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Original Article

A Study of Pediatric Leprosy in a Tertiary Care Center in a Western State of India: A Descriptive Study

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Elimination of leprosy as public health problem (defined as a registered prevalence of less than 1 case per 10,000 population) was achieved globally in 2000 and in 2005 from India. However, new cases including those in children continue to be reported. As pediatric leprosy shows active transmission of infection in the community, these have special epidemiological significance. The objective of this study was to study the profile of leprosy and deformity in pediatric age group (<15 years). A descriptive cohort study was carried out. The present study comprises of pediatric leprosy patients among 200 patients of leprosy who presented to outpatient Department of a tertiary dermatology center in Western Gujarat during the period 2009-10 and followed up until 2016. All newly diagnosed, on-treatment and relapse cases of leprosy in pediatric age group during that period were included. Detailed history, relevant past and family history were noted. A detailed physical examination was carried out, Slit Skin Smear (SSS) and punch biopsy to confirm the diagnosis was also done. The patients were then classified as per WHO into Paucibacillary(PB) / Multibacillary(MB) cases for treatment purpose and treatment provided accordingly. The patients were regularly followed up during the study period. Findings shows that out of 200 patients, 7.5% (n=15) patients belonged to pediatric age group. Tuberculoid leprosy was the commonest type seen in 53.2% (n=8) of pediatric patients. Male: Female ratio (4:1) was much higher in cahildren than adults. 33% (n=5/15) patients had a positive household contact. There were no deformities seen in this age group. This study signifies the importance of transmission in close contacts. However, the matter of concern remains that 67% of children had no household contacts. Such cases require in-depth epidemiological investigations for other possible sources of transmission.

Keywords : Pediatric Leprosy, Household Contact, Prevalence, Gujarat, India

Introduction

Leprosy has affected humankind since 600 BC and was well recognized in the civilization of ancient China, Egypt and India. Leprosy can affect at any age and reducing new cases among under - 15 years is one of the priorities of National Leprosy Control Programme. According to National Leprosy Eradication Programme, a total of 1,35,485

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new cases were detected during the year 2016-17, which gives Annual New Case Detection Rate (ANCDR) of 10.17 per 100,000 population, of which 8.7% were children (NLEP Annual Report 2016-17). This high proportion of pediatric leprosy patient among new cases is considered epidemiologically relevant for understanding the endemicity of disease, transmission of disease in community, efficiency of leprosy control programme and lack of effective health education (Amador et al 2001). As we need such information from different parts of India, this study has been carried out.

Material and Methods

It was a descriptive cohort study. The study was started in 2009 with 2 years for recruitment and the patients were followed up for 5 years. A total number of 200 patients of leprosy who attended Out Patient Department of Department of Dermatology, Venerology & Leprology were chosen during 2009-2010 and were followed up until 2016 for this study. The study was a part of thesis protocol submitted to the University. Assent was taken before their enrollment in the study. All the patients were diagnosed as leprosy on the presence of at least one of three cardinal signs (WHO 2012) **:**

1. Definite loss of sensation in a pale or reddish skin patch.
2. A thickened or enlarged peripheral nerve with loss of sensation and/or weakness of the muscles supplied by that nerve.
3. The presence of acid-fast bacilli in a slit-skin smear.

Inclusion criteria was as follows :

1. All the newly detected cases including pediatric leprosy patient (defined as children less than 15 year of age) (International Federations of Anti-Leprosy Associations 2001).
2. Patients who had completed Anti Leprosy Treatment (ALT) and developed new signs and symptoms of leprosy during surveillance or there-after (Relapse) (Ramu 1995).
3. Patients who were already diagnosed cases of Leprosy on ALT.

Those, who denied giving assent, were excluded from this study.

A detailed history in reference to the age, gender, area of residence, cutaneous lesions, sensory complaints, eye complaints, systemic complaint and relevant past and family history were noted in a standard case sheet. A detailed cutaneous, sensory and neurological examination was done. Any signs of lepra reactions, ulceration or deformity were noted. Apart from routine investigations, Slit Skin Smear (SSS) for acid fast staining of bacilli was done. SSS were graded as per Ridley Logarithmic Scale. Those with skin lesions were subjected to punch biopsy from active border of lesion to confirm the diagnosis and classification (IAL 1982). Those with Pure Neural leprosy were sent for Electromyogram (EMG) and Nerve Conduction velocity (NCV). Based on all the above findings a clinical diagnosis was made. The patients were then classified as per WHO into PB/MB cases for treatment purpose and treatment provided accordingly. The family of pediatric leprosy patients was thoroughly counseled, basic facts about leprosy explained and the need for regular treatment was stressed. Any misconceptions related to the disease were cleared. Regular hand, foot and eye care was explained. Standard ALT was given to all the patients. The patients were regularly followed up during the study period. Occurrence of Lepra reactions was noted and these were treated accordingly. A written and informed consent was taken from every patient and parents/guardian in

case of pediatric cases. A 6 monthly SSS was done till patients declared release from treatment, any other significant events during the course of treatment were noted. Patients were declared RFT after completion of their fixed MDT as per WHO guidelines. These patients were followed up during study period for any Relapse/Late Reactions.

