



FUNCTIONAL OUTCOME OF OSTEOCHONDRAL REPAIR OF KNEE JOINT USING MOSAICPLASTY IN VERY LARGE OSTEOCHONDRAL DEFECTS OF FEMORAL CONDYLE

Orthopaedics

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ABSTRACT

Large osteochondral defects of the weight bearing surfaces of the knee joint is challenging for orthopaedic surgeons. It is very difficult to reconstruct cartilage defects along with subchondral bone reconstruction in such large defects. A 29- year male patient presented with complain of knee pain, decreased knee range of motion, difficulty walking and climb staircases. His past medical history was suggestive of 6month old injury over knee for which he was treated conservatively. After that injury, gradually he developed progressive symptoms. MRI was done after 6 months of trauma, suggestive of large osteochondral defect (6-6.5cm²). For larger lesions (>4 cm²), ACI (autologous chondrocyte transplantation) or OCA(allograft osteochondral transplantation) have been a well-defined treatment option, with OCA being an option for large osteochondritis dissecans lesions and posttraumatic defects. However, patient was treated with mosaicplasty procedure. At 6 months follow-up, the patient was symptom free with almost complete functional recovery. This case report suggests mosaicplasty as a good salvage procedure for large osteochondral defects with compromised subchondral bone integrity.

KEYWORDS

INTRODUCTION

Chondral and osteochondral lesions in the knee are still one of the significant challenges for knee surgeons, especially when they occur in young individuals and athletes. Preservation of the anatomical structure and physiological properties of the cartilage is a basic requisite for good functioning of the joint¹. The capacity for cartilage regeneration is limited because chondrocytes do not have the capability to differentiate and multiply¹. These lesions can cause pain, oedema and joint degeneration. If they are not properly treated, they can cause osteoarthritis, particularly if they are located in load-bearing areas¹.

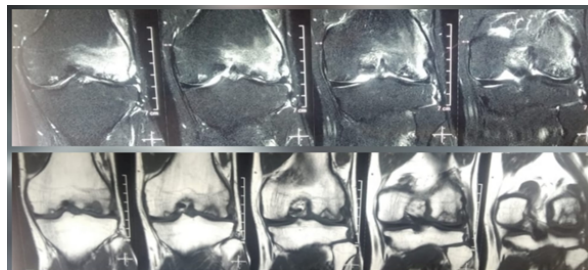
A wide variety of options are available now ranging from reparative procedure to reconstructive procedure. Reparative procedures for knee cartilage injury include microfracture, abrasion arthroplasty, drilling, and 'biological procedures' involving cell culture. Reconstructive procedures available for treating knee cartilage injuries are mosaicplasty (osteochondral autograft transplantation) and allograft transplantation². However, there are very few reports regarding use of such procedure as salvage, in case of very large osteochondral defect. This case report describes the functional outcome of chondral repair of the knee joint using mosaicplasty in the treatment of very large osteochondral defects of femoral condyle in young patient.

CASE REPORT

A 29- year male patient employed as mechanical engineer in private company without any co-morbid condition came to out- patient department of tertiary care centre with chief complaint of constant knee pain, inability to fully flex the knee and difficulty in walking and climbing staircase. His past medical history is suggestive of trauma 6 months back for which he was treated conservatively with long knee brace. After that he gradually developed progressive symptoms. On clinical examination, patient had antalgic gait and the knee range of motion was restricted and painful. Mild effusion was detected on knee joint. Mc-murray and apley-test were positive and Lachman test was negative. Xray showed no evident abnormality in the knee joint or any degenerative changes. MRI was done which was suggestive of osteochondral injury in the medial and lateral femoral condyle of about 5-7 cm², more extensive in the lateral condyle with bone oedema in lateral condyle and surface irregularity. As per MRI findings, lateral parapatellar approach with autologous osteochondral transplant was planned using commercially available Autologous Osteochondral

