A CASE REPORT : MEDICAL REHABILITATION ON MALE PATIENT AGED 78 YEARS POST TOTAL KNEE REPLACEMENT GENU SINISTRAEC OSTEOARTHRITIS GENU SINISTRA

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ABSTRAK

Osteoartritis (OA) merupakan penyakit degeneratif sendi yang semakin banyak ditemui, baik di negara maju maupun di negara berkembang. Osteoartritis lebih sering mengenai sendi penopang berat badan terutama sendi lutut. Angka kejadian osteoarthritis lutut di Indonesia mencapai 15,5% pada pria dan 12,7% pada wanita. Namun hal ini juga turut meningkatkan angka komorbiditas pasien, terutama dalam melakukan aktivitas sehari–hari. Pada pasien OA yang tidak membaik dengan terapi konvensional, *Total Knee Replacement* (TKR) menjadi salah satu tatalaksana yang mampu memperbaiki keluhan dan disabilitas pasien. TKR merupakan tindakan bedah ortopedi yang paling umum dikerjakan di Amerika Serikat dan angkanya juga terus meningkat pada negara berkembang seperti Indonesia. Pemahaman mengenai prosedur rehabilitasi sebelum dan sesudah operasi rekonstruksi menjadi penting dalam keberhasilan prosedur TKR. Pasien laki-laki usia 78 tahun dengan diagnosis OA Genu Sinistra, dilakukan pemeriksaan preoperative hingga follow up pasca 4 Bulan pemasangan TKR. Pasien yang mulanya mengeluh kesulitan melakukan aktivitas sehari hari secara mandiri, pasca tindakan mengalami kemajuan dan perbaikan kualitas hidup.

Kata kunci : disabilitas, OA, rehabilitasi, TKR

ABSTRACT

Osteoarthritis (OA) is a degenerative joint disease that is increasingly common, both in developed and developing countries. Osteoarthritis more often affects weight-bearing joints, especially the knee joint. The incidence of knee osteoarthritis in Indonesia reaches 15.5% in men and 12.7% in women. However, this also increases the patient's comorbidity rate, especially in carrying out daily activities. In OA patients who do not improve with conventional therapy, Total Knee Replacement (TKR) is one of the treatments that can improve patient complaints and disability. TKR is the most common orthopaedic surgery performed in the United States and the number continues to increase in developing countries such as Indonesia. Understanding rehabilitation procedures before and after reconstructive surgery is important in the success of TKR procedures. A 78-year-old male patient with a diagnosis of OA Genu Sinistra, was examined preoperatively until follow-up after 4 months of TKR insertion. Patients who initially complained of difficulty doing daily activities independently, post-action experienced progress and improved quality of life.

Keywords *: OA, TKR, disability, rehabilitation*

INTRODUCTION

Osteoarthritis (OA) is a degenerative joint disease that is increasingly common in both developed and developing countries. The disease is also becoming more common as life expectancy increases. Osteoarthritis more often affects weight-bearing joints, especially the knee joint. (Maitin, 2015; Hamilton et al., 2020) OA management is also increasingly developing in order to further improve the quality of life of patients. In OA patients who do not improve with conventional therapy, Total Knee Replacement (TKR) is one of the treatments that can improve patient complaints and disability. (Maitin, 2015; Hamilton et al.,

2020)

Understanding the rehabilitation procedures before and after reconstructive surgery is important in the success of TKR procedures. Preoperative rehabilitation includes preparation of the patient's condition before surgery, such as patient education about the course of the disease, weight loss, improvement of cardiovascular fitness, and other exercises to increase patient strength and flexibility. Rehabilitation continues after surgery by focusing on joint range of motion exercises, quadriceps and hamstring muscle strengthening, walking exercises, independence in performing Activities of Daily Living (ADLs), and patient and family education. (Maxey & Magnusson, 2013) All of these processes need the involvement of the patient, the patient's family or caregiver, and various disciplines to support the success of the TKR procedure carried out by the patient. The ultimate goal is for the patient to return to being active in performing AKS activities and participating in activities in their community.

