

CUTANEOUS TUBERCULOSIS IN CHILDREN A CLINICO-MICROBIOLOGICAL STUDY

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Twenty untreated patients of cutaneous tuberculosis varying from 2-12 years of age were included in the study. The incidence of cutaneous tuberculosis amongst the paediatric dermatological patients was 0.36%. Of these, 10 had lupus vulgaris, 8 had scrofuloderma, 3 had tuberculosis verrucosa cutis and 2 had lichen scrofulosorum. Three patients concomitantly had more than one type of skin tuberculosis. Systemic involvement in the form of pulmonary and osseous system was seen in 45% cases. The tuberculin test was uniformly positive. Affirmative clinico-histopathological correlation was observed in all the patients. However, acid fast bacilli could not be demonstrated in any of the sections. Only one patient (scrofuloderma) exhibited AFB on smear examination. In the same patient, M. tuberculosis could be cultured on L-J medium. However, Elisa for IgM antibodies in serum was positive in 12 (60%) cases. Need for newer techniques in the diagnosis is emphasised.

Key Words: Cutaneous tuberculosis, Paediatric, ELISA test

Introduction

Tuberculosis continues to be a major public health problem in the world today, especially in the developing countries like India. Recently there has been a resurgence of the disease entity even in developed countries because of the emergence of HIV infection.¹ Cutaneous tuberculosis has a varied clinical presentation determined by the pathogenicity of the infecting mycobacterial strain, route of infection as well as status of cellular immunity of the host.² During the past decade non-tuberculosis mycobacteria have increasingly emerged as pathogens in infections involving the skin.³ The routine culture modalities and detection of mycobacteria have undergone a number of dramatic changes during the last two decades including the use of saline extract of tissue mixed with non-toxic aluminium powder. Serodiagnosis for rapid detection of tubercular infection using ELISA method is being increasingly used.⁴ Newer techniques like DNA probe

identification and polymerase chain reaction are also being employed for a definitive diagnosis.⁵

The paucity of studies incorporating the use of newer diagnostic techniques in cutaneous tuberculosis in childhood group, prompted us to undertake the study.

Materials and Methods

Twenty consecutive fresh and untreated cases of cutaneous tuberculosis, afflicting 2-12 years of age group, attending the Dermatology OPD of Kalawati Saran Children's Hospital, from April 1995 to March 1996, constituted the subject material for this study. Routine baseline haematological, biochemical and urine investigations were carried out in all the cases. All the patients were screened for HIV infection by ELISA test. In cases having signs and symptoms of pulmonary involvement, either a sputum specimen or gastric lavage aspirate was obtained, which was utilised for smear examination for the detection of M. tuberculosis and also for inoculation on the Lowenstein-Jensen medium. Skiagram of the chest and other anatomical sites like bones and joints was done as and when indicated. The tuberculin sensitivity was elicited by performing the Mantoux test using 1 TU of PPD.

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Depending upon the type of the lesion, the exudate/slit smear/contact smear from the biopsy material were prepared and stained by Ziehl-Neelsen method and Auramine O fluorescence acid fast stain for demonstration of mycobacteria. The skin biopsy tissue specimen was obtained from the advancing edge of the lesion or the edge of the sinus tract. It was divided into two portions, one part processed for histopathological evaluation and the other portion used for microscopy and inoculation for the isolation of mycobacteria. The isolates were identified biochemically by using standard methods.⁶ Antimycobacterial IgM antibody, formed against the A 60 antigen complex found in the cytosol of both typical and atypical mycobacteria, was detected in the serum using an immuno-enzymatic test (Andaelisa mycobacteria IgM test, Anda Biologicals, Strasbourg, France).

The various observations pertaining to morphological features, tuberculin test, radiological data and the microbiological results were pooled.

Results

Of the total 5569 paediatric patients, 20 cases were found to be of skin tuberculosis, thus giving an incidence of 0.36%.

Majority of the cases, 10 (50%) belonged to the age group of 9-12 years, 6 (30%) in 5-8 years and 4 (20%) were below the age group of 4 years. The girls were found to be more commonly affected as compared to the boys with the sex ratio being 1:1.85. Intra-familial source of infection was observed in 7 cases, extra-familial in one, while in rest no source of infection could be elicited. BCG vaccination had been received by 11 children while the rest were non-immunised. Lupus vulgaris was the commonest type of skin tuberculosis, observed in 50% of the cases followed by scrofuloderma in 40%, tuberculosis verrucosa cutis in 15% and lichen scrofulosorum in 10% cases. One patient had concomitant lupus vulgaris and scrofuloderma. Of the 2 cases of lichen scrofulosorum, one each had co-existing tuberculosis verrucosa cutis and scrofuloderma respectively.

