Association between Cerebrospinal Fluid Pleocytosis and Enteroviral Meningitis

Mulford et al. (5) recently investigated the correlation between cerebrospinal fluid (CSF) leukocyte count and enteroviral reverse transcription (RT)-PCR results in cases of suspected meningitis. They found that CSF pleocytosis was absent in 30% of infants aged ≤2 months with a positive enteroviral RT-PCR result, compared with 2% of patients aged 2 months to 18 years and 0% of patients aged >18 years. In their study, pleocytosis was defined as a CSF white cell count of >22 cells/mm³ for neonates, >15 cells/mm³ for infants aged 1 to 2 months, and >5 cells/mm³ for patients aged >2 months.

We recorded similar findings in a retrospective review of all patients with PCR-confirmed enteroviral meningitis who were admitted to Christchurch Hospital, Christchurch, New Zealand, between January 2001 and January 2003, using a previously published RT-PCR assay (7). In our study population (75 patients aged between 3 weeks and 49 years), the proportion of patients without CSF pleocytosis was 30% in infants aged ≤2 months, compared with 13% for patients aged 2 months to 18 years, and 4% for patients aged >18 years. Pleocytosis in our study was defined as ≥30 white cells/mm³ for infants less than 1 month of age and as ≥5 white cells/mm³ for all other patients, and all of our cases had clinical features of meningitis with no Gram stain or culture evidence of bacterial infection.

It is interesting that all patients without CSF pleocytosis had similar clinical manifestations and presented within the same time frame (48 h of symptom onset) as those patients with a raised white cell count in their CSF. Similar findings have also been recorded by other investigators (2, 3, 4).

Mulford et al. (5) also looked at the diagnostic value of CSF protein levels. They found that this was not a good predictor of enteroviral central nervous system infection, with low sensitivity and specificity for diagnosis in all age groups, whether used by itself or when interpreted in conjunction with the CSF white cell count. While our study looked only at enterovirus RT-PCR-positive patients, in 61% of our cases, patients had both elevated CSF protein levels and pleocytosis (in our laboratory, CSF protein levels of >0.4 g/liter are regarded as abnormal). Of interest, as has been previously observed (1–4, 6), we also found that a polymorphonuclear cell response predominated in just over half of our patients with CSF pleocytosis, despite the confirmed viral etiology.

In summary, enteroviral meningitis frequently occurs in the absence of either CSF pleocytosis or elevated protein levels, especially in young infants. Our findings reinforce earlier observations that the CSF profile alone cannot reliably differentiate enteroviral and bacterial meningitis. However, in areas where there is a high prevalence of bacterial meningitis, the value of performing an enteroviral PCR as an additional rapid diagnostic test should be emphasized, regardless of the CSF profile. Should bacterial investigations then prove negative, a positive enteroviral diagnosis can help in the rationalization of antibiotic therapy and shorten hospital stays. The recent guidelines for management of bacterial meningitis from the Infectious Diseases Society of America support this practice (8).