There are 3 types of arthrokinematic movements during knee flexion and extension: glides, rolls and spins. The convex part of the femoral condyle will move against the concave part of the tibia condyle or vice versa. The femur will glide posteriorly and roll from flexion to extension. Glide from the medial condyle of the femur in the final phase of weight bearing extension (in closed - chain movements) will cause the femur to spin over the tibia medially in closed - chain movements. Whereas in open - chain movements, the tibia will spin laterally to maintain the knee position in extension. This condition is often referred to as the screw - home mechanism of the knee. (Lippert, 2011) The knee joint is the largest joint in the body and is a synovial joint with a hinge joint type. There are 3 joints that make up the knee joint, namely 2 femorotibial articulations and 1 femoropatellar articulation. (Palastanga & Soames, 2012)

The articulation between the femur and patella is referred to as the patellofemoral joint. The function of the patella is to increase the mechanical advantage of the quadriceps muscle and protect the knee joint. Q angle, also known as patellofemoral angle, is the angle between the quadriceps muscles (mainly rectus femoris) and the patellar tendon. In extension, the angle ranges from 13-19°, but is usually greater in women due to a larger pelvis. (Lippert, 2011; Palastanga & Soames, 2012) The ligaments that play a role in knee stabilisation include 2 cruciate ligaments and 2 collateral ligaments. The cruciate ligament maintains stability in the sagittal plane and is located within the joint capsule, between the medial and lateral condyles and is therefore referred to as the intracapsular ligament. The anterior cruciate ligament contracts during extension and prevents hyperextension of the knee and prevents the tibia from moving forwards when the knee is flexed. Whereas the posterior cruciate ligament will contract during flexion and tends to have less injury than the anterior cruciate ligament. (Lippert, 2011)

Osteoarthritis is a degenerative process due to biochemical breakdown of hyaline cartilage in synovial joints, subchondral bone, and synovium. Osteoarthritis mostly occurs in the weight-bearing joints which include the knee, hip, cervical, lumbosacral and foot. (Cuccurullo, 2020; Lozada & Diamond, 2020) In the early phase, cartilage swelling occurs due to increased proteoglycan synthesis, indicating an attempt by chondrocytes to repair cartilage damage. This phase may last several years. Progressive osteoarthritis is characterised by a decrease in proteoglycan levels, causing the cartilage to soften and lose elasticity. This loss of cartilage will lead to a reduction in the joint gap. (Lozada & Diamond, 2020) Erosion of the damaged cartilage in joints with osteoarthritis will continue until the underlying bone is exposed. This bone will lose the cartilage that protects it and continued friction will cause the subchondral bone to increase its vascularity and cellularity and become thickened and hard (called eburnation). Irritated subchondral bone may form cysts. (Lozada & Diamond, 2020)

Early in the course of the disease, a conventional rotgen examination will show the joint will appear normal, but the patient's gait will show an antalgic gait in the weight bearing joint involved. The patient will complain of pain that is deep in nature and will worsen on overuse. Patients also complain of morning joint stiffness lasting more than 30 minutes. (Lozada &

Diamond, 2020; Rock et al., 2021) Decreased ROM and crepitation are also common. Malalignment with joint enlargement may occur. Limited joint range of motion and muscle atrophy around the affected joint may be encountered. The joint will become unstable as the osteoarthritis progresses. (ResearchGate, 2021).

CASE REPORT

A 78-year-old male patient complained of pain and stiffness in the left knee since 1 year ago. The pain was felt to arise and worsen when the patient squatted, changed positions from sitting to standing, when standing for a long time, and walking. The pain was relieved after the patient took painkillers and rested. The knee felt stiff especially in the morning. The complaint is not accompanied by tingling and numbness. There is no weakness in the legs. The patient's left leg is bent outwards, making it unstable when walking. The patient has difficulty doing activities that require the patient to sit, stand for a long time, or walk far more than 20 metres. The examination showed that the head was tilted to the left, the shoulders were asymmetrical (the right shoulder was higher than the left shoulder), and there was genu varus of the left leg. From the *gait* examination, the patient walked without using a walker, the head tilted to the left, the shoulders appeared asymmetrical (the left shoulder was higher than the right shoulder), *inadequate heel strike*, shortened *stance phase* time on the left side (involved side), shortened *stride length* on the left side (involved side), instability (+) during the *stance phase on* the left side, *gait pattern: antalgic gait.*

