

Original Article

Utility and clinical relevance of multiplex PCR panels for diagnosis of central nervous system infections

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Background and objectives: Multiplex molecular panels for meningitis and encephalitis (M&E) allow rapid detection of multiple pathogens directly from cerebrospinal fluid (CSF) samples. Although their use is expanding, real-world data on their diagnostic yield and clinical relevance remain limited. This study aimed to assess the diagnostic performance, clinical relevance, and usage patterns of multiplex PCR panels for diagnosis of meningitis and encephalitis over a five-year period in a tertiary care hospital.

Methods: We retrospectively analysed CSF samples tested with multiplex M&E panels between January 2019 and December 2023. Clinical data, test results, and subsequent clinical actions were reviewed. Only the first positive sample per patient was included. Clinical relevance was defined as a documented change in diagnosis or treatment attributed to the panel result.

Results: Out of 1,491 CSF samples, 122 (8.2%) were positive for at least one pathogen. Viral agents accounted for most detections, with human herpesvirus-6 (n=34, 27.9%), enterovirus (n=14, 11.5%), and herpes simplex virus type-1 (n=10, 8.2%) being most common. *Streptococcus pneumoniae* (n=13, 10.6%) was the leading bacterial pathogen. Co-detections were observed in (n=18, 14.7%) of positive cases. Only 41% (n=50) of positive results were associated with a clinically relevant action. Repeat testing after an initial negative result had low additional diagnostic yield (n=7, 7.2%), and several tests were ordered for conditions not covered by the panels.

Interpretation and conclusions: Multiplex PCR panels offer rapid pathogen detection in CNS infections, but inappropriate test utilisation and limited follow up may reduce their clinical impact. Clearer testing criteria and clinician awareness regarding panel contents are essential to improve diagnostic efficiency.

Keywords Cerebrospinal fluid; Clinical relevance; Diagnostic testing; Encephalitis; Meningitis; Multiplex PCR