Lower limb was the most common site of involvement seen in 55% cases, followed by upper limb, trunk, neck and buttocks with face the least commonly involved site.

Significant lymph node enlargement was seen in 16 cases. Systemic involvement in the form of pulmonary and bony involvement was seen in 9 cases (Table I). The Mantoux test was positive in all the cases. Only one patient, a cases of scrofuloderma exhibited acid fast bacilli on smear examination, both on Ziehl-Neelsen and fluorescent staining. Affirmative clinicohistopathological correlation was observed in all the patients. However, no AFB could be detected even on serial sectioning of the tissue specimens in any patient. M.tuberculosis could be cultured from only one case, that of scrofuloderma, identified by its growth characteristics on L-J medium and subsequently confirmed by biochemical tests. However, ELISA for detection of IgM antibodies in serum against mycobacterial antigen A60 was positive in 12 (60%) cases. Of these, majority i.e.7 were cases of scrofuloderma, 4 of lupus vulgaris and one of tuberculosis verrucosa cutis. One case of lichen scrofulosorum showing a positive ELISA test for the detection of HIV was negative in all the 20 cases.

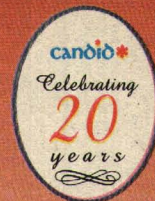
Table I. Associated systemic features

Systemic features	No.of cases	Percentage
Fever	7	35
Malaise	6	30
Cough	1	5
Loss of weight	6	30
Loss of appetite	3	15
Lymph node involvement	16	80
Bone and joint involvement	5	25

Discussion

Smears either from the exudate or from the tissue specimen for the demonstration of mycobacteria can provide the first confirmation of a clinical diagnosis. Acid fast bacilli may be observed in some of the clinical

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types of skin tuberculosis, especially tuberculous chancre and scrofuloderma. However, in one recent study, authors were not able to detect any bacillus in skin smears in their series of 100 patients. Fluorescent staining for detection of the bacilli in smears has not proved much helpful either. In the same study, culture results *on L-J media too were uniformly negative in all the cases. In our study also only one case was smear positive and *M. tuberculosis* could be isolated on the culture media in the same patient. Efforts to culture the organism was negative in rest 19 cases. In the last couple of decades newer techniques have emerged for the rapid detection, isolation and identification of mycobacteria. These include fluorescent microscopy⁷ DNA probe identification,⁷ high performance liquid chromatography,⁸ polymerase chain reaction,⁹ serological diagnosis¹⁰ and DNA finger printing.¹¹ Newer methods are gradually being incorporated into the testing schedules which will revolutionise the early and/or definitive diagnosis of tuberculosis in future. However, these tests, apart from being expensive, need well equipped laboratories. Attempts to use ELISA for sero-diagnosis of tuberculosis have produced encouraging results.¹² An A 60 based ELISA test for tuberculosis has been developed, whose sensitivity, specificity and positive predictive value has been calculated as 76%, 98% and 95% respectively.¹²

The present study confirms with the opinion of Michelson,¹³ Pandhi et al¹⁴ and Ramesh et al,⁴ that the definitive diagnosis of skin tuberculosis employing smear and culture examination for demonstration of acid fast bacilli though useful, is tedious and unrewarding. In the present study, although a good clinico-histopathological correlation was observed in all the cases, supported by a positive Matoux test, yet smear examination with both Ziehl-Neelsen and fluorescent staining, as well as culture on Lowenstein-Jensen media were unsuccessful in 95% cases. Nonetheless ELISA test for detection of IgM antibodies in the serum against mycobacterial antigen A 60 proved more promising and was positive in 12 cases.

The present study once again brings the focus on the old query, do the absence of AFB on smear as well as the culture modalities reflect positively on the studied opinion of many authors including ourselves that the lesions of cutaneous tuberculosis represent a reaction pattern to antigenic remnants of the bacilli seeded there during the initial haematogenous spread of the infection? Are the bacilli subsequently destroyed by the immune response of the host or at best made attenuated or non-viable? However, the infective origin of the skin lesions is positive tuberculin reaction in the patients. More studies are thus imperative to arrive at a consensus.

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