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Case Report

Physical therapy in a patient with post-encephalitis tetra-paresis: a case report

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ABSTRACT

The purpose of the rehabilitation program is to improve motor skills, coordination, mobilization and other existing disorders to achieve independence in daily living (ADL). Physical therapy as part of the rehabilitation program can provide core stability exercises, facilitation and stimulation of motion of the upper and lower extremities, balance exercises and mobilization exercises, as well as strengthening exercises with facilitation and active stimulation techniques and using the patient's body weight as a training burden. Strengthening exercise can reduce spasticity by strengthening the antagonist muscles. After six months of the rehabilitation program, manual muscle testing (MMT) was evaluated for the right upper extremity 3/5, left upper extremity 5/5, right lower extremity 1/5, left lower extremity 2/5. Ashworth scale right upper extremity 1/4, right lower extremity 2/4, and left lower extremity 1/4. Clonus is reduced, the patient can stand with maximum support without clonus for 10 minutes. Trunk impairment scale 12/23 and Barthel index 65/100. Mobilization of the patient is being able to sit with minimal assistance, namely stabilization in the pelvis, sitting to standing with moderate support, which is supported at the knee bilaterally, and standing with support at the knee and pelvic for 10 minutes. This case report concludes that although physiotherapy is done late with strengthening exercise and core stability strengthening techniques, it can improve motor skills, which in turn will increase the patient's independence in carrying out functional activities and ADLs.

Keywords: Anti-NMDAR, Encephalitis, Motor skills, Co-ordination, Mobilization, Spasticity

INTRODUCTION

Encephalitis is an inflammation of the brain parenchyma with an incidence of 32-75% and a worldwide mortality rate of 8-18.45%.[1] Clinical characteristics of encephalitis can be fever, headache and decreased consciousness, caused by various microorganisms, namely viruses (69%), bacteria, parasites and complications of other infectious diseases. Since 2007, it has been known that encephalitis can be caused by a non-infectious process, namely autoimmune caused by viruses.[2,6]

This type of encephalitis is the most common and often co-occurs with viral meningitis. The virus attacks the host outside the central nervous system (CNS) and then reaches the spinal cord and brain hematogenously or retrogradely from nerve endings.[1] Viral encephalitis tends to be more common in younger people than older people. However, the environment also plays an important role. Many cases of viral encephalitis go undetected due to lack of examination and mild symptoms. In addition, studies have shown that many patients have high antibodies to the virus but are asymptomatic.[6]

Anti-NMDAR (n-methyl D-aspartate receptor) encephalitis is an autoimmune encephalitis caused by antibody reactions to extracellular membrane antigens, namely the NR1 subunit which is part of NMDAR, a type

of glutamate receptor at synapses of the central nervous system with prominent neuropsychiatric manifestations in the early and late stages of life.[3,5] If it persists seizures, lethargy, hypoventilation and loss of consciousness will occur with approximately 75% of diagnosed patients recovering completely or with mild symptoms, 25% with very severe symptoms, the frequency of relapse or recurrence reaches 20-25% with a relapse period of approx.[6] Two years, severe sequelae 18% , mortality rate 4% even 7% in 24 months. Cases of NMDAR encephalitis are very rare. Even in research, experts say that NMDAR antibodies are identified only in 1% of patients aged 18-35 years who are treated in intensive care units.[3,4,6]

Anti-NMDAR encephalitis must be distinguished from encephalitis caused by other etiologies because of different clinical manifestations. In anti-NMDA receptor positive encephalitis, there are some symptoms that are rarely seen in viral encephalitis, such as hallucinations, psychosis, personality changes and irritability, although in 70% of cases patients initially have prodromal symptoms similar to viral symptoms such as fatigue, headache, symptoms of upper respiratory tract disorders, nausea, diarrhea, myalgia.[1,3,5]

