

## Leprosy in Pediatric Patient: A Report of Three Cases

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Leprosy, caused by *Mycobacterium leprae*, remains a significant public health concern, particularly affecting children in endemic regions. The World Health Organization reported 7.4% of global and 11.5% of Indonesian leprosy cases in children in 2020. The finding of new pediatric leprosy cases is one indication of continuing transmission. Despite being uncommon, leprosy-related deformities in children pose a serious challenge, emphasizing the need for early diagnosis and effective management. The purpose of this case series is to provide an overview of leprosy and deformity reactions in pediatric leprosy patients. These case series describe three patients who were diagnosed with borderline lepromatous with a mild reversal reaction, borderline tuberculoid with a mild reversal reaction and disability grade 2, and the last case diagnosed with lepromatous leprosy with severe erythema nodosum leprosum. Deformities in children are uncommon outcomes of leprosy, influenced by factors such as early diagnosis, timely and adequate MDT treatment, and appropriate management of leprosy reactions.

**Keywords :** Childhood Leprosy, Leprosy Reaction, Deformity, Case Reports, Indonesia

### Introduction

Leprosy is a chronic infection caused by *Mycobacterium leprae*. Hypopigmented or reddish plaques are usually the main skin lesions that appear in patients. Globally, 10,302 new child cases were reported, accounting for 5.9% of all new cases. The child cases (70.1%) were reported from Southeast Asia (SEAR), with a detection rate of 14 per million child population. (Sharma et al 2024). These plaques may have lack of sensation or numbness. Deformities or ulcers that are difficult to heal, and even limb mutilation, can also occur (Joshi 2017). Complications arising from the immune response to *M. leprae* are

known as leprosy reactions, which include type 1 (Reversal Reaction/RR) and type 2 (erythema nodosum leprosum/ENL) (Salgado et al 2019). Various factors are responsible for leprosy reactions and increased risk of deformity in childhood leprosy. Timely and appropriate management of reactions in leprosy is known to be important for reducing/ preventing disabilities. It is important to maintain focus on this issue.

We report this case series because any leprosy case in children reflects active disease transmission in the community. Summary of these three cases is presented in Table 1.

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**Table 1 : Summary of the three cases.**

Patient no./sex/age	Chief complaint	History of contact	BI/MI of BTA test	MH type	Leprosy reaction	Disability
1/boy/9	Painful red patches on the right and left cheeks	No history of contact with family, neighbors, and friends.	5+/80%	BL	Mild RR	No
2/boy/15	Painless wound deepening on the index finger of the left hand for one week ago	History of contact with patient's grandfather.	2+/30%	BT	Mild RR	Grade 2
3/girl/9	Painful reddish patches on the left cheek, left arms and left limbs	History of close contact with patient's father.	3+/60%	LL	Severe ENL	No

**Case 1**

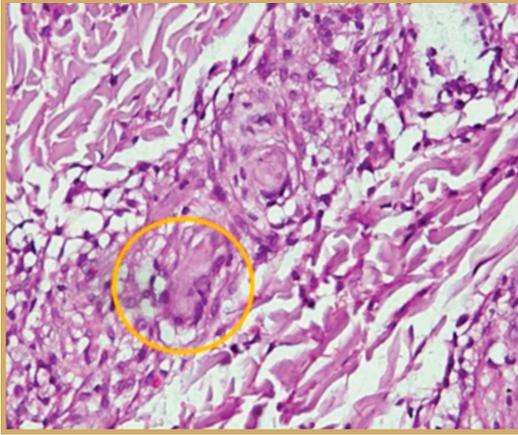
A nine-year-old boy presented with a chief complaint of painful red patches on his right and left cheeks that have worsened. The red patches spread into his arms and legs, accompanied by a fever over a month. There was no history of contact with family, neighbors, or friends.

On physical examination, there were painless enlargement of the auricularis magnus nerve and posterior tibial nerve. The sensibility test reveals hypoesthesia on the abdomen, back, digiti 1-5 manus sinistra and dextra, digiti 1-5 plantar pedis dextra and sinistra, with a stocking and glove pattern sensory disturbance. The patient's dermatologic status shows erythematous, infiltrate, xerotic, and blackish crust (Fig. 1).

