The present randomised prospective study on the diagnostic aspects of childhood neurotuberculosis (Tuberculous meningitis) was undertaken using *M. tuberculosis* specific 17 KDa antigen and a polyclonal antibody reactive to 17 KDa antigen for concurrent ELISA tests in CSF.

**EVALUATION OF SPECIFICITY**

Among ninety (90) control children admitted for study, thirty (30) were culture proven bacterial meningitis (12 *S. pneumoniae* + 18 *H. influenzae* cases) and the remaining sixty (60) were children with seizure disorders having normal CSF. Three (3) CSF from children with pneumococcal meningitis showed positivity only in 17 KDa antibody assay but not in antigen assay. The other *S. pneumoniae* (9) and *H. influenzae* (18) meningitis cases showed no positivity in either antigen or antibody assay. The normal CSF derived from children with seizure disorder also showed no positivity in either antigen or antibody assay. The specificity of 17 KDa antigen, antibody system was derived to be 97% (87 of 90 negative).
TB MENINGITIS AND ASSAY POSITIVITY

Among ninety-one (91) children admitted as TB meningitis, thirty-one (31) were positive for M. tuberculosis on CSF culture (Definite or Proven group) and the remaining sixty (60) negative in culture (Suspect group). The 17 KDa antigen, antibody assays were positive for either antigen or antibody or both in all the proven cases, proving a sensitivity of 100% detection. In the suspect group forty-five (45) were found to be positive for either antigen or antibody or both. The remaining fifteen (15) were completely negative. Analysis of CSF cell count responses and CSF/Blood sugar ratio pointed that these 15 assay negative cases were not identical to TBM group. It was thus clearly shown that these 15 cases were true negatives and were wrongly diagnosed as TBM.

The proven and assay positive suspect TBM were similar in their CSF cell count responses and CSF/Blood sugar ratio. There was also no significant (F=2.35, P = 0.13) difference between these groups for 17 KDa antigen values in CSF reinforcing their similarity. The concurrent assay was thus able to detect 75% of suspect TBM which was not possible by culture. Since all the culture positive cases were also assay positive, it can be said that positivity in assay is equivalent to culture positivity.
STAGE OF TBM AND ASSAY POSITIVITY

The stage specific distribution of cases with respect to 17 KDa antigen positivity showed presence of antigen alone in majority of children with Stage I disease. This implies that the diagnosis of TBM by this method can be made at an early stage of TBM. With respect to antibody positivity, the later Stages II and III showed higher incidence indicating its usefulness for prognosis. A significant negative correlation \( r = -0.58, P = 0.0007 \) was obtained in the proven group between 17 KDa antigen, and antibody OD values in the CSF, indicating the antigen, antibody interactions in TB meningitis process within the CSF. Presence of Immune complexes in the CSF was supported by the presence of antigen alone in Stage I cases while none of Stage III cases had exclusive antigen in CSF. Immune complexes were fractionated from among CSF of proven TBM cases. Immune complexes examined contained both 17 KDa antigen, antibody.

TB MENINGITIS AND CONVENTIONAL PARAMETERS

Eight-five percent of children with TBM were below five years of age (Mean age 41.4 ± 25.9 months). Two-thirds of them had a positive adult tuberculous contact and 50% did not have BCG vaccination. Malnutrition was evident in 57% of these children. Convulsions was noted frequently (60%) and choroidal
tubercle was seen in only one child. Clinical symptoms and signs provided no conclusive evidence to indicate TBM or not. The number of drop-outs on follow up was high (68%). Hence no valid comparison of recovery pattern between TBM and no TBM in suspect group could be done.

Thirty-eight percent of children with TBM had negative tuberculin test and normal chest x-ray was seen in 36% of TBM cases. These two parameters were helpful only when positive. CSF sugar/Blood sugar ratio was more useful as a diagnostic parameter than CSF protein levels. CSF cellular response in TBM ranged between 10-1000/cu.mm. and majority (70%) had cell counts ranging 50-500/cu.mm. Mononuclear cells in varying proportions (10-40%) were seen uniformly in the CSF of TBM children along with lymphocytes and infrequently with polymorphs. Normal CSF was seen in only one case of TBM.

**COMPARISON OF DIAGNOSTIC PARAMETERS**

CSF cytology, CSF/Blood sugar ratio, protein levels were dominant conventional parameters to indicate TBM. CSF cytology alone differentiated the cases with no TBM in the suspect group in a manner similar to 17 KDa antigen, antibody detection. 17 KDA antigen, antibody test reinforced the conclusions one may arrive through cytology parameter.
Sensitivity 84% and specificity 97% levels for concurrent 17 KDa antigen, antibody assay and the levels for cytology (Sensitivity 81% and Specificity 100%) indicate that they are parameters of equal importance (Efficiency 90% for both). But the presence of 17 KDa antigen alone in CSF of majority of TBM cases in Stage I indicates that it is a more useful marker than cytology and other parameters, especially for diagnosis of TBM at an early stage in children.