The difficulty of diagnosing anti-NMDAR encephalitis and multi-disciplinary medical treatment causes a very long healing period that can take months. During this treatment phase, collaboration from the rehabilitation team is needed to immediately restore function and reduce disability. However, this process is often hampered due to psychotic disorders and irritability, which causes a lack of internal support from within the patient to recover and vice versa will cause complications, in the form of decubitus, decreased muscle mass and muscle strength, impaired mobilization, and contractures due to spasticity. The purpose of the rehabilitation program is to improve motor skills, coordination, mobilization and other existing disorders to achieve independence in daily living (ADL).[3,5,11-13]

CASE REPORT

A 22-years-old female patient was diagnosed with encephalitis 4 years ago. The patient has a history of being treated for 3 months at the Prof. Dr. dr. Mahar Mardjono national brain center hospital Jakarta, due to experiencing weakness throughout the body, a fever of 40^0C and decubitus in the gluteus area after being treated at another hospital for one month. After treatment, the patient did not routinely undergo physical therapy due to the patient's psychological condition, which tends to be sad and pain in the gluteus area after debridement surgery due to decubitus, so that the patient lies down more. 2 years ago, the patient had a burn on his right knee and an open gluteal decubitus wound that required reoperation. For 4 years, the patient was unable to mobilize independently, and his activities were carried out in a bed and wheelchair, to move the patient assisted by the family by being lifted/ carried. Both lower limbs are so weak that the patient is unable to stand and walk, and tremors are common, especially when changing the position of the knee to straighten it. The patient's left arm can move actively, while the right arm is slightly weak, but the fingers of the right hand are difficult to move actively, but can still be moved with the help of others.

The patient's consciousness is compos mentis, blood pressure is 110/70 mmHg, pulse rate is 84x/minute, respiratory rate is 20x/minute. MMT right upper extremity 3/5, left upper extremity 4/5, right lower extremity 1/5, left lower extremity 1/5. Ashworth scale right upper extremity 2/4, right lower extremity 3/4, left lower extremity 2/4. Clonus occurs mainly in the lower right extremity, which is when the initial facilitation of movement and changes in the patient's position. Trunk impairment scale 5/23 and Barthel index 50/100. Anthropometric examination showed differences in the circumference of lower extremities, namely the right patella circumference 34 cm-32 cm left, right upper leg 38 cm-left 35 cm, and left lower leg 28 cm-22 cm. Sensory examination showed no disturbance. All parameters were recorded in the pre, post intervention program (Table 1).

Table 1: Assessment results.

Assessment type	Pre intervention	Post intervention
MMT	Right upper extremity 3/5	Right upper extremity 3/5
	Left upper extremity 4/5	Left upper extremity 5/5
	Right lower extremity 1/5	Right lower extremity 1/5
	Left lower extremity 1/5	Left lower extremity 2/5
Ashworth scale	Right upper extremity 2/4	Right upper extremity 1/4
	Right lower extremity 3/4	Right lower extremity 2/4
	Left lower extremity 2/4	Left lower extremity 1/4
TIS	5/23	12/23
Barthel index	50/100	65/100
Functional abilities	Sitting balanced±10 min	Standing with support on the pelvis and knees ± 5 min

The physical therapy program provided consists of a series of exercises starting from relaxation and muscle facilitation in the lower leg area with the Bobath method to reduce spasticity and stimulate movement of the lower extremities. Stimulation of trunk muscles to improve core stabilization by activating deep trunk muscles, sit-ups, push ups and posture correction when sitting and standing. In addition to facilitation and stimulation, gradual mobilization exercises are also carried out from

right to left rotation, sleeping to sitting, sitting to standing and standing independently. Until now, a routine physiotherapy program has been carried out for 6 months with a frequency of 2 times/week and a duration of 90 minutes of exercise/training session. In addition, the patient is given a home education program to sit without leaning for a minimum of four hours per day, and wear a hand splint for the right wrist.

