therapy is of paramount importance to improve patient outcomes and guide infection control measures. Molecular diagnostic tests have dramatically impacted the diagnosis and management of CNS infections, as these are more rapid and sensitive than conventional culture and antigen detection methods.

The BioFire Meningitis/Encephalitis panel offers a syndromic test approach, detecting 14 of the most common bacterial, viral and fungal causes of CNS infections within a rapid turnaround time (Table 1).

TABLE 1: SUMMARY OF TEST CHARACTERISTICS[1,2]

Targets	Bacteria: • *Escherichia coli* K1 • *Haemophilus influenzae* • *Listeria monocytogenes* • *Neisseria meningitidis* • *Streptococcus agalactiae* (Group B streptococcus) • *Streptococcus pneumoniae* Viruses: • Herpes simplex virus 1 (HSV-1) • Herpes simplex virus 2 (HSV-2) • Varicella zoster virus (VZV) • Cytomegalovirus (CMV) • Human herpesvirus 6 (HHV-6) • Enterovirus • Human parechovirus Yeast: • *Cryptococcus (C. neoformans/C. gattii)*
Indications	Clinical suspicion of meningitis or encephalitis
Specimen type	Cerebrospinal fluid (CSF)
Advantages	• Short turnaround time • Early initiation of targeted therapy • Implementation of appropriate infection control measures • May foster antimicrobial stewardship • Remains positive even after the administration of antibiotics
Limitations	• False positives • False negatives • Unclear significance of a positive result of some of the viral targets such as CMV and HHV-6 • Lack of reporting on antimicrobial susceptibility
Mnemonic	**CSFPCR**
Turnaround time	Six hours (from being received in the laboratory performing the test)

Contact your local Ampath representative should you require information on the cost and medical aid reimbursement criteria for this panel.

False positive results, in particular for *Streptococcus pneumoniae* and *Haemophilus influenzae,* have been reported, most likely derived from the nasopharyngeal flora of health care workers or laboratory personnel. This highlights the importance of sterile techniques and the use of appropriate personal protective equipment, including a surgical mask, when collecting and processing these CSF specimens.

The interpretation of a positive CMV and HHV-6 is complicated by the fact that these viruses may develop latency in brain tissue (HHV-6) and leukocytes (CMV). A positive result may thus not correlate with active disease and requires interpretation in conjunction with the clinical picture and underlying immune status of the patient. Viral quantification in the CSF may be of value in these cases.

False negative results may occur due to the presence of inhibitors in the sample, pathogens being present in low concentrations (below the limit of detection of the assay), or the pathogen not being included as a target in the panel or test used. It is therefore important to consider and test for other pathogens in the appropriate patient, e.g. *Mycobacterium tuberculosis* complex, arboviruses, etc. It is especially important in immunocompromised patients to broaden the differential diagnosis and test appropriately. This panel is not appropriate in patients with health care associated-ventriculitis or meningitis.

In conclusion, the BioFire Meningitis/Encephalitis panel can be a very useful tool for the rapid detection of pathogens in patients suspected of having community-acquired meningitis or encephalitis. However, the CSF cell count, biochemistry, microscopy, culture and sensitivity (MCS), and cryptococcal antigen should still be requested as routine. In addition, in a patient where encephalitis is strongly suspected clinically and the HSV is negative on the BioFire ME panel, acyclovir therapy should be continued and a repeat HSV PCR requested after 72 hours.

REFERENCES

1. Lindström J, Elfving K, Lindh M, Westin J, Studahl M. Assessment of the FilmArray ME panel in 4199 consecutively tested cerebrospinal fluid samples. Clinical Microbiology and Infection. 1 January 2022; 28(1): 79–84.
2. Nguyen S, Same R. No small thing: clinical implications of rapid syndromic panel-based diagnostic testing in children. Clinical Microbiology Newsletter. 1 September 2021; 43(17):143–54.