is likely that the protozoan parasites were the cause of diarrhoea in these children. Concomitant presence of Rota antigen in a single sample possibly points to a mixed infection. The present study, although conducted in a limited sample size, highlights the importance of Cryptosporidium as a cause of acute diarrhoea in children. Hospital records show that the use of antibiotics is almost an integral part of the management of diarrhoea. Cryptosporidiosis is self-limiting with supportive therapy and it is therefore suggested that the introduction of a simple technique as part of routine diagnostics in all clinical laboratories contribute to avoiding misuse of antibiotics. Moreover, since a child with cryptosporidiosis could be a source of hospital-acquired infection, a specific diagnosis is important for the prevention of its spread.

M. SHARIFF[a], M. DEB[a], R. SINGH[b], *and* K. SINGH[b]
Departments of [a] Microbiology and [b] Pediatrics, B.P. Koirala Institute of Health Sciences, Dharan, Nepal

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Isotype Specific Antibody Response in Childhood Tuberculosis Against Purified 38 kDa Antigen of Mycobacterium tuberculosis

Standardized, purified mycobacterial antigens with species specificity and strong immunogenicity are urgently needed for rapid diagnosis. Our study aimed to evaluate the diagnostic potential for a 38 kDa, secreted antigen of *Mycobacterium tuberculosis,* purified in our laboratory, in cases of childhood tuberculosis.

The study population consisted of 87 children, below the age of 15 years. Childhood tuberculosis (CTB) patients included both pulmonary and extrapulmonary cases (n = 26). Out of the 26 cases, nine were either smear and/or culture positive, and three had TB lymphadenititis confirmed by bacteriology or histopathology. Others were clinically diagnosed as having extrapulmonary forms of tuberculosis and in them, the tuberculous etiology was confirmed by clinical improvement with anti-tuberculous therapy. Childhood normals (CNHS) (n = 61) included normal, healthy schoolchildren.

The 38 kDa antigen was purified from *M. tuberculosis* culture filtrate as described previously.[1] IgG, IgA and IgM antibody levels against the 38 kDa were estimated in sera from childhood tuberculosis patients and normals, as described.[1]

Among the 26 cases of childhood tuberculosis, 18 were positive for IgG, nine positive for IgA and five positive for IgM. Combination of all the three isotypes yielded 21 positives out of 26 cases (sensitivity = 80.76 per cent). Out of 61 controls, there were no positives in IgG and IgM and only one positive for IgA (specificity = 98.37 per cent). The data is presented in Table 1.

Both smear positive cases and four out of seven culture positive cases, were positive for anti-38 kDa antibody. In addition, two out of three cases who had lymphadenitis, with positive biopsy but negative bacteriology, were also positive for the antibody. Thirteen other cases, who were clinically categorized without bacteriological evidence, were also confirmed by the ELISA.

Limited studies have been done with reference to the semipurified and purified antigens on serodiagnosis among children.[2–4] In the present study using 38 kDa antigen purified by isoelectric focusing, we

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Correspondence: Dr Alamelu Raja, Tuberculosis Research Centre (ICMR), Mayor V. R. Ramanathan Road, Chetput, Chennai–600 031, India. Tel. 91 044 826 5425; Fax 91 044 826 2137. E-mail <trcicmr@md3.vsnl.net.in>.

TABLE 1
ELISA Positivity of CTB and CNHS for 38kDa antigen

Category	Total No.	IgG		IgG + IgM		IgG + IgA + IgM	
		No.	%+ve	No.	%+ve	No.	% +ve
CTB	26	18	69.23	20	76.92	21	80.76
CNHS	61	0	0	0	0	1	1.63

Sensitivity 80.76%. Specificity 98.37%.

were able to obtain a sensitivity of 80.76 per cent with a specificity of 98.37 per cent by a combination of all three isotypes. It is indeed useful, since some sera that were negative for IgG were making IgA and IgM antibodies. Generally, IgM is supposed to indicate primary immune response, which is very relevant in progressive primary tuberculosis, such as in childhood.

The 38 kDa isolated by different methods have shown varying outcome. Using Antigen 5 (38 kDa), Alde, *et al*.[5], obtained a sensitivity of 85 per cent with 100 per cent specificity in the bacteriologically confirmed cases of tuberculous children; but the number of control subjects was low (n = 19) in that study. In a study by Swaminathan, *et al*.,[4] using the 38 kDa kit (Pathozyme-TB complex kit), the authors obtained a sensitivity of 45 per cent with 73 per cent specificity by measuring IgG antibody levels.

Fifteen out of 17 cases who did not have bacteriological evidence could be correctly diagnosed, by anti-38 kDa antibody. This result is a good improvement over the results of A60, obtained in another Indian study, where positivity in sputum negative probable cases was only 62.7 per cent.[3] Thus the 38 kDa antigen purified in our laboratory by isoelectric focusing, proves to be an improved serodiagnostic agent for childhood tuberculosis.

B. RAMALINGAM[a], K. R. UMA DEVI[a], SOUMYA SWAMINATHAN,[b] *and* ALAMELU RAJA
Departments of [a]*Immunology and* [b]*HIV/AIDS, Tuberculosis Research Centre (ICMR), Chennai, India*

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