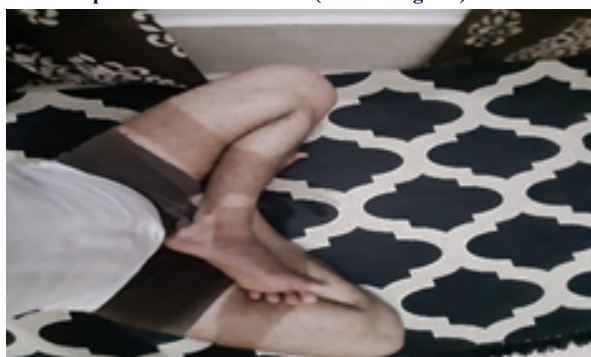
Harvesting instrumentation system. After opening the joint, about 6 to 6.5 cm² lesion found, which was removed. We took about 7 plugs of osteochondral autograft each of 8mm diameter and 25 mm depth from non-weight bearing portion of lateral and medial femoral condyle and harvested over the defects. On post-operative day 1, patient knee was mobilized and non-weight bearing with crutches was permitted. In follow up after 3 months, patient was permitted partial weight bearing. Patient was clinically evaluated with Tegnes-Lysholm Knee scoring system before treatment and during each follow-up. The Lysholm score was 37 points pre operatively and increased to 93 at 6-month follow-up visit. At 6 months, patient was able to walk, climb stairs, even run without any assistance and had full Range of movement of the operated knee joint. At 6 months follow-up visit, patient's mechanical symptoms of involved knee have resolved completely and no longer interferes with functional, professional and social life and patient is able to perform light sporting activity without any pain.

PRE OPERATIVE IMAGES:



INTRA OPERATIVE IMAGES:



6 Months follow-up :**A. Post-operative full knee flexion (0 to 140 degrees)****B. Post-operative ability of the patient to sit cross legged****B. Post-operative active full knee extension****DISCUSSION**

For larger lesions ($>4 \text{ cm}^2$), ACI (autologous chondrocyte transplantation) or OCA (allograft osteochondral transplantation) have shown the best results, with OCA being an option for large osteochondritis dissecans lesions and posttraumatic defects⁴. Both the procedures have stood the test of time in providing excellent outcome in such cases. But this procedure is fraught with many problems such as ACI is very expensive, two staged procedure and not easily available. Although, in previous studies promising results has been reported, poor osteochondrogenesis has been shown in recent studies. Second option is of osteochondral allograft (OCA) transplantation as salvage procedure. But this procedure has disadvantages such as high cost, risk of viral disease transmission, difficulty in matching fresh donors, allograft failure and high re-operation rate. As a third option, autologous mosaicplasty with osteochondral transplant can be used as we did in our case. Many authors emphasize the advantages of mosaicplasty in the simplicity of a one-stage surgical procedure, the transfer of living autologous cartilage, the low cost and morbidity. But this technique is limited with availability of donor plugs from non-weight bearing regions, particularly when defects are large ($>4 \text{ cm}^2$). In our case, the defect was $6-6.5 \text{ cm}^2$. In such large defects, it is not easy to provide the perfect convexity of femoral condyle. In our case, Patient was able to walk, run, sit cross legged, squat and carry out all the activities of their daily living without any pain or discomfort at 6 months post -surgery, similar to the results found in series where patients were treated with ACI.

CONCLUSION

The single-staged, cheaper and easily available option of Mosaicplasty may prove to be a boon for large cartilage defects of the femoral condyles in young patients and have excellent functional outcomes, however a meticulous technique should be followed to reconstruct the articular surface of femoral condyle. Preparation of the recipient site should leave the edges of the defect clean and Maximum coverage and stability (press-fit) should be obtained. Thus, mosaicplasty can effectively reconstruct both bone and cartilage defect in case of large defects involving more than 4 cm^2 in knee joint as a salvage procedure.

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