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Nerve Function Examination as a Screening for Prevention of Disability in Morbus Hansen at Kelet General Hospital, Central Java: A Case Report

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A B S T R A C T

Disability in leprosy or Morbus Hansen can be prevented by early diagnosis and regular and accurate treatment with multi-drug treatment. This study aimed to describe the examination of nerve function in preventing leprosy disability. In this case, a man, 21 years old, has a history of diagnosis of Morbus Hansen multibacillary type since five years ago. There are deformities in both hands and feet with red bumps. On neurological examination, there was anesthesia in hand with paralysis of the finger muscles causing claw hand. No reduction in muscle mass was seen. The patient found it difficult to move his left hand, especially on the 4th and 5th fingers. The range of motion (ROM) of the 4th and 5th fingers was limited. Examination of nerve function begins by palpating the auricular magnus, radial, ulnar, peroneus communis, and posterior tibial nerves. Motor and sensory examinations were carried out by examining the strength of the facial muscles, finger muscles, and wrist muscles. For the lower limbs, examine the muscles of the ankles and toes. In conclusion, early examination of disability and exercise therapy can help prevent disability and keep the condition of disability from getting worse.

1. Introduction

Leprosy is a disease caused by *Mycobacterium leprae* and is a burden of disease because it causes irreversible disability in sufferers.[1] Disability can occur due to impaired peripheral nerve function. One of the causes of acute damage to nerve function is leprosy reactions.[2] Leprosy reactions can occur before treatment, especially during or after treatment.[3] Although the clinical picture, bacteria, histopathology, and precipitating factors of leprosy reactions are well known, and the exact cause is unknown. This reaction may represent episodes of acute hypersensitivity to bacillary antigens that disrupt the balance of immunity.[3]

There are three levels of disability in leprosy, namely levels 0, I, and II. Grade 0 defects are defects that do not show abnormalities due to leprosy; Grade I defects are defects caused by imperceptible sensory nerve damage such as loss of touch in the cornea of the eye, palms of the hands, and soles of the feet; while grade II means visible disability or damage such as claw hand, drop foot, Bell's palsy.[4,5] In 2017, level II disability in Indonesia reached 6.50%.[5] This figure is still above the program indicator of 5%.[4] The level II disability rate of people with leprosy per 10,000 population in Central Java Province in 2017 was 0.53, an increase compared to the level II disability rate in

2016, which reached 0.38.[6]

Leprosy generally attacks the peripheral nerves, causing sensory and motor damage to these nerves.[7] The longer the delay from the time the first signs are detected until the start of treatment, the greater the risk of disability due to progressive nerve damage.[8] Screening examination of nerve function in leprosy patients is expected to prevent long-term complications.[9-11] This study aimed to describe neurological function examination in preventing leprosy disability.

2. Case Presentation

A man, 21 years old, has been diagnosed with Morbus hansen type multibacillary since 5 years ago. There are deformities in both hands and feet accompanied by red bumps, especially on the legs and arms. The patient had taken rifampicin, ofloxacin, and minocycline instead of MDT (multi-drug treatment). None of the patients' families had similar complaints and denied having a history of travel to leprosy endemic areas. In addition, he had never been in contact with a leper before. Since one year ago, he has complained of weakness in the fingers on his right hand and red bumps on his arms and legs.

Data collection in this study has obtained consent from the patient using a statement, and informed consent that the patient is willing to participate as a research subject and the patient is aware that this data collection does not contain harmful actions or treatments.

On physical examination, the general condition of the patient was good, vital signs were within normal limits, and nutritional status was adequate, with a weight of 57 kg. Examination of the palpation of the peripheral nerves found thickening of the nerves in the nerves right and left ulnar and right and left posterior tibial nerves accompanied by decreased motor and sensory function. The skin surface appears dry with patches of hyperpigmentation and some prominent infiltration of both lower extremities. There is anesthesia for the hand with paralysis of the finger muscles causing the fingers to curl (claw hand). No visible reduction/reduction in muscle mass that occurs weakness. The patient found it difficult to move the left hand, especially on the fourth and fifth fingers. The range of motion of the fourth and fifth fingers was limited. The results of the nerve function examination / POD (prevention of disability) are presented in table 1. There is a thickening of the radial nerve, ulnar nerve, peroneus common nerve, and posterior tibial nerve.