On slit skin smear examination an average bacteriological index (BI) of 5+ and morphological index (MI) of 80% were found. The histopathological examination results as seen in Fig. 2 showed foamy macrophages that indicate morbus Hansen borderline lepromatous (BL) type with a mild reversal reaction.



**Fig. 1 : Erythematous plaques (blue arrow) and hypopigmented macules on the left arm (red arrow).**



**Fig. 2 : Histopathological examination showed foamy macrophages (yellow circle), magnified at 40x.**

The specific management given to this patient included MDT-MB, 250 milligrams of paracetamol three times a day, 10 milligrams of zinc, vitamin B complex, and ten percent urea cream for topical therapy on dry skin. After one month of treatment, no new skin lesions appeared on the patient's body and there were no reddish bumps or tingling feeling in the fingers.

#### **Case 2**

A fifteen-year-old boy with a chief complaint of a painless wound deepening on the index finger of the left hand for one week ago. The patient also felt a fever along with the appearance of the swelling. There was a history of close contact with his grandfather, who had a numb hypopigmented patch, crooked hands, and died in 2015. The dermatologic findings of this patient include erythematous plaques, hypopigmented macules on both cheeks, abdomen, back, and both arms, trophic ulcers on pedis dextra and sinistra, cuticular xerosis, absorption on digiti 2 manus sinistra (Fig. 3), claw hand (+), and fissures on digiti 1 manus dextra (Fig. 4).

Upon sensibility examination, there was



**Fig. 3 : Absorption on digiti 2 manus sinistra (green box).**

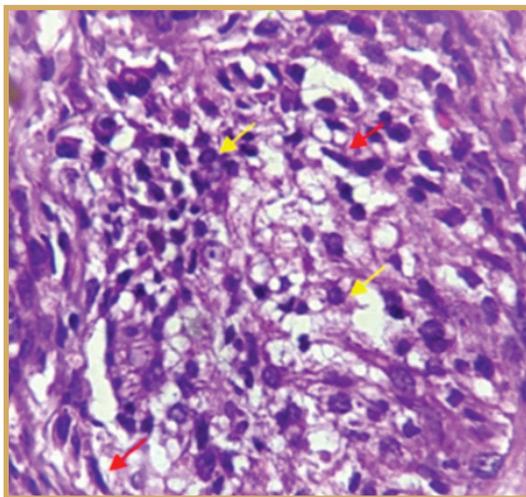


**Fig. 4 : Fissure on digiti 1 manus dextra.**

hypoesthesia on the digiti 1 manus sinistra, abdomen, back, and digiti 1-5 plantar pedis dextra and sinistra, anesthesia on digiti 2-5

manus sinistra and digiti 1-5 manus dextra. On slit skin smear examination, an average BI of 2+ and MI of 30% were found.

The histopathological examination (Fig. 5) was indicative of morbus hansen borderline tuberculoid with mild reversal reaction and disability grade 2. The specific treatment provided to this patient included MDT-MB, 500 milligrams of paracetamol, 20 milligrams of zinc, vitamin B complex, and 10% urea cream on dry skin and 2% sodium fusidate cream on wounds for topical therapy. After two months of treatment the swelling in both hands and legs had reduced, and the tropic ulcers were healed.



**Fig. 5 : Epithelioid cells (red arrows) and histiocytes (yellow arrows) and lymphocyte clusters in 100x magnification.**

### Case 3

A nine-year-old girl presented with a chief complaint of painful reddish patches on her left cheek, left arms, and left limbs that have been expanding for the past 7 days. This condition has significantly impacted the patient's daily activities, causing difficulty in walking and preventing her from attending school. There was



**Fig. 6 : Hyperpigmented macules, erythematous plaques, hyperpigmented plaques, and erythema nodules are present on the left arm.**

history of close contact with the patient's father, who was diagnosed with leprosy a year ago but refused to take the prescribed medication.

The dermatological findings included hyperpigmented macules, erythematous plaques, infiltrates on the left cheek, and hyperpigmented erythema nodules on the left arm (Fig. 6). Xerosis on both legs and hyperpigmented macules and plaques on the left limb and back were also observed (Fig. 7).

