Case Report

Ortho-biological management of osteonecrosis in sickle cell disease using core decompression with bone marrow aspirate: A case report

Santoshkumar Hakkalamani[1]*, Abhijith Bapuram[2], Mohan Kumar Jagadeesan[3], Vijay A Kulkarni[4], Gautham Mariswamy[5]

[1]Senior Consultant - Orthopaedics, Chief of Joint Replacements, Robotic Surgery & Sports Injuries, KIMS Hospital Electronic city, Bangalore
[2]Consultant, Department of Orthopaedics, KIMS Hospital Electronic city, Bangalore
[3]Senior Consultant - Orthopaedics, Chief of Arthroscopy Division, Sports Injury Specialist, Knee & Shoulder Surgeon, KIMS Hospital Electronic city, Bangalore
[4]Consultant – Orthopaedics & Robotic Joint Replacement, KIMS Hospital Electronic city, Bangalore
[5]Post Graduate student, Department of Orthopaedics, KIMS Hospital, Hubballi, Karnataka
*Correspondence

Citation: Santoshkumar Hakkalamani, Abhijith Bapuram, Mohan Kumar Jagadeesan, Vijay A Kulkarni, Gautham Mariswamy. Ortho-biological management of osteonecrosis in sickle cell disease using core decompression with bone marrow aspirate: A case report. Kauverian Med J. 2026;3(8):43—46.

Academic Editor: Dr. Venkita S. Suresh

ISSN: 2584-1572 (Online)

Abstract

Background: Avascular necrosis is a debilitating manifestation of Sickle Cell Disease caused due to structural abnormality of the red blood cells and the precarious blood supply of the femoral head. Prompt identification of the condition in susceptible individuals is of utmost importance. Here,we present a case of sickle cell disease with bilateral avascular necrosis in Ficat-Arlet stages IIa(left hip) which was managed by core decompression augmented with bone marrow aspirate injection.

Keywords: Avascular necrosis; Sickle Cell Disease; Ficat-Arlet; Core Decompression; Bone marrow aspirate

1. Introduction

Avascular necrosis (AVN) or osteonecrosis is an orthopaedic manifestation of a wider systemic disorder caused due to interruption of blood supply causing cellular death of bone. Systemic Lupus Erythematosus (SLE) is an autoimmune disorder presenting with myriad of clinical manifestations such a mucocutaneous presentations to life threatening organ involvement.[1] Avascular necrosis is a common complication of SLE, occurring in 10–30% of patients depending on the symptoms, and is a major cause of morbidity in lupus [2].It is then further accelerated by using of steroids in these conditions. Here we present a case of SLE who presented with AVN and was managed by core decompression using bone marrow aspirate.

2. Case Presentation

A 33-year-old female presented to the OPD with chief complaints of bilateral hip pain since 3 months associated inability to sit cross legged and squat which was affecting her

activities of daily living. Patients were known cases of SLE who had was on chronic steroid therapy since 1 year.

On examination of the hip, anterior joint tenderness was present over both hips with painfully restricted rotations (internal rotation-10-degree passive external rotation 20-degree passive over left hip internal rotation-20-degree External rotation-30 degrees over right hip). Axis deviation of the left hip was present. Plain radiographs of pelvis with both hips were obtained revealing Ficat-Arlet Grade 2a AVN changes over left and right hips.

All preoperative blood investigations were obtained, and patients were taken for core decompression of bilateral hips with bone marrow aspirate injection. Intra-operatively, Fluoroscopic images were taken and subchondral cysts were identified. Patients were placed in supine positions. Both limbs were prepared and draped in sterile fashion. Bone marrow of about 10ml was aspirated by the iliac crest. Using a stab incision, 3mm guide wire was placed 2cm below the base of the greater trochanter through the neck of femur up to the subchondral bone. Without removing the guide wire, a 4mm drill bit was used and drilled up to the subchondral bone. Next, an Arthrex flip cutter was taken, placed up to the tip of the guide wire and up to 10mm of cut was taken over the subchondral bone. The same was repeated over the subchondral cysts localized by fluoroscopic imaging and multiple drill holes were made. The guide wire was removed, and Jamshidi needle was placed through the drilled tunnel and trocar was removed. 5ML of BMAC was injected through the needle into the femoral head. The stab incision was closed using 2-0 monocryl. The same procedure was repeated over the right hip.

