



Prevalence and clinical spectrum of childhood leprosy in a tertiary care hospital in Kolar

Kolar'daki üçüncü basamak hastanede pediatrik lepra prevalansı ve klinik spektrumu

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Abstract

Background and Design: Leprosy is a chronic granulomatous, infectious disease that primarily affects the skin and peripheral nerves. Leprosy in children is an indicator of active transmission in the community. This study aimed to analyze the prevalence and clinical spectrum of childhood leprosy and highlight the importance of examining close contacts and the impact of detection and treatment of leprosy in the community.

Materials and Methods: This retrospective study included patients presenting to the dermatology department of a tertiary care hospital attached to a medical college during the years 2011-2019.

Results: Two hundred and twenty-three patients with leprosy were analyzed, of which 201 were adults and 22 were children. Children constituted 9.87% of the patients (approx. one child with leprosy for every 10 adults with leprosy). Of 22 children with leprosy, 13 (59.09%) were boys and nine (40.90%) were girls, with a ratio of 1.4:1. Twelve of twenty-two child patients (54.54%) had a single patch, while 10 of 22 (45.45%) had more than one skin lesion. Fourteen patients (63.63%) were diagnosed clinically with borderline tuberculoid (BT) leprosy, and six patients (27.27%) had borderline lepromatous leprosy. Of the fourteen patients with BT leprosy, 10 patients (71.4%) had a single lesion. Eleven patients (50%) were diagnosed with multibacillary leprosy, and eleven patients (50%) were diagnosed with paucibacillary leprosy. A clinicopathological correlation was noted in 16 patients (72.72%). Family contact was observed in four children with leprosy.

Conclusion: A high proportion of childhood leprosy cases indicates active transmission and warrants awareness among the community members and healthcare workers in terms of early detection and treatment of childhood and adult leprosy. This helps in preventing transmission, development of grave deformities, and associated social stigma of leprosy among the community members.

Keywords: Childhood leprosy, deformities, transmission

Öz

Amaç: Lepra, esas olarak deriyi ve periferik sinirleri etkileyen kronik granülatöz, bulaşıcı bir hastalıktır. Pediatrik lepra, toplumdaki aktif bulaşmanın bir göstergesidir. Çalışmanın amacı, pediatrik lepranın yaygınlığını ve klinik spektrumunu analiz etmek, yakın temasların incelenmesinin önemini ve toplumda lepranın tespiti ve tedavisinin etkisini vurgulamaktır.

Gereç ve Yöntem: Bu retrospektif çalışma, 2011-2019 yılları arasında tıp fakültesine bağlı üçüncü basamak bir hastanenin dermatoloji bölümünde gerçekleştirildi.

Bulgular: Toplam 223 lepra olgusu analiz edildi, bunların 201'i yetişkin lepra olgusu ve 22'si pediatrik lepra olgusuydu. Pediatrik lepra oranı %9,87 idi. (her 10 yetişkin lepra olgusu için yaklaşık 1 pediatrik lepra olgusu). Yirmi iki pediatrik lepra olgusundan, 13'ü (%59,09) erkek, 9'u (%40,90) kızdı. Erkek: Kız oranı 1,4:1 idi, %54,54'te (22 hastanın 12'si) tek yama vardı, %45,45'inde (22 hastanın 10'u) birden fazla deri lezyonu vardı. On dört hasta (%63,63) klinik olarak borderline tüberküloit (BT) lepra tanısı almıştı ve altı hastada (%27,27) borderline

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lepomatous lepra vardı. On dört BT lepra hastasından 10'unda (%71,4) tek lezyon vardı. On bir (%50) olgu multibasiller, on bir (%50) olgu paucibasillary idi. Klinikopatolojik korelasyon 16 (%72,72) hasta arasında görüldü. Aile teması (bulaşı) 4 pediatrik lepra olgusunda görüldü.

Sonuç: Pediatrik lepra olgularının yüksek oranı, aktif bulaşma olduğunu gösterir ve toplum üyeleri ile sağlık çalışanları arasında pediatrik ve erişkin leprasının erken teşhisi ve tedavisi konusunda farkındalık sağlar. Bu, topluluk üyeleri arasında yayılımın, ciddi deformitelerin gelişmesinin ve lepra ilişkili sosyal damgalanmanın önlenmesine yardımcı olur.

