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Case Report

The effectiveness of physiotherapy in elderly with knee osteoarthritis cases at Sumbawa hospital: case report

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ABSTRACT

The purpose of this study was to determine the results of giving microwave diathermy (MWD), transcutaneous electrical nerve stimulation (TENS), and exercise therapy in the elderly with osteoarthritis and whether physiotherapy can reduce pain due to osteoarthritis. In a case study of elderly people aged 60 years with osteoarthritis dextra, therapy was carried out three times a week for 4 weeks, with measurements using the numeric rating scale and muscle strength measurements with manual muscle testing (MMT). Management of MWD for 15 minutes, TENS for 20 minutes, and exercise therapy for 8 times 2 sets. Symptoms experienced during physiotherapies such as pain when walking and squatting movements are reduced and patient complaints decrease which indicates a decrease in pain level and an increase in ROM. Physiotherapy with MWD, TENS and exercise therapy modalities can reduce pain and increase ROM in the elderly with cases of osteoarthritis.

Keywords: Knee osteoarthritis, MWD, TENS, Physical therapy

INTRODUCTION

Osteoarthritis is a degenerative joint disease that is closely related to cartilage damage and stiffness in the joints, where there is a complex joint process starting from the repair process of bone, cartilage, and synovium followed by components of the inflammatory process.[1] Osteoarthritis is one of the most common diseases that cause pain and movement disability in the elderly population.

Osteoarthritis is a common disease among the elderly and one of the main causes of disability. Elderly or elderly is someone who is aged 60 years and over. In the process of aging, there has been a decline in organ function and an unavoidable decline in physical development.[2]

Osteoarthritis is a disorder that regarding races and genders. This disease is a chronic progressive disease characterized by inflammation of the articular cartilage and inflammation of the synovial membrane, which causes pain, stiffness in the joints, decreased muscle strength, and even decreased mobility. This disease was once considered a normal aging process because its incidence increases with age.

The cause of osteoarthritis itself is still not known with certainty, but based on several studies it is known that the main causes of osteoarthritis are age, female gender, obesity, physical activity, genetic factors, race, trauma or joint injury, and chondrocalcinosis. Lack of movement, obesity, and comorbidities related to metabolism such as diabetes can worsen the condition of osteoarthritis.[3]

According to the American academy of orthopedic surgeons, the incidence of knee osteoarthritis in the United States is estimated at 240 people per 100,000 annually. Around 2009, outpatients for cases of

osteoarthritis were estimated at more than eleven million. It is estimated that in 2010, nearly ten million adults experienced symptoms of knee osteoarthritis.[4]

Based on the world health organization in 2017 in a study it was stated that osteoarthritis sufferers in the world reached 9.6% in men and 18% in women.[5] According to Riskesdas in 2018, the prevalence of Indonesia's point disease was 7.3%. the prevalence of osteoarthritis increased by 18.6% in those over 65 years and 18.9% in those over 75 years.

A physiotherapy is a form of public health service aimed at individuals or groups to develop, maintain, and restore motion and function of the human body throughout the life cycle by implementing manuals, modalities, function training, and communication.

In this condition of knee osteoarthritis, physiotherapy plays a role in reducing functional disorders that arise such as pain, spasm, decreased muscle strength, and decreased ROM. Physiotherapy management in dealing with these symptoms by providing exercise therapy and electrotherapy in the form of MWD and TENS which can also play a role in increasing the ability of functional activities as described by previous research studies.[6]

CASE REPORT

The patient on behalf of Mr. W aged 60 years about 1 year ago felt dizzy because of vertigo and increased blood pressure so he had to be hospitalized in the hospital. After completing hospitalization, about 3 days later the patient began to feel pain and cramps in the knee, especially on the right side, making it difficult to walk far. Then the patient checked his condition with the doctor and was given anti-pain medication, anti-hypertensive, and also nerve vitamins. Then the doctor referred me to physiotherapy for therapy. The patient has a history of comorbidities, namely diabetes mellitus, vertigo, and hypertension.

On physical examination, it was found that on static inspection, there was no deformity in the knee, no swelling, and no use of assistive devices. Dynamic inspection revealed that the patient's walking pattern was slow and painful, with limping and more tread on the right side. Palpation revealed knee crepitus, medial and lateral knee pain, no edema, and normal local temperature.

Basic motion examination showed active and passive motion on the right side of the knee joint unable to full ROM due to pain. Isometric given maximum resistance patient has not been able to but given minimal resistance patient can flex movement and right knee extension.

Pain examination was carried out using a visual analog scale measuring instrument and an examination of muscle strength with MMT with the following results:

Table 1: Pain measurement (VAS).

Pain	Dextra (cm)	Sinistra (cm)
Silent pain	3.3	2.3
Tenderness	7.1	2.4
Motion pain	8.3	2.6

Table 2: MMT Measurement.