Table 1. The results of the examination of the morphology of the nerves along with the level of pain.

No	Dextra		Nerve	Sinistra	
	Pain	Touch		Pain	Touch
1	-	N	n. auricularis magnus	-	N
2	-	T	n. radialis	-	T
3	-	T	n. ulnar	-	T
4	-	T	n. peroneus communis	-	T
5	-	T	n. tibialis posterior	-	T

Examination of innervation motor function was carried out with manual muscle testing (MMT)[6] with a value range of 0-5. A value of 5 means normal, full range of motion (ROM) against gravity and against maximum resistance. Value 4 means full ROM movement, against gravity, against resistance. At least Value 3 means full ROM movement and can fight gravity without fighting resistance. A value of 2 means full ROM movement without fighting gravity. A value of 1 means that you only see or feel muscle

contractions, while a value of 0 means that you are paralyzed. In table 2, there is muscle weakness in the ulnar nerve area with an MMT value of 2. With the condition of muscle weakness, as in the case above, the patient is usually referred for further physiotherapy treatment.

Table 2. Tabulation of motor nerve function examination results.

No	Motor nerve function	Right	Left
1	**Facial nerve**		
	Closing eyes	5	5
2	**Ulnar nerve**		
	Abduction of the little finger	5	2
	Abduction of the index finger	5	2
	Intrinsic position (4,5)	5	2
	Intrinsic position (2,3)	4	2
3	**Medianus nerve**		
	Abduction of thumb	4	4
	Opposition of thumb	5	5
4	**Radial nerve**		
	Extension wrist	5	5
5	**Nerve peroneus communis**		
	Dorsal flexion	5	5

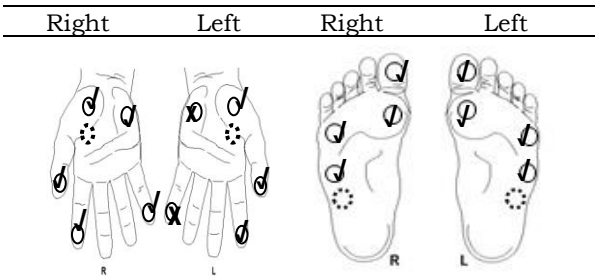

Figure 1. Results of sensory function examination of nerves.

Based on Figure 1, there are several points on the palm that are not felt from the dot (x) image. This is possible due to damage to the sensory nerves innervated by the ulnar nerve. There is also a clinical picture of hyperpigmentation of the facial skin and hand muscle weakness (Figures 2 and 3).

Figure 2. Hyperpigmentation of the skin.

Figure 3. Condition of hand muscle weakness.

3. Discussion

Complaints of weakness in the fingers of the left hand and nodules all over the body, especially in the extremity area, are the main reasons for patients visiting Kelet General Hospital, which has a Leprosy Rehabilitation Unit. This condition of weakness can be said to be too late in handling the prevention of leprosy disability. Previous studies stated that nerve damage is still considered reversible if it occurs in less than 6 months.[12] In these patients, silent neuritis is not detected early, and treatment delays nerve conduction velocity (NCV), which manifests as irreversible nerve damage.[13] Assessment of routine neurological function tests can detect the condition, and appropriate treatment can overcome nerve damage.

Nerve function examination is one of the efforts to prevent leprosy disability. According to the pathogenesis, the nervous system affected by this disease is the peripheral nervous system, especially some nerves such as the n. facialis, n. radialis, n. ulnar, n. median, n. peroneus communis and n. posterior tibial. Damage to the sensory, motor and autonomic functions specifically shows a typical picture of disability.[14-16]

The prevention of leprosy defects is much better and more economical than its prevention. This prevention must be carried out as early as possible, both by health workers and by the patients themselves and their families.[17] Physiotherapy plays an important role in preventing the disability condition of leprosy. Early examination of disability and physiotherapy can help prevent disability and keep the condition of disability from getting worse

4. Conclusion

Screening and physiotherapy can prevent further disability in leprosy patients.

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