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Case Report

Ortho-biological management of osteonecrosis in sickle cell disease using core decompression with platelet-rich plasma: a case report

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ABSTRACT

Avascular necrosis (AVN) is a debilitating manifestation of sickle cell disease (SCD) 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 SCD with bilateral AVN in Ficat-Arlet stages IIb (left hip) and I (right hip) which was managed by core decompression augmented with platelet rich plasma.

Keywords: Avascular necrosis, Sickle cell disease, Ficat-Aarlet, Core decompression, Platelet rich plasma

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.

SCD is described as a group of inherited haemoglobinopathies where structural abnormality of the red blood cell causes a plethora of systemic manifestation in susceptible individuals.

AVN is a serious complication of SCD which contributes as the main reason of joint pain. Studies have shown that AVN occurs in 10% to as many as 30% of people with SCD.[1]

Prompt identification of the condition and treatment of AVN is essential in improving the standard of life in such patients.

Here we present a case of SCD who presented with AVN and was managed by core decompression using platelet rich plasma.

CASE REPORT

A 24 year old boy presented to the OPD with chief complaints of priapism since 2 months associated with painful limp over the left hip since 8 months.

Patient was a known case of SCD who had multiple episodes of vaso-occlusive crisis commonly causing severe pain over both hands and multiple joint debilitating him from performing basic activities of daily living.

On examination of the hip, anterior joint tenderness was present over bilateral hip 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 was obtained revealing Ficat-Arlet grade 2b AVN changes over left hip with grade 1 changes over right hip.

MRI of the same was obtained confirming the diagnosis.

All pre operative blood investigations were obtained and patient was taken for core decompression of bilateral hip with platelet rich plasma (PRP) injection.

Hb electrophoresis was done revealing a high percentage of HbS confirming SCD.

Intra-operatively, Fluoroscopic images were taken and subchondral cysts were identified. Patient was placed in supine position. Both limbs were prepared and draped in sterile fashion. 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 localised by fluoroscopic imaging and multiple drill holes were made.

Venous blood was drawn from the patient intra-operatively and PRP was prepared using the centrifuge and about 6 ml of PRP was obtained. The guide wire was removed and Jamshidi needle was placed through the drilled tunnel and trocar was removed. The 3 ML of PRP 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 hip and mobilised 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 mobilising well using walker.

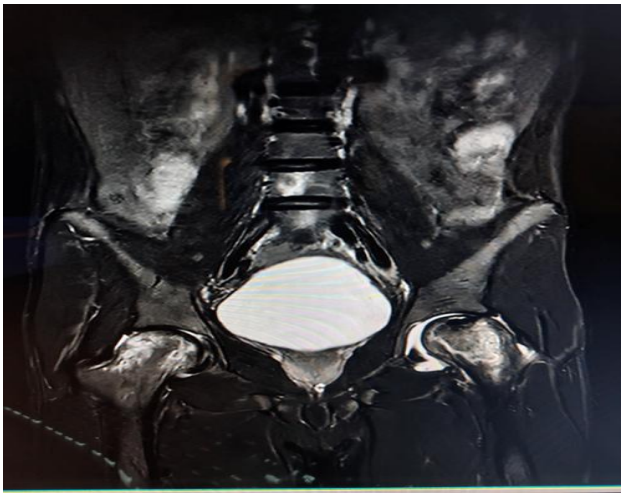

Figure 1: Pre-operative MRI showing bilateral AVN of femoral heads.