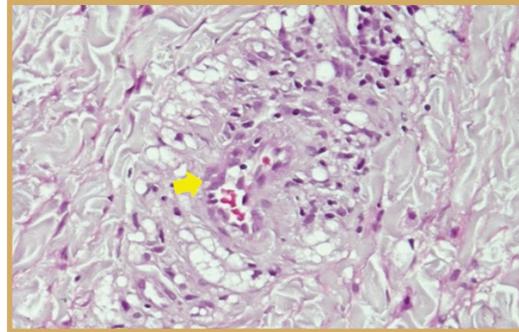
Upon examination of sensibility, there was hypoesthesia in the left arm and left limb. Auricular magnus nerve enlargement was observed, but no nerve pain was reported. An average BI of 3+ and MI of 60% were observed based on the slit skin smear examination. The histopathological examination results indicated



**Fig. 7 : Hyperpigmented macules, hyperpigmented plaques, erythema nodules on the left limb, xerosis on both legs.**

a diagnosis of morbus Hansen lepromatous leprosy (LL) type with severe erythema nodosum leprosum (Fig. 8).

The specific management given to this patient was MDT-MB for children, 250 milligrams of paracetamol, 20 milligrams of prednisone, 20 milligrams of zinc, vitamin B complex, and 10% urea cream for topical therapy on dry skin. After one month of therapy, the painful red patches on both arms and limbs were reduced.



**Fig. 8 : Neutrophils appear to infiltrate blood vessels (vasculitis) (yellow arrow), 400x magnification.**

### Discussion

The anamnesis of the second and third cases revealed a history of contact between the patient and family members diagnosed with leprosy. Thus, the source of infection in patients were possibly intrafamilial contacts. This is in accordance with the study by Narang & Kumar (2019), which states that children who come into contact with a leprosy-diagnosed family are nine times more prone than those who do not. When contact occurs outside the family environment, the contagion rate is four times higher. The duration of contact between a healthy individual and a leprosy patient correlates positively with the chance of transmission. Genetic predispositions and environmental conditions can also affect the chance of leprosy transmission. Nutritional inadequacies in children significantly contribute to leprosy transmission, although further explanation is needed to understand the underlying mechanism (Narang & Kumar 2019).

The prevalence of leprosy reactions in children ranges from 3.1% to 33.9%, compared to over 50% in adults (Narang & Kumar 2019). Leprosy reactions were found in 11.2% of children under the age of 15 years (Bandeira et al 2019). A leprosy reaction in a child typically manifests in older

children or those with well-developed immune systems. In all three cases, we can observe a reaction in leprosy in children under the age of 15. Children having mild leprosy reactions without nerve complications or substantial systemic symptoms are prescribed bed rest and aspirin or nonsteroidal anti-inflammatory drugs. Children with severe leprosy symptoms of reactions should get appropriate corticosteroid dosages to prevent nerve damage (Indraswari & Listiawan 2022).

In the second case, the patient presented with a painless deformity of a trophic ulcer and a challenging-to-heal fissure on the hands and feet. Leprosy recurrence and deformity are uncommon in children under the age of 15. The risk of a child getting deformity increases 6.1 times if there are multiple lesions, symptoms of neuritis involving multiple peripheral nerves, slit skin smear tests showing high positivity values, delayed treatment at a health facility, and the presence of leprosy reactions (Rodrigues et al 2020). So, in this case, the patient was suspected of having a history of recurrent leprosy reactions, but the patient was unaware, did not suspect leprosy, and did not receive appropriate therapy. Because of severe ENL, the third case was initially given a 20-milligram prednisone tablet each day. After a month of MDT-MB and leprosy response treatment, our patients reported high satisfaction with the treatment, with significant improvements in their symptoms and lesions as evidenced by physical examination.

The WHO recommends that health facilities prioritise quick and correct diagnosis and treatment of MDT to decrease the rate of leprosy complications. Effective case detection

can be accomplished by employing geographical information systems (GIS) and spatial analysis to map areas based on the number of cases in each location. By mapping regions based on the number of cases, the relevant techniques for dealing with leprosy cases in each region can be determined (Barreto et al 2017).

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