Post operatively, Immediate full weight bearing was performed over bilateral hips and mobilized using walker. Ankle pump exercises, knee and hip ROM exercises were initiated. On post op day 2, patient noticed significant decrease in hip pain with improved range of motion and was mobilizing well using walker.

Fig (1): Core Decompression using Arthrex Flip cutter

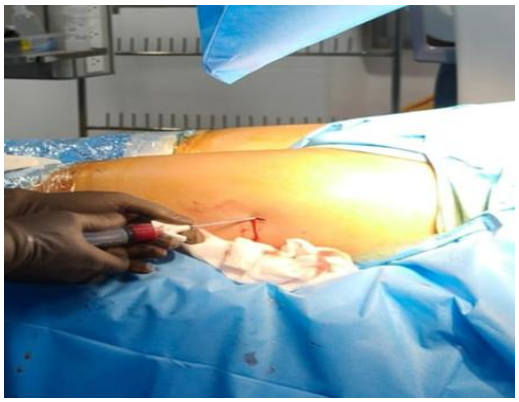

Fig (2): Instillation of BMAC

Fig (3): Post-Operative Radiograph

3. Discussion

AVN is caused by loss of blood supply to a part of bone leading to bone necrosis and collapse [3]. Diverse etiologies have been described for AVN. Chronic inflammatory conditions such as SLE are considered as a well-known cause [4]. In a patient of SLE, several factors can lead to bone ischemia and AVN include Raynaud's phenomenon, vasculitis, fat emboli, corticosteroids, and the antiphospholipid syndrome [5]. Core decompression has become a common surgical modality of treatment for avascular necrosis of the femoral head in pre-collapse stage. Various adjuncts have been used such as Platelet rich plasma, Bone marrow aspirate, bone grafting, and muscle pedicle grafting. Early core decompression halts the progression of the disease and hence delays the need for total hip arthroplasty [6].

Theories related to its pathogenesis highlight the fact that osteogenesis in the femoral head decreases due to diminished numbers of mesenchymal mononuclear cells; thereby instillation of BMAC could help in trabecular regeneration.[7]. The effect of instillation of BMAC is increased presence of osteoprogenitor cells in the necrotic area to aid in tissue regeneration.[8]. Therefore, BMAC has been used as an adjuvant and reported more beneficial results in early stages of AVN. In our case, at 1 week follow-up patient was able to do all of her activities of daily living with almost no pain. We therefore recommend the usage of BMAC as an adjunct along with core decompression in patients presenting with avascular necrosis of femoral head in Systemic Lupus Erythematosus

References

[1] Mohamed DF, Aziz AB, Hassan SA, Shedid NH, El-Owaidy RH, Teama MA. Juvenile lupus: Different clinical and serological presentations compared to adult lupus in Egypt. Egypt Rheumatol 2018;40(1):55–8.

[2] Joo YB, Sung YK, Shim JS, Kim JH, Lee EK, Lee HS, et al. Prevalence, incidence, and associated factors of avascular necrosis in Korean patients with systemic lupus erythematosus: a nationwide epidemiologic study. Rheumatol Int 2015;35(5):879–86

[3] Assouline-Dayan Y, Chang C, Greenspan A, Shoenfeld Y, Gershwin ME. Pathogenesis and natural history of osteonecrosis. Semin Arthritis Rheum. 2002;32:94–124. doi: 10.1053/sarh.2002.33724b.

[4] Jacobs B. Epidemiology of traumatic and nontraumatic osteonecrosis. Clin Orthop Relat Res. 1978;130:51

[5] Gontero RP, Bedoya ME, Benavente E, Roverano SG, Paira SO. Osteonecrosis in systemic lupus erythematosus. Reumatol Clin. 2015;11:151–155. doi: 10.1016/j.reuma.2014.05.005.

[6] Mont MA, Glueck CJ, Pacheco IH, Wang P, Hungerford DS, Petri M. Risk factors for osteonecrosis in systemic lupus erythematosus. J Rheumatol. 1997;24:654–662.

[7] Hernigou P., Poignard A., Manicom O., Mathieu G., Rouard H. The use of percutaneous autologous bone marrow transplantation in nonunion and avascular necrosis of bone. J Bone Joint Surg. 2005;87(7):896–902. doi: 10.1302/0301-620X.87B7.16289.

[8] Baksh D., Song L., Tuan R.S. Adult mesenchymal stem cells: characterization, differentiation, and application in cell and gene therapy. J Cell Mol Med. 2004;8(3):301–316. doi: 10.1111/j.1582-4934.2004.tb00320.x.