In this case, a conventional photo examination of the genu sinitra before the action with AP / Lateral / Skyline projection, a picture of narrowing of the joint gap in the medial and lateral aspects was obtained, accompanied by multiple osteophytes on the eminentia intercondylaris, lateral condylus of the tibia os and sinistra femur os, there was also a subluxation of the sinistra patella os to the lateral, impressing the picture of osteoarthritis of the genu sinistra gr IV according to Kellgren and Lawrence Classification (figure 1).

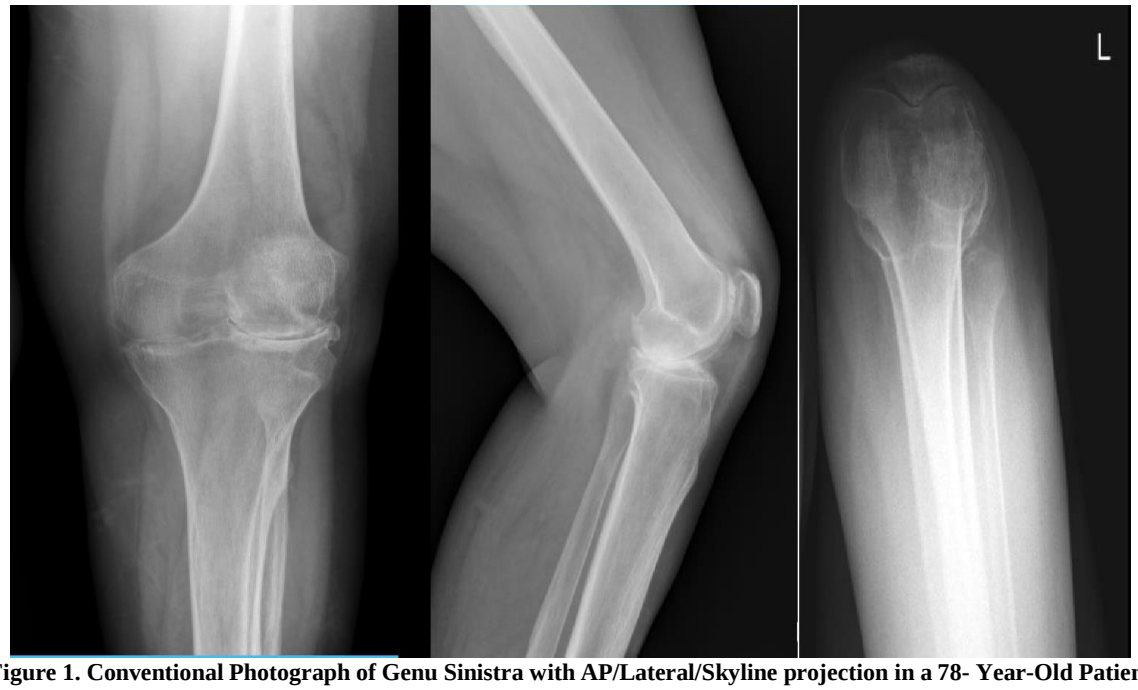

Figure 1. Conventional Photograph of Genu Sinistra with AP/Lateral/Skyline projection in a 78- Year-Old Patient Before TKR Insertion

The patient was diagnosed with OA Genu Sinistra which was then carried out procedural surgery for TKR insertion on 6 June 2024. A conventional radiological examination of the

sinistra genu was performed at 3 hours post-operatively. With good results, TKR appeared to be in a good position, there were no postoperative complications (figure 2).

