

Efficacy of Physiotherapy Management for Avascular Necrosis of Femur Head with Core Decompression

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Abstract-

Background Of The Study: Avascular necrosis is defined as cellular death of bone components due to interruption of the blood supply; the bone structures then collapse, resulting in bone destruction, pain, and loss of joint function. The head of femur is the most common bone affected by avascular necrosis.

Purpose: The purpose of this study is to determine the efficacy of physiotherapy management of avascular necrosis of femur head with coredecompression.

Conclusion: Core decompression is an effective and safe method of treating avascular necrosis of femur head. Physiotherapy has proven to be extremely beneficial for reducing pain, increasing range of motion of a joint, improving functional independence and improving the quality of life of the patient.

Key Words: avascular necrosis, core decompression, physiotherapy, bone, functional independence, efficacy.

Introduction:

Avascular necrosis (AVN), also known as osteonecrosis [1], aseptic necrosis and ischemic bone necrosis, is a relatively common disease characterized by death of cellular elements of bone or marrow. The hip (femoral head) is the most commonly affected site for clinically significant AVN. There are many risk factors for the disease including hemoglobinopathies, dislocation of the hip, blood disorders such as sickle cell anemia, radiation treatments, chemotherapy, pancreatitis, decompression disease, hypercoagulable state, hyperlipidemia, autoimmune disease, human immune deficiency virus, as well as collagen vascular disease. Secondary collapse of the femoral head, disabling hip pain may result in the need for total hip replacement. For non-traumatic AVN, the disease is often bilateral, which further increases the extent of disability. Various approaches have been employed for treating different stages of AVN of the hip. Osteonecrosis [2] of the femoral head (ONFH) is interrupted or damaged by the blood supply to the femoral head, causing death and subsequent repair of bone cells and bone marrow components, which in turn leads to structural changes in the femoral head and collapse of the femoral head, causing joint pain and dysfunction in patients, and the disease is difficult to heal. Avascular necrosis may be caused due to the injury, [4] fracture, damage to blood vessels, long term use of medicines such as corticosteroids, excessive, long term of alcohol. The most common symptoms of avascular necrosis are minimal early joint pain, [5] increased joint pain and joint begins to collapse, limited range of motion due to pain, limping as the individual has difficulty walking on the affected side. Avascular necrosis can be classified five different stages:

Stage 1: Onset of disease is asymptomatic

Stage 2: This stage is characterized by sclerosis of the superior central portion of the joint head and or osteopenia and or subchondral cyst.

Stage 3: In this stage, the articular surface is depressed so that the round contour is compromised, without being significantly deformed. This leads to a joint space narrowing.

Stage 4: This stage is characterized by a wide collapse of the subchondral bone and destruction of the underlying trabecular pattern. This can lead to secondary arthritis.

Stage 5: The final stage where both articular surfaces are affected, which leads to a dysfunctional joint.

Case Report:

This is the case of a patient who is 48 years old male admitted in NRI General Hospital with a chief complaint of pain in the right hip joint. He complains of right hip pain since 1 month. The patient brought to the hospital and pre-operative assessment was necessary to judge patient's capability to withstand anesthesia and pre-operative blood loss along with it radiographs like x-ray of both joints were taken in AP view and Lateral view, MRI pelvis with both hips, CT scan are suggested and investigated. On physical examination, range of motion of the right hip was severely limited and painful in all ranges, with most pain being felt in abduction and internal rotation. Palpation of right hip region revealed extreme tenderness. Muscle palpation revealed tenderness in the right thigh and pelvic musculature.

muscle atrophy was also noted in the right thigh musculature. lumbar spine range of motion was full with end range pain in right lateral flexion and right rotation. Straight leg raise produced right hip pain. Posterior joint provocation tests were painful for L4, L5, S1 testing was painful for the right sacroiliac joint. Muscle palpation revealed tenderness in the lumbar, paraspinal and right gluteal musculature. Range of motion of right knee was full and pain free and no effusion was noted. As pre-operative assessment was done and radiographs shows avascular necrosis of femur head. This needs to be corrected by surgical intervention and the surgery is planned 3 days after admission to the hospital. The surgical intervention planned is the core decompression. [6] During the surgery all his vitals are stable and he is non allergic to anesthesia. Post-operative advice given to the patient was to consult the physiotherapy. Hence the patient reached out to us on post-operative day 1. The post-operative assessment is done on the same day including motor and sensory functions. Previously on observation we observed his built and there was no change in built post-operatively also. But there is edema which need to be reduced as it may lead to deep vein thrombosis. Complete history of patient was taken. MRI was evaluated to confirm the diagnosis of avascular necrosis of the femoral head.

