Multibacillary Leprosy in a Child

Arridha Hutami Putri[1*], Mila Darmi[2], Ramona Dumasari Lubis[1]
[1]*Department of Dermatology and Venereology, Faculty of Medicine Universitas Sumatera Utara, Jln. Dr. Mansur No. 66, Medan, Sumatera Utara*
[2]*Department of Dermatology and Venereology, General Hospital of H. Adam Malik, Jln. Bunga Lau No. 17, Medan, Sumatera Utara*
[*]*Corresponding author*

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Abstract: This manuscript aims to review the cutting-edge developments regarding the diagnosis, management, and prevention of leprosy in children. Where leprosy in children is a robust indicator of the active source of infection in the community, we reported a case of borderline lepromatous leprosy in a 14-year-old boy. He came with the chief complaint of swelling of left little finger since one month ago. The patient also complaint blackish patch with loss of sensations on the left hand since two years ago. After one year, there was an appearance of papules on the ears and sparse eyebrows followed by swelling of left little finger one month ago. His father was already diagnosed as multibacillary leprosy eight years ago and had completed the treatment. There is no history of BCG vaccination. Physical examination revealed sparse eyebrows (madarosis), dermatological examination revealed diffuse hyperpigmentation macular with anesthesia on the left hand, papules and infiltrate on the ear lobes. Sensibility examination revealed anesthesia on the left hand, which is innervated by the ulnar and median nerve. Thickened and tenderness found on the ulnar nerve and muscle weakness grade 3 was found on the left hand, which is innervated by the ulnar nerve. Ziehl-Neelsen staining of slit skin smear revealed acid-fast bacilli with Bacteriological Index 4+. The patient was diagnosed as multibacillary leprosy then prescribed with multi-drug therapy and advice on daily care routinely. The prognosis of the patient is good since no disabilities. Early diagnosis and treatment is a fundamental strategy to prevent leprosy transmission.

1 INTRODUCTION

Leprosy has been a major public health problem in many developing countries for centuries. Children are believed to be the most vulnerable group to infection with Mycobacterium leprae given their nascent immunity and possible intrafamilial contact (Singal et al, 2010). Leprosy in children has a significantly unique aspect because of its potential to cause progressive physical deformity with serious consequent psychosocial impact on both the child and the family. Epidemiologically, childhood leprosy is an index of transmission of disease in the population (Kaur et al, 1991). In the post-elimination era, the incidence of leprosy amongst young children indicates active foci of transmission in the community, making it a robust epidemiological indicator to assess the progress of leprosy control programs (Singal et al, 2010). Amongst children, the disease tends to occur with the highest frequency in children of 5–14 years age group and only 5.8–6% cases are below five years of age. This may be due to the relatively long incubation period of leprosy and delayed diagnosis of indeterminate lesions in children. Among children, boys are more commonly affected than girls. This may be due to greater mobility and increased opportunities for contact in a male child (Shetty et al, 2013). Familial contacts are known to have a significant role in the development of childhood leprosy.The risk of developing leprosy in a person is four times when there is a neighborhood contact. However, this risk increases to nine times when the contact is intra-familial. Further, the risk gets higher if a contact has a multibacillary (MB) form. The attack rate reportedly increases when the index case is mother (Singal et al, 2010; Jain et al, 2002).

The mode of transmission of leprosy is still not conclusively proven although infection can occur

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through very long and close contact. Another presumption is by nasal droplets inhalation (Singal et al, 2010; Wisnu et al, 2016). There is also epidemiologic evidence to suggest that leprosy may be transmissible from mothers to offsprings via the placenta. The report of a child developing leprosy at the age of 3 weeks is an example where the infection could have been intrauterine. Although M. leprae are known to be present in the breast milk of mothers suffering from lepromatous leprosy, the risk of acquiring leprosy infection in the breastfed infant via the gastrointestinal tract remains uncertain (Singal et al, 2010). Leprosy in children can be challenging to identify, mainly because of the peripheral nerve function evaluation. The younger the child, the more difficult the changes in sensitivity are to evaluate. Leprosy diagnosis is based on clinical signs and loss of sensation, associated or not with thickened nerves. Although there are no laboratory exams that can detect all cases of leprosy, the presence of acid-fast bacilli (AFB) in skin smears is conclusive for leprosy diagnosis (Singal et al, 2010; Wisnu et al, 2016). Given that one of the main targets of the global leprosy strategy is zero disabilities among new pediatric patients (children below the age of 15) by 2020, this case report aims to review the cutting-edge developments regarding the diagnosis, management, and prevention of leprosy in children.

