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DIAGNOSIS OF CHILDHOOD LEPROSY-CHANGING TRENDS

SYNOPSIS

Leprosy, a chronic infectious disease caused by mycobacterium leprae, mainly involves the skin, respiratory mucosa and the peripheral nervous system. Leprosy continues to remain a public health problem. In 2011, the global new case detection was 219075 and in India it was 127295. Thus, India accounts for > 58% of total cases of leprosy worldwide. Pediatric leprosy accounts for around 10% of the total disease burden.

The main source of transmission of leprosy is from the untreated lepromatous patients and the most common route is through the nasal secretions. From the nasal mucosa, the bacteria spreads by hematogenous route to skin and the peripheral nerves. The disease has a long incubation period of 3-5 yrs (can be upto 20 yrs).

After infection, the child first develops indeterminate leprosy which can either get cured spontaneously or on treatment or it can progress to one of the several clinical forms (tuberculoid, borderline or lepromatous). The clinical spectrum varies from tuberculoid, where there are a few, large, anesthetic skin patches with thickened peripheral nerves and no detectable bacilli to lepromatous type where there are multiple, small skin lesions with intact sensation and high bacillary load. In our study spanning over 20 years, we have observed no significant change in the clinical profile.

Early diagnosis of leprosy requires a high index of suspicion on the part of the clinician. It is based on detection of 2 of the following features, namely, characteristic skin lesion, loss of sensation and thickened peripheral nerves or the detection of AFB in skin or nasal smear.

We have conducted a number of studies, evaluating various newer techniques for early detection of the disease. In one study, we found the FLA-ABS and Lepromin tests, to be of immense value for identification of "at risk" population in the community and for detecting subclinical infection. We also studied antibody response against 35k Da antigen by SACT and found that nearly 50% smear negative, 42% lepromin +ve and 70% lepromin -ve cases showed positive antibody response with no false positive response.

Gene probes developed at our institute were tried on 100 patients. AII smear +ve cases, lepromin +ve cases and majority of smear- ve cases were detected by this method. 9 cases (4 indeterminate & 5 nonspecific) with inconclusive histopathology were also detected.

In another study on 22 children, In-situ hybridization technique helped in diagnosing children with negative skin smear and non specific histopathology. It also permits the concomitant study of tissue pathology.

Again, in our pioneer study, evaluation of the In-situ PCR technique revealed that histopathology detected 45% of total cases, In Situ PCR detected as much as 60% of the total cases. Thus, In-situ PCR offered excellent structural correlation permitting concomitant study of tissue pathology. As contamination by foreign DNA/RNA does not exist, it is a valuable tool for diagnosis of childhood leprosy.

RLEP based PCR is yet another useful tool to detect cases where skin smears are -ve and skin biopsy is not feasible. In our study involving 73 patients, Z-N staining for AFB was positive in 17/73 (23.28%) cases and RLEP PCR in 56/73 (76.71%) cases. All 30 controls showed negative results. RLEP PCR technique had a significantly greater positivity (especially in early stages of leprosy) than ZN staining ($p < 0.001$).

Suggested algorithm for diagnosis. Whenever there is clinical suspicion, we can either go for smear for AFB or histology to confirm the diagnosis. A positive smear for AFB is confirmatory. If it is negative then, we can subject the specimen for gene probes or PCR/In-

Situ PCR/RLEP PCR. If the result is positive, it is diagnostic of leprosy. On the other hand, if histology shows characteristic features then it is confirmatory; if it is not characteristic, we can go for in-situ hybridization. A positive in-situ hybridization is diagnostic of leprosy; if it is negative then we can opt for in-situ PCR.

To conclude, leprosy often poses a diagnostic dilemma. It is important that after a good clinical assessment, new diagnostic tests be used to diagnose the condition at an early stage & prevent complications/ deformities.