Anahtar Kelimeler: Pediatrik lepra, deformiteler, iletim

Introduction

Leprosy is a chronic disease that primarily involves the skin and peripheral nerves¹. According to the National Leprosy Eradication Program 2018-2019, 120,334 new patients with leprosy were detected in India during the period of 2018-2019, and the annual new case detection rate is 8.7 per 100,000 population. The proportion of childhood cases reported in our country was 7.7 %². The annual new case detection rate in Karnataka, India, is 3.8 per 100,000 population². Though, in 2005, leprosy was declared eliminated by the World Health Organization (WHO), it is still an endemic disease in various countries³. Leprosy in children is an indicator of active community transmission. Close contacts could be the infection source whether it is familial or non-familial³. Childhood leprosy cases in the community evidently indicate the grave nature of the problem of undetected adult leprosy and its deformities and active transmission and highlight the implications on individual patients and the community^{4,5}.

Materials and Methods

All patients up to the age of 18 years who presented to dermatology, venereology, and leprosy department in a tertiary care setting, R.L Jalappa Hospital, Kolar attached to a medical college during January 2011 to December 2019 and were diagnosed with leprosy were included in the study. All patients were diagnosed based on a detailed history and clinical examination, followed by slit skin smear and skin biopsy. Retrospective data were collected from the records maintained in the leprosy clinic of the hospital from January 2011 to December 2019. Familial contact history was also noted. Patients were diagnosed clinically using Ridley-Jopling classification. Based on the number of skin lesions, peripheral nerve involvement, and smear positivity, the patients were categorized as multibacillary (MB) or paucibasillary (PB) for therapeutic purposes. In cases of lepra reactions, patients were treated accordingly with glucocorticoids, non-steroidal anti-inflammatory drugs, zinc, and multivitamins, along with supportive therapy. All patients had monthly follow-ups until the completion of the therapy, and thereafter, they had six-month follow-ups.

This study is approved by the Institutional Ethical Review Committee of Sri Devaraj Urs Academy of Higher Education and Research, Kolar (approval number: SDUMC/KLR/IEC/305/2019-20, date: 21.04.2020).

Statistical Analysis

Data was entered into Microsoft excel data sheet and was analyzed using SPSS Version 22.0 software. The data was analyzed for descriptive statistical analysis using frequencies and proportions. Anonymity of the respondents at every stage of data analysis was maintained.

Results

Two hundred and twenty-three patients were diagnosed with leprosy during the study period of January 2011 to December 2019, of which

201 were adults and 22 were children (0-18 years old) (Table 1). Children constituted 9.87% of the patients (approx. one child with leprosy for every 10 adults with leprosy). Of 22 children with leprosy, 13 (59.09%) were boys and nine (40.90%) were girls (Table 2), with a ratio of 1.4:1. Twelve of twenty-two child patients (54.54%) had a single patch, while 10 of 22 (45.45%) had more than one skin lesion (Figure 1). Fourteen patients (63.63%) were diagnosed with borderline tuberculoid (BT) leprosy, of which 10 had a single lesion. Six patients (27.27%) had borderline lepromatous leprosy. One patient had borderline borderline leprosy (4.5%) and another patient had indeterminate leprosy (4.5%). A clinicopathological correlation was noted in 16 patients (72.72%) (Table 3) and in nine of ten patients clinically diagnosed with BT. Deformity was seen in two patients (9%): One patient had a partial right claw hand, and the other had a bilateral claw hand. A trophic ulcer over the ball of the right great toe was noticed in one patient (4.5%). Lepra reactions were seen in two patients (9%), where both

Table 1. Total number of adult and child patients with leprosy

Sl. no.	Type	Number of patients	Percentage
1	Adult leprosy	201	90%
2	Childhood leprosy	21	10%