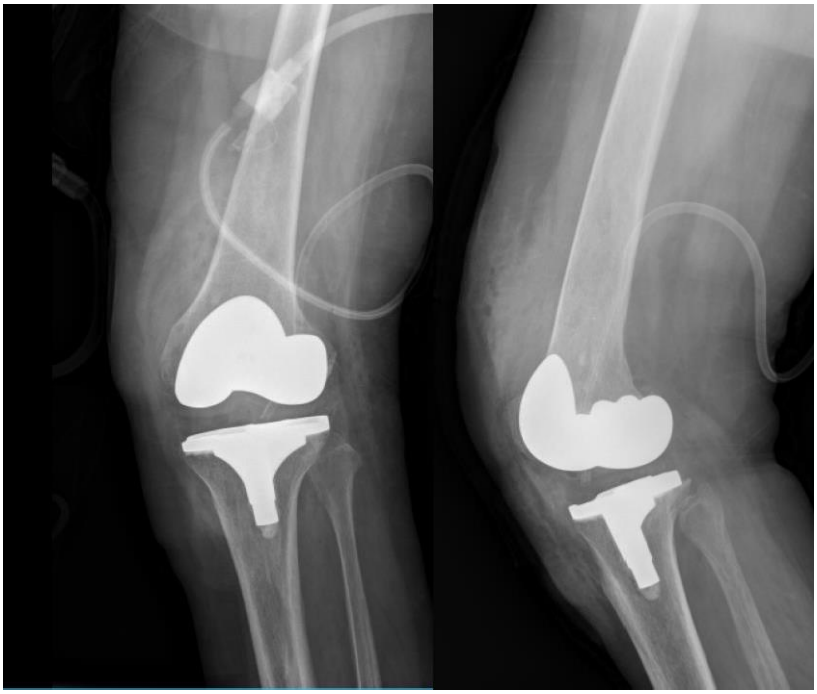

Figure 2. Conventional radiological examination of the sinistra genu AP/Lateral 3 hours after TKR placement of the sinistra genu

On the second day post-operative follow-up, the patient complained of surgical wound pain (+), VAS 2, the surgical wound region was covered with elastic bandage, drain (+). In this patient we set 2 main goals in the rehabilitation process. Short-term goals, such as controlling pain and edema of the right extremity, increasing Knee ROM with postoperative targets (Week I: 90° and Week II: 110°), prevent contractures and muscle atrophy, increase quadricep, hamstring, and core muscle strength and ambulation with Weight Bearing with/without a walker. While long-term goals are to maintain ideal body weight, increase cardiovascular and musculoskeletal endurance and Activity Daily Living (ADL) independently in transfers, ambulation and up and down stairs (Maxey & Magnusson, 2013).

Physical exercise is carried out from day 2–3 postoperatively, including breathing exercise, ankle ROM exercise (such as pumping, circumduction). Isometric gluteal sets, hamstring sets and quadricep sets were taught to prevent disuse atrophy and quadriceps reflex inhibition. The programme started with 10 repetitions per hour and increased to 20 repetitions three times a day (Maxey & Magnusson, 2013). Physical exercise was increased in intensity within the first week of rehabilitation. Active Assistive Range of Motion (AAROM) exercises such as heel slides or therapist-assisted knee flexion and passive knee extension can be given to improve mobility. Straight leg raises (SLRs) and terminal knee extension (TKE) will further increase quadriceps muscle strength thereby improving dynamic stabilisation of the knee. Exercises to perform AKS activities such as dressing, transferring, reaching, and picking up items need to be performed with supervision from an occupational therapist or physiotherapist. The need for assistive devices can be evaluated and managed (Maxey & Magnusson, 2013).

At 2–3 weeks post-surgery the patient is expected to be able to transfer, gait and perform all AKS safely in the home and community setting. At this stage, it is important for the therapist to assess the home conditions and propose appropriate changes to the patient's condition such as the installation of handrails. Patients are also given a home programme to improve their mobility and strength. In patients who have deficient extension mobility, Total Knee Extension

(TKE) exercises with passive pressure on the knee can be given (Maxey & Magnusson, 2013).

In this patient, further follow-up and procedural *after care* was carried out in accordance with the theory presented, this patient was evaluated 4 months *after* the action. The patient claimed to be able to move well, the pain and limitation of movement felt much better, the patient was able to use his left leg quite well, walking or climbing stairs by himself (figure 3).