Outcome Measures:

The times up down stairs (TUDS) Test was used to measure functional mobility. The TUDS Test requires subject to ascend and descend stairs while the time (in seconds) is recorded with a stopwatch. The subject was instructed to go up and down 12 stairs "as fast as possible while being safe" and was instructed to use the railing if desired. The examiner said, "On your mark, get set, go," at which time the subject ascended and descended the set of 12 stairs as quickly as possible. Timing began when the subject's first foot lifted off the ground at the bottom of the stairs. Timing ended when both feet were back on the ground at the bottom of the stairs.

Pain Visual Analogue Scale (VAS) this is a self-reported measure of pain severity. The pain VAS has been found to be valid, reliable and sensitive to change in non-drug clinical trials. The scale consists of a 100 millimeter horizontal line that is anchored with verbal descriptors of "no pain" and pain as bad as could it be. Respondents are asked to place a line perpendicular to the VAS line at the point that best indicates their pain at the present time.

Treatment procedure:

Physiotherapy treatment for avascular necrosis of femur head with core decompression includes static quadriceps, ankle toe movements, straight leg raise, core strengthening exercises, range of motion exercises, balance training. Strengthening exercise involve all the muscles of hip joint. Hip flexors, hip extensors, hip abductors and adductors, external rotators and internal rotators. knee flexors and extensors. Ankle dorsi flexors and planter flexors. Each exercise was done with Effect of Physical Therapy on Range of Motion & Pain. 30 repetitions divided into 3 sets, each with 10 repetitions it is performed 4 days in a week. Relaxation period was given to the patient asked and until he asked to continue the previous exercise. Rest period was given between each exercise from 1-2 minutes. Stretching exercise for internal rotators and abductors with 30 repetitions interpreted with rest period. Treatment was done four times per week for a period of three months.

Discussion:

Avascular necrosis is a degenerative bone disease marked by the loss of bone cellular components due to a disruption in the subchondral blood supply. Osteonecrosis, aseptic necrosis, and ischemic bone necrosis [3] are all terms used to describe this condition. At weight-bearing joints, it usually affects the epiphysis of long bones. [7] The head of the femur has a very limited blood supply, with only a few anastomoses leading to a wedge-shaped region of avascular necrosis (AVN). Thus, the head of the femur is the most often impacted site [8]. It usually leads to irreparable joint degeneration, [9] resulting in considerable disability as a result of pain and movement restrictions. Initially physiotherapy includes passive stretching of the hamstrings, quadriceps, hip flexors and abductors [10], as well as passive and active range of motion exercises for the hip and knee. Once the patient was able to weight bear, he was instructed in restoring normal gait. The patient was then progressed to closed kinetic chain strengthening, balance and proprioceptive exercises including the use of wobble board to restore muscle and joint coordination and joint position sense. Physical therapy alone looked to be equally helpful as hip core decompression [11] followed by Physical therapy in increasing hip function, according to that study. According to study done by Rahim Karim, osteonecrosis of the femoral head reported that exercise program was useful in enhancing the rate of patients improvement after [12] avascular necrosis. The present study found that, after one month of treatment, there are increase in the range of motion of the affected joints. Visual analogue scale [13] decreased from 8 to 4/10. There was significant improvement in the strength of the muscles and the patient experienced alleviation from symptoms and achieved functional mobility that he had previously been unable to tolerate to pain. As a result, physical therapy has been proved to be highly beneficial. This case study differ from others case as in this case there was involvement of multidisciplinary team including medical, surgical approach and physiotherapy rehabilitation, which played a vital role in reducing pain and functional independence in patients with avascular necrosis of femur head.

Conclusion:

Core decompression is an effective and safe method for treating avascular necrosis of femur head. Physiotherapy has proven to be extremely beneficial for reducing pain, increasing range of motion of a joint and improving functional independence of the patient.

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