Table 2. Total number of boys and girls with childhood leprosy

Sl. no.	Gender	Number of patients	Percentage
1	Male	13	59.09%
2	Female	9	40.09%

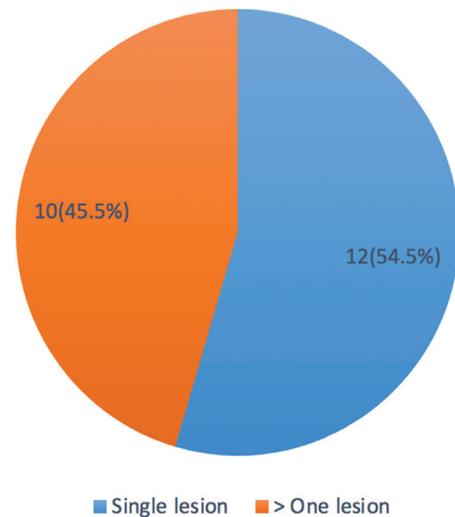


Figure 1. Total number of patches

had type 1 reaction. Familial contact history was noted in four of 22 patients (18.18%) (Table 4). In the first patient, the familial contact was presented in the father, and in the second and third patients were siblings, and the familial contact was their grandfather. In the fourth patients, the familial contact was the uncle. Of 10 patients who had more than one skin lesion, four patients (18.1%) had a positive slit skin smear test (Table 5). Slit skin smear test was negative in 18 patients (81.9%). Eleven patients (50%) were MB, and eleven patients (50%) were PB, according to the WHO classification (Table 6).

Discussion

Leprosy, or Hansen's disease, is a chronic, granulomatous, infectious disease that primarily affects the skin and peripheral nerves¹. It has variable clinical manifestations based on the cell-mediated immunity of the particular host. The widely accepted classification is Ridley-Jopling classification, as it includes the clinical, histopathological, and immunological spectrum of the disease⁶. The WHO categorized leprosy into two types, for field healthcare workers: MB and PB⁷. The Indian leprosy classification has considered pure neuritic variant as a separate group³.

Leprosy affects all ages from early infancy to old age⁸. In our study, 22 child patients were diagnosed with leprosy. The mean age of patients was 13.1 years, with the eldest being 18 years old and the youngest being six years old. This relatively older age of onset could be due to

a long incubation period, late diagnosis of lesions, and difficulty while assessing the loss of sensations in very young age groups⁸. Delayed diagnosis will lead to deformities and disabilities, which have a significant impact on the psychosocial, physical and financial aspects of these children and their families⁸. Low socioeconomic status, illiteracy, and ignorance about the disease will lead to leprosy-related deformities⁹. A child with leprosy-related deformity bears the stigma for life¹⁰.

In this study, boys outnumbered girls (1.4:1), which was in concordance with other studies by Katakam et al.¹, Chhabra et al.¹¹, and Adil et al.¹². This increased incidence of leprosy in boys might be due to the greater mobility and accessibility to healthcare and neglecting the girl child^{1,11,12}.

Deformities were seen in two patients (9%): One patient had a right claw hand, and the other had a bilateral claw hand. A trophic ulcer over the ball of the right great toe was seen in one patient (4.5%). Residual deformity is the dreaded complication in children with leprosy, as it persists lifelong. Multiple skin lesions, older age, MB leprosy, multiple nerve involvement, smear positivity, reactions at presentation, thickened nerve trunks, and delay in seeking healthcare are the common risk factors for deformity development in children¹⁰.

Lepra reactions were seen in two patients (9%), where both had type 1 reaction. Repeated reactions in children lead to psychological stress, deformity, and economic burden on the child's family¹⁰.

In our study, BT (63.6%) was the most common type of leprosy. Similar results were shown by Palit and Inamadar⁹, Semwal et al.¹³,

Table 3. Clinicopathological correlation

Sl. no.	Age in years	Sex	Clinical diagnosis	Histopathological diagnosis	Clinicopathological correlation
1	14	M	BT	BT	Yes
2	12	M	BT	BT	Yes
3	8	F	BT	BT	Yes
4	12	M	BL	BL	Yes
5	14	M	BT	BB	No
6	8	M	Indeterminate	BT	No
7	12	M	BT	BT	Yes
8	19	M	BT	BT	Yes
9	15	M	BT	BT	Yes
10	9	M	Indeterminate	Indeterminate	Yes
11	6	F	Indeterminate	BT	No
12	10	F	BT	BT	Yes
13	16	F	Indeterminate	BT	No
14	13	F	BL	BL	Yes
15	14	M	Indeterminate	BT	No
16	17	M	BL	BL	Yes
17	16	F	BL	BL	Yes
18	12	M	BL	BL	Yes
19	16	F	BT	BT	Yes
20	15	M	BL	BL	Yes
21	14	F	BT	BT	Yes
22	18	F	BL	BT	No