Regio	Move	MMT
Knee dextra	Flexi	4
	Extension	4
Knee sinistra	Flexi	4
	Ekstensi	4

Specific tests in cases of osteoarthritis that can be done are ballottement test positive results, positive crepitus test, and negative Mc. Murray test, and positive fluctuation test. Management of physiotherapy in cases of knee osteoarthritis includes:

MWD

This physiotherapy intervention in osteoarthritis patients given 2 times a week with an intensity of 50-60 MHz and technique is upright. Time given is 15 min in 1 therapy.

TENS

Administration of TENS to osteoarthritis patients is given 3 times a week with an intensity according to patient's tolerance, using asymmetrical tension currents with pad placement on lateral and medial knees. Time given is 20 min in 1 therapy.

Strengthening exercise

Strengthening exercise is an exercise that can help reduce pain and increase the strength of weak muscles. Isometric exercise is one of the strengthening exercises that can be given to osteoarthritis patients. Muscle strengthening exercises can be done every day with an intensity of 8 repetitions of 3 sets. Strengthening exercises can be given such as quadriceps setting and hamstring setting.

After 4 times of therapy, the results showed a reduction in pain in the right knee, and muscle strength also experienced a slight increase

Table 3: Pain evaluation results NRS.

Knee extra	T1	T2	T3	T4
Silent pain	3	2	2	1
Tenderness	7	7	5	4
Motion pain	8	8	7	4

Based on the table above, it was found that there was a decrease in silent pain, pressure, and motion from the first day of therapy to the fourth therapy.

Table 4: MMT evaluation results.

Regio	T1	T2	T3	T4
Flexi knee	4	4	4	5
Ekstensi knee	4	4	4	5

Based on the table above, it was found that there was an increase in the value of muscle strength in osteoarthritis patients from the first therapy to the fourth therapy.

DISCUSSION

Physiotherapy has an important role in musculoskeletal cases, especially in cases of osteoarthritis. In this condition, physiotherapy can reduce functional disorders that arise such as pain, decreased ROM, and muscle weakness. Physiotherapy also plays a role in improving the ability to functional activities by providing exercise therapy and electrotherapy.

From the research above, it was found that there was a decrease in pain in osteoarthritis patients who had undergone therapy until the fourth therapy was given interventions in the form of TENS, MWD, and Strengthening. This is to previous studies which explained that TENS can reduce pain with the gate control theory method, where the release of the endorphin system by TENS using low frequencies can inhibit pain in the posterior horn of the spinal cord by stimulating the sensory receptors of the A-delta nerve fibers. and C. so that with reduced pain, OA patients can return to activities more effectively and efficiently.[7]

Pain can also be reduced by giving the MWD intervention. According to previous research, MWD has a therapeutic effect that can facilitate blood flow, so that there is an improvement of the remnants of inflammation. Microwave Diathermy can reduce soft tissue contractures by increasing tissue elasticity. Not only that, but MWD also acts as a preparation before giving exercise, minimizes pain, normalizes muscle tone through a sedative effect, and improves the metabolic system in the knee.[8]

Exercise therapy is also very influential in improving the function of the knee, one example is an isometric exercise which can increase the strength of muscles that experience weakness and is believed to reduce pain. In osteoarthritis of the knee, the muscles that experience general weakness are the quadriceps and hamstring muscles. Movements performed in isometric exercise can gain strength in the muscles without changing continuously and greatly minimize pain.[9] According to from explained that the physiological effect of muscle strengthening is hypertrophy where there is an increase in muscle size due to an increase in the size of muscle fibers, especially type II muscle fibers and myofibrils, the total amount of contractile protein, capillary density, connective tissue, tendons, and ligaments.[10] With increasing muscle fiber size, it is expected that there will be an increase in muscle strength.

Exercise on the knee must be done regularly and regularly because it can increase metabolism from increased blood circulation and increase the diffusion of joint fluid through the bone matrix. Meeting the nutritional needs of cartilage is very dependent on the condition of joint fluid, so if the joint fluid is good, the nutrient supply for cartilage is maximized. The presence of strong contractions of the quadriceps and hamstrings due to routine exercise on the knee will facilitate the pumping action mechanism so that the metabolic process and local circulation can take place properly due to vasodilation and relaxation after maximal contraction of these muscles. Thus, the transportation of metabolic and metabolic wastes produced through the inflammatory process can run smoothly so that pain is reduced, can increase muscle strength and new tissue production, and will increase the range of motion in the knee joint.[11]

CONCLUSION

The intervention of exercise therapy and electrotherapy can influence the symptoms experienced by patients in cases of knee osteoarthritis. MWD, TENS, ROM exercise, and strengthening can stimulate pain reduction and increase the strength of weak muscles. So that after several treatments, there were changes such as a decrease in pain, as well as an increase in muscle strength and ROM values. Suggestions for further research are to be able to combine other types of exercise for cases of osteoarthritis and maximize measurement with other tools.

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