2 CASE

A 14-year-old boy came for treatment in polyclinic Dermatology and Venereology H.Adam Malik General Hospital presented He came with the chief complaint of swelling of left little finger since one month ago. The patient also complaint blackish patch with loss of sensations on the left hand since two years ago. After one year, there was an appearance of papules on the ears and sparse eyebrows followed by swelling of left little finger one month ago. No report of fever, joint pain or urinary problem and the same compliance before. His father was already diagnosed as multibacillary leprosy eight years ago and had completed the treatment. There is no history of BCG vaccination, and the patient did not complete his vaccination. In physical examination, the vital signs were within normal limits, and nutritional status was normal, but we found sparse eyebrows (madarosis) (see figure 1a). Dermatological examination revealed diffuse hyperpigmentation macular with anesthesia on the left hand (figure 1b and 1c). There were papules and infiltrates on the ear lobes (figure 1d). The sensory examination revealed anesthesia to touch and pain stimulus in the skin lesions and area, which is innervated by ulnar nerve and median nerve. On palpation of the peripheral nerves, thickening and tenderness found on the ulnar nerve. The motoric examination revealed grade 3 weakness in abduction movement, which is innervated by the ulnar nerve. We also noted a decrease in sweat production in the area with skin lesion during activities.

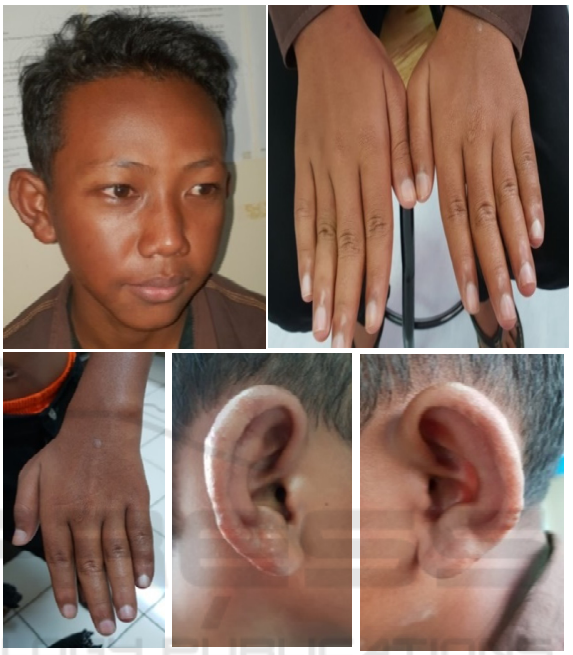

Figure 1. (a) Madarosis in eyebrows. (b) (c) a diffuse hyperpigmentation macular, the size of a placard accompanied by anesthesia on the left hand. (d) infiltrate on the ear lobes.

The differential diagnosis in these patients is multibacillary type leprosy, postinflammatory hyperpigmentation, and tinea manus. Then in the patient carried out a bacteriological examination of acid-resistant bacteria with a skin smear slit on ear lobes, bacteriological index results of the left ear lobe (+) 4 and right ear lobe (+) 4 were obtained (figure 2). A diagnosis of multibacillary leprosy as defined by the World Health Organization (WHO) was made. The patients, without a clear history of exposure to infectious diseases, were subsequently treated with multidrug therapy, consisting of monthly doses of rifampicin 450 mg and clofazimine 150 mg, plus daily doses of dapsone 50 mg and clofazimine 50 mg. The patient was educated to rest enough and to control routinely every month, besides doing daily care routinely. The prognosis of the patient is *quo ad vitam bonam, quo ad*

functionam dubia ad malam, and *quo ad sanationam malam.*

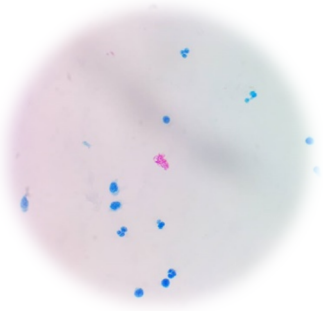

Figure 2. The results of slit skin smear examination in patients showed (+) 4.

3 DISCUSSION

Leprosy in children under the age of 15 is a significant epidemiological indicator. This is related to the active transmission of disease in the community, recalling that the leprosy control program carried out is not efficient.(WHO,2015;WHO,2016) In children, this disease most often occurs at the age of 5-14 years and only 5.8-6% of cases in children under five years old. This is due to the relatively long incubation period and delayed diagnosis of indeterminate lesions. More common in boys, possibly due to greater mobility and increasing opportunities for contact.(Shetty et al,2013) Family contacts are known to play an important role in the development of leprosy in children. The risk of developing leprosy in a person increases nine-fold if the contact is between families. Furthermore, the risk increases if contact with an MB patient, and the incidence increases if the source of contact is his mother (Singal et al, 2010; Jain et al, 2002).