M: Male, F: Female, BT: Borderline tuberculoid, BL: Borderline lepromatous, BB: Borderline borderline

Table 4. Number of patients with contact history and those with no contact history

Sl. no.	Type	Number of patients	Percentage
1	Contact history	4	18.18%
2	Non-contact	18	81.9%

Table 5. Number of patients with positive and negative slit skin smear tests

Sl. no.	Slit skin smear	Number of patients	Percentage
1	Positive	4	18.1%
2	Negative	18	81.9%

Table 6. Number of patients diagnosed with multibacillary and paucibacillary leprosy, according to the World Health Organization

Sl. no.	Type	Number of patients	Percentage
1	MB	11	50%
2	PB	11	50%

MB: Multibacillary, PB: Paucibacillary

and Singal et al.¹⁴. A study by Sasidharanpillai et al.¹⁵ also showed the predominance of BT in their study.

Slit skin smear was positive in four cases (18.1%), and previous studies by Grover et al.¹⁶ have reported higher smear positivity rates ranging from 17.4% to 30%. Another study by Dogra et al.¹⁷ also reported slit skin smear positivity in 28.8% of the children.

A clinicopathological correlation was seen in 16 patients (72.2%), which was in concordance with a study by Dogra et al.¹⁷ and Philip et al.¹⁸ and in 9 of 10 patients clinically diagnosed with borderline tuberculoid. One patient who was clinically diagnosed with borderline tuberculoid turned out to be borderline borderline histologically.

In our study, four patients (18.1%) had a history of contact within the household, which was similar to other studies (Philip et al.¹⁸, and Shetty et al.¹⁹). It has been documented that the risk of a person developing leprosy is multiplied by four times with extrafamilial contact and multiplied by nine times with intrafamilial contact^{18,19}. This indicates the high risk of transmission. Regular screening of contacts of patients, mainly children, should be done at periodic intervals. Screening school children can be considered an effective way to diagnose leprosy in childhood. In some developing countries, many leprosy cases will not be detected while conducting school surveys, as many of these children work for daily wages rather than going to the schools. House-to-house surveys and community-based detection of cases are better methods to detect leprosy cases in childhood¹⁰.

Study Limitations

This is a single centered retrospective study design. It is a hospital based study, therefore it does not represent the actual burden of leprosy in the community. Community based studies is need of the hour to know the actual incidence, prevalence and factors affecting the causation of leprosy.

Conclusion

The clinical, bacteriological, and histopathological characteristics of newly detected childhood leprosy cases in the community evidently indicate the grave nature of the problem of undetected and untreated adult leprosy and its deformities and active transmission. This warrants awareness among the community members and healthcare workers in terms of early diagnosis and treatment of childhood and adult leprosy. Early detection and treatment of childhood and adult leprosy prevent not only transmission among the community but also its grave deformities and associated social stigma. It also reflects on the impact of national programs in eradicating leprosy.

Ethics

Ethics Committee Approval: This study is approved by the Institutional Ethical Review Committee of Sri Devaraj Urs Academy of Higher Education and Research, Kolar (approval number: SDUMC/KLR/IEC/305/2019-20, date: 21.04.2020).

Informed Consent: The study design is retrospective in nature and the data used for the study is obtained from the records maintained in the leprosy clinic. However, the anonymity of the respondents at every stage of data analysis was maintained.

Peer-review: Externally and internally peer-reviewed.

Authorship Contributions

Concept: N.G., S.K.K., R.T.S., H.K., Design: N.G., S.K.K., R.T.S., H.K., Data Collection or Processing: N.G., Analysis or Interpretation: N.G., Literature Search: N.G., S.K.K., Writing: S.K.K., R.T.S., H.K.

Conflict of Interest: No conflict of interest was declared by the authors.

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