

## Cerebrospinal Fluid C-Reactive Protein in Meningitis

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Bacterial meningitis is a common clinical problem during infancy and childhood. Delay in distinguishing bacterial from viral meningitis or meningoencephalitis may have irrevocable consequences. A typical case of pyogenic meningitis without prior antibiotics may not create any diagnostic problem, but prior treatment with inappropriate and inadequate antibiotics may cause sufficient alteration in biochemistry and cytology of cerebrospinal fluid (CSF) and organisms may not get isolated from blood or CSF(1). Moreover cerebrospinal fluid culture for pyogenic organisms are positive in only 30-60% of cases according to various Indian workers(2). Hence a quick and reliable method is required for bedside diagnosis.

C-reactive protein (CRP), an acute phase serum protein is a globulin formed by the body in response to various non-specific stimuli such as infection, tissue necrosis or neoplasm. Micro-

bial infection stimulates hepatocytes in liver to produce CRP. CSF-CRP has been reported to be one of the most reliable and early indices to differentiate bacterial from non-bacterial meningitis(3,4). It is also useful in monitoring the clinical course of the meningitis(5). The present study was undertaken to evaluate the diagnostic significance of CRP in CSF as an early indicator in the differentiation of bacterial from non bacterial meningitis.

### Subjects and Methods

Fifty children in the age group of 1 month to 10 years admitted to the Pediatrics Department of Medical College, Amritsar between July 1992 to May 1993 with clinical diagnosis of meningitis were, included in the study. These patients were further divided into two groups of 25 each, *i.e.*, pyogenic and aseptic meningitis according to clinical, biochemical, cytological, bacteriological and serological study of CSF. All specimens for investigations were collected before starting antibiotics. The investigation with each case included total leucocyte count, differential leucocyte count, blood culture, blood sugar, CSF for Gram staining, culture, cytology, biochemistry and CSF serology for C-reactive protein. CSF sample was tested for CRP by simple antigen antibody precipitation test, *i.e.*, latex slide agglutination method with the help of commercially available kit supplied by Span diagnostics. Presence of agglutination indicates CSF-CRP concentration of more than 6 µg/ml and was considered positive. Values of less than 6 µg/ml were considered negative.

### Results

Of the 25 cases of pyogenic meningi-

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tis, CSF Gram staining was positive in 6 (24%). CSF culture was positive in 4 cases (16%). Organisms isolated in CSF culture were; *Klebsiella* species in 2, *H. influenzae* in 1 and *Streptococcus pneumoniae* in 1. Of 25 cases of bacterial meningitis, there was increased CSF leucocytic count with predominance of polymorphs in 18 (72%), predominance of lymphocytes in 5 (20%) and absent pleocytosis in 2 (8%) cases. In these 7 cases of lymphocytic response and absent pleocytosis, CSF culture was positive in 3 subjects and Gram staining in remaining 4 patients.

CRP in CSF was positive in 21 (84%) cases of pyogenic meningitis, whereas it was negative in all subjects with aseptic meningitis. No correlation was found between CSF-CRP positivity and total and differential cell count in CSF in cases of pyogenic meningitis.

#### Discussion

In the present study, CSF-CRP was positive in 21 out of 25 cases of pyogenic meningitis giving it a sensitivity rate of 84%. In aseptic meningitis, CSF-CRP agglutination was negative in all the cases giving it a specificity of 100%. So Hie CSF-CRP values in patients with pyogenic meningitis had a sensitivity of 84%, specificity of 100% and a positive predictive value of 100%. Similar findings have been reported by other workers(6-9).

It is concluded that CRP in CSF is a useful additional test for diagnosis of pyogenic meningitis. This is true even with prior antibiotic therapy. Thus it is a useful test in diagnosis of unmodified and partially treated pyogenic meningitis where CSF biochemical and cytological values may be equivocal.

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