In this patient, the source of contact was his father who diagnosed with a multibacillary type of leprosy since eight years ago. So that patients are at risk of leprosy from birth because of the long incubation period of leprosy with an average of 2-5 years but can also be up to 40 years. (Kementrian Kesehatan RI,2014) Risks are increasing because patients are in contact with multibacillary leprosy patients, and there is not BCG immunization history. In the study of Richardus and Oskam, someone who had received a BCG vaccine in his childhood received protection by 57%.(Richardus et al,2019)

Leprosy in children is very difficult to detect, usually due to errors in examining peripheral nerve function. In a much younger child, it is more difficult to check for changes in sensibility.(Barreto et al,2017;Romero-Montoya et al,2014). The diagnosis in this patient based on history, physical and dermatological examination, and investigations. Based on WHO Expert Committee on Leprosy, the enforcement of the diagnosis of leprosy in children is the same as that of adult patients, namely if there is at least one of the followings cardinal signs: hypopigmented or erythematous skin lesions with loss or disturbance sensation, peripheral nerve involvement characterized by thickened or enlarged peripheral nerve with nerve disorders and presence of acid-fast bacilli in a slit-skin smear.(Lee et al,2012) The patient complaint blackish patch with loss of sensations on the left hand since two years ago. After one year, there was an appearance of papules on the ears and sparse eyebrows followed by swelling of left little finger one month ago. Physical examination revealed sparse eyebrows (madarosis), and dermatological examination revealed diffuse hyperpigmentation macular with anesthesia on the left hand. There were papules and infiltrates on the ear lobes. The sensory examination revealed anesthesia to touch and pain stimulus in the skin lesions and area, which is innervated by ulnar nerve and median nerve. Thickened and tenderness found on the ulnar nerve and muscle weakness grade 3 was found on the left hand, which is innervated by the ulnar nerve. We also noted a decrease in sweat production in the area with skin lesion during activities. Ziehl-Neelsen staining of slit skin smear revealed acid-fast bacilli with Bacteriological Index 4+. Positive skin smears have been reported in less than 10% cases. The skin smear positivity has been shown to increase with age. (Singal et al, 2010)

Ridley and Jopling classification based on clinical, histopathological, and immunological criteria can be used for classifying leprosy in adults and children as well. In most children, the most leprosy spectrum is borderline tuberculoid (BT) types with a prevalence of 42-78%. However, a large proportion of early cases of childhood leprosy remain AFB negative because most of them are TT, BT, or indeterminate (Singal et al, 2010) A simplified classification based on the number of lesions and total peripheral nerve involvement was given by WHO in 1998; paucibacillary-PB) and multibacillary-MB. (Wisnu et al,2016;WHO,2016; Kementrian Kesehatan RI,2014). School children lesions are very preliminary, and the present challenge is to diagnose them with very mild

symptoms, with no reactions nor disabilities, still on PB form. (Barreto et al,2017) Multibacillary leprosy presents as more than five skin lesions with hypoesthesia or anesthesia, symmetrical nerve thickening, and nerve function deficits, madarosis, leonine facies, and deformities in an advanced stage.(Bryceson et al,1990). The patient was diagnosed as multibacillary leprosy due to having madarosis and slit skin smear revealed acid-fast bacilli with Bacteriological Index 4+. The differential diagnosis of tinea manus can be ruled out because the lesions in tinea are usually well-defined with elevated or more active edges even though they are accompanied by dry skin and affect only one part of the body. However, KOH verification was negative. Postinflammatory hyperpigmentation can be excluded because there is no history of injury or infection that occurred in the patient's left hand before.

The patient then prescribed with multi-drug therapy for children with MB leprosy and advice on daily care routinely. In Indonesia, MDT for Children is divided into under five years, 5-9 years, 10-15 years, and more than 15 years. In patients treated with MDT MB children, which consists of rifampicin 450 mg every month, clofazimine 150 mg at the beginning of the month and 50 mg per day, and dapsone 50 mg per day. The prognosis of the patient is good due to no disabilities and deformities were seen.

4 CONCLUSION

Early diagnosis and treatment is a fundamental strategy to prevent leprosy transmission. Leprosy in children below 15 years old is a robust indicator of the active source of infection in the community where they live. Subclinical infection among children is considered a sentinel for hidden prevalence in the general population, as well. Early diagnosis in children can be hard, even for those with experience in dealing with this disease, because of the full range of clinical aspects of the skin lesions and mainly due to the difficulty of performing the clinical peripheral nerve evaluation. The younger the child, the more difficult the changes in sensitivity are to evaluate. Ongoing research is trying to develop better diagnostic tests and to advance chemoprophylaxis and immunoprophylaxis approaches. However, for now, we must maintain leprosy expertise and improve the health professionals training for leprosy diagnosis

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