



Case Report

Outcome of modified physiotherapy management in post-Operative avascular necrosis managed by core decompression with PRP infiltration

Gauri Kariya, Swapna Jawade*, Om C. Wadhokar Chaitanya A. Kulkarni Waqar M. Naqvi

Ravi Nair Physiotherapy College, Datta Meghe Institute of Medical Sciences, Wardha, Maharashtra, India.

ABSTRACT

Avascular necrosis is the decrease of bone tissue due to loss of blood supply. In severe cases it may result in bone collapse and Most often it affects Hip. Physiotherapy plays an important role in reducing post-operative pain in Avascular necrosis. After operative management, physiotherapy interventions play crucial role in rehabilitation of patient. Strengthening exercises, squats, passive movements proves to be useful. A 24-year male who was diagnosed with Avascular necrosis of right femoral head. Patient was suffering from pain at right hip since 8 months. Pain gradually started from hip and then it progressed up to knee. Patient had dull aching pain which aggravates while walking, standing and relieves as patient rests. Patient showed diurnal variation, symptoms of pain worsens in early morning. On the visual analogue scale, patient scored 08/10 for pain. On palpation there was no tenderness at the site of pain Patient underwent core decompression with PRP infiltration of right femoral head after 15 days of admission to the hospital. Patient was referred to physiotherapy with complaints of pain, restricted range of motion (ROM), muscle weakness and difficulty in weight bearing. Modified physiotherapy Rehabilitation was given to regain full range of motion, gradually to increase weight bearing and keep associated muscles strong. Patient was treated 5 days per week for 08 weeks. Key exercises of rehabilitation were mobilization, static quadriceps strengthening exercises, bed side sitting. It is concluded that modified physiotherapy intervention used in this case report was effective in post-operative Avascular Necrosis for early restoration of strength, ROM and functional activities.

Keywords: Postoperative rehabilitation, Avascular Necrosis, Post-Operative Avascular Necrosis.

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Correspondence: Swapna Jawade* ✉ drswapnasj@gmail.com

Department of Musculoskeletal Physiotherapy, Ravi Nair Physiotherapy College, Datta Meghe Institute of Medical Sci., Wardha, Maharashtra, India.

INTRODUCTION

Avascular necrosis is the decrease of bone tissue due to loss of blood supply. Other names are Osteonecrosis, aseptic necrosis, ischemic bone necrosis. In severe cases it may result in bone collapse. Most often it affects hip. Some other common sites are shoulder, knees, and ankles. Avascular necrosis is the clinical condition which includes complaint such as pain at the site, decreased range of motion. In severe cases pain becomes chronic and radiates to the surrounding areas like thigh, buttock ^[1]. Avascular necrosis is the condition in which blood supply to the extremity is seriously jeopardized which makes extremity prone to fractures and results in necrosis. Clinically, limb is in attitude of external rotation. All the medullary blood supply and most of the capsular blood supply to the head are cut off. Viability of the femoral head depends entirely on the blood supply through the ligamentum teres. If there is inadequate blood supply, avascular necrosis occurs. Increase in ischaemia may result in functional dependency of patient by affecting weight bearing of the patient. As the condition progresses and worsens, weight bearing of the hip gets affected and usual range

of motion of hip gets affected ^[1,2].

Physiotherapy plays an important role in reducing post-operative pain in Avascular necrosis. Immobilization and traction is proven to be of great help. It is the skeletal traction limiting frequency, duration and the intensity of treatment are determined by the physiotherapist. After operative management, physiotherapy interventions play crucial role in rehabilitation of patient. Strengthening exercises, squats, passive movements proves to be useful. Most Important aim of post-operative physiotherapy rehabilitation following core depression with PRP infiltration is focus on pain reduction, increase in weight bearing ^[3]. As weight bearing of the patient improves, patient becomes functionally independent and decrease in pain results in effective weight bearing. There are many causes of Avascular necrosis which include fractures, dislocations, chronic alcohol use, congenital causes. This disease progresses in 4 stages. Vascular diseases secondary to diabetes, as well as direct damage from cytotoxic agents have been also implicated in the

development of avascular necrosis.

In this case report, modified postoperative physiotherapy protocol is used to help patient of Post-Operative Avascular Necrosis Managed by Core Decompression with PRP Infiltration in early recovery of pain, ROM, Muscle strength and functional activities.

Patient and observation

A 24-year male patient who was MBA student by occupation with right hand dominance. He had no history of trauma, Patient was conscious, oriented to place and time and brought to AVBRH hospital Sawangi Meghe with the complaints of pain and decreased range of motion. Patient was referred for the investigation of MRI and USG by orthopaedic surgeon and was diagnosed as Avascular necrosis of femoral head. Patient was operated with core depression with PRP infiltration of right femoral head. Patient was referred to physiotherapy with complaints of intense pain in right hip and difficulty to raise right lower extremity from hip and weakness in the limb. Pain was dull and insidious in onset and referred to hip, sudden in onset, intermittent in nature, aggravated by movement and relieved at rest and intensity of pain on numerical pain rating scale was 7. Patient had no any previous significant medical or surgical history. Patient was having 500 mg calcium tablet and 650 mg paracetamol. Patient had no significant personal or family history.