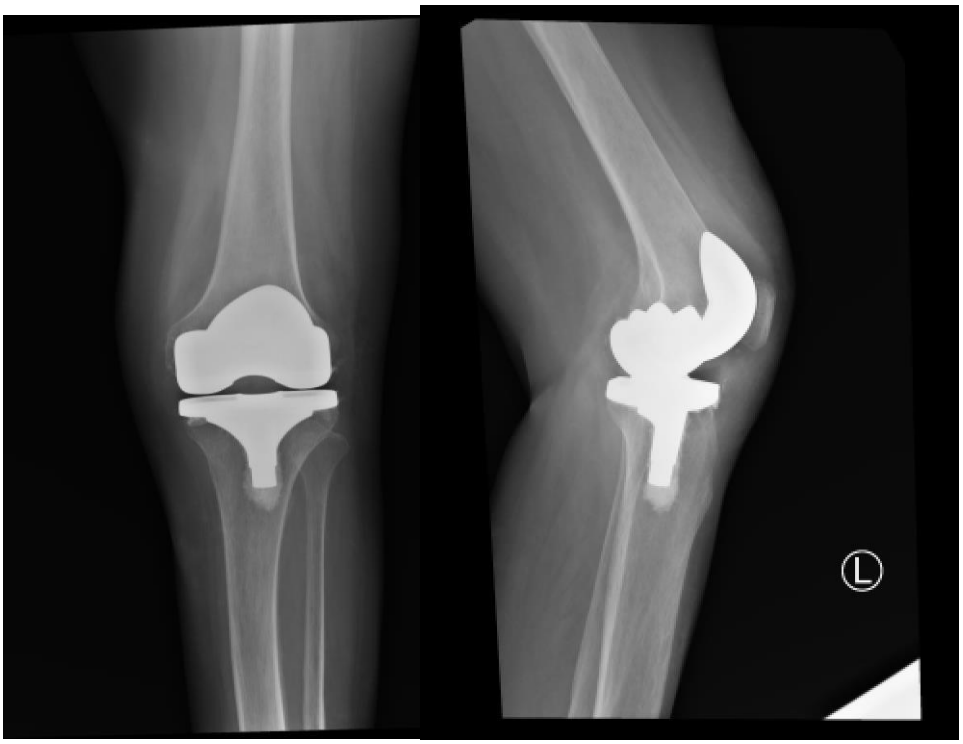

Figure 3. Conventional Radiological Examination of the Sinistra Genu 4 Months Post-Action. There is an osteotomy as high as distal os femur sinistra and proximal os tibia sinistra which has been installed with knee prothesis and bone cement with good position and position

At 12 weeks post-surgery, patients are expected to be able to restore gait, reduce walker dependency, increase ROM, improve *weight bearing*, balance, strength, *endurance*, and propioseptive abilities. Functional knee ROM in performing activities starts from an angle of 0^o- 110^o. Full extension is required in a normal walking pattern and to facilitate quadriceps strength. Aerobic exercise and weight reduction in obese patients should also be considered. Knee-friendly exercises such as stationary bike, walking, and swimming are recommended for patients to improve cardiovascular capacity. The long-term goal is that patients do not feel pain in performing their functional activities. Patients can still return to their recreational activities and sports that do not burden the implant (Maxey & Magnusson, 2013).

CONCLUSION

Total Knee Replacement (TKR) is an effective therapy in the management of osteoarthritis that cannot improve with conservative therapy. The main indications for TKR procedures are pain caused by severe arthritis and decreased quality of life due to knee joint dysfunction. The choice of TKR implant and fixation type, preoperative rehabilitation programme, and postoperative rehabilitation programme will affect the healing process of patients after TKR procedures. Post-surgical rehabilitation aims to restore ROM function and muscle strength around the knee joint so that patients are able to return to being active and independent. Several physical exercises and modalities can be given to patients to achieve predetermined goals. The success of TKR rehabilitation begins with patient preparation before surgery to the

rehabilitation process after surgery. The participation of patients and their families in the rehabilitation process plays an important role. Therefore, good education to patients and their families regarding rehabilitation procedures and goals to be achieved must be implemented.

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