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High Tibial osteotomy (HTO) combined with osteochondral autograft transplantation (OATS) in a patient with osteochondral defects in medial femoral condyle - A rare case report.

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Abstract

OCD lesions are characterised by an aseptic necrosis in the subchondral bone region and have an unknown aetiology It appears that mechanical factors are crucial. Children and adolescents with open growth plates (juvenile OCD) and adults with closed growth plates (adult OCD) both exhibit OCD Clinical symptoms are unspecific. When surgery is required, the procedure is determined by the cartilage's stage and condition. Retrograde operations are beneficial when the cartilage is intact. There are numerous methods that can be applied when the cartilage is injured. While methods like drilling and micro fracturing result in reparative cartilage, other methods, such as chondrocyte transplantation or more osteochondral grafts, rebuild the lesion. OATS is most effective in lesions smaller than 2.5 cm^2 in high-demand patients. This technique transfers both articular cartilage and subchondral bone from a non-weight-bearing area of the knee to the site of the defect. Medial opening wedge high tibial osteotomy (MOWHTO) is a widely used surgical treatment option for medial compartmental osteoarthritis with varus deformity in relatively young and active patients.

Keyword: Osteochondritis Dissecans (OCD), Medial Opening Wedge High Tibial Osteotomy (MOWHTO), Osteochondral Autograft Transfer System (OATS)

Introduction

König [1] first used the term "osteochondritis dissecans" in 1888 and proposed three possible causes for the development of loose bodies:

1. Direct trauma with acute osteochondral fracture
2. Minimal trauma that develops into osteonecrosis and consecutive fragmentation
3. No evidence of trauma with a spontaneous development, which König called “osteochondritis dissecans” (OCD).[1]

The exact prevalence of OCD is unknown but rates of between 15 and 29 per 100,000 have been reported.[2,3] Kessler et al.[4] have shown that the incidence of OCD of the knee in patients aged 6 to 19 years was 9.5 per 100,000 and 15.4 and 3.3 per 100,000 for male and female patients, respectively. Patients aged 12 to 19 years represented the majority of OCD, with an incidence of 11.2 per 100,000 versus 6.8 per 100,000 for those aged 6 to 11 years.

Traumatic, ischemic, genetic, and idiopathic conditions are four distinct groups into which the aetiology of OCD may be divided [5,6].

Case Report

An 18-year-old boy presented with left knee pain and locking with decreased ROM [flexion of 100 degree] in the last 20 days with a past history of blunt trauma to the same limb 2 years back. Pt has been advised to get an X ray in 2 orthogonal planes with the knee flexed 35°, and a 45°patella sunrise view. followed by MRI which shows focal osteochondral defect along articular surface of medial femoral condyle measuring 10.0x8.0x3.0 mm with subchondral lucent area and patchy area of grade 2 chondromalacia patellae over medial and lateral facets of patella and patchy areas of early cartilage degeneration of both tibial and femoral condyles.