Clinical findings

Consent was taken from patient. Patient was explained about physical examination and intervention. On general examination, patient was moderate, conscious, oriented to time and place and cooperative. Patient was haemodynamically stable, afebrile with BP was 110/70 mmHg, pulse rate was 70 beats per minute, respiratory rate was 15 breath per min. Patient had no findings of cyanosis, icterus, clubbing, oedema. On observation scar was present over lateral aspect of hip with no muscle wasting and oedema. Attitude of right lower extremity in supine lying was hip extended, internally rotated with knee and ankle extended. On examination temperature of local area was normal. Range of motion had been mentioned in [Table 1]. Muscle strength assessment was taken and compared on both lower limbs.

Therapeutic intervention

Due to chronic pain since 8 months patient was not able to walk properly. Gait of the patient was severely affected. Patient was unable to perform activities of weight bearing as hip of patient was severely affected. Patient could not tolerate activities like standing, walking as weight bearing was impaired. Core decompression with PRP infiltration was performed on this patient, after 3 days of immobilization Physiotherapy rehabilitation protocol was executed every week with different therapeutic exercises. Short term goal was patient education, to reduce pain and tenderness, improve range of motion and muscle strength of left upper limb. Long term goal was to improve range of motion and weight bearing.

Table No. 1 Range of motion assessment Pre and Post intervention

Motion	Pre- interventional ROM		Post- interventional ROM	
	Active ROM	Passive ROM	Active ROM	Passive ROM
hip flexion	25°	30°	110°	130°
hip extension	50°	55°	100	115°
hip abduction	20°	20°	45°	45°
hip adduction	25°	25°	45°	45°
hip internal rotation	30°	30°	45°	45°
hip external rotation	25°	25°	40°	45°

Table 2. Manual muscle testing (MMT) post intervention

motions	Left leg	Right leg
Hip flexion	4/5	3/5
Hip extension	4/5	3/5
Hip abduction	4/5	3/5
Hip adduction	4/5	3/5
Hip internal rotation	2/5	1/5
Hip external rotation	2/5	1/5
Knee flexion	4/5	3/5
Knee extension	4/5	3/5
Ankle	4/5	3/5

Table 3. Physiotherapy rehabilitation post – intervention

Week wise	Rehabilitation
0-7 days	Cryotherapy (cold pack for Inflammation for 10 minute) Assisted hip flexion for right side (10 rep, twice a day) Mobilization grade – I, II
1-2 week	Squats with the help of fixture Lower limb strengthening, Hip flexion lying supine with hip and knee flexed at 90 degrees.
2-4 week	Strengthening exercises (10 rep, twice a day) Mobilization – I, II, weight bearing exercises.
4-8 week	Adduction and Abduction circular movement of affected hip while standing with help of fixture (10 rep, twice a day) Walking with crutches of cyclic training.

DISCUSSION

Avascular necrosis of femoral head remains a significant source of patient's morbidity which causes pain and if untreated may even lead to hip dysfunction. The present case report demonstrated the feasibility and safety of an intensive multiplex physical therapy management programs with patients in Avascular necrosis. In this case surgical procedure core decompression with PRP infiltration was performed. Core decompression is a surgical procedure in which there is surgical drilling into the area of necrosed bone where blood supply is badly compromised. This surgical procedure reduces pressure, helps to enhance blood flow and stops bone destruction [1]. Above interventions cannot reverse Avascular necrosis, but they can reduce progression of disease, post-operative pain. Immobilization traction of hip joint and rehabilitation training program are effective physiotherapy management [2]. It has been suggested that in systemic lupus erythematosus of the femoral head may develop which results in diversion of stem cells. It has been noticed that pro-inflammatory and the pro-coagulant properties of the vascular endothelium are induced

by antiphospholipid antibodies can be brought in control by treatment with statins. The aim of proponents of core decompression is to reduce intramedullary pressure and hence helps to arrest process of avascular necrosis [3]. Jawade.S stated that strengthening exercise helps to strengthen lower limb muscles and which helps patient to gain functional independence [4].

The pathophysiology reflects impairment of vascularisation of blood vessels which supplies to anterior and superior part of femoral head. This area of necrosis is the source of loss of joint congruence which leads to premature wear of hip [5]. Core decompression with PRP infiltration is acceptable method to treat Avascular necrosis. In this case patient's major complaints were pain, stiffness, decrease in range of motion, ineffective weight bearing. Certain different treatment protocols like cryotherapy which helps in pain reduction [6], strengthening exercises helps to strengthen muscles, weight bearing exercises were used to regain mobility and solve complaints of the patient. Squats helps in relieving muscle tightness caused due to prolonged immobilization [7]. Strength training exercises given to the patient to improve the muscle strength in pain free manner [8]. Strengthening exercises are more efficient when given with 1 repetition maximum [9][10].

CONCLUSION

It is concluded that Modified physiotherapy rehabilitation protocol had significantly reduce pain, increased range of motion, stiffness, increased weight bearing, increased functional independence which helps to restore full range of motion which helps in early rehabilitation.

Figure 1: ROM assessment



Figure 2: Manual exercises



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