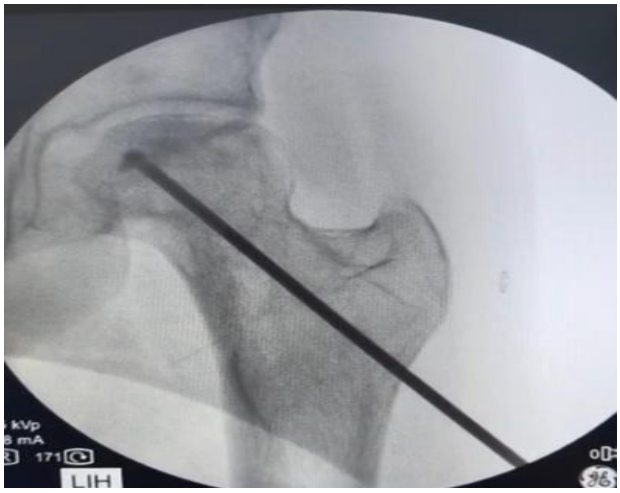

Figure 2: Core decompression using Arthrex flip cutter.

Figure 3: Instillation of PRP.

Figure 4: Post-operative radiograph.

DISCUSSION

SCD is caused by an autosomal recessive mutation occurring on the hemoglobin (Hb) subunit β gene of chromosome 11, resulting in a glutamate-to-valine substitution in the Hbβ chain. The resulting sickle Hb (HbS) molecule tends to polymerise under hypoxic conditions, which alters the structural integrity of the erythrocyte membrane. This polymerization drives the pathophysiology of SCD by restricting flow through the microvasculature, which eventually predisposes the individuals to vaso-occlusive crises like AVN-FH.[2]

It also causes other systemic manifestations such as osteomyelitis, recurrent pneumonia, pulmonary thromboembolism which was not seen in this case.

Core decompression has become a common surgical modality of treatment for AVN of the femoral head in pre-collapse stage. Various adjuncts have been used such as Platelet rich plasma, Bone marrow aspirate, bone grafting, muscle pedicle grafting. Early core decompression halts the progression of the disease and hence delaying the need for total hip arthroplasty.[3]

The use of PRP is considered safe and has shown positive effects on the stimulation of tissue healing with a rationale that additional platelets will exponentially increase the number of multiple growth factors.[4]

When PRP is used in conjunction to autologous bone graft, it is postulated to synergistically augment the growth and formation of bone.[5]

PRP also produces significant relief from pain and improvement in functional outcome after the use of PRP after CD in early stages (Ficat stage I and II) of AVN of femoral head at midterm follow-up of 4.5-6 years. And significant reduction in progression of disease in terms of area of necrosis and collapse.[6] In our case the patient had significant reduction in pain and also improvement in his range of motion.

CONCLUSION

To our knowledge there has been no literature where PRP was used along with core decompression in a patient with SCD. At 1 week follow-up patient was able to do all of his activities of daily living with almost no pain. We therefore recommend the usage of PRP as an adjunct along with core decompression in patients presenting with AVN of femoral head in SCD.

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REFERENCES

1. Adesina O, Brunson A, Keegan THM, Wun T. Osteonecrosis of the femoral head in sickle cell disease: prevalence, comorbidities, and surgical outcomes in California. Blood Adv. 2017;1(16):1287-95.
2. Sundd P, Gladwin MT, Novelli EM. Pathophysiology of sickle cell disease. Annu Rev Pathol. 2019;14:263-92.
3. Mukisi-Mukaza M, Manicom O, Alexis C, Bashoun K, Donkerwolcke M, Burny F. Treatment of sickle cell disease's hip necrosis by core decompression: A prospective case-control study. Orthop Traumatol Surg Res. 2009;95(7):498-504.
4. Sierra R, Houdek M, Wyles C, Martin J. Stem cell treatment for avascular necrosis of the femoral head: current perspec tives. Stem Cells Cloning. 2014;7:65.
5. Martin JR, Houdek MT, Sierra RJ. Use of concentrated bone marrow aspirate and platelet rich plasma during minimally invasive decompression of the femoral head in the treatment of osteonecrosis. Croat Med J. 2013;54(3):219-24.
6. Aggarwal AK, Poornalingam K, Jain A, Prakash M. Com bining platelet-rich plasma instillation with core decompres sion improves functional outcome and delays progression in early-stage avascular necrosis of femoral head: A 4.5- to 6-year prospective randomized comparative study. J Arth Roplasty. 2021;36(1):54-61.

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