Results

Of the 200 leprosy patients attended to our center during the study period, 15 were of pediatric age group (<15 years) (Table 1). The incidence of PB cases (Table 2) in pediatric age group was significantly higher 46.6% (n=7/15) compared to study population 20.5% (n=41). Tuberculoid leprosy was the commonest type seen in 53.2% (n=8) patient as compared to overall 27% (n=54) in study population (Table 3). There were no patients with lepromatous leprosy in pediatric age group while this formed a major proportion in adult population, beyond 15 years (n=61/185. Male to female ratio was 4:1. 33% (n=5) of the patients had positive family history. None of the pediatric patients showed reactions comparison to adults in the study group had 21.75% (n=40) patients with reaction. 6.7% (n=1) of pediatric patient had relapse compare to 8.5% (n=16) in study group. No pediatric patient had deformity while in the study group, 6.5% (n=12) of the patients had deformity (Table 4).

Table 1 : Profile of Pediatric Leprosy Cases

Age (In years)	No. of Patient (%)
0-5	1 (0.5%)
5-10	6 (3%)
>10	8 (14%)
Total	15 (7.5%)

Table 2 : WHO Classification of Pediatric Patients studied

WHO Classification of cases	No of pediatric patient	No of patient in the study
PB	7 (46.6%)	41 (20.5%)
MB	8 (53.4%)	159 (79.5%)

Table 3 : Clinical Diagnosis of Pediatric cases (15) versus total cohort (200)

Diagnosis	Proportion / percentage of different types of leprosy among 15 Pediatric cases	Percentage of different types of leprosy in the total cohort of 200
Tuberculoid Leprosy	8 (53.2%)	54 (27%)
Borderline Tuberculoid	4 (26.7%)	29 (14.5%)
Borderline borderline	0 (0%)	1 (0.5%)
Borderline lepromatous	1 (6.7%)	42 (21%)
Lepromatous leprosy	0 (0%)	61 (30.5%)
Indeterminate leprosy	1 (6.7%)	1 (0.5%)
Pure Neuritic leprosy	1 (6.7%)	12 (6%)

Table 4 : Comparison of Pediatric Patients with Adult Age Group of Leprosy Patients

Case Profile	Pediatric patients	Study group
Male: Female Ratio	4:1	2.03 : 1
Family history	33%	7%
Reaction % (Type 1/ Type 2)	0/0	22/21.5(21.75%)
Relapse	6.7%	8.5%
Deformity	0	6.5%

Discussion

Leprosy is a chronic granulomatous disease caused by *Mycobacterium leprae*, affecting all age groups, primarily affecting the nerves and skin and secondarily other organs. Child leprosy is defined as the percentage of children (usually less than 15 year of age) among all cases of all new cases of leprosy (International Federations of Anti-Leprosy Associations 2001). Pediatric leprosy indicates active disease, hidden reservoir and recent, ongoing transmission of infection in the community. The source of infection can be either any member of the family, neighbors or fellow students.

The average national child leprosy rate is approximately 9%, various studies showed prevalence rate of pediatrics leprosy between 5.1% to 11.43% (Nair 2017), the proportion of child cases was more than 10% of new cases detected in eleven states/UTs of India, with 6 of them (Tamil Nadu, Punjab, Dadra & Nagar haveli, Bihar, Mizoram, and Arunachal Pradesh) showing very high rates ranging from 14% to 23% (Rao & Suneetha 2018). According to National Leprosy Eradication programme annual report of year 2016-2017 11792 pediatric leprosy cases with 8.7% prevalence rate were reported (NLEP 2016-17), while in our study the figure is 7.5**%** which is almost similar to NLEP data. The male-female ratio in this study was 4:1 that was higher to other studies done in India where the ratio ranged from 1.25:1 to 3:1 (Palit & Inamadar 2014). Compare to other study where familial contact ranged from 6.06% to 47%, present study had positive family history in 33% of pediatric patient (Palit & Inamadar 2014, Sasidharanpillai et al 2014, Prasad 1998). This is because of the fact that leprosy is predominantly spread through nasal droplets and proximity between parents and children facilitates this process. The predominance of TT and BT leprosy in this study also explains the fact of macules being the most common type of primary skin lesion seen in this study (79.9%) as these types of leprosy usually present with macules. There was only one case each BL, Pure neuritic and indeterminate leprosy in this study. BL and LL types of leprosy are usually rare in the pediatric age group as seen in our study. The prevalence of smear-positive leprosy cases in children was 13.3% in our study while it was 8.19% in study done by Palit et al (2014). There were no cases of histoid leprosy in this study as this is extremely rare in children (Dogra et al 2014, Nair & Kumar 2013). The prevalence of pure neuritic leprosy was 6.7% in this study, while it was 4.6% in a study done by Singal et al (2011). We had not seen leprae reaction in this study compare to other studies having incidence between 1.36% to 29.7% (Palit and Inamadar 2014). Lepra reactions are rare in pediatric leprosy

due to the aforementioned immature immunity in children as lepra reactions are predominantly immunologically mediated episodes in the course of leprosy. None of pediatric patient in this study showed deformity compared to other studies where it ranged from 0% to 24% (Palit & Inamadar 2014). Low or nil deformity and reaction rates in children, most cases belonging to PB types in our study suggests earlier reporting and diagnosis of the child leprosy patients.

Conclusions

Our study of a tertiary care hospital settings needs to be extended to field areas of the state. While profile of disease in child leprosy cases in our study is a good indicator, leprosy in children clearly shows transmission of infection in community and demands priority. Early detection of leprosy cases among children, improving the contact tracing, periodic follow up and monitoring of every close contact in a household will be important to achieve the global target of zero child infection by 2020 in our settings as well.

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