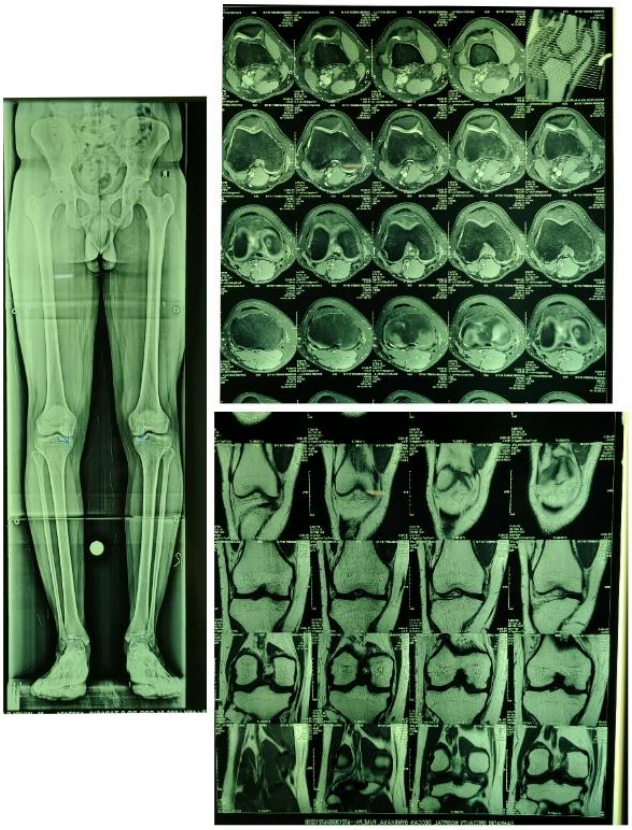

Figure 1: MRI Left Knee with Scanogram

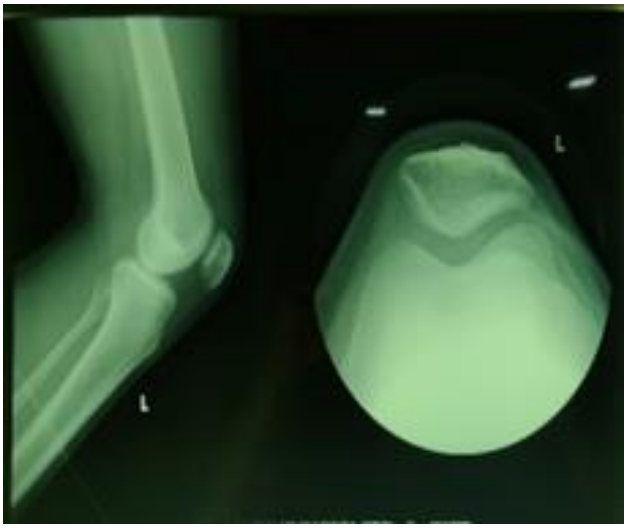

Figure 2: X Ray left knee Lateral View and Skyline View

Discussion

Through medial parapatellar approach arthrotomy done Osteochondral fragments identified and removed, defect cleared and measured 10.0x8.0x3.0 mm. subsequently, 2 cylindrical osteochondral autograft plugs harvested of

corresponding size used from lateral femoral condyle from non-articular site. Defect completely obliterated and well fixed. ROM checked. Preoperative evaluation was done for correction of mild varus malalignment of left knee by calculating the correction angle by using Miniaci's method on a weight-bearing Scanogram with Fujisawa point as a reference. It was calculated to use a wedge of 8 mm preoperatively. Incision taken 5cm distal to MJL, pes anserinus was incised, superficial MCL released. HTO was performed using an open wedge osteotomy. During the opening of osteotomy gap, alignment was checked and corrected after which a Tomo fix plate with 8 mm wedge along with golden screw of 38 mm used. Alignment correction achieved. Patient advised non-weight bearing for four weeks post-operatively, and a knee brace was used for support and knee protection. Partial weight bearing was permitted from 6 weeks post operatively and full weight bearing was permitted 8 weeks postoperatively.

Jacobi et al.[7] analyzed the bilateral full-leg radiographs of their patients and found that OCD lesions and deviation of the mechanical axis in the varus or valgus were correlated significantly with medial (varus) and lateral lesions (valgus), respectively. Various other options for treating OCD lesions according to the size and cartilage health which includes Massive autologous osteochondral transplants, Autologous bone-cartilage-paste grafts, Autologous chondrocyte transplantation (second generation) in combination with a bone graft, Biomimetic osteochondral scaffolds, Bone marrow–derived cell transplantation.

Therefore, it should be thought of as an an additional treatment goal to correct the malalignment, more so for varus than for valgus malalignment. Slawski [8] reported on 6 Adult OCD patients suffering from a varus malalignment in 7 of their knees with a high-tibial osteotomy and achieved a distinct improvement of the postoperative Lysholm score.

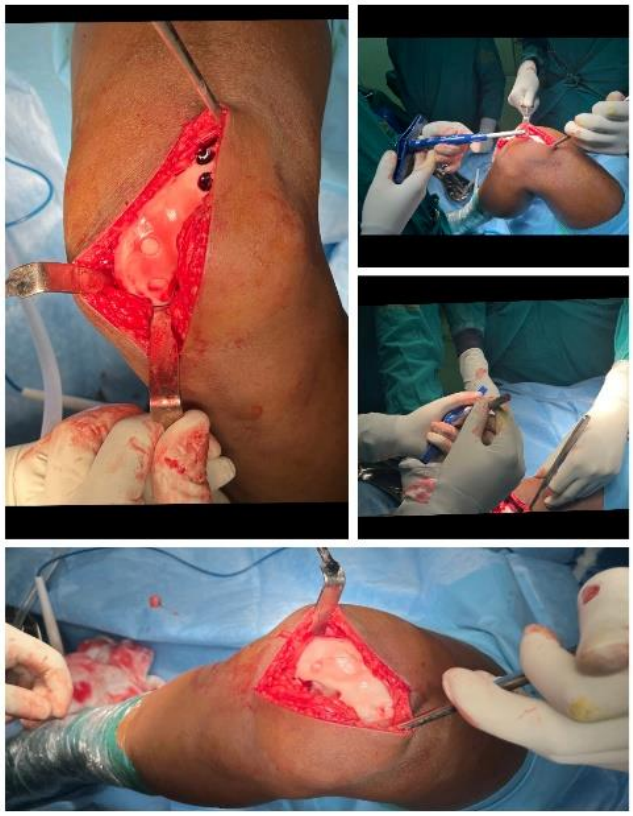

Figure 3: Intra Operative Images

Figure 4: Post Operative Xray

Conclusion

HTO is an effective technique in correcting malalignment and managing early osteoarthritis, especially when cartilage restoration procedures are used as an adjunct. For successful MOWHTO outcomes, it is important to

achieve an optimal alignment through accurate preoperative surgical planning. In addition, it is essential to recognize and pay attention to the correction amount, medial soft tissue laxity, risk factors for lateral hinge fracture, and other factors that can lead to correction errors. A variety of operative techniques exist to address OCD lesions, and treatment selection depends upon physical status, fragment stability, and lesional size. Superior outcomes are observed in skeletally immature patients, males, smaller lesions, and a shorter duration of preoperative symptoms.

Figure 5: Pre and Post Op Clinical Image

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