After six months, an evaluation was carried out with changes in the assessment results as follows (Table 2): blood pressure 110/70 mmHg, pulse frequency 76x/minute, respiratory rate 20x/minute. MMT right upper extremity 3/5, left upper extremity 5/5, right lower extremity 1/5, left lower extremity 2/5. Ashworth scale right upper extremity 1/4, right lower extremity 2/4, left lower extremity 1/4. Clonus is reduced, the patient can stand with maximum support without clonus for 10 minutes. Trunk impairment scale 12/23 and Barthel index 65/100. Anthropometric examination showed differences in the circumference of the lower extremities, namely the right patella circumference 34-32 cm left, right upper leg 39 cm-left 37 cm, and left lower leg 29-24 cm. Mobilize the patient to a sitting position with minimal assistance.

Table 2: Physical therapy program.

Variables	Duration
	24 weeks of training sessions
Frequency	2 times per week
Intensity	90-120 minutes per session
Type	Spasticity treatment: Stretching, friction Golgi tendon and muscle belly and strengthening agonist muscle
	Strengthening exercises: Lower extremity and upper extremity with active assisted
	Gradual mobilization exercises: Rolling right and left, lying down to sit exercise, balanced sitting exercise, sitting to standing exercise, balanced standing exercise
	Core muscle strengthening: Sit ups, push ups
	Use of hand splint

DISCUSSION

Autoimmune encephalitis causes edema in the brain which will interfere with the function of the central nervous system, one of which is motor function. In addition, autoimmune encephalitis can also cause psychosis and irritability, characterized by symptoms of depression, hallucinations and decreased motivation of the patient to recover.[5] The patient's condition was diagnosed with encephalitis after 1 month of treatment at several previous hospitals without a definite diagnosis and resulted in grade IV decubitus complications with 2 surgeries, malnutrition, anemia, and burns to the right knee. In addition to several other aggravating medical conditions, the patient's psychological condition is also affected, namely depression, excessive fear and sadness. Three years after initial treatment and undergoing medical treatment for pressure sores and burns, initiated a physical therapy program to restore function and independence in ADL.[11-13]

The physical therapy program provided is strengthening exercise with facilitation and active stimulation techniques and using the patient's body weight as a training burden. Strengthening exercise can reduce spasticity with two events.[13] The first way is to strengthen the antagonist muscle, which will inhibit the reaction of the spastic muscle. When the spastic muscles are active and stimulate joint flexion movement, the stronger extensor muscles have the ability to limit the flexion movement.[12] Exercise is also intended to strengthen spastic muscles. Spastic muscles look like strong muscles, but without brain-to-muscle connectivity, spastic muscles remain weak muscles.[12]

Muscle strengthening can occur at any time when a muscle contracts, but it depends on a person's ability to contract the muscle. This exercise is very difficult, and muscle fatigue can occur. Patients who cannot perform movements with a full ROM, but are able to contract their muscles, will be able to increase muscle strength through repetitive movements. The repetition of this movement, can not only increase muscle strength, but also stimulates plasticity. This neuroplasticity will increase the brain's ability to stimulate muscles. Strengthening exercise with weight bearing technique is done by helping the patient to stand for a long time. This standing position actually activates the extensor muscles of the lower extremities and trunk.[9,12-14]

Core muscle strengthening is carried out with active exercises using sit-ups and push-ups to increase the strength of the abdominal muscles and trunk muscles. This type of exercise can be done, considering that the damage to the gluteus due to the decubitus is very large, direct activation of the gluteus through pelvic tilting and bridging movements is difficult. Home programs for core muscle strengthening can also be done by increasing daily activities, by sitting without leaning, and learning to stand up by limiting assistance from family.[9,13]

Physical therapy programs are also aimed at improving the patient's mobility and independence. The exercises given are in stages, starting from rotational exercises on the bed, sleeping to sitting, sitting balanced, sitting to standing and standing exercises balanced.[12-14]

CONCLUSION

This case report concludes that although physiotherapy is done late with strengthening exercise and core stability strengthening techniques, it can improve motor skills, which in turn will increase the patient's independence in carrying out functional activities and ADLs.

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